

https://dspace.org/

Investigating the Impact of Hedge Funds on an Optimally Balanced Portfolio

Kungwane, Keabetswe

2025
University of the Witwatersrand, Johannesburg
https://hdl.handle.net/10539/47863

Kungwane, Keabetswe . (2025). Investigating the Impact of Hedge Funds on an Optimally Balanced Portfolio [Master`s dissertation, University of the Witwatersrand, Johannesburg]. WIReDSpace. https://hdl.handle.net/10539/47863

Downloaded from a DSpace repository. https://dspace.org/

INVESTIGATING THE IMPACT OF HEDGE FUNDS ON AN OPTIMALLY BALANCED PORTFOLIO



WITS BUSINESS SCHOOL

UNIVERSITY OF THE WITWATERSRAND

JOHANNESBURG, SOUTH AFRICA

Author: Keabetswe Kungwane

Supervisor: Dr Blessing Mudavanhu

Date: February 2025

DECLARATION

I, Keabetswe Kungwane, declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted for the Master of Management in Finance and Investment degree at the University of Witwatersrand, Johannesburg, South Africa. This thesis has not, either in whole or in part, been submitted for a degree or diploma to any other university.

Signature of candidate: **Date:**

_____

DEDICATION AND ACKNOWLEDGMENTS

I want to thank my supervisor, Dr. Blessing Mudavhanhu, for his guidance and insightful feedback throughout the process of writing this thesis.

The thesis is dedicated to my paternal grandparents - Bethuel and Malefyane Kungwane; maternal grandparents - Conrad and Herminah Mogapi; my parents, Philemon and Vivian Kungwane, and beloved siblings for their love, support, and inspiration throughout my academic journey.

ABSTRACT

This study explores the incorporation of hedge funds into balanced investment portfolios, emphasising their ability to enhance returns and mitigate risk through diversification. Analysing monthly return data between January 2007 to December 2023 and sub-period analysis from January 2010 to December 2019, the research evaluates the performance of several hedge fund strategies - Fixed Income, Equity Long/Short, Market Neutral and Multi-Strategy against a synthetic traditional “balanced fund” and the industry balanced fund from Allan Gray. By employing mean-variance optimization methods, the paper seeks to identify optimal asset allocation strategies that maximize returns while minimising risk exposure.

In line with regulation 28 of the Pension Funds Act, the results indicate that a 10% allocation to hedge funds in traditional diversified portfolios can substantially improve performance measures adjusted for risk, such as the Sharpe ratio and Jensen's alpha. This research adds to the current knowledge base by demonstrating practical evidence and confirmation of the effectiveness of hedge funds. It provides valuable insights for portfolio management and diversification within the South African financial context. Ultimately, the findings highlight the critical role of alternative asset classes in achieving superior investment performance and volatility reduction.

TABLE OF CONTENTS

Abstract……4

Table of contents……5

List of figures……7

List of tables……8

Chapter 1: Introduction

1.1 Balanced funds……9

1.2 Regulation 28……10

1.3 Hedge Funds……12

1.4 Statement of the problem and Research question……17

1.4.1 Statement of the problem……17

1.4.2 Research question……18

Chapter 2: Literature Review

2.1 Including Hedge funds in a balanced portfolio……18

2.2 Diversification……19

2.3 Optimal allocation to Hedge funds……23

Chapter 3: Data and Methodology

3.1 Data……28

3.2 Data sources……29

3.3 Methodology……29

3.4 Performance measures……30

3.4.1 Sharpe Ratio……30

3.4.2 CAPM……32

3.4.3 Jensen's Alpha……34

Chapter 4: Data analysis and results

4.1 Hedge fund indices performance relative to the JSE ALSI……35

4.2 Calculation of returns……36

4.3 Correlation……36

4.4 Optimal Asset Allocation……37

4.4.1 Synthetic balanced fund and hedge funds 2007 to 2023: No restriction……38

4.4.2 Synthetic balanced fund and hedge funds 2007 to 2023: 50% Allocation…….…….39
4.4.3 Allan Gray balanced fund and hedge fund strategies 2007 to 2023…….40
4.4.4 Allan Gray balanced fund and hedge Funds 2007 to 2023: No restriction……..41
4.4.5 Allan Gray balanced and hedge funds 2007 to 2023: 50% Allocation…….42
4.4.6 Synthetic balanced fund and hedge funds : 2010 to 2019 ……...43
4.4.7 Synthetic balanced fund and hedge Funds 2010 to 2019: No restriction…….44
4.4.8 Synthetic balanced fund and hedge Funds 2010 to 2019: 50% Allocation……..45
4.4.9 Allan Gray and hedge funds 2010 to 2019……...46
4.4.10 Allan Gray balanced fund and hedge Funds 2010 to 2019: No restriction…….46
4.4.11 Allan Gray balanced fund and hedge Funds 2010 to 2019: 50% Allocation……..47
4.5 Jensen's Alpha
4.5.1 Synthetic balanced fund and hedge fund strategy: 2007 to 2023…….…..…..48
4.5.2 Synthetic balanced fund and hedge fund strategy: 2010 to 2019…….……..…49
4.5.3 Allan Gray balanced fund and hedge fund strategy: 2007 to 2023…….……...…51
4.5.4 Allan Gray balanced fund and hedge fund strategy: 2010 to 2019…….……52
Chapter 5: Conclusion and Recommendations
5.1 Conclusion and remarks……..…….…..54
5.2 Recommendations…….…….54
References……..….55

LIST OF FIGURES

Figure 1: South African assets by strategy in 2023

Figure 2: The evolution of the South African hedge funds industry

Figure 3: Aspects in portfolio construction with hedge funds

Figure 4: Allan Gray balanced fund asset allocation

Figure 5: Indices performance: December 2009 to August 2024

LIST OF TABLES

Table 1: Correlation matrix

Table 2: Synthetic balanced fund and hedge fund strategies 2007 to 2023

Table 3: Synthetic balanced fund and hedge funds 2007 to 2023: No restriction

Table 4: Synthetic balanced and hedge funds 2007 to 2023: 50% Allocation

Table 5: Allan Gray balanced fund and hedge fund strategies 2007 to 2023

Table 6: Allan Gray and hedge funds 2007 to 2023: No restriction

Table 7: Allan Gray balanced and hedge funds 2007 to 2023: 50% Allocation

Table 8: Synthetic balanced fund and hedge funds: 2010 to 2019

Table 9: Synthetic balanced and hedge funds 2010 to 2019: No restriction

Table 10: Synthetic balanced and hedge funds 2010 to 2019: 50% Allocation

Table 11: Allan Gray and hedge funds 2010 to 2019

Table 12: Allan Gray and hedge funds 2010 to 2019: No restriction

Table 13: Allan Gray and hedge funds 2010 to 2019: 50% allocation

Table 14: Synthetic balanced fund and hedge fund strategy: 2007 to 2023

Table 15: Synthetic balanced fund and hedge fund strategy: 2010 to 2019

Table 16: Allan Gray balanced fund and hedge fund strategy: 2007 to 2023

Table 17: Allan Gray balanced fund and hedge fund strategy: 2010 to 2019

Chapter 1: Introduction

1.1 Balanced funds

A Balanced fund is a class of mutual funds that primarily use stocks and bonds as the underlying asset allocation. The name "Balanced Fund" is due to the nature of the asset allocation within the fund, which is a balanced portfolio of fixed income, equities and in some instances money market instruments. Individuals saving towards retirement and investors with a moderate risk profile who seek investments less volatile than pure equities but still delivering inflation-beating returns prefer a balanced portfolio (Asisa, 2023).

Balanced funds diversify investor portfolios through an asset allocation mix of equities and bonds; a higher weight is typically assigned to equities for capital growth. The goal of a balanced fund is to provide a less volatile return profile compared to an equity-only portfolio, this is achieved by including bonds that offer higher returns than cash-type investments and are less likely to have significant drawdowns compared to equities. During events where both stocks and bonds delivered negative returns (an event last seen in the 1960s), investors in balanced funds were still better off than those with 100% of their portfolios allocated to equities (Kephart, 2024).

Below are some of the characteristics of balanced funds in India: (Franklin Templeton, 2022)

a. Investments into a balanced fund offer investors an opportunity to diversify portfolios as these funds invest in numerous instruments across debt and equity asset classes.
b. By investing in debt and equity instruments, balanced funds ensure a composed ratio, minimising an investor's exposure to volatility.
c. Investments in a balanced fund permit the fund manager to adjust the fund’s portfolio according to market conditions.
d. Balanced funds have lower risk than equity-only mutual funds due to their exposure to more than one asset class.
e. These mutual funds are designed to automatically stabilise an investor's portfolio in volatile market conditions. The harmonisation process also allows fund managers to reduce equity exposure to maintain the fund’s performance and vice versa.

The first balanced fund in the United States of America is the Vanguard Wellington Fund (VWELX), the fund was introduced in 1929 and is still in existence to this day. The fund's

assets under management have grown significantly over time, from $100 000 to over $112 billion as of April 2023.

The fund is actively managed, with managers allocating 60% to 70% in stocks and the remainder to fixed income securities such as bonds.

It is quite evident that balanced funds are predominantly made up of stocks and bonds with a higher allocation favouring equities in order to achieve growth and beat inflation over time. This asset allocation mix is intended to diversify investors long term investment portfolio and reduce volatility.

In South Africa, balanced funds fall within the multi-asset high equity category of the Association of Savings and Investments (ASISA). In 1999, this category represented 6% of the overall mutual fund industry and grew to 40% in 2022. The balanced funds with the highest assets under management in 2024 are the Allan Gray Balanced fund and the Coronation Balanced Plus. The Allan Gray balanced fund is used in this research to represent a traditional industry fund in the South African context.

1.2 Regulation 28

Most balanced funds are managed in compliance with Regulation 28 of the Pension Funds Act. It applies to retirement funds such as Provident and Pensions Funds, Preservation Funds and Retirement Annuities. Regulation 28 proposes investment limits on retirement funds; the limitations are meant to safeguard pension funds from taking excessive risks in attempts to increase returns (National Treasury, 2011).

The restrictions propose the maximum proportion that pension fund managers may allocate to a particular asset class, including by issuer within that asset class. The main objective is to promote diversification and protect investors from poor asset allocation and investment decisions.

Specific maximums are prescribed by Regulation 28, and the value of assets under management is restricted per investment class. The maximums are as follows (National Treasury, 2011):

i) A maximum of 10% of assets under management may be invested in hedge funds.

ii) A maximum of 15% of assets under management may be invested in private equity funds.
iii) A maximum of 10% may be invested in commodities.
iv) A maximum of 75% may be invested in equities.
v) A maximum of 45% of offshore assets.

The above limits ensure diversification and a reduction in volatility within funds intended for retirement savings. In addition, there is a tax benefit linked to contributions to retirement funds.

The Income Tax Act (No. 58 of 1962) offers tax advantages by allowing taxpayers to subtract contributions made to pension funds, provident funds, and retirement annuity funds, within specified limits, from their income when calculating the taxable portion of their earnings, leading to a reduced tax liability.

Schedule two of the Income Tax Act governs the taxation of pension fund withdrawals, which lowers the overall tax rate. The benefit mentioned above is intended to encourage investors to save for retirement; however, this is only applicable to investments in mutual funds that adhere to Regulation 28 limits.

Retirement funds in South Africa are regulated under the Pension Funds Act, Pension fund managers were permitted to invest in hedge funds through Regulation 28 before they were formerly regulated as collective investment schemes under the Collective Investment Schemes Act (CISCA) 45 of 2002 (Simon Peile, 2016).

Regulation 28 was amended to permit a 10% asset allocation to hedge funds in 2022. This is linked to the analysis conducted in this paper to investigate the optimal percentage allocation to hedge funds within a portfolio.

1.2 Hedge Funds

When individuals or organisations decide to hedge, they do so in order to insure themselves against a negative impact on their finances. This does not necessarily prevent the event from happening; however, should it happen, and they have hedged correctly, then the impact of the adverse event is reduced. Therefore, to hedge against investment risk, asset managers strategically utilise financial instruments and market strategies to counterbalance the risk of any negative price movements. To simplify this, investors hedge an investment by trading another (Atleha-edu, 2022).

Alfred Jones, deemed the father of hedge funds, shaped the then-unique practice in 1949 when he put together two investment strategies by shorting and using leverage in a portfolio. He shorted stocks that he held a long position in while concurrently using leverage to amplify gains, the theory behind this strategy was based on the belief that he would be protected from detrimental moves in the market while reaping the rewards of skilful stock picking (Opperman, 2017).

There is no universally accepted definition for hedge funds, however, they can be described as portfolios that are actively managed and produce returns by making use of a variety of strategies which include derivatives, long and short strategies and leverage, to enhance returns and manage downside risk (Nhambiri & Ngweza, 2021).

A survey conducted by Novare in 2023 defines a hedge fund as financial partnerships that pool funds together and use these funds to employ various strategies to actively earn optimal positive returns for their investors at low risk. The strategies used by hedge fund managers include the use of derivatives, short selling and leverage, with the main objective of achieving positive investment returns in both favourable and unfavourable financial markets.

Short selling enables fund managers to create a fundamentally unique type of portfolio dissimilar to a traditional equity portfolio. Hedge fund managers can influence and manage the overall net exposure of the portfolio, by way of an example, a 100% net exposure aligns with a traditional equity portfolio and market neutral or 0% net exposure implies that the value of short positions (borrowed shares sold) cancels out the value of long positions (shares owned).

This technique results in a limited participation in both market upswings and drawdowns, resulting in a smoother return profile (Hedge News Africa, 2024).

Hedge funds employ both long and short positions, trade options or bonds, buy undervalued securities, and use arbitrage. The main aim of most hedge fund managers is to preserve capital, reduce volatility and risk, and deliver absolute (positive) returns under all market conditions. However, several hedge funds performance is inferior to that of traditional stocks and bonds (Cobbett,2005).

The perceived complex strategies implemented by hedge funds managers has in the past resulted in the asset class being only available to private clients, ultra-high net worth individuals, and institutional investors. Today, hedge funds are available to retail investors and retirement funds. This being the case, hedge funds remain misunderstood as those who favour the investment vehicle view it as an opportunity to gain extraordinary returns even during market downturns, in addition, hedge funds are considered as a tool to discover the real price of assets that are overvalued (Atleha-edu, 2022).

Critics categorise hedge funds as carrying extremely high risk to investors and the overall economy. Attributable to the ability to use leverage and bet against macroeconomic movements.

It is imperative to distinguish mutual funds from hedge funds (Cobbet, 2005):

i) Mutual funds are measured on relative performance, whereas hedge funds pursue absolute (positive) returns as they attempt to generate profits in all market conditions

ii) Mutual funds are highly regulated and restricted in terms of some of the assets, strategies, and derivatives they can use, whereas hedge funds are less restricted.

iii) Hedge funds can attract skilled specialists due to fees based on performance rather than the total assets under administration, unlike mutual funds.

iv) Due to restricted trading opportunities, hedge funds have limited capacity for additional capital, mutual funds have unlimited capacity.

v) Mutual funds cannot protect against negative market conditions other than increasing their cash holdings, whereas hedge funds utilise various trading strategies to protect portfolios.

It is evident that one of the key characteristics which distinguish hedge funds from mutual funds is the strategies and techniques fund managers implemented by fund managers. This study explores four strategies, namely:

- **Fixed Income** – attempts to profit from mispricing opportunities in fixed income securities by taking balancing positions in the market while managing interest rate risk (Novare, 2023)

- **Market Neutral** – Managers take half long and half short positions to offset market risk. In this case, market risk is reduced to a great extent, making it difficult to generate returns; therefore, stock picking skills are very critical (Ackermann, McEnally & Ravenscraft, 1999).

- **Equity Long short** – Investing in equities that are expected to increase in value and shorting those that are expected to decrease in value (Novare, 2023)

- **Multi-Strategy**—This strategy uses an investment philosophy in which different strategies, such as equity long/short and credit arbitrage, are combined to deliver diversified risk-adjusted returns (Novare,2023).

Access to hedge funds is restricted to organisations and individuals with substantial financial resources and often have high minimum investment requirements. (Capocci & Hubner, 2004). In South Africa, the minimum investment into retail hedge funds is fairly reasonable and differs from one manager to another, while a minimum of R 1 million is required to invest in qualified hedge funds. Only experienced investors may invest in qualified hedge funds.

According to Hedge News Africa, assets in the South African hedge funds industry reached R89,2 billion in the 12 months ending December 2023, increasing by 16,14% from R76,8 billion the year before.

Asset Manager 36One explains that, from a global perspective, the hedge fund industry is much more complex to navigate owing to of the number of different approaches used by hedge fund managers.

These strategies include multi-strategy, macro/event driven, equity long/short, fixed income, relative value and merger arbitrage strategies. The South African industry is less complicated compared to the rest of the globe with equity long/short strategy contributing to approximately 60% of the market.



Figure 1: South African assets by strategy in 2023

As previously stated, the long/short equity strategy involves taking long positions in stocks that are expected to rise in value and short positions in equities that are expected to fall. The strategy benefits from shifts in the spread between the long and short positions while lowering market exposure due to the short holdings.

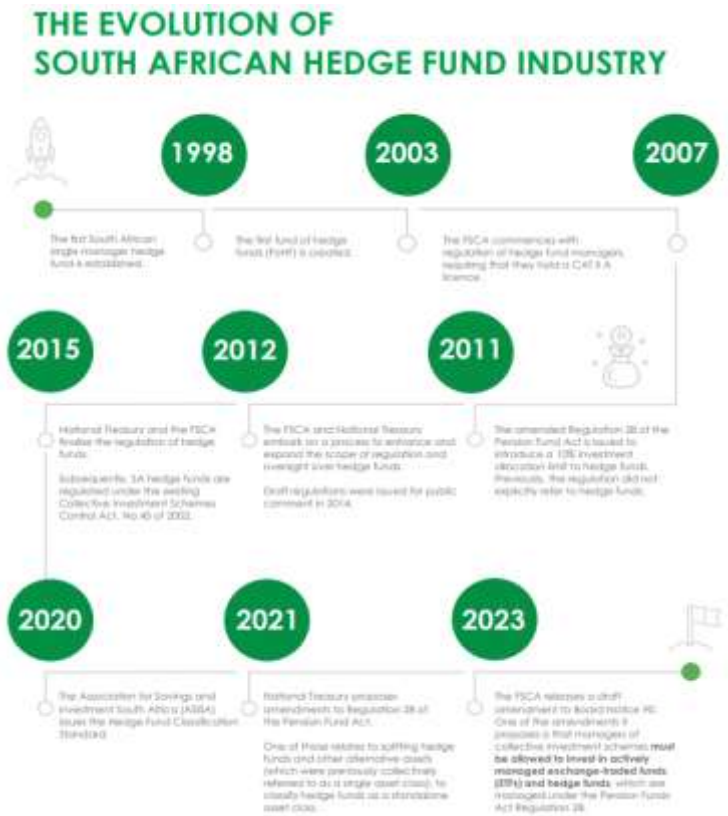
The returns of hedge funds are more stable than those of equities over time, although the individual strategy returns vary (Joosub, 2020). When investing in a market-neutral strategy, one can expect returns that are more stable in the long term. However, in South Africa, 60% of

hedge funds implement the long/short strategy. This implies that they are prone to perform in line with the market. In essence, long/short fund hedge funds are not great diversifiers relative to the broader market.

Hedge fund strategies that require managers to trade often are riskier than market neutral funds. (Cobbet (2005). Our quantitative analysis indicates a 100% apportionment to hedge fund strategies under all scenario's with the exception of the market neutral strategy between 2010 to 2019.

In addition to generating positive returns through all market conditions, two characteristics that speak to the quality of returns need to be considered: returns need to be reasonably uncorrelated to the beta of equity and bond markets. Secondly, the returns need to demonstrate positive asymmetry, participating in rising markets while providing capital protection in market downturns (Joosub, 2020).

The south African hedge funds industry has evolved overtime, from being regulated for the first time in 2015 under Board Notice 52 of the Collective investments Schemes Act 45 of 2002 to a proposal for review of Board notice 90 which intends to permit collective investment schemes to invest in retail hedge funds.



Source: Novare Hedge funds Survey 2023

Figure 2: The evolution of the South African hedge funds industry

The regulation of hedge funds is recent, this indicates that retail investors can now invest in hedge funds, however, the regulation does not permit asset managers to include hedge funds in balanced mandates -institutional investors are permitted (Brierley, 2017).

1.4 Statement of the problem and Research question

1.4.1 Statement of the problem

Traditional investor portfolios continue to face challenges due to elevated uncertainty, global policies and business and inflation cycles. Fund managers are faced with the momentous task to pursue alternative assets that grow and preserve capital with reduced volatility. South African retirement fund members who have a bulk exposure of their assets in the domestic market, have failed to outperform inflation of 4,9% because of muted returns over a five-year period to December 2022 (Hedge News Africa, 2024).

In an effort to generate excess returns, fund managers and investors pursue alternative asset classes and strategies in their portfolio construction. It is imperative that an in-depth analysis is conducted to ascertain the impact of alternative asset classes considered by fund managers.

There is a gap in literature from a South African context which provides this analysis. The current study intends to carry out empirical quantitative analysis and provide literature on the time series performance of hedge funds used as an alternative asset class in a balanced portfolio to fill the existing gap.

1.4.2 Research question

A “balanced fund" offers more diversification benefits compared to an all-equity or all-bond fund. Most "balanced funds" in the asset management industry comply with the limits prescribed by Regulation 28 of the Pension Funds Act.

The aim of this research is to unpack the inclusion of a hedge fund as an alternative asset class to a traditional “balanced portfolio”. We further investigate the overall effect on diversification and portfolio return across four hedge fund strategies. The motivation behind this study is to contribute to existing literature on the optimal allocation to hedge funds as an alternative asset class.

Chapter 2: Literature Review

2.1 Including a Hedge fund in a balanced portfolio

Hedge funds have increasingly become a vital component of institutional portfolio management. In the United States of America, hedge funds constitute approximately 7% of public pension assets and 18% of large endowment assets, reflecting their growing role in enhancing diversification, managing risks and aiming for higher returns within institutional investment strategies (CFA institute, 2024).

Numerous studies investigate whether the inclusion of a hedge fund to a portfolio may improve returns, increase diversification, or reduce volatility. Hedge funds benefit portfolios in two ways, the first is diversification in comparison to other available investment options, which is known as the "beta benefit." The second is that hedge funds produce an abnormal risk-adjusted return, which is known as the "alpha benefit." In conclusion, the diversification argument claims that the majority of hedge funds have low betas compared to traditional stock and bond indices (Cvitanic, Lazrak, Martellini & Zapatero, 2003).

Hedge funds have a positive alpha and profit from short selling, derivatives, and other non-traditional asset classes in a way that is not allowed in long-only mutual funds. Using the S&P 500, a hedge fund index, the EACM 100, and the Lehman Brothers bond index to construct a mean-variance frontier, Cvitanic et al. (2003) concluded that adding the hedge fund index significantly improved the mean-variance frontier of investment opportunities.

The study adds that a fund manager using mean-variance analysis should invest nearly all of the portfolio's risky components in hedge funds because their in-sample Sharpe ratio appears to be higher than the Sharpe ratios of the two other funds examined in the paper. This is in line with the results reported in our study.

However, only a portion of an investor's portfolio that they are willing to lose should be invested in hedge funds. A well-structured portfolio that includes conventional asset classes such as bonds and stocks, or a balanced portfolio, should eventually even out returns across all financial market declines (Cameron, 2004).

Investing in hedge funds can be challenging as information on valuation and underlying investments is not easily accessible. The multifaceted investment practices involve a variety of financial instruments where there may be no benchmark or market; further to this, the use of leverage may magnify losses and gains. Furthermore, they contend that the characteristics of hedge funds, such as leverage, liquidity, and operational risks, suggest that managers of pension funds might lack the requisite knowledge and drive to invest in this specific asset class. As a result, they contend that only individuals with the requisite expertise should choose hedge fund managers and have the authority to negotiate terms pertaining to fees and information disclosure (Bouvatier & Rigot, 2013).

A perspective in contrast to the above view is that hedge funds are anticipated to play a major role in active allocation methods since the returns of alternative investment techniques show no correlation to those of conventional asset classes (Cvitanic et al., 2003).

Hedge fund returns are generated differently compared to long-only funds, consequently improving performance and overall diversification when added correctly to a portfolio. Due to the flexibility of restrictions, hedge funds can pursue returns from a wider range of market conditions (Edify fund managers, 2025).

2.2 Diversification, Volatility and Risk

Traditional asset management practice involves increasing the number of assets in a portfolio in order to diversify, however, diversification best achieved when a portfolio implements various strategies that behave differently under pressure. Hedge funds contribute meaningfully to diversification of portfolios', they are well positioned to capture opportunities that traditional funds may lose (Novare, 2025).

Hedge funds delivered positive returns while keeping volatility to a minimum compared to stocks and bonds, however, we need to understand the entire perspective by taking into account the fact that volatility is not the only measure of risk. Volatility considers what normally

happens; however, it does not indicate how far bad returns can deviate from the normal distribution of returns (Bernstein, 2005).

When there is a significant decline in share prices or the JSE All share index, a hedge fund with a low correlation to the market may perform better or even generate positive returns as a result of a reduced correlation to traditional stocks and fixed income assets. Furthermore, due to the diminutive correlation between hedge funds and conventional asset classes, they are set up to guarantee outperformance during market turbulence (Atleha-edu, 2022). This is in line with the results of the sub-period quantitative analysis conducted in this paper.

The global growth of the hedge funds industry is an indication that investors and fund managers have confidence in the notion that hedge funds should be treated as an alternative asset class in portfolio allocation. Hedge funds invest in traditional asset classes, they invest in JSE listed equities, fixed income and cash. Although hedge funds make use of derivatives, his position is that the South African futures and options market is very large, liquid and transparent with most of the instruments being listed. Therefore, this minimises the operational risk hedge funds are exposed to, making them more traditional and simpler than most investors think they are. South African hedge funds are less exotic compared to offshore counterparts (Brierley, 2017).

Hedge fund managers are required to establish a vigorous risk management control in line with the strategies they implement, the size of their portfolio's and their investment processes. Their risk management framework highlights the risk accompanying chosen strategies as well as monitor and quantify their exposure to these risks. They are required to report breaches together with motivation detailing the extent and measures taken to rectify to the Financial Sector Conduct Authority (FSCA) (Nhambiri & Ngwenza, 2021).

Portfolio risk management procedures performed by hedge fund managers enable them to improve returns during financial market declines owing to their ability to exit positions (Falkowski, M., Sierpinska-Sawicz, A, & Szczepankowski, 2020).

The paramount tool used by hedge fund managers to manage risk is the ability to participate in short selling, this technique enable fund managers to make a profit when the price of an asset declines, this strategy enables managers to hedge against market movements. A hedge fund

may have the ability to deliver absolute returns to investors even when the general market delivers negative returns. This is a benefit that is not available to long only managers (Peile, 2016).

Hedge funds are distinguished from traditional investments as follows (Zietsman,2020):

i) Long only fund managers analyse stocks, make decisions to buy, sell or hold

ii) Hedge fund managers need to be able to do this well – and more. Hedge fund managers have a lot more tools at their disposal. Hedge funds can use leverage and other strategies, such as shorting, which allows them to generate returns from both a positive and a negative view

iii) Managing hedge funds can be more complex than long-only funds, and so requires a different skill set

iv) Most hedge fund managers in South Africa have a stake in the outcome and are willing to allocate a significant amount of their investable assets to their own funds.

She further states that at least 15% to 20% of an investor's portfolio should be invested in asset classes that are not correlated to those that are traditional. This makes hedge funds a key part of a well-diversified portfolio in line with our research.

Hedge fund managers aim to produce high risk-adjusted returns by reducing a number of risks which may negatively impact returns. Hedge funds that are regulated in South Africa employ tools permitted by CISCA within prescribed limits (Wagenaar, 2025).

We have observed that hedge funds persevere in periods where global markets experience substantial poor performance, uncertainty and volatility across different asset classes as a result of the coronavirus pandemic. These funds are naturally geared towards generating reasonably superior risk- adjusted returns regardless of the market conditions, although this has not always been the case, recent data has validated the whole purpose of hedge funds and investors have

been rewarded for their faith in an asset class that is frequently overlooked and misconstrued (Van der nest, 2020).

Although our research focuses on the inclusion of hedge funds in pre-retirement portfolios, income generating post-retirement portfolios such as a living annuity benefit from including hedge funds. Over a 14-year period, the volatility of 36One hedge fund was significantly less volatile than the JSE All Share Index with lower drawdowns. From the analysis it was concluded that higher volatility has a negative impact on performance within portfolio's that are income producing which may result in clients not meeting their retirement income objectives (Martins, 2020).

Hedge funds can be used as a great diversifier by annuity income earners when markets are volatile and portfolio managers fail to deliver excess returns from traditional asset classes (Zietsman, 2020).

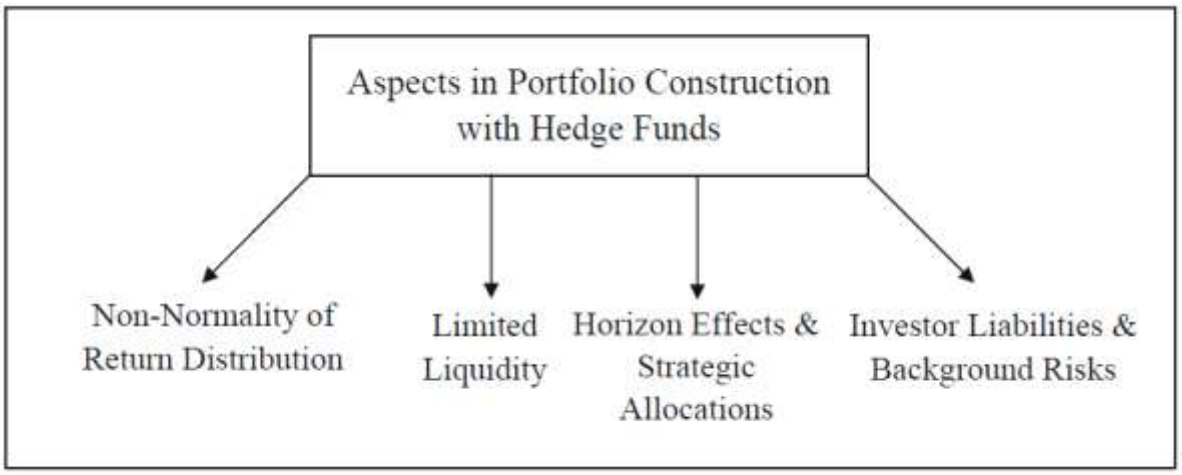
In contrast, the diversification benefit provided by hedge funds may be insignificant. During periods of high market turbulence, a high correlation between hedge funds and equities will lead to a negative impact on portfolios if managers do not alter their strategy (Joosub, 2020).

Investors should invest only a portion funds that is not critical to their short to medium term spending needs including a buffer in order to withstand even the worst markets, and that in order to determine a suitable allocation, it is important to understand an investors assets, their income and expenses, their risk profile and their time horizon (Bernstein, 2005).

2.3 Optimal allocation

In attempts to generate excess returns and exposure to uncorrelated risk factors, many institutional and retail investors tend to increase their allocation to hedge funds and other alternative investments when they are under pressure. Existing literature indicates that up to 30% of a portfolio that is made up of bonds and stocks should be reallocated to hedge funds, other studies recommend an even higher allocation Holler (2012).

Although allocation to hedge funds is recommended, constructing a portfolio that includes this asset class may be complicated due additional factors depicted in the diagram below.



Source: Hedge Funds and financial markets, John Holler 2012

Figure 3: Aspects in portfolio construction with hedge funds

The classical mean-variance analysis does not highlight the abnormal distribution of hedge fund returns. As a result, it is uncertain whether hedge funds and other alternative investments actually contribute to the increase the value of investors' portfolios and whether they should receive a large portion of their allocation (Holler, 2012).

Overtime academic researchers have developed new models that adjust for the risks depicted in figure 3. Although these models still suggest allocating a high portion to hedge funds, most established institutional investors such as insurance companies and pensions funds actually allocate a small percentage of their portfolios to hedge funds (Holler, 2012).

A crucial characteristic of hedge funds that fud managers and investors need to take into consideration is limited liquidity due to trading strategies. In order to decide on an optimal asset allocation for an investor, the time horizon of hedge funds has to be considered, “intertemporal hedging” effects may make the trade of between return and risk depend on the investment term. The structure of investors liability and background explain explicit exposures to risk that an investor has to incorporate into their asset allocation decisions. The scale of these risks and hedge fund returns may impact the investors disposition to invest in hedge funds. (Holler, 2012).

Several studies document an upward shift of the efficient frontier when hedge funds are added to a diversified portfolio, optimum allocations to hedge funds from these studies are fairly significant. Most researchers recommend an allocation of more than 20% even though these studies are based on different proxies, time periods and benchmarks. In our research results we see an allocation of up to 100% over various sub-periods across different hedge fund strategies.

The size of the hedge fund apportionment is determined by the investors' perception of the hedge fund managers' fund management abilities in the case of a Bayesian model is used to predict p excess returns. Studies have looked at how different hedge fund strategies affect a portfolio that is diversified across conventional asset classes such as stocks and bonds. By producing better Sharpe ratios, these studies also indicate that adding hedge funds significantly increases a portfolios efficiency (Holler, 2012).

A Study conducted by Bessler, Holler and Kurmann (2012) utilising a Bayesian framework provides evidence that hedge funds are an attractive alternative investments class and provide low levels of instability. Nevertheless, the growing factor structure of hedge funds along with global equities and other asset classes will ultimately make it more challenging for investors to still achieve the historical benefits of diversification.

A further study was conducted by Holler (2012) finds that hedge fund returns are characterised by significantly higher order moment risks, he investigates whether investors should still structure their portfolios to favour greater hedge fund allocations. The findings suggest that investors should allocate a sizeable portion of their portfolio to hedge funds, even after controlling for higher-moment risks.

Investments in hedge funds have grown enormously over 10 years from $200 million dollars to $1.1Trillion. The funds have gained popularity with a wide variety of investors from pension funds and university endowments to wealthy individuals and those still building their wealth. The trading strategies and tool kit that hedge fund managers have at their disposal sets them apart, managers have the ability to take advantage of opportunities as and when they arise (Bernstein, 2005).

Since the early 2000's, institutional investors have been increasing their allocation to alternative investments for diversification. 50% of hedge fund inflows emanated from institutional investors for the first time in 2007, high net worth individuals accounted for the largest share of the flows over the preceding years. Following the 2001 to 2002 stock market crash, pension fund managers employ a core-satellite portfolio management strategy in pursuit of increased portfolio returns and diversification (Bouvatier & Rigot, 2013).

The core makes up a significant portion of the portfolio and comprises of traditional asset classes such as stock and bonds. The satellite portion of 10% to 25% is allocated to alternative investments such as hedge funds and private equity. The primary objective of this portion of the portfolio is excess returns (alpha) and improved diversification (lower beta). Hedge funds seemed to be the alternative investment to achieve the objective of the satellite portion, therefore was preferred by institutional (Bouvatier & Rigot, 2013). The results indicated in Tables 14 to 17 of our study are consistent notion.

Retail are strongly encouraged to invest only the portion they do not intend spending in future, including the conservative portion set aside to withstand poor market conditions. In order to correctly ascertain the excess capital that should be allocated to hedge funds, various factors such as time horizon, income, expenses and risk profile. (Bernstein, 2005).

In South Africa, pension funds are authorised to invest up to 10% in hedge funds. In the United States of America, the federal government does not limit the allocation of private defined benefit plans to hedge funds. The governments approach of pension funds allocation to alternative investments varied from 1,35% in 2000 to 25,42% in 2008 in pursuit of alpha and diversification. The evidence suggests a positive impact on global returns, however, due to increased costs and low allocation to hedge funds, the effect may be neutralized (Bouvatier & Rigot, 2013).

The regulator raised the apportionment to alternative investments by pension funds to 15% from 2.5% in 2011. This opened up alternative investment opportunities for fund managers and retail investors through retirement funds. However, pension fund managers in South Africa currently allocate below 2% (Joosub, 2020).

An 8% to 10% allocation to alternative investments is advocated for in the South African market, however, the value derived by investors is impaired, owing to the fact that a significant portion of the hedge funds market implement the equity long/short strategy which is considered to be a proxy to the equity market. Table 1 records a correlation coefficient of 0.79 between the JSE All Share Index and the equity long/short hedge fund strategy in support of this view. In the United States and abroad, event-driven and macro strategies have proven offer the diversification benefit investors seek (Joosub,2020).

Investing in a hedge fund of funds as opposed to a single strategy may offer improved diversification benefits as portfolios benefit from a spread across different managers, techniques, and styles (Chapinduka, 2015). Our study excludes a fund of fund analysis.

Chapter 3: Data and Methodology

3.1 Data

We use monthly returns from January 2007 to December 2023. Our analysis is comprehensive and considers various sub- periods. The JSE All-share index represents our market portfolio. The JSE All bond index represents the bond portfolio. The synthetic “balanced” portfolio will be created using 30% of the JSE All bond index and 70% of the JSE All share Index in line with the Allan Gray Balanced fund as at June 2024. The Allan Gray balanced fund will represent a traditional "balanced fund" in the South African market. This fund was selected as it has the highest assets under management within the ASISA multi-asset high equity category.

The funds' asset allocation as at June 2024 is indicated below:

Asset allocation on 30 June 2024[7]

Asset class	Total	South Africa	Foreign
Net equities	65.8	41.0	24.8
Hedged equities	7.9	1.7	6.2
Property	0.7	0.4	0.3
Commodity-linked	3.3	2.6	0.7
Bonds	13.9	9.0	4.9
Money market and cash[8]	8.5	7.9	0.6
Total (%)	**100.0**	**62.6**	**37.4**[9]

Figure 4: Allan Gray balanced fund asset allocation

The fund currently holds 73% in equities (local and foreign), 13,9% in Bonds and approximately 8,5% in cash, this allocation changes overtime based on market conditions.

A correlation test will be conducted on returns from the traditional “Balanced fund” (both asset manager fund and synthetic), the returns from four different hedge fund strategies, namely: Equity Long short, Fixed income, Multi- Strategy and Market Neutral, the JSE ALSI and ALBI.

The four hedge fund strategies considered in this paper are the most common in the South African market. We use indexes as opposed to specific funds to mitigate manager risk and bias.

The 3-month treasury bill rate will be used as a proxy for the risk-free rate.

3.2 Data Sources

The Data will be sourced from Bloomberg for the JSE All share Index, all Bond index and the Allan Gray Balanced Fund. The 3-month treasury bill rate is sourced from Fred Economics. Gathering hedge fund data in South Africa can be quite challenging as it is not readily available. In South Africa, Hedge News Africa is the only data vendor available for hedge funds.

In the United States of America, Europe, and Asia, hedge fund data is sourced from databases such as Eurek Hedge, Hedge Fund Research (HFR), and Barclay Hedge. In South Africa, Hedge Fund News Africa will be used for data as this is the primary source of alternative investment data and research. The Hedge fund strategies used in research are long/short equity, market neutrality, multi-strategy, and fixed income.

3.3 Methodology

The classical mean-variance approach, which was introduced in 1952 by Harry Markowitz, will be used, where we will maximise returns and minimise risk then investigate which hedge fund strategy will deliver the most optimal portfolio. The optimal portfolio will be the one which is diversified and delivers the highest return with minimal risk. We will then compare the returns to verify whether including hedge funds as an alternative asset class delivers better returns relative to risk.

Portfolio selection can be broken down into two phases, The first phase starts with experience and observation and concludes with opinions regarding the future performance of stocks. The second phase begins with managers' projections for the performance of securities in the future and concludes with portfolio (Markowitz, 1952).

In a tribute to Markowitz, Blay (2024) states that the portfolio theory implies that the selection of a portfolio is in relation to an investor’s beliefs about portfolio investments. The covariance - the relationship between the securities in a portfolio - was at the heart of this.

Assumptions underlying the mean-variance approach

a) Investors are risk averse and they prefer a higher return for specific level of risk
b) Investment returns are normally distributed; therefore, we may only use covariances, returns and variance to derive optimal portfolio's
c) There are no taxes and transaction costs
d) Expected returns, Covariances and variances are known to investors

An investor will maximise their expected utility when using the efficient frontier to select a portfolio whether returns are normally distributed or not, whether they understand what expected utility is or not and whether they understand the theory of rational behaviour or not (Blay, 2024).

3.4 Performance Measures

The Sharpe ratio and Jensen's alpha are regarded as risk adjusted measures of return. The Sharpe ration takes into account total risk (standard deviation) while the Jensen's alpha highlights systematic risk (beta). In this study we use the Sharpe ratio and Jensen's alpha, however other measures such as the Treynor measure could be included in future studies.

3.4.1 Sharpe Ratio:

The Sharpe ratio is the most widely used risk-adjusted performance metric, It is employed to quantify the correlation between the standard deviation of returns in a fund or portfolio and the mean excess returns. Because hedge funds and other alternative investments involve derivatives, they often provide profits that are not typically dispersed. This raises the possibility that typical performance and risk measurements could underestimate risk and thus overestimate risk-adjusted returns. The Sharpe ratio might not be an appropriate performance metric as a result claims (Eling, 2008).

This being the case, a study conducted in 2007 indicated that the Sharpe ratio and other performance measures used resulted in ranking that was virtually identical (Eling, 2008).

When analysing hedge funds or mutual funds, the Sharpe ratio might be a superior performance measure, due to the following reasons (Eling, 2008) :

a) It is the most well-known performance metric and is frequently employed in the financial sector. The majority of investment finance data suppliers, including Morningstar, provide the ratio. The mean-variance approach is used in the majority of asset allocation analyses to determine the trade-off between return and risk.

b) It is easily computed, with fewer data requirements and easily understood by professionals and those who are not. Due to its ability to accurately summarise risk and return, it is the most well-understood performance metric.

c) The Sharpe ratio can be tested using a variety of statistical methods, unlike with other performance measures. Due to the extensive amount of research on the Sharpe ratio, it's weaknesses and strengths are well known, which may not be the case with the other measures of performance.

d) The performance measure used to analyse mutual or hedge funds does not influence the comparative evaluation of funds in a critical way. When mutual funds or hedge funds are analysed, the performance measure used does not influence the comparative performance critically.

e) In theory, the Sharpe ratio aligns with the concept of expected utility maximisation

The Sharpe ratio can be used to analyse mutual funds and hedge funds. A portfolio's performance increases as the Sharpe ratio rises (Eling, 2008).

The problem with the Sharpe ratio is that it relies on the idea that risk is the same as volatility. Secondly when the Sharpe ratio is applied to one fund in isolation, it ignores the correlation of the fund with the investments within the portfolio. Thirdly, the Sharpe ratio may be misleading if the returns are not normally distributed (Verma & Hirpara, 2016).

The Shape ratio measure is a linear-factor model of investment styles, these may not be designed to sufficiently capture features which are not linear (usually found in hedge funds. This may lead to fund managers incorrectly concluding that there are no systematic risks (Fung, 2001).

Experimental data implies that hedge funds reduce uncertainty and reduce systematic risk, largely due to non-cyclical nature of investments (Falkowski, M., Sierpinska-Sawicz, A, & Szczepankowski, 2020).

The Sharpe ratio can be expressed mathematically as:

$$S_P = \frac{(R_{Pt} - R_{ft})}{\sigma_{pt}}$$

where,

S_P = the Sharpe ratio at time 't'

R_{Pt} = the return on a portfolio at time 't'

R_{ft} = the risk-free rate at time 't'

σ_{pt} = the standard deviation of the portfolio at time 't'

3.4.2 Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is a common and broadly used model. It was originally developed by Sharpe (1964), Lintner (1965) and Mossin (1966). The CAPM presents a specific description of the correlation between the expected from an asset and the risk associated with achieving those returns. (Iqbal, 2011) further state that according to CAPM all investments carry two types of risks, the first being market risk symbolized by "beta", "beta" is also known as systematic risk which cannot be diversified away.

The second kind of risk, referred to as unsystematic risk, is unique to a business and is amenable to diversification. The expected return of a portfolio is only dependent on the systematic risk, or "beta," since unsystematic risk can be diversified away.

CAPM relies on a hypothetical market portfolio which includes assets such as property, bonds and stocks. Identifying a true market portfolio may be a challenge, therefore in practice, CAPM is analysed using a stock market index, this index represents the market portfolio. In our research the JSE All share index (ALSI) will represent the market portfolio (Iqbal, 2011).

The CAPM can be expressed mathematically as:

$$E(R_{pt}) = R_{ft} + \beta_p(R_{mt} - R_{ft})$$

where,

$E(R_{pt})$ = the expected return on a portfolio 'p' during time 't'

R_{ft} = the risk-free rate during time 't'

β_p = the beta of portfolio 'p'

R_{mt} = Expected return on market portfolio/index at time 't'

There is a linear link between risk and return. The risk premium on a portfolio varies in direct proportion to the degree of systematic risk and is a function of market portfolio risk (Iqbal, 2011).

CAPM Assumptions

a) Unlimited lending and borrowing at the risk-free rate
b) The buying and selling of securities does not affect the price
c) Assets are infinitely divisible
d) There are no personal income taxes
e) There is no limit to short sales
f) The return and volatility of investments are of importance to investors
g) The market allows for the purchase and sale of any asset.
h) Investors make decisions solely based on the standard deviations and the return they expect from their portfolio's

3.4.3 Jensen's Alpa:

The Sharpe ratio does not quantify the value added in a portfolio; it is mere a ranking criterion. An additional performance measure we will utilise to determine the value added within a portfolio is the Jensen's Alpha. The method was developed by Michael C Jensen (1968) and it is based on the capital asset pricing model of Sharpe, Litner and Mossin. According to (Verma & Hirpara, 2016) The Jensen's Alpha quantifies the additional return (alpha) as the excess return above the security market line in CAPM.

The amount that the additional return on a portfolio above the predicted return provided by the CAPM is known as the alpha. Alpha may be equal to zero, less than zero, or larger than zero. When a portfolio produces a rate of return that exceeds the anticipated return, this is shown by a positive alpha.

The model used to calculate Jensen's alpha is expressed as:

$$R_{pt} - E(R_{pt}) = R_{pt} - R_{ft} - \beta_p(R_{mt} - R_{ft})$$

where,

R_{pt} = the rate of return generated by the portfolio

$R_{pt} - E(R_{pt})$ = the excess return above the CAPM expected return which is alpha (α)

Verma and Hirpara (2016) find that a well-diversified portfolio will have the same performance and ranking according to both Jensen's and Sharpe's alpha. The Sharpe ratio would be the most appropriate risk measure when a portfolio represents an investor's whole wealth or is not adequately diversified. In these cases, the standard deviation of returns is the most appropriate risk measure.

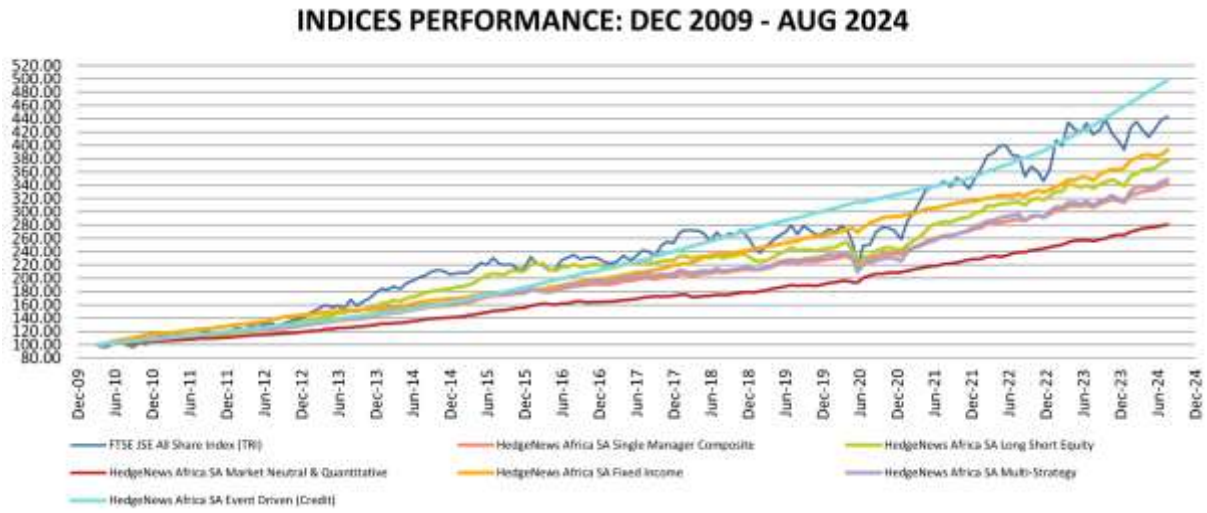
Jensen's alpha can be used to evaluate the performance of a well-diversified portfolio since the unsystematic risk would have been mitigated and the systematic risk (beta) would be the suitable risk measure.

Chapter 4: Data Analysis and Results

In this chapter, we first consider the performance of the different hedge fund strategy returns relative to the JSE ALSI over 15 years from December 2009 to August 2024. We then follow this up by calculating the correlation of returns between the hedge fund strategies, the JSE ALSI, ALBI, synthetic balanced fund, and the Allan Gray balanced fund.

A portfolio is created between the balanced funds and the hedge fund strategies, and the results are unpacked. Lastly, we create four different portfolios by allocating 10% to each hedge fund strategy and 90% to the balanced funds to assess which hedge fund strategy delivers the highest alpha.

4.1 Hedge fund returns relative to the JSE All share index



Source: Hedgenews Africa

Figure 5: Indices performance: December 2009 to August 2024

The above graph indicates the performance of the different hedge fund strategies relative to the JSE All share index (ALSI) over 14 years, the event driven Hedge funds strategy outperformed the ALSI as well as the other Hedge fund strategies from December 2018. In our research we only focus on the Fixed income, Market neutral, equity long short and Multi strategy.

4.2 Calculation of returns

$$R_i = ln\left(\frac{S_i}{S_{i-1}}\right)$$

where,

R_i = the monthly return

S_i = stock price as at the current period

S_{i-1}=stock price as at the previous period

4.3 Correlation Matrix

The below correlation matrix was constructed using the monthly returns between the different assets. Correlation measures the intensity of the relationship between two assets or variables, as the value of one asset changes, the other asset moves in a specific direction. Correlation values rage from -1 to +1, a correlation of 1 represents a perfect positive relationship, as one asset increases in value, so does the other and vice versa, while -1 represents a perfectly negative correlation, as one asset increases the other decreases.

Correlation Matrix

	ALBI	*ALSI*	*Allan Gray Balanced Fund*	*Synthetic Balanced fund*	*Equity long short*	*Market Neutral*	*Multi Startegy*	*Fixed Income*	*Risk free rate*
ALBI	**1,00**	0,26	0,16	0,44	0,26	0,05	0,37	0,49	0,02
ALSI	0,26	**1,00**	**0,77**	**0,98**	0,79	0,38	0,70	0,41	-0,18
Allan Gray Balanced Fund	0,16	0,77	**1,00**	0,75	0,76	0,45	0,74	0,24	-0,17
Synthetic Balanced fund	0,44	0,98	0,75	**1,00**	0,79	0,36	0,73	0,47	-0,17
Equity long short	0,26	0,79	**0,76**	**0,79**	**1,00**	0,57	0,82	0,36	-0,23
Market Neutral	0,05	0,38	**0,45**	**0,36**	0,57	**1,00**	0,49	0,22	0,03
Multi Startegy	0,37	0,70	**0,74**	**0,73**	0,82	0,49	**1,00**	0,45	-0,18
Fixed Income	0,49	0,41	**0,24**	**0,47**	0,36	0,22	0,45	**1,00**	0,10
Risk free rate	0,02	-0,18	-0,17	-0,17	-0,23	0,03	-0,18	0,10	**1,00**

Table 1: Correlation matrix

The correlation between the JSE ALSI and JSE ALBI is 0,25 which is low but still positive , as the JSE ALSI increases, so does the ALBI, however, at a lower degree. The positive correlation between the ALBI and ALSI is due to the fact that bonds normally react positively(negatively) to falling (rising) inflation which is likely to result in lower (higher) interest rates. The correlation between the synthetic balanced fund and all hedge fund strategies is positive, with the highest correlation being with the equity long/short strategy, which makes

sense as the main asset class used in this strategy is equities (stocks). The lowest correlation is with the market-neutral strategy, followed by the fixed income (0,35), then the multi-strategy (0,72).

The Allan Gray balanced fund also has the highest correlation with the equity long/short hedge fund strategy (0,75), the lowest correlation is with the fixed income strategy (0,25), this is due to the fact the a traditional industry balanced fund may in certain periods have a lower weighting in South African bonds as well as exposure to offshore assets, whereas the synthetic balanced portfolio maintains an allocation of 30% to fixed income assets throughout the period of assessment. The second lowest is the market neutral strategy (0,45), followed by the multi-strategy, which has a high correlation of 0,73 with the Allan Gray balanced fund.

4.4 Optimal asset allocation: Synthetic balanced fund and hedge fund strategies 2007 to 2023

We use the solver function in Excel to determine the optimal allocation between the synthetic balanced fund, the Allan Gray balanced fund, and the different hedge fund strategies. This allows us to optimize a portfolio between the balanced fund and each of the hedge fund strategies.

The goal is to determine the hedge fund strategy that best optimises the portfolio, this will be determined by comparing the Sharpe ratios of each portfolio.

Synthetic Fund and Hedge fund Strategies				
Asset	**Annual Return**	**Annualised Standard Deviation**	**Sharpe Ratio**	**Sharpe Ratio Rank**
Synthetic Balanced Fund	6,93%	11,60%	0,03	5
Hedge Funds				
Equity Long/ Short	8,61%	6,24%	0,33	3
Market Neutral	7,77%	2,09%	0,57	2
Multi-strategy	8,07%	4,93%	0,30	4
Fixed Income	9,82%	2,31%	1,40	1
Risk free rate	6,58%			

Table 2: Synthetic balanced fund and hedge fund strategies 2007 to 2023

We first calculate the annualised returns of each individual asset, the synthetic balanced fund delivered a return of 6,93% with a standard deviation of 11,60%, all hedge fund strategies delivered returns higher than the Synthetic balanced fund at a lower standard deviation, the

highest return of 9,82% from the fixed income strategy with a very low standard deviation of 2,31% and the lowest hedge fund return of 7,77% from the Market neutral strategy with a standard deviation of 2,31%.

The individual asset Sharpe ratios indicate that the fixed income strategy delivered the highest Sharpe ratio of 1,40, followed by the Market neutral strategy (0,57), the equity long/short strategy (0,33), and lastly, the multi-strategy (0,30). The fixed income strategy delivered the highest excess return per unit of risk compared to all assets, and the synthetic balanced portfolio delivered the lowest (0,03).

4.4.1 Synthetic balanced fund and hedge funds 2007 to 2023: No restriction

Using the solver function, we start by optimising the portfolio between the synthetic balanced fund and each of the hedge fund strategies, placing no restriction on the percentage allocation to each asset. The optimisation tool is meant to allocate a percentage to each asset depending on the risk and return of each asset and the correlation between the assets.

	Optimal Allocation : No restriction				
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Synthetic Balanced Fund	0%				
Hedge Funds					
Equity Long/ Short	100%	8,39%	0,31%	5,22	4
Market Neutral	100%	7,77%	0,04%	27,35	2
Multi-strategy	100%	8,07%	0,24%	6,13	3
Fixed Income	100%	9,82%	0,05%	60,84	1

Table 3: Synthetic balanced fund and hedge funds 2007 to 2023: No restriction

When considering the portfolio allocation between the synthetic balanced fund and the equity long/short strategy, we find that the portfolio is optimized when 100% is invested in the Hedge fund and zero in the synthetic balanced fund. This portfolio delivered an annualized return of 8,39%, a standard deviation of 0.31%, and a Sharpe ratio of 5.22.

A portfolio between the synthetic balanced portfolio and the Market neutral strategy is optimised when 100% is allocated to the hedge fund strategy, with a slightly lower return of 7,77%, a lower standard deviation of 0,04% and a much higher Sharpe ratio of 27,35 compared to the portfolio with the equity long/short strategy. 100% is allocated to the Multi-strategy and

a return of 8,07%, with a standard deviation of 0,24%, both are higher than the portfolio with the market neutral strategy and lower than the equity long/short strategy.

The last portfolio is the fixed income/synthetic portfolio, where an optimized portfolio is achieved when 100% is allocated to the Hedge fund strategy. The return of 9,92% is the highest, and the standard deviation of 0,05% is lower than both the equity long/short and multi-strategy and slightly higher than the Market neutral strategy.

The portfolio with the fixed income strategy delivered the highest return and Sharpe ratio with very low risk.

This is in line with (Brierly,2017) when he stated that risk adjusted returns delivered by hedge funds are so fascinating that any risk return calculation maximises the allocation to hedge funds, with the equity long short in particular.

We find that the optimisation method allocates 100% to the hedge fund strategies because each individual strategy delivers a higher return with a lower standard deviation compared to the balanced fund. The equity long/short for example returned 8,61% with a standard deviation of 6,24%, compared to the synthetic balanced fund which returned 6,93% and standard deviation of 11,60%, hence the 100% allocation to the hedge fund.

All individual hedge fund strategies have higher returns with lower standard deviations compared to the balanced fund.

4.4.2 Synthetic balanced fund and hedge funds 2007 to 2023: 50% Allocation

When optimising the portfolios with an allocation of 50% to the synthetic portfolio and 50% to the synthetic balanced fund, we find that the expected return of each portfolio is lower with a higher standard deviation compared to the optimal portfolios with no restrictions to asset allocation. This is not surprising as 50% is allocated to the synthetic balanced fund when it was previously 0%.

Optimal Allocation : 50%/50% restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Synthetic Balanced Fund	50%				
Hedge Funds					
Equity Long/ Short	50%	7,77%	0,80%	1,50	4
Market Neutral	50%	7,35%	0,39%	1,97	2
Multi-strategy	50%	7,50%	0,61%	1,52	3
Fixed Income	50%	8,37%	0,41%	4,34	1

Table 4: Synthetic balanced and hedge funds 2007 to 2023: 50% Allocation

The fixed income strategy delivers the highest return of 8,37% and Sharpe ratio (4,34) with a low standard deviation of 0,41%. The portfolio with the second highest Sharpe ratio is the market neutral/Synthetic balanced fund portfolio (1,97) with a return of 7,35% and a standard deviation of 0,39%, which is the lowest of all the portfolios. The multi-strategy portfolio delivered a Sharpe ratio of 1,52, with a return of 7,50%, and standard deviation of 0,61%. The equity long/short portfolio has the lowest Sharpe ratio of 1,50, a return of 7,77% and the highest standard deviation of 0,80%.

We find that the fixed income strategy portfolio delivers the highest Sharpe ratio, the equity long/short portfolio delivers the lowest Sharpe ratio in both the "no allocation restriction" scenario and with a 50% allocation

4.4.3 Allan Gray balanced fund and hedge fund strategies 2007 to 2023

The synthetic balanced fund is replaced with the industry balanced fund (Allan Gray), all individual hedge fund strategies remain the same to test if the results may be the same and ascertain if there may be a bias in the construction of the synthetic portfolio.

Allan Gray Balanced Fund and Hedge fund Strategies				
Asset	Annual Return	Annualised Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Allan Gray Balanced Fund	6,77%	8,83%	0,02	5
Hedge Funds				
Equity Long/ Short	8,61%	6,24%	0,33	3
Market Neutral	7,77%	2,09%	0,57	2
Multi-strategy	8,07%	4,93%	0,30	4
Fixed Income	9,82%	2,31%	1,40	1
Risk free rate	6,58%			

Table 5: Allan Gray balanced fund and hedge fund strategies 2007 to 2023

When following the same approach over the same investment period, replacing the Synthetic balanced fund with the Allan Gray balanced fund, we find that the return on the fund is 6,77%, slightly lower than the Synthetic balanced, and a standard deviation of 8,83%, approximately 2,77% lower than the synthetic. As in the case with the Synthetic balanced fund, The Sharpe ratio of 0,02 is lower than that of all the Hedge fund strategies. The hedge fund strategy returns, standard deviation and Sharpe ratios are all the same as in the previous case.

4.4.4 Allan Gray balanced and hedge funds 2007 to 2023: No restriction

A portfolio is created with the Allan Gray balanced fund and each of the hedge fund strategies and optimised with no asset allocation restriction.

	Optimal Allocation : No restriction				
	Allocation	**Portfolio Expected Return**	**Annual Standard Deviation**	**Sharpe Ratio**	**Sharpe Ratio Rank**
Asset					
Allan Gray Balanced Fund	0%				
Hedge Funds					
Equity Long/ Short	100%	8,61%	0,39%	5,22	4
Market Neutral	100%	7,77%	0,04%	27,25	2
Multi-strategy	100%	8,07%	0,24%	6,13	3
Fixed Income	100%	9,82%	0,05%	60,84	1

Table 6: Allan Gray and Hedge funds 2007 to 2023: No restriction

When no portfolio allocation restriction is placed on the assets, 100% is allocated to the different hedge fund strategies. The portfolio with the highest Sharpe ratio is the fixed income/ Allan Gray balanced fund portfolio; the return is also the highest (9,82%) with a second lowest standard deviation of 0,05%. The market neutral strategy delivered a Sharpe ratio of 27,25, a return of 7,77% and the lowest Standard deviation of 0,04%. The Multi strategy portfolio achieved a Sharpe ratio of 6,13, a return of 8,07% and standard deviation of 0,24%. The equity long/short has the lowest Sharpe ratio of 5,22, the second highest return of 8,61% and the highest standard deviation of 0,39%.

The fixed income strategy portfolio delivered the highest risk adjusted excess return.

In this again 100% is allocated to the hedge fund strategies as they all delivered higher returns with lower standard deviations compared to the balanced fund. As an example, the market neutral strategy returned 7,77% higher than the Allan Gray balanced fund (6,77%) and a very

low standard deviation of 2,09% compared to 8,83% from the balanced fund. Although the difference in return is on l%, the cost of the return delivered by the balanced fund is too high with a 6,74% difference.

4.4.5 Allan Gray balanced fund and hedge funds 2007 to 2023: 50% Allocation

As we have done with the Synthetic fund, we allocate 50% to both the assets within each portfolio and note a reduction in the expected return of all portfolios with an increase in risk, as in the case of the synthetic portfolio.

Optimal Allocation : 50%/50% restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Allan Gray Balanced Fund	50%				
Hedge Funds					
Equity Long/ Short	50%	7,69%	0,57%	1,96	4
Market Neutral	50%	7,27%	0,25%	2,80	2
Multi-strategy	50%	7,42%	0,42%	2,03	3
Fixed Income	50%	8,30%	0,23%	7,39	1

Table 7: Allan Gray balanced and Hedge funds 2007 to 2023: 50% Allocation

The equity long/short portfolio in this case delivers a return of 7,69%, the highest standard deviation of 0,57% and the lowest Sharpe ratio of 1,96, which is slightly higher than with the Synthetic portfolio. The Market neutral retuned a Sharpe ratio of 2,80, a standard deviation of 0,25% and an annualised return of 7,27%.

The multi strategy portfolio, exhibits the lowest Sharpe ratio of 2,03, a Standard deviation of 0,42% and a return of 7,42%. The fixed income portfolio returned the highest Sharpe ratio of 7,39, higher than in the case of the Synthetic portfolio, the second lowest standard deviation of 0,23 and the highest return of 8,30%.

We find that the portfolio with the fixed income Hedge fund strategy has the highest Sharpe ratio under no asset allocation restriction and in the case whether 50% is allocated to each asset within a portfolio, this is the same for both the Synthetic balanced fund and the Allan Gray balanced fund between the period January 2007 to December 2023.

4.4.6 Synthetic balanced fund and hedge funds : 2010 to 2019

The period considered in the above scenario's include two events that had a negative effect on global markets, the first event is the global financial crises which took place between 2007 and early 2009 the second being the COVID-19 crises which happened between 2020 and early 2021. In this section we repeat the above portfolio optimization process using prices from 2010 to 2019, this process excludes both economic events.

Synthetic Fund and Hedge fund Strategies				
Asset	**Annual Return**	**Annualised Standard Deviation**	**Sharpe Ratio**	**Sharpe Ratio Rank**
Synthetic Balanced Fund	7,62%	8,70%	0,15	5
Hedge Funds				
Equity Long/ Short	9,22%	4,79%	0,61	3
Market Neutral	6,73%	1,91%	0,23	4
Multi-strategy	8,60%	2,79%	0,78	2
Fixed Income	9,96%	1,72%	2,13	1
Risk free rate	6,29%			

Table 8: Synthetic balanced fund and Hedge funds : 2010 to 2019

Over the period 2010 to 2019, the Synthetic balanced fund returned 7,62% and a Sharpe ratio of 0,15 which are both higher than the 2007 to 2023 period and a lower standard deviation of 8,70%. The equity long/short Hedge fund strategy delivered an annualised return of 9,22%, standard deviation of 4,79% and the third highest Sharpe ratio of 0,61. The market neutral strategy has the lowest Sharpe ratio of 0,23 and a return of 6,73%, both lower than the period 2007 to 2023, the standard deviation of 1,91% is also lower.

The multi-strategy hedge fund delivered the second highest Sharpe ratio of 0,78, a standard deviation of 2,79% and an annualised return of 8,60% which is an improvement from the 2007 to 2023 assessment. The highest Sharpe ratio of 2,13 is from the fixed income hedge fund strategy, with a low standard deviation of 1,72% and a return of 9,96%, higher than in the former period of assement.

The fixed income strategy maintaing the first rank , followed by the multi- strartegy hedge fund which ranked last in the previous period, in third place is the equity long/short strategy which ranked 4th in the previous perod, then lastly the market neutral strategy which ranked second formerly.

4.4.7 Synthetic balanced fund and hedge funds 2010 to 2019: No restriction

When considering the portfolios of different hedge fund strategies with the Synthetic balanced fund over a period that excludes both the global financial and COVID crises, some literature that argues that hedge funds perform better during market downturns. From the individual asset returns and standard deviations, we see that the returns from all assets including the synthetic balanced fund, are higher with lower standard deviations.

Optimal Allocation : No restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Synthetic Balanced Fund	0%				
Hedge Funds					
Equity Long/ Short	100%	9,22%	0,23%	12,73	3
Multi-strategy	100%	8,60%	0,09%	26,11	2
Fixed Income	100%	9,96%	0,03%	123,47	1
Market Neutral	96%	6,76%	0,04%	12,30	4
Synthetic Balanced Fund	4%				

Table 9: Synthetic balanced and hedge funds 2010 to 2019: No restriction

The first portfolio is optimised when 100% is allocated to the Equity long/short strategy, this delivered a Sharpe ratio of 12,73, a standard deviation of 0,23% and a return of 9,22% higher than the previous 8,31%. The multi-strategy returned the second highest Sharpe ratio in this period of 26,11, a standard deviation of 0,09% and a return of 8,60%, higher than 7,77% during 2007 to 2023. The market neutral strategy portfolio is optimised when 4% is allocated to the synthetic portfolio and 96% is allocated to the hedge fund, this is due to the hedge fund strategy offering a slightly lower return of 6,73% compared to 7,62% from the Synthetic portfolio however with a significantly lower standard deviation of 1,91% in comparison to 8,70%.

It is fairly challenging for the market neutral strategy to generate market beating returns as the strategy's main focus is to reduce market risk and provide stable returns.

The optimization model seems to place a greater weight on return compared to risk, as the exposure to risk is significantly higher with the synthetic portfolio for a slightly higher return.

100% is allocated to the fixed income strategy, with the highest Sharpe ratio of 123,47, a standard deviation of 0,03% and a return of 9,96%.

4.4.8 Synthetic balanced fund and hedge funds 2010 to 2019: 50% Allocation

An allocation of 50% to each asset under each portfolio reduces the overall portfolio expected return, with the exception of the market neutral strategy, where we see an increase in the expected return. The additional return and risk results from the higher allocation to the balanced fund from 4% to 50%.

Optimal Allocation : 50%/50% restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Synthetic Balanced Fund	50%				
Hedge Funds					
Equity Long/ Short	50%	8,42%	0,40%	5,26	3
Market Neutral	50%	7,17%	3,22%	3,97	4
Multi-strategy	50%	8,11%	0,30%	6,12	2
Fixed Income	50%	8,79%	0,21%	11,81	1

Table 10: Synthetic balanced and hedge funds 2010 to 2019: 50% Allocation

An equal allocation between the two assets leads to a return of 8,42% from the Equity long/short portfolio higher than the 7,7% return from the previous assessment, a standard deviation of 0,40% , lower than 0,80% and a Sharpe ratio of 5,26. The market neutral portfolio has the lowest Sharpe ratio of 3,97, a standard deviation of 3,22% and a return of 7,17%, the standard deviation is higher and the return is slightly lower compared to the previous period.

The multi-strategy portfolio delivered the second highest Sharpe ratio of 6,12 higher than 1,52 from the previous period, a standard deviation of 0,30% and a return of 8,11%. The fixed income strategy is leading with a Sharpe ratio of 11,81, significantly higher than 4,34, a return of 8,79% and a lower standard deviation of 0,21. Again in this case the fixed income strategy portfolio offers the highest Sharpe ratio.

4.4.9 Allan Gray and Hedge funds 2010 to 2019

It is quite evident that the hedge fund strategies and the balanced funds improve in return and risk compared to the 2007 to 2023 period, leading to improved Sharpe ratios

Allan Gray Balanced Fund and Hedge fund Strategies				
Asset	**Annual Return**	**Annualised Standard Deviation**	**Sharpe Ratio**	**Sharpe Ratio Rank**
Allan Gray Balanced Fund	7,36%	6,77%	0,16	5
Hedge Funds				
Equity Long/ Short	9,22%	4,79%	0,61	3
Market Neutral	6,73%	1,91%	0,23	4
Multi-strategy	8,60%	2,97%	0,78	2
Fixed Income	9,96%	1,72%	2,13	1
Risk free rate	6,29%			

Table 11: Allan Gray and hedge funds 2010 to 2019

The Allan Gray balanced fund delivered a higher return of 7,36% compared to 6,77% (2007 to 2023) with a lower standard deviation of 6,77%, which was 8,83% previously. The fund ranks the lowest when comparing the Sharpe ratios of the different assets. The equity long/short hedge fund strategy returned 9,22%, with a standard deviation of 4,79% the return is higher with a lower risk compared to the previous period.

The Market neutral strategy previously ranked second, it now has the second lowest Sharpe ratio of 0,23, a standard deviation of 1,91% and a return pf 6,73% which are both lower than the previous period. The multi-strategy portfolio improved by delivering a Sharpe ratio of 0,78, a standard deviation of 2,97% and a return of 8,60%. The fixed income strategy has the highest Sharpe ratio of 2,13, the lowest standard deviation of 1,72% and the highest return of 9,96%.

4.4.10 Allan Gray balanced fund and hedge funds 2010 to 2019: No restriction

In this scenario we note a 100% allocation to hedge fund strategies with the market neutral strategy as in the previous case with the synthetic balanced fund between 2009 and 2010.

Optimal Allocation : No restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Allan Gray Balanced Fund	0%				
Hedge Funds					
Equity Long/ Short	100%	9,22%	0,23%	12,73	3
Multi-strategy	100%	8,60%	0,09%	26,11	2
Fixed Income	100%	9,96%	0,03%	123,47	1
Allan Gray Balanced Fund	3%				
Market Neutral	97%	6,75%	0,04%	12,08	4

Table 12: Allan Gray and hedge funds 2010 to 2019: No restriction

A non-restricted asset allocation leads to an allocation of 100% to the equity long /short portfolio, this portfolio ranks third with a Sharpe ratio of 12,73, higher compared to 5,22 from 2007 to 2023, a lower standard deviation of 0,23% and a higher return of 9,22%.

100% was allocated to the multi-strategy Hedge fund, the portfolio delivered a return of 8,60% slightly higher than the previous period and a lower standard deviation of 0,09%. There is a split in asset allocation between the market neutral and the Allan Gray balanced portfolio, with 3% allocated to Allan Gray (1% lower than to the Synthetic fund over the same period) and 97% to the Market neutral hedge fund strategy (1% higher the market neutral strategy over the same period).

The portfolio returned 6,75%, lower than 7,77% from the previous period, a standard deviation of 0,04% and a Sharpe ratio of 12,08 which is more than half the previous ratio of 27,25. The fixed income portfolio returned 9,97%, a low standard deviation of 0,03% and Sharpe ratio of 123,47 which is double the value form the previous period.

4.4.11 Allan Gray balanced fund and hedge funds 2010 to 2019: 50% allocation

A 50% allocation to each asset in our two-asset portfolio between the hedge fund and the Allan Gray balanced fund leads to a decrease in return, however, as in the previous case with the synthetic balanced fund, the market neutral portfolio return improves with a slightly higher standard deviation compared to the optimisation with no restriction.

Optimal Allocation : 50%/50% restriction					
	Allocation	Portfolio Expected Return	Annual Standard Deviation	Sharpe Ratio	Sharpe Ratio Rank
Asset					
Allan Gray Balanced Fund	50%				
Hedge Funds					
Equity Long/ Short	50%	8,29%	0,29%	6,98	3
Market Neutral	50%	7,04%	0,15%	5,03	4
Multi-strategy	50%	7,98%	0,20%	8,53	2
Fixed Income	50%	8,66%	0,12%	20,19	1

Table 13: Allan Gray and Hedge funds 2010 to 2019: 50% allocation

When 50% is allocated to both the Allan Gray balanced fund and each of the hedge fund strategies, we find that the Equity long/short strategy delivers a return of 8,29%, higher than the previous period of assessment with a lower standard deviation of 0,29%. The Sharpe ratio of 6,98 ranks third compared to 1,96 between 2007 and 2023. The market neutral strategy returned 7,04% and a standard deviation of 0,15%, both slightly lower than the previous period. The portfolio Sharpe ratio is 5,03, higher than 2,8 however the portfolio ranked last in the 2010 to 2019 period.

The multi-strategy portfolio delivered an annualised return of 7,98%, a standard deviation of 0,2% and Sharpe ratio of 8,53 higher than 2,03, the portfolio ranks second in this case an improvement from the 2007 to 2023. The fixed income strategy ranks first with a Sharpe ratio of 20,19 a higher return of 8,66% and lower standard deviation of 0,12% in comparison with the previous period.

In conclusion, the Fixed income strategy delivers the highest Sharpe ratio over various periods of analysis due to the high return relative to low standard deviation.

4.5 Jensen's Alpha

Regulation 28 of the pension funds Act in south Africa, permits a 10% allocation to Hedge funds in South Africa. In this section we allocate 10% to a Hedge fund strategy and 90% to the Synthetic balanced fund and the Allan Gray Balanced Fund over the periods 2007 to 2023 and 2010 to 2019. Institutional investors are restricted to a 10% Regulation 28 allocation (Brierley, 2017). The optimisation processes this section will allocate 10% to hedge funds.

We calculate the CAPM return and compare this to the portfolio return to determine whether the portfolio generates an excess return (alpha) compared to CAPM, we further investigate which hedge fund strategy portfolio delivers the highest alpha.

4.5.1 Synthetic balanced fund and hedge fund strategy: 2007 to 2023

The Sharpe ratio and Jensen's alpha deliver more or less the same results, all portfolios with a 10% allocation to a hedge fund strategy deliver a higher Sharpe ratio and Jensen's alpha compared to a standalone synthetic balanced fund.

	90%Synthetic Balanced fund and 10% to hedge fund strategies					
	SBF & Equity Long/Short	SBF & Market Neutral	SBF & Multi Strategy	SBF & Fixed Income	Synthtic Bal. Fund (SBF)	ALSI
Average Annual Return	7,10%	7,01%	7,04%	7,22%	6,93%	6,54%
Annualised STD Dev	10,94%	10,52%	10,81%	10,55%	11,60%	
Risk free rate	6,58%					
Sharpe Ratio	0,05	0,04	0,04	0,06	0,03	
Ranking	2	3	3	1	4	
Beta	0,70	0,67	0,69	0,67	0,74	
CAPM Return	6,55%	6,55%	6,55%	6,55%	6,55%	
Alpha	0,55%	0,46%	0,49%	0,67%	0,38%	
Ranking	2	4	3	1	5	

Table 14: Synthetic Balanced fund and hedge fund strategy: 2007 to 2023

Between 2007 and 2023, the Equity long/short portfolio returned 7,10% with a standard deviation of 10,94%, a Sharpe ratio of 0,05 ranking second from the rest of the portfolio's, a beta of 0,70 which indicates how the return of the portfolio fluctuates relative to the market. The CAPM return is 6,55% generating an Alpha of 0,55% which is second from the rest of the portfolios in line with the Sharpe ratio.

The market neutral portfolio delivered a return of 7,01%, a standard deviation of 10,52%, Sharpe ratio of 0,04, beta of 0,67 slightly lower than the equity long/short portfolio, a CAPM return of 6,55% which is equal to the synthetic balanced fund and all hedge fund strategy portfolios. The excess return generated by the portfolio is 0,46% ranking last of all the portfolios. Multi-strategy delivered a similar return of 7,04%, a Standard deviation 10,81% and a Sharpe ratio just like the market neutral of 0,04.

The portfolio has a beta of 0,69, a CAPM return equal to the rest of the portfolios of 6,55%, leading to an alpha of 0,49%, higher than market neutral but lower than the equity long/ short. Finally, the fixed income strategy retuned 7,22%, higher than all the portfolio's, the second lowest standard deviation of 10,55%, a Sharpe ratio of 0,06, CAPM return of 6,55% in line with the rest of the portfolios. This leads to an alpha of 0,67%.

We note that the synthetic balanced fund compared to the portfolio's which include 10% of hedge fund strategies delivers the lowest return of 6,93%, the highest standard deviation

(11,60%) and beta (0,74), a CAPM return in line with the equity long/short, Multi strategy, market neutral strategy and fixed income portfolio. The portfolio delivered the lowest alpha (0,38%) of all portfolios.

4.5.2 Synthetic balanced fund and hedge fund strategy: 2010 to 2019

A period excluding both COVID and the global financial crises indicates Sharpe ratio's higher than the standalone balanced fund, however, the alpha generated by the market neutral portfolio is the lowest in this case.

	90%Synthetic Balanced fund and 10% to hedge fund strategies					
	SBF & Equity Long/Short	SBF & Market Neutral	SBF & Multi Strategy	SBF & Fixed Income	Synthtic Bal. Fund (SBF)	ALSI
Average Annual Return	7,78%	7,53%	7,71%	7,85%	7,62%	7,24%
Annualised STD Dev	8,20%	7,89%	8,03%	7,87%	8,70%	
Risk free rate	6,29%					
Sharpe Ratio	0,18	0,16	0,18	0,20	0,15	
Ranking	2	3	2	1	4	
Beta	0,68	0,66	0,67	0,65	0,72	
CAPM Return	6,94%	6,92%	6,93%	6,91%	6,98%	
Alpha	0,83%	0,61%	0,79%	**0,94%**	0,63%	
Ranking	2	5	3	1	4	

Table 15: Synthetic Balanced fund and hedge fund strategy: 2010 to 2019

Considering the same portfolios between 2010 and 2019, we find that the equity long/short portfolio returns 7,78% and a standard deviation of 8,20%, the former higher and the latter greater compared to the 2007 to 2023 period. The Sharpe ratio of 0,18 holds second rank, a beta of 0,68, CAPM return of 6,94% and ultimately an alpha o 0,83% greater than the previous period.

The Market neutral portfolio returned 7,53% higher than 7,01% and a standard deviation of 7,89% lower than 10,52%, a Sharpe ratio of 0,16, Beta of 0,66, a higher CAPM return of 6,92% and excess return of 0,61%. This strategy ranks last in this case closer to the Synthetic balanced fund. Multi- strategy delivered a return of 7,71%, a standard deviation of 8,03% and a Sharpe ratio of 0,18, all three measures improved compared to the previous period, a beta of 0,67, CAPM return of 6,93% and an alpha of 0,61%.

The Fixed income strategy returned 7,85%, with higher standard deviation during this period compared to 2,55% previously, A Sharpe ratio of 0,20, beta of 0,65, higher than the previous beta of 0,12, a CAPM return of 6,91% and a alpha of 0,94%, although lower, this is the highest

Alpha compared to rest of the portfolio's. The lower alpha is expected as the CAPM return is higher as a result of a higher beta.

The balanced fund delivered the second lowest alpha.

4.5.3 Allan Gray balanced fund and hedge fund strategy: 2007 to 2023

Similar to the synthetic balanced fund scenario both the Sharpe rate ratio and Jensen's alpha rank the portfolio's the same between 2007 and 2023.

	90% Allan Gray Balanced fund and 10% to hedge fund strategies					
	ABF & Equity Long/Short	ABF & Market Neutral	ABF & Multi Strategy	ABF & Fixed Income	Allan Gray Bal. Fund (ABF)	ALSI
Average Annual Return	6,96%	6,87%	6,90%	7,08%	6,77%	6,54%
Annualised STD Dev	8,43%	8,05%	8,32%	8,01%	8,83%	
Risk free rate	6,58%					
Sharpe Ratio	0,04	0,04	0,04	0,06	0,02	
Ranking	2	4	3	1	5	
Beta	0,43	0,40	0,42	0,41	0,44	
CAPM Return	6,56%	6,56%	6,56%	6,56%	6,56%	
Alpha	0,40%	0,31%	0,34%	**0,52%**	0,21%	
Ranking	2	4	3	1	5	

Table 16: Allan Gray balanced fund and hedge fund strategy: 2007 to 2023

When 90% is allocated to the Allan Gray balanced fund and 10% to each of the hedge fund strategies, the Equity long/short portfolio returns 6,96% , with a standard deviation of 8,43%, the Sharpe ratio of 0,04 is in line with the market neutral and multi-strategy portfolio, lower than the Fixed income strategy portfolio and marginally higher than the Allan Gray balanced fund. The portfolio beta is 0,43, with a CAPM return of 6,56% which is the same as all the other portfolio's including the Allan Gray balanced fund. The excess return of 0,40% ranks second after the fixed income in line with the Sharpe ratio.

The market neutral strategy returned 6,87% with a standard, deviation of 8,05%, Beta of 0,4 and the second lowest alpha of 0,31%. Third is the multi-strategy portfolio with a return of 6,90%, a standard deviation of 8,32%, beta of 0,42 and alpha of 0,34%.The fixed income portfolio delivered a slightly higher return of 7,08% with a fairly high standard deviation of 8,01%, a leading Sharpe ratio of 0,06, CAPM return in line with the rest of the strategies of 6,56% and an alpha of 0,52%, which ranked first.

In comparison to the standalone fund which delivered then lowest return and alpha (Allan Gray balanced fund), all hedge fund strategy portfolios ranked higher.

4.5.4 Allan Gray balanced fund and Hedge fund strategy: 2010 to 2019

The Sharpe ratio and Jensen's alpha provide slightly different results, in this case the market neutral has a return lower than the standalone balanced fund, leading to the lowest Sharpe ratio in line with the balanced fund and a Jensen's alpha lower than all portfolios as well as the balanced fund.

	90% Allan Gray Balanced fund and 10% to hedge fund strategies					
	ABF & Equity Long/Short	ABF & Market Neutral	ABF & Multi Strategy	ABF & Fixed Income	Allan Gray Bal. Fund (ABF)	ALSI
Average Annual Return	7,54%	7,29%	7,48%	7,62%	7,36%	7,24%
Annualised STD Dev	6,44%	6,17%	6,28%	6,08%	6,77%	
Risk free rate	6,29%					
Sharpe Ratio	0,19	0,16	0,19	0,22	0,16	
Ranking	2	3	2	1	4	
Beta	0,42	0,39	0,40	0,39	0,43	
CAPM Return	6,69%	6,66%	6,68%	6,66%	6,70%	
Alpha	0,85%	0,63%	0,81%	**0,96%**	0,66%	
Ranking	2	5	3	1	4	

Table 17: Allan Gray balanced fund and hedge fund strategy: 2010 to 2019

Over the 2010 to 2019 period of assessment, the equity long/short 7,54%, higher than 2007 to 2023 with lower volatility of 6,44%, a beta of 0,42, CAPM return of 6,69% and an alpha of 0,85%, higher than the previous alpha of 0,85%. The alpha ranks second to the other portfolios and the Allan Gray balanced portfolio, in line with the Sharpe ratio. The market neutral portfolio also delivered a higher return of 7,29%, volatility of 6,17%, an improvement from the previous period. The Sharpe ratio of 0,16 is the second lowest from the Allan Gray balanced fund, with a CAPM return of 6,66% and excess return of 0,63% which is higher than the previous period but of the lowest rank from 2010 to 2019.

The multi-strategy portfolio delivered a return of 7,48% with a lower standard deviation (6,28%) compared to the previous period in line with all portfolios. As per the trend so far, the fixed income portfolio delivered the highest return of 7,62%, a standard deviation of 6,08% and a marginally higher Sharpe ratio of 0,22. The beta of 0,39 is slightly lower than the previous period beta with a CAPM return (6,66%) equal to the market neutral portfolio and an alpha of 0,96% , an improvement from the previous period of assessment.

In this case the alpha delivered by the Allan Gray portfolio is the second lowest from the market neutral portfolio, the fund rand last between 2007 and 2023.

As expected, the Fixed income strategy consistently delivers the lowest beta due to the low correlation between equities and bonds compared to other strategies. The low beta results in a

CAPM return lower than that of the portfolio with a 10% allocation, leading to an increase in excess returns.

5. Conclusion and Recommendations

5.1 Concluding Remarks

This study has critically examined the role of hedge funds as an alternative asset class within traditional “balanced portfolios”, particularly in the context of South African investment strategies. From 2007 to 2023, the analysis highlights the potential benefits of incorporating hedge funds to enhance portfolio diversification and improve overall returns. Assessing the period between 2010 and 2019, we found the same result.

The findings indicate that certain hedge fund strategies, such as Fixed Income and Equity Long/Short, generate excess returns (alpha) compared to the Capital Asset Pricing Model (CAPM) benchmarks. The performance measures used - Sharpe ratio and Jensen's alpha- suggest that these strategies provide competitive returns and exhibit lower volatility relative to traditional equity investments. This highlights the value of hedge funds in mitigating risk while pursuing higher returns, although the highest alpha generated by the fixed income strategy is less than 2%.

Furthermore, this study shows that including a hedge fund in a diversified portfolio reduces the beta (systematic risk), as discussed in the literature.

In addition, the research aligns with the regulatory framework established by Regulation 28 of the Pension Funds Act, which permits a 10% allocation to hedge funds within retirement portfolios. This allowance presents an opportunity for investors to optimize their asset allocation by strategically incorporating hedge funds, thereby enhancing the risk-return profile of their investments.

In conclusion, incorporating hedge funds into balanced portfolios is feasible and advantageous for investors regardless of market conditions.

5.2 Recommendations

Due to time limitations of this research, it is our recommendation that future research investigate the weighting allocated to risk versus return when applying the optimisation function in Excel and whether other strategies, such as the hedge fund of funds, will yield improved results. As the investment landscape continues to evolve, this study's findings serve as a valuable guide for both individual and institutional investors aiming to achieve sustainable growth and stability in their portfolios.

References

1. Holler, J. (2012). *Hedge funds and financial markets,* (First ed.). Germany: Gabler Verlag

2. Cvitanic, J., Lazrak, A., Martellini, L., Zapatero, F. (2003). Optimal allocation to hedge funds: an empirical analysis. *Quantitative Finance*, *2003*(3), 28-29.

3. Bessler, W., Holler, J., Kurmann, P. (2012). Hedge funds and optimal allocation: Beysian expectations and spanning tests. *Financial Markets Portfolio Management, 2012*(26), 109-141.

4. Zietsman, K. (2020). Hedge funds can be a great diversifier. *Money Marketing, 2020*(1),13.

5. National Treasury, 2022, 'Pension Funds Act (24/1956): Amendments to Regulation 28 in terms of the pensions fund Act, *Government Gazette* 2230(46649), 1–6.

6. Bouvatier, V.,& Rigot, S.(2013). Pension funds' allocation to Hedge funds: an empirical analysis of US and Canadian defined benefit plans. *Applied economics, 2013*(45), 3701 - 3710.

7. Bernstein, (2005). Hedge Funds: Finding the right allocation. *The Berstein Journal: Perspectives on Investing and Wealth Management*, 12-17.

8. Martins, S. (2020). Allocating a portion of savings to Hedge funds. *Money Marketing Journal*, 2020(7), 16.

9. Eling, M. (2008). Does the measure matter in the mutual funds industry?. *Financial Analysts Journal, 64*(3*)*, 54-66.

10. Markowitz, H.(1952). Portfolio Selection. *Journal of Finance, 7* (1), 77-91.

11. Iqbal, Dr.(2011). Relevance of Capital Asset pricing model: A Review. *Journal of Banking, Financial services and Insurance Research, 1*(2), 85 -97.

12. Verma, M.,& Hipara, J.R.(2016).Performance evaluation of portfolio using the Sharpe, Jensens and Treynor methods. *Scholars Journal of Economics, Business and Management, 3*(7), 382-390.

13. Kephart, J. (2024, June 12). *The best balanced funds*. https://www.morningstar.com/funds/best-balanced-funds

14. Franklin Templeton, (April 2022). *All you need to know about balanced funds.* https://www.franklintempletonindia.com/knowledge-centre/quick-learn/new-to-mutual-funds/video/all-you-need-to-know-about-balanced-funds

15. Asisa, 2019. *Investment fundamentals 2.* 1 - 11

16. 36One Asset Management. Understanding Hedge funds in South Africa. https://www.36one.co.za/articles/understanding-the-hedge-fund-industry-in-south-africa

17. Hedge News Africa. (May 2024). *South African Hedge Fund Assets near R 90 Billion*. https://hedgenewsafrica.com/news/2024/05/01/sa-hedge-fund-assets-near-r90-billion/

18. Novare Annual South Africa Hedge Fund survey, (2023). https://novarecis.co.za/docs/gen/Novare-Hedge-Fund-Survey-2023.pdf

19. Peiler, S.(2016). How keen are South Africans on retail investor hedge funds?. *Money Marketing Journal, 2016*(7*)*, 26.

20. Atleha- Edu, (2022). Hedge funds: protecting retirement fund returns. *Personal Finance, 2022*(502*)*, 17-19.

21. Opperman, W. (2017). Defining hedge funds. *Money Marketing, 2017*(7*)*, 16.

22. Cobbet, J. (2005). Hedge fund ABC. *Personal Finance, 2005*(293*)*, 11-12.

23. Nhambiri, P.,& Ngwenza, D.(2021).Hedge funds and their benefits. *Money Marketing, 2021*(7), 1.

24. Cameron, J. (2004). Hedge funds versus other funds. *Money Newsletter, 2004*(12*)*, 4.

25. Joosub, R. (2020). The role of multi-asset hedge funds to improve risk-adjusted returns. *Money Marketing, 2020*(7*)*, 20.

26. Brierley, S. (2017). The story of hedge funds. *Money Marketing, 2017*(7*)*, 18.

27. Van der Nest, M. (2020). Hedge funds shine through investment gloom. *Money Marketing, 2020*(7*)*, 20.

28. Blay, K. (2024). From portfolio selection to portfolio choice: Remembering Harry Markowitz. *Journal of Portfolio Management, 50*(8*)*, 1-15.

29. Chapinduka, T. (2015). Fully regulated environment for hedge funds: investing hedge funds. *Money Marketing, 7*(1), 20.

30. Ackermann, C., McEnally, R. & Ravenscraft, D. (1999). The performance of hedge funds: risk, return and Incentives. *The Journal of Finance,54*(3), 833-874.

31. Capocci, D., & Hubner, G. (2004). Analysis of hedge fund performance. *Journal of Empirical Finance,11*(1),55-89.

32. Fung, W. (2001). The risk in hedge fund strategies: theory and evidence from trend followers. *The review of financial studies, 8*(4), 313-341.

33. Falkowski, M., Sierpinska-Sawicz, A, & Szczepankowski, P. (2020). The effectiveness of hedge fund investment strategies under various market conditions. *Contemporary Economics, 14*(2), 127-143.

34. Edify Fund Managers (2025). The role of hedge funds in modern portfolio's: a data driven analysis. *Hedge News Africa,* 20 January 2025, 1.

35. Wagenaar, E. (2025). Are hedge funds really high risk? A South African Perspective. *The Quarterly Journal of African Alternatives and Hedge Fund Community, 6*(8), 10-11.

36. Hedge News Africa. (June 2024). *The Role of Hedge Funds in a balanced portfolio*. https://hedgenewsafrica.com/the-reading-room/2024/01/15/the-role-of-hedge-funds-in-a-balanced-portfolio/

37. Novare. (May 2025). *Why Hedge Funds Belong in Every Smart Investors Portfolio*. https://www.peregrine.co.za/insights/why-hedge-funds-belong-in-every-smart-investor-s-portfolio/

38. CFA Institute. (June 2024). *Hedge Funds: A Poor Choice for Most Long-Term Investors.* https://blogs.cfainstitute.org/investor/2024/06/26/hedge-funds-a-poor-choice-for-most-long-term-investors/