MCom

Responsible Investing in South African Collective Investment Schemes: An Analysis of Performance

A Dissertation

presented to

The **Development Finance Centre (DEFIC)**

Graduate School of Business

University of Cape Town

In partial fulfilment

of the requirements for the Degree of

Master of Commerce in Development Finance

by

Charlie Killingbeck

KLLCHA007

December 2021

Supervisor: Assoc./Prof. Abdul Latif Alhassan

Plagiarism Declaration

1. I certify that I have read and understand the Commerce Faculty Ethics in Research Policy. http://www.commerce.uct.ac.za/Pages/ComFac-Downloads

2. I certify that I have read the General Rules and Policies Handbook (Handbook 3) regarding Student Rules of Academic Conduct: RCS1.1 to RCS3.2 and Rules Relating to examinations G20.1 to G22.2.

3. I certify that I have read and understand the document, "Avoiding Plagiarism: A Guide for students".

4. This work has not been previously submitted in whole, or in part, for the award of any degree in this or any other university. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed, and has been cited and referenced.

5. I authorise the University of Cape Town to reproduce for the purpose of research either the whole or any portion of contents in any manner whatsoever.

Student number	KLLCHA007
Student name	Charlie Killingbeck
Signature of Student	
Date	31/10/2021

Table of Contents

Acknowledgements

I would like to thank the Development Finance Centre (DEFIC), and the wider Graduate School of Business for their support over the duration of my degree. In association with this research a specific thank you to Assoc./Prof. Abdul Latif Alhassan, whose expertise and guidance has made it possible.

List of Figures

List of Tables

Abstract

Estimates suggest that a $3.3 – $4.5 trillion financing gap exists if we are to meet the SDG goals by 2030. Public funding alone cannot meet this target, private capital needs to be mobilised. Impact investing has the potential to bridge this gap, providing measurable real-world impact alongside financial performance. However, the empirical effect of impact investing on financial performance appears under researched. This study sought to identify if funds, and investors, accept a trade-off between impact and financial performance among Collective Investment Schemes (CISs) domiciled in South Africa. The quasi-experimental design, with the two methods of analysis being a non-parametric ANOVA and multiple regression (OLS and fixed effects) were employed to analyse data on 1,106 South African Collective Investment Schemes over three- and five-year investment periods.

The results indicate a weak relationship with the absolute returns performance measure, both positive and negative, but fail to establish a relationship for volatilities and risk-adjusted returns. The latter suggests that measurable real-world impact can be attainted alongside financial performance. These findings will improve individual investor's and investment manager's understanding of responsible investing, ESG factors and the relationship with risk and returns and, importantly, they indicate the financial performance barrier does not appear to exist in South African CISs.

List of Abbreviations

ANOVA	Analysis of Variance
APT	Arbitrage Pricing Theory
ASISA	The Association for Savings & Investment South Africa
AUM	Assets Under Management
BEE	Black Economic Empowerment
CAPM	Capital Asset Pricing Model
CIS	Collective Investment Scheme
CISCA	Collective Investment Schemes Control Act
ESG	Environmental, Social, Governance
FCIS	Foreign Collective Investment Scheme
FSCA	Financial Services Conduct Authority
FTSE/JSE	FTSE Russell and the Johannesburg Stock Exchange
GIIN	Global Impact Investment Network
GSIA	The Global Sustainable Investment Alliance
IMP	Impact Management Project
IRR	Internal Rate of Return
MPT	Modern Portfolio Theory
OLS	Ordinary Least Squares
PE	Private Equity
PRI	Principles for Responsible Investment
RI	See SRI
RIAA	Responsible Investment Association Australasia
SDG	Sustainable Development Goal
SRI	Socially Responsible Investment
TDI	Targeted Development Investment
UN	United Nations
VC	Venture Capital
ZAR	South African Rand

Chapter 1: Introduction

1.1 Study Background

The UN report, *Unlocking SDG Financing* (2018), estimates that a $3.3 – $4.5 trillion financing gap exists if we are to meet the SDG goals by 2030. £2.5 trillion of which is needed in developing regions. It has been widely accepted that public funding alone cannot meet this target, private capital needs to be mobilised. Impact investing has the potential to bridge this gap, providing measurable real-world impact alongside financial returns.

Numerous barriers to a mainstream adoption of impact investing have been identified through various market surveys, including; limited investment opportunities, lack of coherent impact measurement, and lack of advisory knowledge. The most common and reoccurring barrier identified is investment performance. (Bouri, Mudaliar, Schiff, Bass, & Dithrich, 2018; Huppé & Silva, 2013; Kotsantonis, Pinney, & Serafeim, 2016).

Investigating the performance barrier, several studies have evaluated impact of environmental, social, and governance (ESG) integration and screening on the risk-returns relationship of individual stocks, funds and indices. The results of which are mixed and incoherent (Revelli & Viviani, 2015). However, these strategies fail to generate measurable real-world impact, and thus, they do not contribute to the *2030 Agenda for Sustainable Development* (UN, 2015). Academia has yet to address whether real-world impact and financial performance are independent, a common view among impact investors. A hypothesis which can only be tested through a comparison of all responsible investing strategies.

Capital market theories conflict on the topic. Classic models, portfolio theory and capital asset pricing models (CAPM), suggest returns should decrease, whilst arbitrage pricing theory (APT) implies a greater opportunity for returns to earned. Under efficient market hypothesis, ESG factors represent a new information set, however, empirical evidence suggests it is not priced into markets (Giese, Lee, Melas, Nagy, & Nishikawa, 2017; Gregory, Stead, & Stead, 2020; Maiti, 2020; Pollard, Pollard, Sherwood, & Klobus, 2017). Therefore, active investors should be able to use ESG information to earn above market returns. The theories are clouded further when private investors are introduced, typically

they earn risk premiums on liquidity and informational asymmetries. However, private responsible investors dominate the impact and thematic strategies, associated with lower returns.

Focussing on South African responsible investors, this quasi-experimental study evaluates the impact of responsible investment strategies on risk, returns and risk-adjusted returns, over three- and five-year periods. To identify if risk-adjusted returns achieved by responsible investors are independent from real-world impact.

1.2 Research Problem

Responsible investing is an umbrella term used to define a wide range of investment strategies that incorporate ESG (Environmental, Social, and Governance) factors (RIAA, 2018). One end of the scale is traditional investment, which seeks the maximise performance with little or no consideration of ESG factors. At the other end is philanthropic investing, which aims to maximise ESG impact with little or no regard for performance.

Empirical literature focussing on responsible investing has thus far has analysed the relationship between ESG factors, risk and returns under two strategies: ESG integration (Nagy, Kassam, and Lee, 2015) and screening (Verheyden et al. 2016, Auer & Schuhmacher 2016, Gelma, Plantinga & Scholtens 2008). Conclusions from these studies vary, however when the body of research is considered no significant differences are found between responsible strategies and traditional investing (Revelli & Viviani, 2015). Supporting the general consensus is the market's adoption of these two strategies, which account for 95% of responsible assets under management (AUM) (GSIA, 2019). However, these investment strategies apply a "do not harm" approach to investing rather than a "contributing to solutions" approach (Impact Management Project (IMP), 2021).

"Do not harm" strategies, are those which seek to minimise risk exposure by ensuring investee companies are behaving responsibility and meet regulatory requirements. For example, they may have strategies in place to reduce carbon emissions or pay staff appropriate wages in accordance with a benchmark piece of regulation. On the other hand, strategies "contributing to solutions" solely invest in organisations which target pressing social or enviromental issues. For example, postively contributing to health or educational outcomes for underserved populations (Impact Management Project (IMP), 2021).

Incorporating three-dimensional frameworks (risk-return-impact), such as those proposed by the PRI (2018) and IMP (2021), and ensuring a "contributing to solutions" approach to the investment decision making process provides a significant opportunity to address sustainability issues and help achieve the *2030 Agenda for Sustainable Development* (UN, 2015). Such is the intention of impact investing strategies.

Despite the SDG's widely accepted importance and urgency of meeting the *2030 Agenda for Sustainable Development* (UN, 2015), capital has been reluctant to adopt investing strategies that have a net positive real-world impact. Impact Funds AUM currently stand at $502 billion (Mudaliar & Dithrich, 2019), 1.5% of responsible AUM or 0.4% of global AUM. Several barriers have been identified explaining this phenomenon, foremost is the perceived negative relationship between these strategies and financial performance (Bouri et al., 2018; Huppé & Silva, 2013; Kotsantonis et al., 2016). Indeed, this is how the Capital Asset Pricing Model (CAPM) predicts markets will react (Dam & Scholtens, 2015; Fabozzi, Markowitz, Kolm, & Gupta, 2011; Heinkel, Kraus, & Zechner, 2001; Mackey, Mackey, & Barney, 2007). Conversely, arbitrage pricing theory (APT) suggests that incorporating ESG data improves an investor's ability to identify mis-priced securities, increasing arbitrage opportunities and potential returns (Giese et al., 2017; Gregory et al., 2020; Maiti, 2020; Pollard et al., 2017).

Most impact investors are seeking market rate returns (Mudaliar & Dithrich, 2019). Implying that there is no trade-off between real-world impact and financial performance. Despite this and the potential to bridge the SDG financing gap, limited research to date has analysed the risk-return relationship for impact strategies. To the best of the authors' knowledge, the only study thus far published in this area of research is that of Barbera, Morsebc, and Yasudaa (2021) which finds that impact venture capital funds (VC) earn returns (IRR) 4.7 percentage points below traditional VC funds. The investors themselves exhibit a willingness to pay for impact, accepting IRRs between 2.5 – 3.7 percentage points lower. When considered with the findings of Mudaliar & Dithrich's (2019), there is a clear disconnect between investors' return expectations and those delivered by impact funds.

Beyond Barbera, Morsebc, and Yasudaa's (2021) research, academic literature remains inconclusive on the independence between real-world impact and financial performance,

hence the need further investigations. By addressing such a limitation in the literature, this research aims to support investment markets to better understand the risk and return profiles of the differing strategies and in doing so creating a more efficient allocation of resources to match investors preferences and risk-return-impact profiles. Against this background, this research seeks to answer the following broad question:

Do funds, and investors, accept a trade-off between impact and financial performance?

1.3 Research Objectives and Hypotheses Statements

The objective of the research is to examine the performance and real-world impact achieved by responsible retail funds in South Africa. The research will be conducted on three measures of performance Returns, Risk, and Risk-adjusted Returns. Thus, the objective can be distilled to three sub-objectives:

O_1: To examine the effect of responsible investing strategies on returns in South African retail funds (Collective Investment Schemes or CISs).

O_2: To examine the effect of responsible investing strategies on volatilities (Risk) in South African retail funds (CISs).

O_3: To examine the effect of responsible investing strategies on risk-adjusted returns in South African retail funds (CISs).

The three sub-objectives can be described by the following sets of hypothesis statements:

H_o: Responsible Investing Strategies have no effect on South African retail fund (CISs) returns.

H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) returns.

H_o: Responsible Investing Strategies have no effect on South African retail fund (CISs) volatility.
H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) volatility.

H_o: Responsible Investing Strategies have no effect on South African retail fund (CISs) risk-adjusted returns.
H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) Risk-adjusted returns.

1.4 Justification

Academia thus far has focussed on the relationship between ESG factors, risk and returns under two strategies; ESG integration and screening (Nagy, Kassam, and Lee, 2015; Verheyden et al. 2016; Auer & Schuhmacher 2016; Gelma, Plantinga & Scholtens 2008). Conclusions from these studies vary, however when the body of research is considered no significant differences are found between such strategies and traditional investing (Revelli & Viviani, 2015). The capital market theories are equally ambiguous; CAPM suggesting a negative relationship between returns and ESG, whilst APT theories suggest ESG increases investors ability to predict returns and arbitrage opportunities (Dam & Scholtens, 2015; Fabozzi, Markowitz, Kolm, & Gupta, 2011; Heinkel, Kraus, & Zechner, 2001; Mackey, Mackey, & Barney, 2007; Giese et al., 2017; Gregory et al., 2020; Maiti, 2020; Pollard et al., 2017). This study contributes to these existing areas of research by reviewing the problem under a different design, considering the full spectrum of responsible investing strategies, and focussing on a new geographic area: South Africa. Little research, beyond Barbera, Morsebc, and Yasudaa's (2021), has compared the risk-return relationship across the spectrum of responsible investment strategies. This paper aims to fill this gap in the literature by performing statistical analysis on returns, risk and risk-adjusted returns of South African CISs across all four major responsible investing strategies.

Outside of academia, the primary stakeholders of this study are; responsible investors, both individuals and institutions; South African CISs; and asset managers. The study will improve individual investor's and investment manager's understanding of responsible

investing, ESG factors, and the relationship with financial performance. Refining asset allocation and risk-profiling to better reflect investors utility functions. If no statistical differences are identified, the claims of impact investors that financial returns are independent for real-world impact will be bolstered. Expanding their ability to raise capital increasing the allocation of responsible AUM to high-impact strategies. This reallocation of capital to higher impact strategies will help to bridge the $3.3 – $4.5 trillion financing gap to fulfil the *2030 Agenda for Sustainable Development* (UN, 2015).

1.5 Scope

The scope of the study has been limited Collective Investment Schemes (CISs) domiciled in South Africa. Foreign Collective Investment Schemes (FCIS), private and institutional funds have been excluded from the study, this decision was made for two reasons; the ease and convenience of data collection on retail funds and the lack of comparability of funds domiciled in differing jurisdictions due to regulatory differences.

1.6 Limitations

The quasi-experimental design raises threats to the validity of the study. However, the study has considered the impact of the threats of omitted variables and non-randomised grouping. The threats are concluded to have a minimal impact once the scope of the study and sample sizes are considered.

Data collection on the responsible investing strategy was limited due to a lack of published data on this fund characteristic. South African CISs are not required to report on their specific strategy. Data was compiled from several sources including the PRI and Alexander Forbes.

Finally, the study was limited to A-share classes. Often funds will list multiple share class with differing shareholder rights attached. Where this was the case additional share classes were removed from the data set to avoid any duplication of data points.

1.7 Organization of the study

Chapter 1: Introduction to Research

Chapter 1 provides an introduction and background to responsible investing, identifies the research problem, and justifies the research. The research questions, objectives, hypotheses, scope, and limitations are defined.

Chapter 2: Literature Review

Chapter 2 explores the existing literature. Defining key concepts of sustainability and responsible investing and reviewing the body of theoretical and empirical literature on responsible investing. Exploring in detail the differing responsible investing strategies available to CISs. In the context of the study, the responsible investing market of South Africa and the barriers to the adoption of impact investing are explored specifically.

Chapter 3: Research Methodology

Chapter 3 describes the research approach and design. Defining the sample, data sources, and the key variables for the study. The methodologies for the analysis of the collected data are described, as are the tests to ensure data integrity and conformity.

Chapter 4: Analysis & Results

Chapter 4 provides an insight into the data collected through descriptive statistics and statistical analysis via the methods described in Chapter 3. The results of the analysis are described, and implications of the findings discussed.

Chapter 5: Conclusions and Recommendations

Chapter 5 reviews the research conducted in the preceding chapters and reaffirms the limitations. In response to the research questions and objectives, recommendations are made to the stakeholders of the study.

Chapter 2: Literature Review

2.1 Introduction

Chapter 2 explores the existing literature. Defining key concepts of sustainability and responsible investing and reviewing the body of theoretical and empirical literature on responsible investing. Exploring in detail the differing responsible investing strategies available to CISs. In the context of the study, the responsible investing market of South Africa and the barriers to the adoption of impact investing are explored specifically.

2.2 Definition of Concepts

2.2.1 Sustainability

The concept of sustainability was defined by the *Brundtland Report* (WCED, 1987) as development that "*meets the needs of the present without compromising the ability of future generations to meet their needs*". The same report highlighted the north-south development divide, whilst significant strides have been made, sadly the divide exists 30 years on.

Three development pillars were subsequently defined; economic, environmental, and social. Today they are more commonly referred to as people, planet, profit, and widely known as the Sustainable Development Goals (SDGs). The *2030 Agenda for Sustainable Development* set the 17 SDGs and 169 targets building on the previous work of the Millennium Development Goals (UN, 2015).

The UN report, *Unlocking SDG Financing* (2018), estimates that a $3.3 – $4.5 trillion financing gap exists if we are to meet the SDG goals by 2030. £2.5 trillion of which is needed in developing regions. It has been widely accepted that public funding alone cannot meet this target, private capital needs to be mobilised. Emphasis is being placed on impact investing and blended finance to support this goal.

A major problem that private capital has with the sustainability concept is the inherent contradiction. Critics are often quick to point to the trade-offs between each pillar which make sustainable development unachievable (Hansmann, Mieg, & Frischknecht, 2012). The most publicised trade-offs are profit-people and profit-planet. The latter can be rephrased as economic development at the cost of the environment, the energy sector

burning fossil fuels, for example. The former as economic development at the cost of social development, one might consider the retail industry and its use of sweat-shops.

Two overarching concepts define how capital should be allocated to minimise such conflicts; corporate sustainability and responsible investing[1]. Corporate sustainability describes how firms deploy capital and create stakeholder value through an environmental and social strategy (Kotler & Lee, 2005). Responsible investing is a strategy which incorporates environmental and social factors into the capital allocation decision process. This paper is focusses on the latter; responsible investing.

2.2.2 Responsible Investing

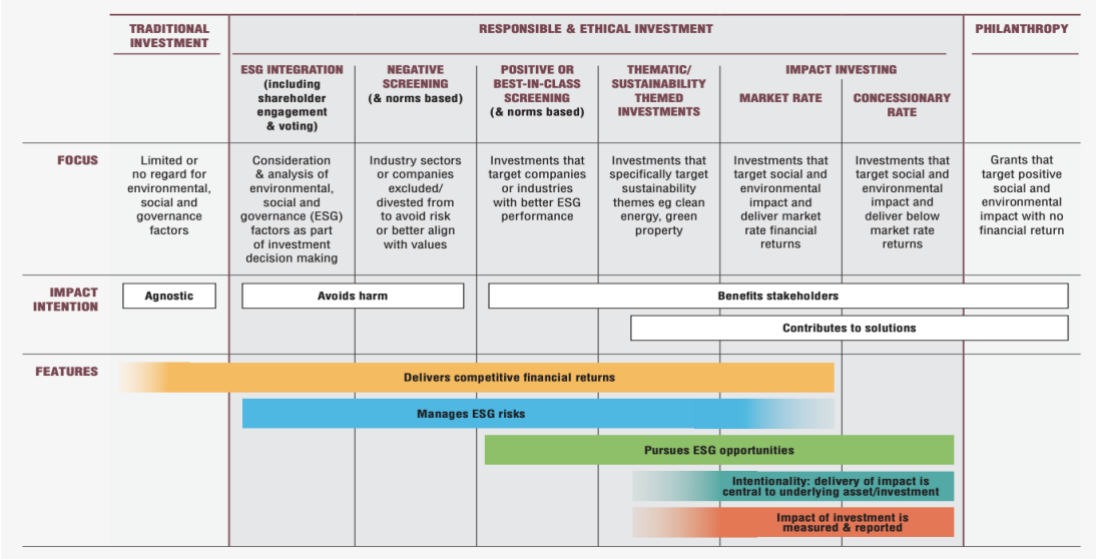
Responsible investing is linked to sustainability at its core. The PRI is a global body formed in 2005 with the support of the UN and the goal of promoting the principles of responsible investing. It defines responsible investment as a *"practice to incorporate environmental, social and governance (ESG) factors in investment decisions and active ownership"* (PRI, 2019a, p. 4).

Traditionally investment decisions have been based on fundamental and technical information. Fundamental information related to company performance measured by financial statements, whereas technical information comprises of the historical market information. ESG information is an additional informational set that can be used in the investment decision making process (Verheyden, Eccles, Fenier, & Arabesque Partners, 2016).

Responsible investing is an umbrella term used to define a wide range of investment strategies that incorporate ESG factors (**Figure 1**). One end of the scale is traditional investment, which seeks the maximise financial performance with little or no consideration of ESG factors. At the other end is philanthropic investing, which aims to maximise ESG impact with little or no regard for financial performance.

[1] The terms "responsible investing", "socially responsible investing", and "sustainable investing" are used interchangeably in academia and the finance industry.

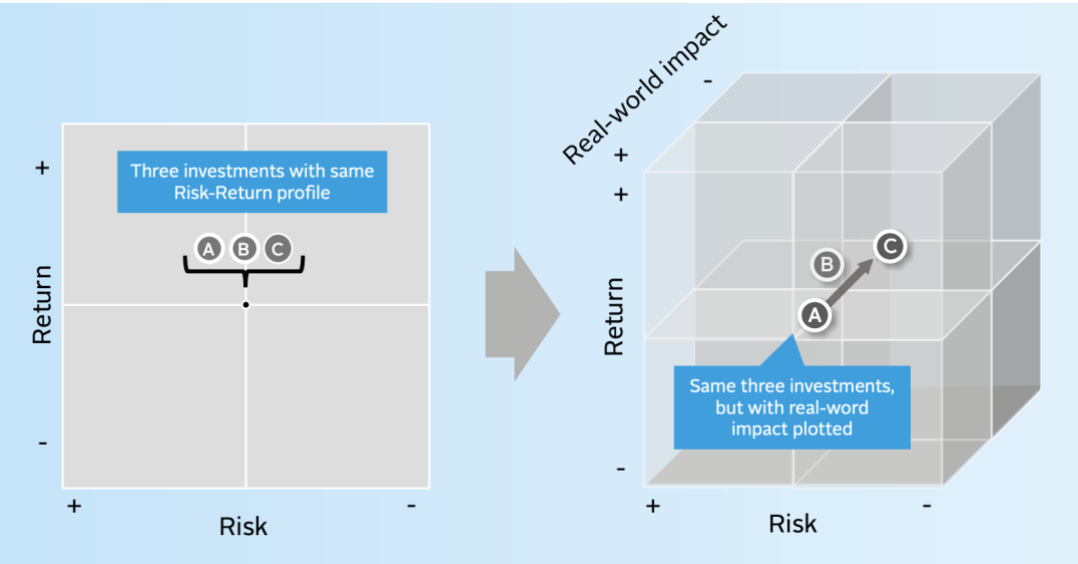
***Figure 1**: Investment Strategy Spectrum*



Obtained from the RIAA (2018)

Moving from left to right on the responsible investment strategy spectrum (**Figure 1**) the ESG factors are incorporated with greater complexity and often include elements of the previous strategy. **Figure 2** resents this in a three-dimensional model. Traditional investment is considered in two-dimensional risk-return model whereby investors are rewarded for taking on greater risk with returns. The PRI (2018) suggest incorporating ESG factors creates a third dimension: "real-world impact". The extent to which the third dimension is considered by an investment manager depends on the strategy employed.

***Figure 2**: Responsible Investing's Third Dimension*

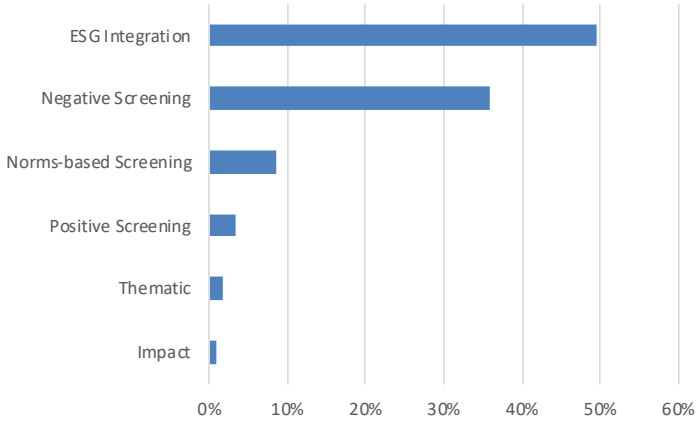


Obtained from PRI (2018, p. 8)

The Global Sustainable Investment Review (GSIA, 2019, p. 7) estimated that global responsible assets under management ("AUM") reached $30.7 trillion in 2018, growing 34% since 2016 (biennial report). The report focusses on five regions; Europe, US, Japan, Canada and Australasia. However, collaborating with the Bertha Centre at the University of Cape Town and the PRI, data was provided for Africa and Latin America respectively, bringing the total responsible AUM to $32.3 trillion.

Figure 3 breaks down the responsible AUM by investment strategy, which in turn, can be reduced to four categories: integration, screening, thematic investing, and impact investing. All seek to eliminate sub-optimal investment choices based on at least one ESG factor, however, subtle differences exist, and certain characteristics enable these classifications.

***Figure 3**: AUM by Strategy.*



Data from GSIA (2019)

Depending on your source, responsible AUM now account for 25 – 35% of total AUM (Fages et al., 2019; PWC, 2017). This represents a significant improvement since the formation of the PRI. However, this growth in responsible investing appears not to have addressed the SDG financing gap.

2.2.3 Collective Investment Schemes

A Collective Investment Scheme (CIS) is a retail investment fund in South Africa, regulated by the Collective Investment Schemes Control Act (CISCA) and overseen by the Financial Services Conduct Authority (FSCA). The latest report by the FSCA on CISs was carried out in 2017. It showed that as at 31 December 2017 there were 1,612 approved South African CISs operating with assets under management of ZAR 2,624 billion (FSB, 2017).

The Association for Savings & Investment South Africa (ASISA) is a not-for-profit organisation representing the savings, investment, and insurance industries. Data from ASISA shows that there were 1,669 approved local CISs operating at 31st March 2021 (ASISA, 2021). A local CIS being incorporated in South Africa, opposed to a Foreign Collective Investment Scheme (FCIS) which is a scheme domiciled outside South Africa but approved for financial promotion in South Africa. ASISA are responsible for CIS fund classifications. They classify funds under two tiers: Geographical and Asset Class (**Table 1**). These classifications are used throughout this research.

Tier	Classification	Description
Geographical	South African	Invest at least 60% of their assets in South African investment markets.
	Worldwide	No limits set for either domestic or foreign assets.
	Global	Invest at least 80% of their assets outside South Africa.
	Regional	Invest at least 80% of assets in a specific country outside South Africa.
Asset Class	Equity	Invest a minimum of 80% of the market value of the portfolios in equities.
	Multi Asset	Invest in a wide spread of investments in the equity, bond, money and property markets.
	Interest Bearing	Invest exclusively in bond, money market investments and other interest earning securities.
	Real Estate	Invest in listed property shares, collective investment schemes in property and property loan stock and real estate investment trusts.

***Table 1**: ASISA Classifications (ASISA, 2018)*

2.3 Responsible Investing Strategies

Responsible investing is an umbrella term used to define a wide range of investment strategies that incorporate ESG factors. Moving through the strategies ESG factors are incorporated with greater complexity and often include elements of the previous strategy. This sub-section explores each strategy in greater detail.

a) ESG Integration

Integration considers ESG factors in the investment decision making process to better manage risks and improve returns. Analysis is performed on at least one ESG factor alongside the traditional due diligence process (PRI, 2019a).

The motivations behind the ESG integration varies between studies but include; portfolio risk reduction (van Duuren, Plantinga, & Scholtens, 2016), improved portfolio performance (Amel-Zadeh & Serafeim, 2018), and client demand (Orsagh, 2015). Sherwood & Pollard (2019) explain the primary motive is to manage the risk-adjusted returns ("α" or "alpha") and fund volatility.

ESG integration can therefore be considered a two-dimensional model. Very little weight is given to the third dimension, ESG factors are used as indicators for risk or returns rather than considering and measuring the real-world impact these factors may have. They can be considered "do not harm" strategies (IMP, 2021).

Whilst almost 50% of responsible assets fall into this category, there is a significant gulf in asset managers application of the strategy (GSIA, 2019). Only 21% of surveyed investors used a fully integrated strategy, defined as a "*systematic and explicit inclusion of ESG risks and opportunities in investment analysis"* (Eccles & Kastrapeli, 2017, p. 11). This is consistent with the findings of van Duuren et al. (2016) who's survey gave an average ESG score of 2.33 (standard deviation = 0.77). The second category being investors who had ESG factors in the back of their minds or believed that the financials where pre-adjusted. They go on to find that 67%[2] of investment managers used ESG integration practises to proactively manage risk and 58%[2] to retrospectively manage risk. Conversely, the CFA Institute (Orsagh, 2015) identified that 57% of their respondents utilised a fully integrated

[2] Respondents were able to provide more than one answer. Therefore, results do not equal 100%.

strategy but went on to show that only 28% provide staff with formal training on the use of ESG factors and that 75% use only publicly available information. These results point to a lack of understanding of ESG integration strategies and the varying degrees of complexity which ESG factors are, or are not, incorporated with.

b) ESG Screening

Screening encompasses three of the strategies, positive screening, negative screening, and norms-based screening. All these strategies entail the systematic elimination a sub-set of investments based on ESG criteria (PRI, 2019b). **Table 2** outlines the differences between strategies.

Screening is often attributed as the original responsible investing strategy. Early ethical investors, religious bodies and non-profit organisations were negatively screening investee companies or funds which conflicted with their beliefs (Kotsantonis et al., 2016; Sherwood & Pollard, 2019). Subsequently, the strategy evolved into the mainstream with investors boycotting regions, i.e. South Africa during the apartheid (norms-based) (Knoll, 2002; Sherwood & Pollard, 2019). The latest development is positive screening. Together these strategies now account for 47% of responsible AUM.

Negative and norms-based screening originally were employed to minimise investment managers policy risk, the risk of non-compliance with an investment mandate (Sherwood & Pollard, 2019). However, more recently screens have been adapted for ESG factors. Asset managers by eliminating the worst ESG performing investments are reducing the combined risk of the remaining assets (Lee, Humphrey, Benson, & Ahn, 2010; Verheyden et al., 2016). They can be considered "do not harm" strategies (IMP, 2021).

Positive ESG screening, the least used screening method by AUM, is used not to minimise risk but rather to identify the investee companies which are creating the most impact. This subtle difference moves an investor from considering the two-dimensional relationship between risk and ESG factors to considering a three-dimensional relationship between financial performance and ESG factors. Postive screening is the first strategy that can be consided as a strategy which is "contribution to solutions" (IMP, 2021).

Screening begins to consider the investment decision under the three-dimensional model, although this is done in stages. Firstly, the real-world impact or ESG factors are used to elimate investments. Subsequently, the investment decision is considered under the two-dimensional risk-return model.

Table 2: *Definitions of Screening Strategies*

Screening Category	Description	
Positive	Selection / elimination of investments that are / are not best-in-class, with respect to ESG factors. Performed at a sector, company or project level.	Most restrictive
Norms-based	Elimination of investments that do not meet a minimum commitment to international laws (norms). This includes but is not limited to the; Universal Declaration of Human Rights, International Labour Organization Standards, and the United Nations Convention Against Corruption.	
Negative	Elimination of investments that do not meet a minimum ESG criteria. Performed at a sector, company or project level.	Least restrictive

Adapted from PRI (2017)

c) Thematic Investing

ESG themed investments or funds seek assets that address specific sustainability issues. Funds can either target broad themes, one or more of the three pillars for example, or they can focus on narrower goals such as a specific SDG (PRI, 2017). The themes are chosen as they are perceived to benefit most from sustainable practises, increasing returns (Whittaker, Spinoso, Lee, Stiehler, & Müller, 2018).

Thematic investing is a pervasive positive screening strategy and as such is concerned with the relationship between ESG factors and financial performance in the long term. The top 5 “megatrends” according to BlackRock Investment Management are; urbanisation, climate change, resource scarcity, demographic change and social change (BlackRock, 2021). All of which are linked to sustainability and the SDGs.

Bérubé, Ghai and Tétrault (2014) discuss thematic strategies and identify three key motivations for its use; alpha can be generated at scale as capital is concentrated, knowledge of specific theme improves increasing the efficiency of capital deployment, and it allows investors to pursue hunches about long-term trends.

Thematic funds are the first strategy to consider investments wholly under the three-dimensional model, risks and returns are considered alongside maximising real-world impact in pursuit of the fund's themes.

d) Impact Investing

Impact investment is an investment strategy whereby "*investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return.*" (GIIN, n.d.). This implies measurement and monitoring of both financial and non-financial returns post investment. A traditional investor divests from an asset providing weak financial performance, whereas an impact investor will divest from an investment if it either has weak financial or non-financial performance

PRI and others often consider impact funds a subset of the thematic strategies due to the similarities in the pre-investment process. However, bodies such as GIIN and GSIA are separating out the classification based on the post-investment measurement of ESG returns.

This strategy can be broken down into two categories depending on the returns sought; market returns or below market returns. The 2019 survey by GIIN (Mudaliar, Bass, Dithrich, & Nova, 2019) showed that 66% of impact investors were seeking market returns, the remaining 44% accepted below market financial returns. This is supported by data showing that only 9% of impact investors are underperforming financially and 2% are not meeting impact targets. The survey also explored investor motivations with the following factors being identified as important; commitments to being responsible investors and generating a non-financial return (97%), client demand (85%) and financially attractive deals (74%). These motivations mirror the motivations of investors who pursue ESG integration (Amel-Zadeh & Serafeim, 2018; Sherwood & Pollard, 2019; Orsagh, 2015).

Impact investment is the only responsible strategy which actively targets and measures social and environmental change; therefore, it is the only one addressing the SDG funding gap and seeking to create the positive sustainable change required to meet the *2030 Agenda for Sustainable Development* (UN, 2015). Impact Fund assets under management currently stand at $502 billion (Mudaliar & Dithrich, 2019), a small proportion of the $32.3 trillion

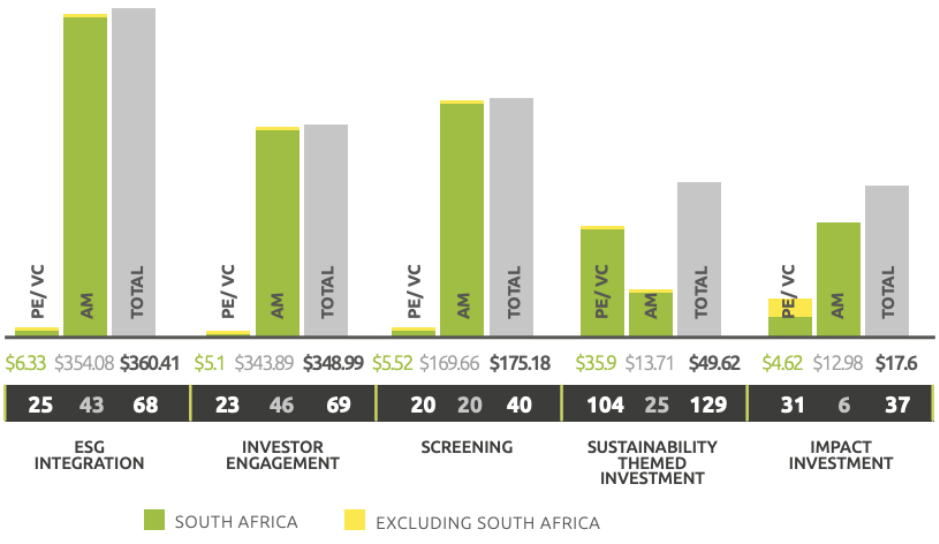
responsible assets. To rephrase, only 1.5% of responsible assets are generating measurable real-world impact.

A relatively small proportion of total responsible assets could be reallocated to bridge the SDG funding gap. As most investors are seeking a market rate return and only 9% of impact investors are underperforming financially (Mudaliar, Bass, Dithrich, & Nova, 2019), investor motivations appear to be aligned and a rational ESG investor can be assumed to be seeking to maximise their returns; both financial and non-financial. Impact funds should therefore be an attractive choice for asset managers. Yet they remain hesitant about allocating capital to impact strategies. To understand why the $32.3 trillion invested under responsible strategies have not been able to bridge the $3.3 – $4.5 trillion SDG financing gap, further analysis is required to identify the differences between each strategy.

2.4 Responsible Investing in South Africa

From *The Global Sustainable Investment Review* (GSIA, 2019), it is clear to see that the responsible investing markets in Latin America and Africa are nascent. These markets combined only contribute 5% of the global responsible AUM. According to *The African Investing for Impact Barometer* (Dhlamini, Giamporcaro, & Makhabane, 2017), Southern Africa is largest region by AUM, with $399.45 billion invested via responsible strategies. The lion's share of which are held in the South African markets.

***Figure 4**: Southern Africa's Responsible AUM by Strategy and Market (US $ Billions)*



Obtained from The African Investing for Impact Barometer (Dhlamini et al., 2017)

The data in **Figure 4** mirrors that of **Figure 3**, with the first three strategies accounting for 75% of total responsible AUM in Southern Africa. The data also allows for differences in capital market to be defined. Most assets (94%) are held in listed products, 97% of which are held under the first three investment strategies; ESG integration, investor engagement, and screening. The funds however tell a different story, 59% of funds are investing in unlisted products and the majority (74%) operate thematic or impact strategies. Differences in fund size can also be extracted, the average listed product fund is $6.4 billion compared to $0.27 billion for private product funds.

Seemingly, thematic and impact funds in Southern Africa, and more specifically South Africa face the same barriers as funds around the world are facing. Whilst responsible investing is moving into the mainstream, strategies generating real-world impact remain in the private domain and lack capital to scale.

2.5 Responsible Investing: The Performance Barrier

Numerous barriers to a mainstream adoption of responsible investing have been identified through various market surveys these include; limited investment opportunities, lack of coherent impact measurement, and lack of advisory knowledge. The most common and reoccurring barrier identified is investment performance (Bouri et al., 2018; Huppé & Silva, 2013; Kotsantonis et al., 2016). Performance being measured most commonly by; absolute returns, volatility, and risk-adjusted returns.

Responsible investment performance has therefore become a widely debated topic in academia and has been considered from several perspectives; micro-macro, investor-investee, and cost-benefit. The results of which are mixed and incoherent.

Theoretical studies to date derive that responsible firms, and investors that pursue responsible opportunities, receive lower financial returns than their irresponsible counterparts. Increased demand for social investments, relative to the entire investment universe, increases their price and therefore lowers financial returns (Dam & Scholtens, 2015; Heinkel, Kraus, & Zechner, 2001; Mackey, Mackey, & Barney, 2007). However, most theories presented thus far are built on the assumption that responsible investors accept lower financial returns in exchange for non-financial returns or minimising social

externalities. As noted earlier, over half (66%) of impact investors consider themselves not to accept this trade-off (Mudaliar et al., 2019). It is clear therefore investor utilities are not being correctly reflected in the theoretical literature.

Empirical studies on the other hand contain a myriad of conclusions from the positive (Nagy, Kassam, & Lee, 2015; Statman & Glushkov, 2009; Verheyden et al., 2016) to the negative (Auer & Schuhmacher, 2016; Galema, Plantinga, & Scholtens, 2008; Hong & Kacperczyk, 2009). Large swathes of research support the consensus that responsible investing has no impact on financial returns (Bello, 2005; Halbritter & Dorfleitner, 2015; Leite & Cortez, 2014; Utz & Wimmer, 2014). The meta-analysis performed by Revelli & Viviani (2015) highlights this lack of consensus, concluding there is no discernible cost or benefit to responsible investing.

Two specific studies in the South African markets both contradict one another. Nandipa's (2020) study of South African Targeted Development Investments (TDIs) finds no significant distinction between their performance and several benchmark indices. Conversely, Viviers et al. (2008) find that the performance of ESG funds has varied. Underperforming the benchmark index between 1992 and 2002, but outperforming the FTSE/JSE All Share between 2002 and 2006.

Whist the performance barrier is regularly sighted as the main barrier to the mainstream adoption of responsible investing among investment professionals, there is no concrete evidence from academia that this is so. Theoretical studies have miss-identified investor utilities and empirical studies show no clear evidence for or against the performance barrier. The difference between academic results and professional evidence establishes our three hypothesis statements:

H_0: Responsible Investing Strategies have no effect on South African retail fund (CISs) returns.
H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) returns.

H_o: Responsible Investing Strategies have no effect on South African retail fund (CISs) volatility.
H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) volatility.

H_o: Responsible Investing Strategies have no effect on South African retail fund (CISs) risk-adjusted returns.
H_1: Responsible Investing Strategies have an effect on South African retail fund (CISs) Risk-adjusted returns.

The three hypothesis statements aim to comprehensively cover all three aspects of performance commonly cited in the aforementioned literature. Establishing the different effects responsible investing strategies have on the three basic elements of financial performance; returns, risk, and risk adjusted returns.

2.6 Theoretical Framework: Asset Pricing & Responsible Investing Theories

Modern portfolio theory (MPT) describes the efficient portfolio where investors maximise returns given their aversion to risk or utility. Pioneered by Markowitz (1952), an investor is able to diversify away idiosyncratic risk by creating a portfolio of assets, the best result occurring when the returns are perfectly negatively correlated at which point only systemic risk remains in the portfolio. An extension of MPT is the capital asset pricing model (CAPM) which describes how the expected return of an asset is a function of the assets systemic risk relative to the systemic risk of the market (Lintner, 1965; Sharpe, 1964).

Responsible investing strategies require a narrowing of available investments based on ESG factors. This restriction of choice has significant consequences when considered under these traditional theories. By restricting the available investment opportunities diversification of portfolios is limited and systematic risk rises. According to CAPM, investors will receive less return per unit of risk they take on than traditional investors or their risk-adjusted returns will decrease (Fabozzi, Markowitz, Kolm, & Gupta, 2011).

Lower returns are also explained when responsible strategies are considered under Merton's (1987) model and subsequent ESG specific papers (Dam & Scholtens, 2015; Heinkel et al., 2001; Mackey et al., 2007). As demand or "investor recognition" for ESG

securities or funds increases returns diminish and returns of "sin" securities and funds increase. Supported by the empirical findings of Hong & Kacperczyk (2009).

A recent paper by Pedersen, Fitzgibbons, and Pomorski (2020) considered MPT and CAPM under three investor preferences; ESG unaware (traditional); ESG aware (responsible) and ESG motivated (philanthropic). Modelling investor preferences on an ESG-Sharpe Ratio (ESG-SR) frontier, an ESG aware investor increases their Sharpe Ratio compared to an ESG unaware investor, however an ESG motivated investor in pursuit of real-world impact reduces their Sharpe Ratio. Incorporating ESG information into the optimal portfolio decision partially explains the mixed results of the findings. However, the model still fails to address the impact and thematic funds which are achieving both market returns and positive real-world impact.

Finally, in this section we will turn our attention to arbitrage pricing theory (APT) first presented by Ross (1976). Where CAPM requires a perfect market for equilibrium to occur, APT relies on investors ability to arbitrage discrepancies in asset prices back to the market equilibrium. APT characterises systemic risk as *n* number of risk factors. Two of the most famous multi-factor models to stem from APT are the three and five-factor models developed by Fama & French (1996, 2015). On top of the excess returns to market seen under CAPM, the models include; firm-size, book-to-market value, profitability, and internal investment as risk factors.

Extending multifactor models, recent studies have succeeded in incorporating ESG as a risk premia or additional factor, showing significant improvements in the model fit (Giese et al., 2017; Gregory et al., 2020; Pollard et al., 2017). ESG data therefore improves an investors ability to identify mis-priced securities, increasing arbitrage opportunities and potential returns.

Asset pricing theories and empirical research are embedded in the public capital markets; however, the analysis equally applies to private markets. When compared to public markets, private markets are highly fragmented, opaque, illiquid, and frictional, this creates a greater arbitrage opportunity. However, these opportunities must be weighed against the cost of identifying them (Krainer & Leroy, 2002).

2.7 Empirical Research on The Performance of Responsible Investing

Several studies consider the SRI universe making no differentiation between the vastly different strategies and broad investment mandates covered. The consensus is that SRI funds are found to have no effect on fund performance, positive or negative. Halbritter & Dorfleitner (2015) investigate SRI in US funds as factors under capital asset pricing models. For a broad sample of ESG data points from several data providers, they conclude that there are no significant differences amongst ESG portfolios or their non-ESG counterparts. Results consistent with Bello (2005) and Utz & Wimmer (2014).

Other, more recent, studies have focussed on individual strategies. Nagy, Kassam, and Lee (2015) focus on ESG integration constructing two ESG portfolios; ESG Tilt and ESG Momentum. Both can be considered integration strategies, utilising additional ESG information sets to add alpha and better manage risk. They find that both portfolios outperform and exhibit lower volatility than the MSCI World benchmark. Annualised return outperformance of 1.1% and 2.2% for the Tilt and Momentum strategies respectively.

With a focus on screening, Verheyden et al. (2016), using similar methodology to Nagy, Kassam, and Lee (2015), construct four best-in-class screened asset groups from two investment universes. The benchmark in this study is the performance of the two un-screened investment universes. In three of the four screened groups constructed screening adds 0.16% of annual performance and improves risk-adjusted returns. The fourth underperformed the benchmark by -0.01%. Auer & Schuhmacher (2016) consider wider markets than the previous studies and construct over 300 best-in-class screened portfolios and 300 irresponsible portfolios or worst-in-class portfolios across five sectors and 3 regions, Asia-Pacific, Europe, and the US. Their results vary across regions with no discernible cost or benefit to ESG screening in Asia-Pacific or the US. However, in Europe there is a significant performance cost to best-in-class ESG screening. Although, one sector and screen combination did show evidence of outperformance: a 20% environmental screen in the capital sector. Finally, Gelma, Plantinga & Scholtens (2008) utilise a differing methodology their constructed best-in-class and worst-in-class portfolios are analysed via asset pricing models rather than a comparison to benchmarks. The initial results show that screening has no significant impact on portfolio performance. ESG screening doesn't

increase or decrease alpha. However, analysing book-to-market ratios they identify that screening lowers performance by lowering book-to-market value of the portfolio.

An alternative study by Hong & Kacpercyk (2009) analyses "sin stocks". Focussing on the alcohol, tobacco, and gambling industries, those typically screened by responsible investors. The pair show that there is a significant price-effect of 15-20% driven by the lower demand for these stocks. Traditional investors are able to capitalise on these lower prices, leading to outperformance.

The aforementioned studies have evaluated investment performance in the public capital markets (debt and equity) analysing the impact of ESG integration and screening on individual stocks, funds and indices. Whilst these strategies account for over 85% of the responsible AUM (GSIA, 2019), they fail to incorporate the real-world impact into the investment decision process. Thus, they do not measurably contribute to the *2030 Agenda for Sustainable Development* (UN, 2015). Academia has yet to firmly establish whether real-world impact and financial returns are independent, a common view among impact investors. A hypothesis which can only be tested through a comparison of all responsible investing strategies.

Studies comparing responsible strategies to date have focussed on the differing screening methods. Barnett and Salomon (2006) found a curvilinear (U-shaped) relationship between screening and fund performance. The implications of which are that fund managers should either not limit their asset selection (traditional) or use a fully integrated screening process (positive). Leite and Cortez (2014) concur, finding that positive screening does lead to improved performance over negative screening, although note that the majority of funds analysed use positive screens which may impact the results. Contradictory evidence can be found in the European bond markets where negative screening appears to increase performance (Henke, 2016).

In the private capital markets, Barbera, Morsebc, and Yasudaa (2021) find that impact venture capital funds (VC) earn returns (IRR) 4.7 percentage points below traditional VC funds. The investors themselves exhibit a willingness to pay for impact, accepting IRRs between 2.5 – 3.7 percentage points lower. Not only suggesting there is a trade off, but that investors are actively willing to pay for this trade off. A significant result when considered

against the fact that 66% of impact investors are investing for market rate returns (Mudaliar & Dithrich, 2019).

Chapter 3: Research Methodology

3.1 Introduction

Chapter 3 describes the research approach and design. Defining the sample, data sources, and the key variables for the study. The methodologies for the analysis of the collected data are described, as are the tests to ensure data integrity and conformity.

3.2 Research Approach & Design

To answer the research questions the study employs a quantitative methodology of quasi-experimental design. Quantitative methodologies stem from the positivism school of thought with the aim to discover casual relationships through an objective study of empirical observation, knowledge about a phenomenon can be gathered without influencing its outcome (Bezuidenhout, Davis, & du Plooy-Cilliers, 2014). Experimental studies investigate whether an observation or condition results in a particular outcome (Leacock, Rose, & Warrican, 2009). This study seeks to answer whether the performance of investment strategies explains why there is a distinct lack of capital being deployed under impact and thematic strategies which generating the largest real-world impact. As the groups in our sample are not randomly allocated, we have a non-equivalent group or quasi-experimental design.

Non-equivalent groups eliminate issues of directionality, investors pick their strategy prior to accepting risk and the associate returns. However, non-random group selection raises threats to both the internal and external validity of the study.

Internally, omitted variables may provide alternative explanations for any relationship, particularly if such variables are confounding (Bezuidenhout et al., 2014; Meyer, 1994). Therefore, drawing conclusions on causation in quasi-experimental studies is limited, and conclusions drawn relate to the correlation. The risk of omitted confounding variables is minimised when the environment of the study is considered. The study has been limited to a single geographic region, South Africa, this eliminates differences in regulatory, economic and technological factors since all funds are operating under the same conditions. To allow the study to draw conclusions on causation between the variables, structural

differences in funds such as; fund size, asset class, age fund, and asset universe (geography) will be controlled for.

Externally, non-random group selection lowers the validity, which in this study this is unavoidable. To ensure the study maximises its external validity it seeks to maximise sample sizes to ensure a large percentage of the population is captured. Reducing the threat to external validity and ensuring a general conclusion can be made for South African CISs.

The reliability of quasi-experimental studies is high, as the controlled environments allow for repetition. The results of the study are replicable. The threats to the reliability of this study arise at two stages; sampling and analysis. Sampling bias and random sampling errors may result in a researcher performing the study on a different sample arriving at a different conclusion. Alternatively, a researcher using the same data but a different instrument may arrive a different conclusion. Risks to sampling are mitigated through the selection of a sufficiently large sample size. The inter-coder threat is dealt with below and the test-retest threat is address by taking measures to ensure the study is robust.

3.3 Population & Sampling

The target population is all collective investment schemes (CIS) domiciled in South Africa as identified by the Association for Savings and Investment South Africa (ASCIA) as at 31st March 2021. This gives a total population size of 1,669 (ASISA, 2021).

The unit of analysis is the investment funds themselves; an asset manager may operate several funds from across the spectrum of strategies. It is each fund's performance that will be subject to analysis, not the asset managers performance.

To determine the sample convenience sampling was utilised. A non-random technique whereby the sample size is determined but what data is convenient or readily available to the researcher (Habib et al. 2014). The convenience factor utilised in this study was the availability of fund data via Funds Data Online (2021). This gave a final sample size of 1,106 CISs, covering 66% of the population.

Using this methodology has several disadvantages. Mackey & Gass (2005) identify that the sample is likely to be biased and not representative of the population. Therefore,

conclusions from the analysis are difficult to extrapolate over the entirety of the population. The other issue commonly cited (Alkassim et al., 2016; Mahmoudi, Farrokhi, & Mahmoudi-Hamidabad, 2012) is outliers. A result of the high self-selection possibility the effect of outliers can have a greater impact on the validity of the study's results. However, the ease and affordability of convenience sampling outweighs the issues of sample bias and outliers. Especially when considering that our sample size represents 66% of the entire population of CISs domiciled in South Africa. Considering this, the result of the study should be sufficiently robust and valid to extrapolate of the entire population of CISs in South Africa, and the risk of outliers minimised.

3.4 Data Sources

Data on CISs are widely available, therefore secondary data compiled by market specialists offer an easy and accurate method of data collection. This study utilises the data available from Funds Data Online (2021), the PRI (2021), and Alexander Forbes (2021).

The data obtained from Funds Data Online included information on the following variables: Returns, Risk, Risk-adjusted Returns, Fund Size, Fund Age, Asset Class and Geographical Region. The last two variables are coded in accordance with the ASISA framework (**Table 1**). The data obtained comprised of 1,365 funds of which 259 were less than three years old and excluded from our data set as the study seeks to analyse the funds over three-year and five-year periods.

The absence of public data on specific responsible strategies utilised by funds, has been a limitation in this study. However, data on the strategies used by each fund was collated from two sources the PRI Signatory Directory (PRI, 2021) and the Alexander Forbes Manager Watch Annual Survey (Alexander Forbes, 2021). The first stage identified funds managed by asset managers listed as signatories of the PRI. These funds were classified as ESG Integrated Funds. The second stage identified Screened, Thematic, and Impact funds from the Alexander Forbes Manager Watch Annual Survey (Alexander Forbes, 2021). The Alexander Forbes data included information on Targeted Development Investments, SA Medical Aid, Black Economic Empowerment (BEE), and Shari'ah funds. Any funds appearing on both adopted the Alexander Forbes Classification.

Using secondary data presents several disadvantages; compatibility with study, coverage of population and time periods, and reliability. However, these disadvantages are outweighed the advantages of being able to access large samples with ease. Obtaining secondary data for CISs is considered the most appropriate method.

As performance data was captured over two-time horizons, three-year and five-year, an unbalanced panel data set of 2,212 data points was created. Following the compilation, a data integrity check was performed. The risk to the validity of the data arises from funds often having more than a single share class. Funds with multiple share classes will be reviewed and any non-A-Share classes were removed.

3.5 Analytical Framework

3.5.1 ANOVA

One-way Analysis of Variance (ANOVA) analysis allows for a comparison of multiple groups distinguishable by a single factor. It establishes if any relationship exists between dependant and independent variables (Tukey, 1949). Under the ANOVA framework the research objectives can be defined via the following probability statements;

Responsible Investing Strategies have no effect on CIS returns.	H_0: $P(\mu_1 \mid x_1) = \cdots = P(\mu_n \mid x_n)$
Responsible Investing Strategies have no effect on CIS volatilities.	H_0: $P(\sigma_1 \mid x_1) = \cdots = P(\sigma_n \mid x_n)$
Responsible Investing Strategies have no effect on CIS risk-adjusted returns.	H_0: $P(\alpha_1 \mid x_1) = \cdots = P(\alpha_n \mid x_n)$

Where μ is the mean return, σ is the variance of returns or risk, and α is the risk-adjusted return of $x_1 \ldots . x_n$, the investment strategies.

The assumptions of these test are that each sample is normally distributed with equal variances. The normality of our samples was tested using two statistical tests; Shapiro-Wilks and Kolmogorov-Smirnov. The homoscedasticity of variances was tested via; Bartlett's and Levene's tests. Under all tests a null hypothesis is constructed, such that we rejected the assumption of normality and homoscedasticity of variances outside a given significance (Keller, 2009).

Assuming the data meets the requirements, the ANOVA tests will be performed to identify any statistical difference between sample groups. Where a statistically significant difference is identified further tests, Tukey and the Bonferroni adjustment of Fisher's LSD, will be used to identify between which groups the difference exists (Keller, 2009). If the data fails to comply with the assumptions, non-parametric statistics will be applied.

3.5.2 Regression Model

To establish whether investment strategy is a deterministic factor in CIS performance multiple regression analysis will be undertaken. The regression analysis will be undertaken as two models:

Model 1 $$X_i = \delta_i + \delta_1 Strategy_i + \delta_2 Age_i + \delta_3 Size_i + \delta_4 Asset\ Class_i + \delta_5 Geographic_i + \varepsilon_i$$

Model 2 $$X_{i,t} = \delta_i + \delta_1 Strategy_{i,t} + \delta_2 Age_{i,t} + \delta_3 Size_{i,t} + \delta_4 Asset\ Class_{i,t} + \delta_5 Geographic_{i,t} + \delta_6 Period_{i,t} + \varepsilon_{i,t}$$

Where *i* and *t* denote funds and time period respectively; X is the dependant variable and will take one of three values; *Returns, Risk,* or *Risk Adjusted Returns. Age* is the funds age in years; *Size* is the fund size in ZARm.

Strategy is the set of dummy variables for each fund which denotes the strategy employed. Four variables are used to describe the five different strategies: Traditional, ESG Integration, Screening, Thematic and Impact. Traditional Strategies are the omitted dummy variable making this the comparative case. Due to the small sample sizes within the Screening and Impact categories a second set of Strategy Dummy variables were created combining ESG Integration with Screening, and Impact with Thematic. The result is three categories with Traditional being the omitted variable and comparative case.

Asset Class is the set of dummy variables for each fund which denotes the ASISA asset class classification. Four categorical groups are created: Interest Bearing, Real Estate, and Multi Asset, with Equity being the omitted variable and comparative case.

Geographic is the set of dummy variables for each fund which denotes the ASISA regional classification. Three categorical groups are created: Global, Regional, and South African. The latter being the omitted variable and comparative case.

Period is the dummy variables to control for the differences in time period being analysed. The three-year period will be the omitted variable and comparative case.

The δ's are the parameters being estimate by this study.

3.6 Measurement & Description of Variables

The study uses secondary data to analyse the impact of investing strategy on fund performance over a three and five-year horizon. The unbalanced panel data set will comprise of the following variables;

3.6.1 Dependent Variables

a) Returns

The first measure of fund performance is returns. Annualised return data will be collected for the three-year and five-year time horizons in accordance with each fund's reporting requirements. This data is from Funds Data Online (2021).

b) Risk

Risk is the second measure of fund performance. The risk variable will be captured from Funds Data Online (2021) measured as the funds historic price volatility (standard deviation). This data will be captured on the three and five-year time horizons.

c) Risk Adjusted Returns

The third and fourth measure of fund performance are risk-adjusted returns. Captured under two variables, the Sharpe Ratio and Sortino Ratio, as detailed by Funds Data Online (2021). As with the risk and return data this will be captured on a three and five-year basis.

3.6.2 Independent Variables

a) Investment Strategy

Investment strategy is a nominal variable, from which we can classify our performance data. The data will be captured as five dummy variables for; Traditional, ESG Integration,

Screening, Thematic, and Impact. The coding for the strategy variables will be 1 if the strategy applies to a specific fund and 0 if not. Funds can only be classified under a single strategy. Traditional investing strategies are the omitted dummy variable and will form the comparative sample. Results for this variable will, therefore, show the relative performance of a specific responsible strategy compared to the traditional strategy.

Due the small sample sizes identified for the Thematic and Impact groupings a second set of dummy variables were created. These comprise of; ESG & Screening and Thematic and Impact. Traditional strategies again forming the comparative sample.

Strategy Variable	Description	Type	Coding
ESG Integration	Funds listed as PRI signatories	Categorial	1 for ESG Integration otherwise 0.
Screening	Funds identified as Shari'ah funds from the Alexander Forbes Manager Watch Annual Survey.	Categorial	1 for Screening otherwise 0.
Thematic	Funds identified on the Medical Aid and BEE Alexander Forbes Manager Watch Annual Survey.	Categorial	1 for Thematic otherwise 0.
Impact	Funds identified as TDIs on the Alexander Forbes Manager Watch Annual Survey.	Categorial	1 for Impact otherwise 0.
Traditional	Funds not classified under any other strategy	Categorial	1 for Traditional otherwise 0.

***Table 3**: Strategy Variables*

3.6.3 Control Variables

The validity of the study may be lowered if omitted variables are not controlled for, importantly, the inclusion of control variables allows the model to isolate the effects of responsible strategy choice. The control variables identified have been presented in **Table 4**. These are the commonly identified determinants of fund performance.

a) Fund Size

Size, consistently measured as Assets Under Management (AUM) in the literature, can either lead to economies of scale (Latzko, 1999), or to diseconomies of scale (Berk & Green, 2002). Despite studies supporting diseconomies of scale (Chen, Hong, Huang, & Kubik, 2004; Faff & Lee, 2008), the consensus remains that larger funds exhibit economies of scale (Elton, Gruber, & Blake, 2012; Indro, Jiang, Hu, & Lee, 1999; Reuter & Zitzewitz, 2010). Thus, size should be positively related to fund performance.

b) Fund Age

Golec (1996) and Webster (2002) find that fund manager tenure is a significant predictor of fund performance. In absence of manager tenure data Fund Age, measured in years, is adopted as a proxy. It is expected to have a positive relationship with fund performance.

c) Asset Class

Asset class will be collected from the ASISA classifications (ASISA, 2018). Asset class is the most fundamental decision in portfolio management (Blake, Lehmann, & Timmerman, 1999) and has been identified as explaining about 40% of fund performance (Ibbotson & Kaplan, 2000). Controlling for asset class will allow a comparison to be made across the different categories. The four ASISA classes and their definitions are:

Equity: Invests a minimum of 80% of the market value of the portfolios in equities.

Multi-asset: Invests in a wide spread of investments in the equity, bond, money and property markets.

Interest Bearing: Invests exclusively in bond, money market investments and other interest earning securities.

Real Estate: Invests in listed property shares, collective investment schemes in property and property loan stock and real estate investment trusts.

The data will be coded as a set of dummy variables with Equity funds being the omitted variable and comparative case. The coding for each asset class variable will 1 if the class applies to a specific fund and 0 if not. Funds can only be classified under a single asset class.

d) Geographical region

Similarly, to ensure comparability, investment region will be controlled for through the Geographical Region variable. An equally fundamental portfolio decision and common

deterministic factor of fund performance (Coval & Moskiwitz, 2001; Krugman, 1990). The three ASISA classes and their definitions are:

South African: Invests at least 60% of their assets in South African investment markets.

Global: Invest at least 80% of their assets outside South Africa.

Regional: Invest at least 80% of assets in a specific country outside South Africa.
The data will be coded as a set of dummy variables with South African funds being the omitted variable and comparative case. The coding for each geographic variable will 1 if the region applies to a specific fund and 0 if not. Funds can only be classified under a single region.

Control Variable	Type	Category	Units and Coding
Fund Size	Continuous	-	ZARm
Fund Age	Continuous	-	Years
Geographical Region	Categorial	South African	1 for South Africa otherwise 0.
		Global	1 for Global otherwise 0.
		Regional	1 for Regional otherwise 0.
Asset Class	Categorial	Equity	1 for Equity otherwise 0.
		Multi Asset	1 for Multi Asset otherwise 0.
		Interest Bearing	1 for Interest Bearing otherwise 0.
		Real Estate	1 for Real Estate otherwise 0.

***Table 4**: Control Variables*

3.7 Estimation Approach

Model 1 will be estimated using an ordinary least squares (OLS) regression over the 3-year and 5-year performance periods individually. OLS is considered the most appropriate method to analyse the cross-sectional data specified under Model 1 leading to the most efficient and unbiased estimations of the parameters (Hallin, 2014).

Model 2 combines the 3-year and 5-year periods forming a panel dataset. The model will be estimated using either a fixed or random effects panel to correct for any unobserved heterogeneity. A bias which can arise when using OLS on panel data (Greene, 2000). The fixed effect panel will control for any omitted or unobservable fund-specific or period-specific effects. To identify the correct model specification to use, a Hausman test

(Hausman, 1978) was undertaken. The test is structured with the null hypothesis that the random effects specification is appropriate. If rejected, a fixed effects model will be used.

Both models will be analysed on the Individual Investment Strategy variables and the Grouped Investment Strategy Variables. The latter created due the small sample sizes identified for the Thematic and Impact categories.

Multicollinearity arises when independent variables are highly correlated to one another and can result in spurious regression results for two reasons. Firstly, the sample coefficients may be far from the actual population parameters, and second, is that it can lead to incorrect inference due to small t-statistics (Keller, 2009). A correlation matrix of independent variables will be analysed to ensure that no variables are highly correlated, implying multicollinearity (Alin, 2010).

Chapter 4: Research Findings & Discussions

4.1 Introduction

Chapter 4 provides an insight into the data collected through descriptive statistics and statistical analysis via the methods described in Chapter 3. The results of the analysis are described, and implications of the findings discussed.

4.2 Descriptive Statistics on South African CISs

The data set used in our analysis comprises of 1,106 funds split over two-time periods; 3-year returns and 5-year returns. The detailed descriptive statistics for the full sample is included in **Table 5** on the preceding pages.

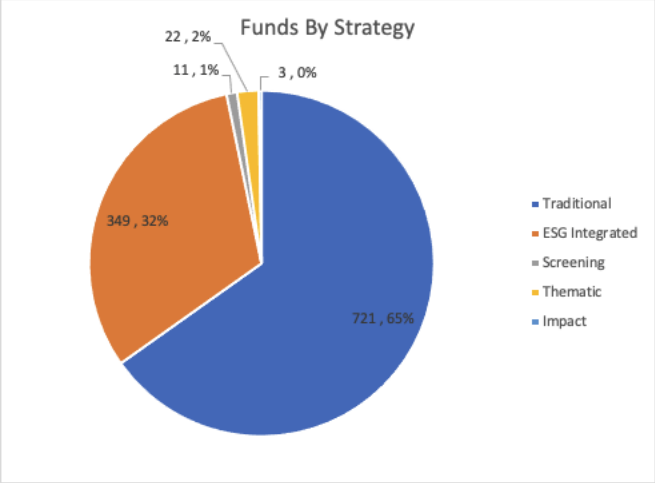


***Figure 5**: Funds by Strategy*

Of the funds, 721 (65%) utilise traditional strategies, 349 (32%) employ ESG integration strategies, 11 (1%) use screening strategies, 22 (2%) of funds are thematic, and 3 (0.3%) are impact funds. Retail funds in South Africa mirror the general South African landscape of absolute fund numbers identified by the *The African Investing for Impact Barometer* (Dhlamini, Giamporcaro, & Makhabane, 2017). By Asset Class (**Figure 6**), 652 (59%) have a multi-asset mandate, 288 (26%) are equity only, 110 (10%) are interest bearing funds, and 58 (5%) are real estate funds. The weighting of the sample by class is similar to that found by the *2018 Global Sustainable Investment Review* (GSIA, 2019). GISA allocate out multi-asset funds to their constituent parts, resulting in 51% equities, 36% fixed income and 13% of other.

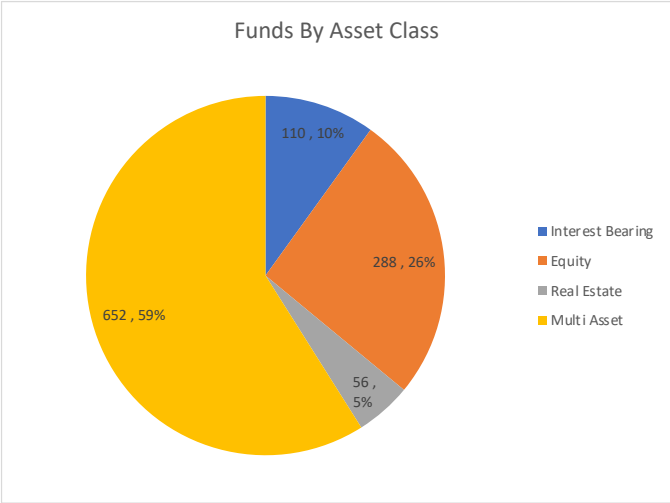


***Figure 6**: Funds by Asset Class*

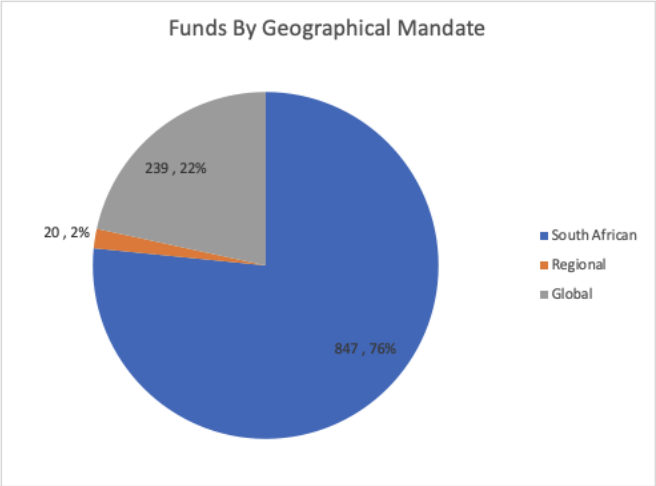


***Figure 7**: Funds by Geographic Mandate*

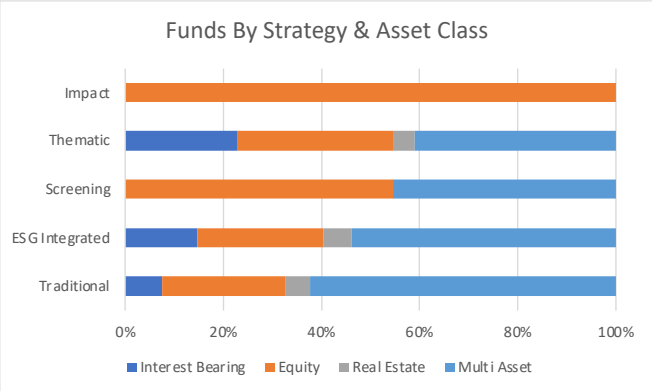


***Figure 8**: Funds by Strategy and Asset Class*

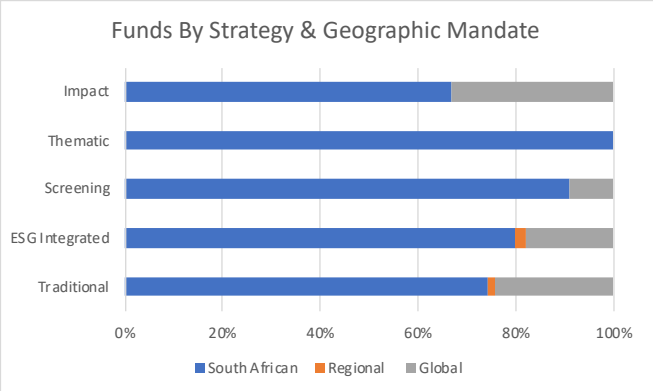


***Figure 9**: Funds by Strategy & Geographic Mandate*

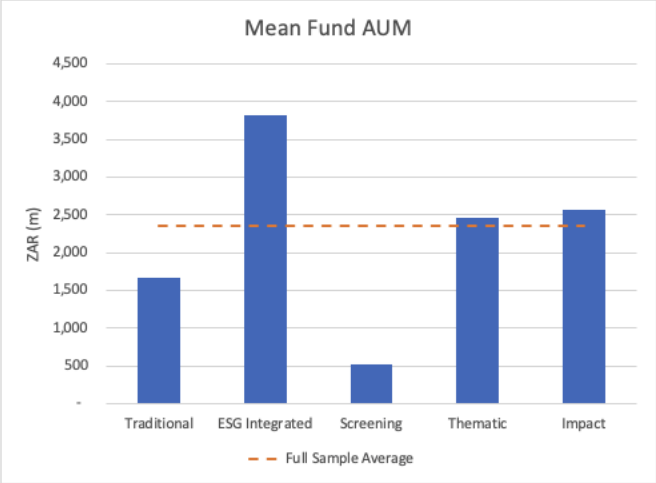


***Figure 10**: Mean Fund AUM by Strategy*

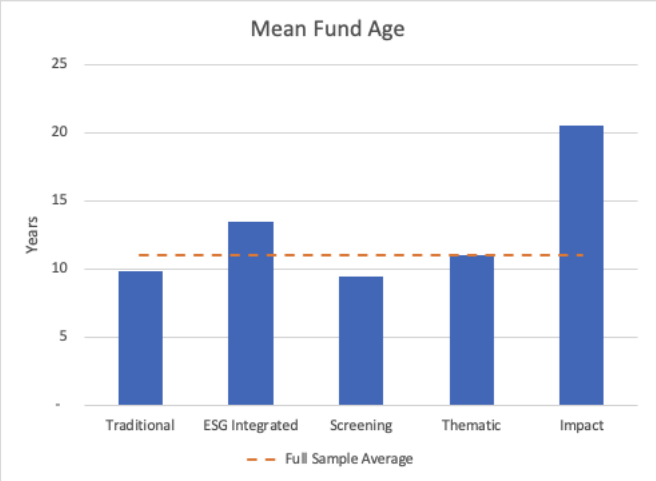


***Figure 11**: Mean Fund Age by Strategy*

Vivers & Els (2017) identified key events between 1992 and 2014 which have defined the responsible investing landscape in South Africa. During the early 90s two key legislations were introduced The King Report on Corporate Governance (1994), and The Reconstruction and Development Programme (1996). Leading to Impact and Thematic funds being established focusing on the Infrastructure, BEE, and job creation.

Funds established in this period, now classified as Targeted Development Investments, are included within this study and are the key driver behind the higher than mean fund age of impact funds (**Figure 11**) (Nandipa, 2020; Viviers et al., 2008).

Following the early growth phase, Vivers & Els (2017) describe a decline phase arising from the Asian financial crisis. Throughout this period Shari'ah compliant funds outperformed the market, and equally saw large growth during the global financial crisis of the late 2000s. Shari'ah compliant funds utilise strict ethical screen in their mandates, and therefore represent a high proportion of the Screened funds in this studies sample. Explaining the lack of Interest Bearing and Real Estate asset classes under this strategy (**Figure 8**) which Shari'ah compliant CISs exclude. By AUM (**Figure 10**) Shari'ah funds remain a niche product for retail investors.

The PRI, launched in 2006, alongside the publication of the third King Report on Corporate Governance (2009), the governments New Growth Path (2009), and global social and environmental attitude shifts saw a resurgence in the Responsible investing in South Africa. The PRI allowed established funds to adopt their investment principles on ESG Integration, as an additional investment analysis and monitoring tool rather than through the adoption of new mandates. The relative ease of the adoption of the principles can be seen through the high proportion of ESG funs in the sample (32%) (**Figure 5**), and Fund Size (**Figure 10**). Of the top ten funds by AUM, seven are utilising an ESG integrated strategy.

Conversely, the relative difficulty of incorporating funds which utilise ESG factors in a more complex manner is highlighted by less diverse geographies and asset classes utilised by Impact and Thematic funds (**Figure 8** & **Figure 9**). Although could also be considered a strength of ESG reporting and data in South Africa (Verney, 2018).

		Full Panel					3-Year Period					5-Year Period				
		N	Minimum	Maximum	Mean	Std. Deviation	N	Minimum	Maximum	Mean	Std. Deviation	N	Minimum	Maximum	Mean	Std. Deviation
Full Panel	Size (Rm)	2212	0	146364.5	2353.219	7655.2222	1106	0	146364.5	2353.219	7656.9539	1106	0	146364.5	2353.219	7656.9539
	Age	2212	3	54.7	11.021	7.0182	1106	3	54.7	11.021	7.0197	1106	3	54.7	11.021	7.0197
	Volatility	1875	0.09	45.93	12.1423	6.32162	1036	0.11	45.93	12.9271	6.70221	839	0.09	40.97	11.1733	5.67335
	Sortino	1926	-0.85	7.52	0.7018	1.15456	1063	-0.85	5.98	0.7144	1.02172	863	-0.81	7.52	0.6862	1.30011
	Sharpe	1872	-34.95	62.09	1.4572	4.61883	1034	-2.46	55.15	1.5698	4.36864	838	-34.95	62.09	1.3183	4.90909
	Returns	1825	-31.14	42.31	3.903	7.15373	1033	-31.14	42.31	4.7421	8.3396	792	-20.01	28.89	2.8085	5.01503
	Valid N (listwise)	1809					1025					784				
Traditional	Size (Rm)	1442	0	67935.6	1665.467	4901.2569	721	0	67935.6	1665.467	4902.9585	721	0	67935.6	1665.467	4902.9585
	Age	1442	3	54.7	9.835	6.1577	721	3	54.7	9.835	6.1598	721	3	54.7	9.835	6.1598
	Volatility	1216	0.11	38.17	12.1633	6.13155	679	0.11	38.17	12.9581	6.4755	537	0.12	32.41	11.1582	5.51078
	Sortino	1240	-0.85	7.52	0.6753	1.10141	692	-0.85	5.82	0.6997	0.95941	548	-0.68	7.52	0.6443	1.25829
	Sharpe	1213	-2.46	62.09	1.372	4.15996	677	-2.46	55.15	1.47	3.91579	536	-1.96	62.09	1.2482	4.44991
	Returns	1175	-31.14	42.31	4.231	7.43717	677	-31.14	42.31	5.2823	8.63229	498	-20.01	27.71	2.8018	5.07431
	Valid N (listwise)	1163					671					492				
ESG Integrated	Size (Rm)	698	0	146364.5	3823.201	11404.2336	349	0	146364.5	3823.201	11412.4234	349	0	146364.5	3823.201	11412.4234
	Age	698	3	54.5	13.434	8.0933	349	3	54.5	13.434	8.0991	349	3	54.5	13.434	8.0991
	Volatility	597	0.2	45.93	12.1111	6.68831	324	0.2	45.93	12.8436	7.15781	273	0.25	40.97	11.2418	5.9817
	Sortino	621	-0.81	6.24	0.7534	1.24909	336	-0.79	5.98	0.7437	1.13943	285	-0.81	6.24	0.7649	1.3691
	Sharpe	597	-2.27	43.34	1.5711	4.59842	324	-2.23	43.34	1.6785	4.61847	273	-2.27	41.52	1.4436	4.5797
	Returns	591	-20.94	35.74	3.2761	6.62232	323	-20.94	35.74	3.7089	7.74528	268	-17.61	28.89	2.7545	4.9053
	Valid N (listwise)	587					321					266				
Screened	Size (Rm)	22	62.3	2243.8	514.991	644.4053	11	62.3	2243.8	514.991	660.3189	11	62.3	2243.8	514.991	660.3189
	Age	22	4	15.2	9.473	3.5335	11	4	15.2	9.473	3.6208	11	4	15.2	9.473	3.6208
	Volatility	21	3.16	23.61	12.0195	4.58203	11	3.16	23.61	12.3436	5.31581	10	7.53	20.15	11.663	3.87149
	Sortino	21	-0.1	1.68	0.4752	0.38237	11	0.17	1.68	0.5855	0.41863	10	-0.1	0.79	0.354	0.31465
	Sharpe	21	-0.26	2.57	1.0224	0.6988	11	0.4	2.57	1.2145	0.65236	10	-0.26	1.73	0.811	0.71939
	Returns	19	1.97	13.52	7.3658	2.9913	11	1.97	13.52	7.6645	3.56247	8	3.94	9.45	6.955	2.13199
	Valid N (listwise)	19					11					8				
Thematic	Size (Rm)	44	22.5	32682.7	2463.932	6815.3426	22	22.5	32682.7	2463.932	6896.0004	22	22.5	32682.7	2463.932	6896.0004
	Age	44	3.5	24	11.055	6.1742	22	3.5	24	11.055	6.2473	22	3.5	24	11.055	6.2473
	Volatility	35	0.09	33.96	11.8066	7.81047	19	0.2	33.96	13.4053	8.14609	16	0.09	27.75	9.9081	7.18068
	Sortino	38	-0.74	5.55	0.9274	1.51501	21	-0.52	4.47	0.8548	1.30139	17	-0.74	5.55	1.0171	1.78193
	Sharpe	35	-34.95	51.3	2.9177	13.52938	19	-1.31	50.52	3.6337	11.44505	16	-34.95	51.3	2.0675	16.00914
	Returns	34	-22.32	14.48	1.2085	6.43292	19	-22.32	14.48	1.0016	7.08353	15	-15.86	10.46	1.4707	5.73585
	Valid N (listwise)	34					19					15				
Impact	Size (Rm)	6	58.1	5690.4	2563.3	2564.4915	3	58.1	5690.4	2563.3	2867.1886	3	58.1	5690.4	2563.3	2867.1886
	Age	6	19.5	22.7	20.567	1.6525	3	19.5	22.7	20.567	1.8475	3	19.5	22.7	20.567	1.8475
	Volatility	6	9.35	16.76	13.3967	2.87498	3	10.43	16.76	14.05	3.26164	3	9.35	14.77	12.7433	2.95718
	Sortino	6	-0.1	0.89	0.1933	0.37988	3	-0.09	0.89	0.3133	0.51248	3	-0.1	0.34	0.0733	0.23438
	Sharpe	6	-0.25	1.63	0.3533	0.72415	3	-0.24	1.63	0.57	0.95974	3	-0.25	0.7	0.1367	0.49903
	Returns	6	-0.42	15.92	5.73	5.55897	3	-0.42	15.92	7.0767	8.25282	3	2.45	6.3	4.3833	1.92505
	Valid N (listwise)	6					3					3				

***Table 5**: Full Descriptive Statistics*

4.3 ANOVA Assumptions

In order to identify the distribution differences among and establish relationships between the Return, Volatility, and Risk-adjusted Returns (Sharpe & Sortino) variables across the five strategic categories an analysis of variance was performed. To ensure the correct procedure was carried out the normality and homogeneity of variances assumptions were tested.

A Shapiro-Wilks test ($p > 0.05$) (Shapiro & Wilk, 1965), Koimogorov-Simirnov test ($p > 0.05$) (Massey, 1951), and an inspection of the skewness and kurtosis measures of the variables implied the data were not approximately normal distributed (**Table 6**).

		Kolmogorov-Smirnov	**Shapiro-Wilk**
	df	Stat.	Stat.
Returns	1,809	0.139*	0.883*
Volatility	1,809	0.069*	0.946*
Sortino	1,809	0.209*	0.707*
Sharpe	1,809	0.302*	0.310*

***Table 6**: Tests of Normality (* 1% Significance Level)*

Due to the non-normality identified by the tests above, a non-parametric Levene's test (Nordstokke & Zumo, 2010; Nordstoke, Zumbo, Carins, & Saklofske, 2011) was used to verify the homogeneity of variances among the sample groups. The results (**Table 7**) show that the null hypothesis cannot be rejected for both risk-adjusted return variables, the Sharpe and Sortino ratios. However, the remaining variables don't exhibit homogeneity of variances. The nulls are rejected at the 95% confidence level.

		Sum Of Squares	**Df**	**Mean Square**	**F**
Residuals Volatility	Between Groups	996,206.62	4	249,051.66	3.412*
	Within Groups	136,503,727.00	1,870	72,996.65	
	Total	137,499,934.00	1,874		
Residual Sortino	Between Groups	399,934.91	4	99,983.73	1.291
	Within Groups	148,823,952.00	1,921	77,472.13	
	Total	149,223,887.00	1,925		
Residual Sharpe	Between Groups	397,420.59	4	99,355.15	1.359
	Within Groups	136,457,425.00	1,867	73,089.14	
	Total	136,854,846.00	1,871		
Residual Returns	Between Groups	1,172,980.55	4	293,245.14	4.262*
	Within Groups	125,229,439.00	1,820	68,807.38	
	Total	126,402,419.00	1,824		

***Table 7**: Non-parametric Levene's Test Results on Residuals (* 1% Significance Level, ** 5% Significance Level)*

Due to the assumption of normality being breached and only the two measures of risk-adjusted returns exhibiting homogeneity across variances. A Kruskal-Wallis H-test was employed due to its robustness against the failure of these assumptions (Vargha & Delaney, 1998).

4.4 Returns Analysis

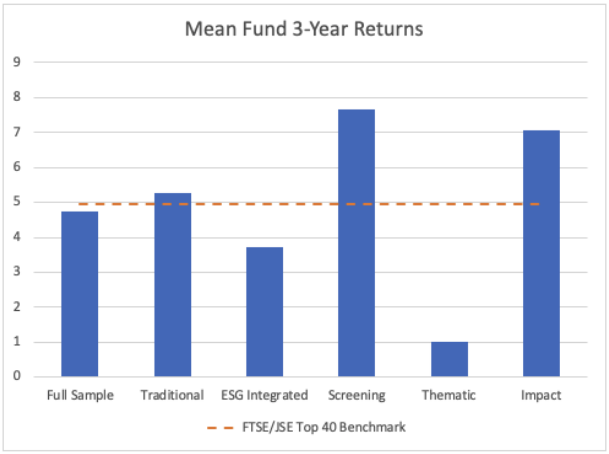


***Figure 12**: Mean Fund 3-Year Returns*

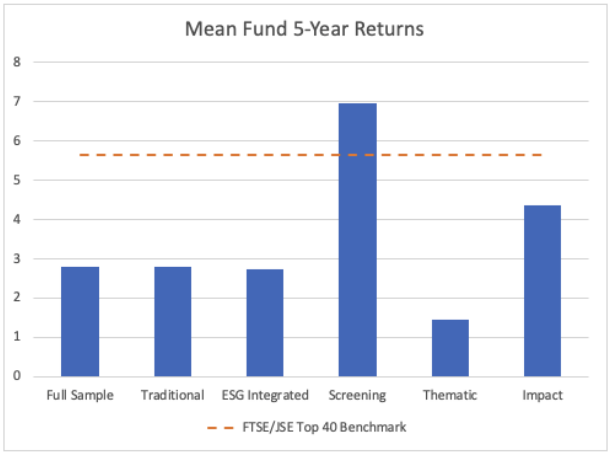


***Figure 13**: Mean Fund 5-Year Returns*

The benchmark indicated on **Figure 12** and **Figure 13** is the FTSE/JSE Top 40 Index. Across the two periods the benchmark returns increase from 4.956% over the 3-year period to 5.642% over the 5-year period. Conversely, returns shown by the sample of South Africa CISs decrease between the two periods. With a mean of 4.742% over the 3-year period and 2.809% over the 5-year period. The implication is that CISs' performance, as measured by absolute returns, was notably worse in the two additional years captured by the 5-year period.

The Kruskal-Wallis H-test (Vargha & Delaney, 1998) results (**Table 8**) indicate there is a statistical difference between the returns under the different strategies. The null that returns under all investing strategies are the same is rejected. The results are robust, and the parametric One-way ANOVA produces the same results as does the Grouped Strategies analysis.

			Kruskal-Wallis		**One-Way**	
		df	H-Stat.	Sig.	F-Stat.	Sig.
Returns	Individual Strategies	4	30.180*	0.000	4.198*	0.002
	Grouped Strategies	2	10.072*	0.007	4.326**	0.013

***Table 8**: Returns ANOVA Test Results (* 1% Significance Level, 5% Significance Level)*

The rank and pairwise comparisons for returns (**Table 9**) and through the graphical analysis of **Figure 12** and **Figure 13** highlight that thematic strategies exhibit returns statistically lower than the other four strategies. Although, the pairwise comparisons with the Bonferroni adjustments are only robust for comparisons against the Traditional (10% significance) and Screening (1% significance). Conversely, Screening strategies exhibit returns statistically higher than other strategies at the 1% significance level. The exception being Impact strategies for which the comparisons exhibit no statistical difference. The third conclusion that can be drawn from the results relates to Traditional Strategies, as noted above results found that Traditional Returns are higher than Thematic but lower than Screening strategies. The relationship between Traditional and ESG strategies exhibits significant differences in return distributions, with Traditional having a higher mean rank. Notably, the pairwise comparisons between ESG - Impact; Traditional - Impact; and Impact – Screening are insignificant. A result which suggests that impact strategies mean returns do not differ from their traditional, ESG or screened counterparts.

		Std. Test Statistic	Sig.	Bonferroni Adjusted Sig.
Individual Strategies	Thematic - ESG	1.820***	0.069	0.687
	Thematic – Traditional	2.727*	0.006	0.064
	Thematic – Impact	-1.706***	0.088	0.880
	Thematic – Screening	4.495*	0.000	0.000
	ESG – Traditional	3.040*	0.00	0.024
	ESG – Impact	-1.059	0.290	1.000
	ESG – Screening	-4.147*	0.000	0.000
	Traditional – Impact	-0.687	0.492	1.000
	Traditional – Screening	-3.517*	0.000	0.004
	Impact - Screening	1.136	0.256	1.000
Grouped Strategies	Traditional – ESG & Screening	2.468**	0.014	0.041
	Traditional – Thematic & Impact	2.245***	0.025	0.074
	ESG & Screening - Thematic & Impact	125.343	0.145	0.435

	Individual Strategies	
	N	Mean Rank
Traditional	1,175	938.87
ESG	591	858.09
Screening	19	1,367.45
Thematic	34	688.90
Impact	6	1,087.00

	Grouped Strategies	
	N	Mean Rank
Traditional	1,175	938.87
ESG & Screening	610	873.96
Thematic & Impact	40	748.61

***Table 9**: Kruskal-Wallis Returns Pairwise Comparisons and Ranks (* 1% Significance Level, ** 5% Significance Level, *** 10% Significance Level)*

Controlling for the small sample bias within the Screening and Impact groups, the Grouped Strategies pairwise comparisons for Returns indicate that Traditional strategies are

significantly above ESG & Screening (10% significance) and Thematic & Impact (10% significance). However, there are no statistically significant differences between ESG & Screening and Thematic & Impact.

4.5 Volatility Analysis

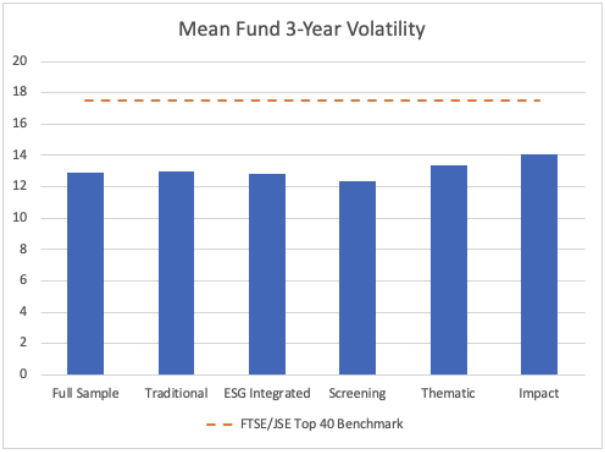


***Figure 14**: Mean Fund 3-Year Volatility*

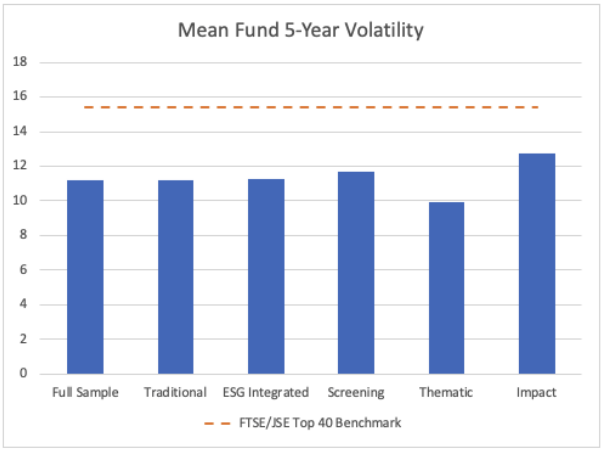


***Figure 15**: Mean Fund 5-Year Volatility*

As for Returns the benchmark indicated on **Figure 14** and **Figure 15** above is the FTSE/JSE Top 40 Index. The index exhibits a volatility 17.48 and 15.43 in the three-year and five-year periods, respectively. Notably, as should be expected from managed CISs', the volatility of all strategies is below this benchmark. Highlighting the benefits of increased diversification.

			Kruskal-Wallis		**One-Way**	
		df	H-Stat.	Sig.	F-Stat.	Sig.
Volatility	Individual Strategies	4	3.279	0.512	0.093	0.985
	Grouped Strategies	2	0.072	0.965	0.021	0.979

***Table 10**: Volatility ANOVA Test Results*

The Kruskal-Wallis H-test (Vargha & Delaney, 1998) results (Table 10) indicated that there were no statistically significant differences between the volatilities of the differing investment strategies. The null that volatilities under all investing strategies are the same is accepted. The results are robust and the parametric One-way ANOVA produces the same results as does the Grouped Strategies analysis.

This result has important implication for the study, implying that there are no differences in volatility between the five strategy classes. A result which suggests that no relationship

exists. Further regression analysis will be performed to confirm this result. Whilst ANOVA analysis alone is insufficient to arrive at a conclusion, the results have interesting implications. A common reason for adoption of ESG Integration (van Duuren et al., 2016) and Screening strategies (Lee et al., 2010; Verheyden et al., 2016), are there ability to reduce volatilities. However, there appears to be no such relationship.

4.6 Risk-Adjusted Returns Analysis

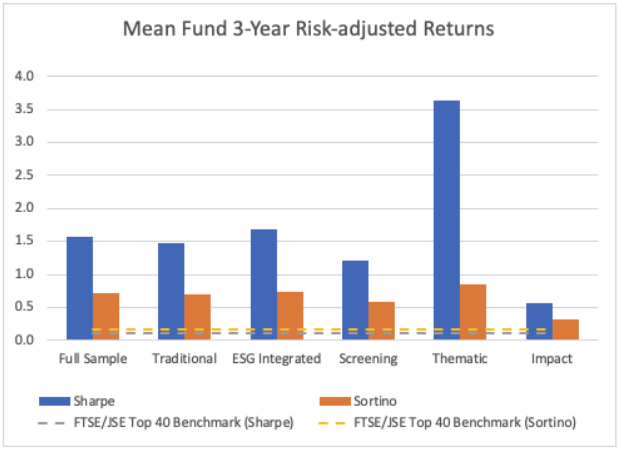


***Figure 16**: Mean Fund 3-Year Risk-adjusted Returns*

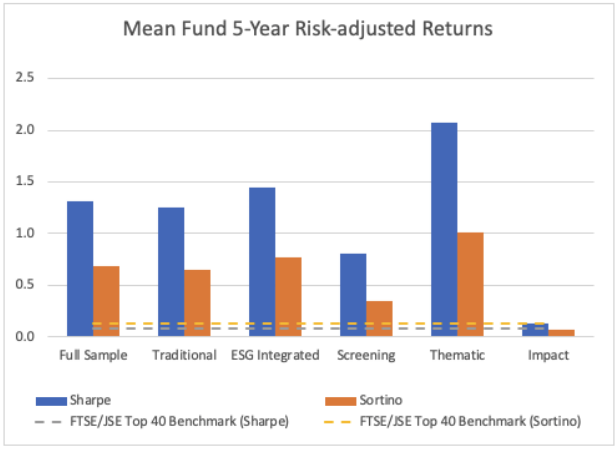


***Figure 17**: Mean Fund 5-Year Risk-adjusted Returns*

Despite Returns consistently below the FTSE/JSE Top 40 Index, Risk-adjusted returns (measured by the Sharpe and Sortino ratios), due to the relationship with volatility, are consistently higher than the index. The exception being Impact strategies over the 5-year time period. Across all strategies, there is little between the means of both the Sharpe and Sortino ratios. The 3-year period means are 0.714 and 1.570 compared with the 5-year means of 0.686 and 1.318 for the Sortino and Sharpe, respectively.

The Kruskal-Wallis H-test (Vargha & Delaney, 1998) results (Table 11) indicated that there were no statistically significant differences between the risk-adjusted returns of the differing investment strategies. The null that risk-adjusted returns under all investing strategies are the same is accepted. The results are robust and the parametric One-way ANOVA produces the same results as does the Grouped Strategies analysis.

			Kruskal-Wallis		One-Way	
		df	H-Stat.	Sig.	F-Stat.	Sig.
Sortino	Individual Strategies	4	2.608	0.625	1.331	0.265
	Grouped Strategies	2	0.012	0.994	1.023	0.360
Sharpe	Individual Strategies	4	1.166	0.884	1.202	0.308
	Grouped Strategies	2	0.219	0.896	1.470	0.230

***Table 11**: Risk-adjusted Returns ANOVA Test Results*

As with volatility, this result has important implications for the study, implying that there are no differences in volatility between the five strategy classes. The inability to statistically distinguish between strategies implies no relationship exists. Or, that no risk-adjusted return performance benefit can be gained from choosing one strategy over the other. This result conflicts with the findings of Sherwood & Pollard (2019) which suggest his is a key motivator behind investors adopting specific strategy.

4.7 Multicollinearity & Hausman Tests

Analysis of independent variables identified that there are two sets of variables which are highly correlated (**Table 12**). Traditional and ESG investment strategies exhibit a correlation coefficient of -0.929 (1% significance), and the Equity and Multi-asset asset have a coefficient of -0.708 (1% significance). These arise due to the use of dummy variables as the categorical indicators, a fund must fall into one of the categories, and the relatively high number of observations within the two categories. Traditional and ESG fund account for 94% of the sample size, whilst Equity and Multi-asset for 85% of the sample size. To ensure all categories are included within the models all variables are retained in the model.

All other the absolute Person Correlation Coefficients are below 0.5, minimising the risk of multicollinearity (Keller, 2009; Alin 2010). All variables are retained within the regression models.

The results of the Hausman test were able to reject the null hypothesis that the random effects model is the correct specification. Therefore, the correct model specification is the fixed effects model.

	Size (Rm)	Age	Traditional	ESG Integrated	Screening	Thematic	Impact	Equity	Interest Bearing	Real Estate	Multi Asset	South African	Regional
Age	.277*	--											
Traditional	-.123*	-.231*	--										
ESG Integrated	.130*	.234*	-.929*	--									
Screening	-0.024	-0.022	-.137*	-.068*	--								
Thematic	0.002	0.001	-.195*	-.097*	-0.014	--							
Impact	0.001	.071*	-.071*	-0.035	-0.005	-0.007	--						
Equity	-0.024	.110*	-0.028	-0.001	.066*	0.019	.088*	--					
Interest Bearing	.104*	.149*	-.112*	.106*	-0.033	.061*	-0.017	-.196*	--				
Real Estate	-.045*	-.051*	-0.013	0.021	-0.023	-0.003	-0.012	-.136*	-.077*	--			
Multi Asset	-0.021	-.165*	.096*	-.070*	-0.027	-.052*	-.062*	-.708*	-.398*	-.277*	--		
South African	.064*	.110*	-.081*	.054**	0.034	.079*	-0.012	-.112*	.105*	-.067*	.064*	--	
Regional	-0.023	-0.015	-0.001	0.01	-0.014	-0.019	-0.007	.183*	.000	-0.031	-.149*	-.245*	--
Global	-.058*	-.108*	.084*	-.059*	-0.03	-.075*	0.015	.056*	-.108*	.079*	-0.017	-.949*	-.071*

***Table 12**: Correlation Analysis (* 1% Significance Level, ** 5% Significance Level)*

4.8 Regression Analysis

The results of the regression analysis examining the effect of investment strategy on performance are presented in **Table 13** & **Table 14**. Three regression models were estimated; a cross sectional estimation using the 3-year returns data, a cross sectional estimation using the 5-year returns period, and a third fixed effects panel model estimation using both 3-year and 5-yar returns for all funds, as described in Chapter 3.

The Returns and Volatility models all exhibit sufficiently strong explanatory power, the R-Square figure is above 50% for all six models, implying that over 50% of the variation in financial returns are explained by our variables. The Risk-adjusted returns models, Sharpe and Sortino ratios, exhibit weaker explanatory power. The Sharpe ratio models R-Square figure ranging between 19% - 22.5%, and for the Sortino ratio these range between 33% - 41%.

The F-Statistic is significant at the 1% significance level for all models which can be interpreted as the fact that our models' variables have improved the predictive explanatory power. The null that all model's coefficients are equal to zero is rejected.

	Model 1 3-Year Returns				Model 2 5-Year Returns				Model 3 Both Periods			
Regression	OLS				OLS				Fixed-Effects			
Independent Variable	Returns	Volatility	Sharpe	Sortino	Returns	Volatility	Sharpe	Sortino	Returns	Volatility	Sharpe	Sortino
Coefficients												
Constant	4.280*	17.265*	0.746**	0.426*	4.012*	14.434*	0.725	0.351*	3.277*	16.702*	0.875*	0.421*
ESG Integrated	-0.834**	-0.135	-0.330	-0.065	-0.013	-0.126	0.376	-0.076	-0.559**	-0.112	-0.355***	-0.073
Screening	2.860	-1.914	0.293	0.090	3.063**	-0.967	0.069	-0.045	2.812**	-1.490***	0.187	0.020
Thematic	-1.372	0.097	1.861**	0.035	0.026	-0.632	-0.172	-0.011	-0.789	-0.192	0.927	0.019
Impact	-1.986	-4.462***	-0.271	-0.099	-1.396	-3.770***	0.497	-0.213	-1.861	-4.131**	-0.387	-0.164
Size (Rm)	0.025	-0.019	0.057*	0.010*	0.020**	-0.017***	0.066*	0.011*	0.024**	-0.018**	0.062*	0.011*
Age	0.037	0.040	-0.009	-0.006	0.000	0.055*	-0.015	-0.004	0.017	0.046*	-0.012	-0.006***
Interest Bearing	-5.850*	-10.975*	7.335*	1.900*	-4.103*	-9.299*	7.217*	2.617*	-5.076*	-10.244*	7.266*	2.230*
Real Estate	-16.454*	8.756*	-1.311**	-0.640*	-15.355*	8.051*	-1.520**	-0.666*	-15.883*	8.437*	-1.403*	-0.648*
Multi-asset	-2.013*	-7.720*	0.440	0.219*	-2.063*	-6.612*	0.315	0.221*	-2.085*	-7.231*	0.378	0.215*
Regional	9.248*	2.182**	-0.109	0.201	1.674***	2.893*	-1.164	-0.478***	6.236*	2.550*	-0.529	-0.051
Global	11.791*	1.474*	0.227	0.222*	5.047*	3.047*	-0.083	-0.056	9.003*	2.163*	0.090	0.103***
Period	-	-	-	-	-	-	-	-	1.753*	-1.538*	-0.291	-0.044
Model Summary												
F Stat.	106.520*	122.061*	27.034*	47.196*	86.958*	123.439*	17.564*	53.246*	154.316*	223.778*	40.330*	89.908*
R Square	0.534	0.567	0.225	0.331	0.551	0.621	0.190	0.408	0.505	0.591	0.207	0.361
Adjusted R Square	0.529	0.563	0.217	0.324	0.544	0.616	0.179	0.400	0.502	0.588	0.201	0.357
Std. Error	5.721	4.432	3.865	0.840	3.385	3.513	4.448	1.007	5.048	4.058	4.127	0.926
Number of CISs	-	-	-	-	-	-	-	-	1,031	1,034	1,032	1,061
Observations	1,031	1,034	1,032	1,061	790	839	836	861	1,821	1,873	1,868	1,922

***Table 13**: Individual Strategy Regression Results (* 1% Significance Level, ** 5% Significance Level, *** 10% Significance Level)*

4.8.1 Individual Strategies

a) Investment Strategy

The coefficient of ESG Integrated strategy is observed to have negative effect fund on Returns but is only significant in Models 1 (3-Year) and 3 (Panel model). The Sharpe ratio, a measure of Risk-adjusted Returns, for the Panel model (3) also highlights a negative and significant relationship. These results indicate that funds adopting an ESG Integration strategy can expect to underperform their traditional counterparts when performance is measured by absolute Returns or the Sharpe Ratio. However, ESG Integration does exhibit a reduction in Volatility against traditional strategies. By the volatility measure ESG Integration improves fund performance, although, these results are insignificant. These results support the Modern Portfolio Theory and Capital Asset Pricing Model where the restriction of the investment universe decreases returns and risk-adjusted returns (Fabozzi, Markowitz, Kolm, & Gupta, 2011). Nagy, Kassam, and Lee (2015), similarly, find that ESG Integration reduces Volatility. However, the finding of decreased return and risk-adjusted returns conflicts with the findings of Halbritter & Dorfleitner (2015), Bello (2005), and Utz & Wimmer (2014).

For investment schemes which employ the screening strategy, a positive and significant effect on Returns is observed for the 5-Year (Model 2) and Panel Models (Model 3). This implies that funds adopting screening strategies outperform their traditional counter parts. Similarly, a significant and negative effect on Volatility is identified in Model 3, suggesting that adopting a Screening strategy amongst South African CISs reduces portfolio risk compared with over Traditional strategies. Most of the funds classified under Screening strategies were ethically screened Shari'ah funds, highlighting the potential benefits of Ethical strategies. This finding supports the Arbitrage Pricing Model (Ross; 1976), whereby ESG factors are an information set investors can utilise to earn additional returns, and the findings of Verheyden et al. (2016).

The coefficient of the thematic strategies dummy are shown to have an insignificant effect on all three measures of fund performance and across the three models. Apart from the Sharpe Ratio in Model 1, which identifies a positive and significant relationship. The signs of the coefficients vary across the models and as such drawing a conclusion of over or

underperformance is difficult for Thematic strategies. These inconclusive results are consistent with Nandipa's (2020) findings on Targeted Development Investments within South Africa, and Viviers et al.'s (2008) results on responsible investing.

Impact strategies have a negative, but insignificant, effect on Returns and Risk-adjusted returns across all three models. A result consistent with the findings of Barbera, Morsebc, and Yasudaa (2021). The exception being the 5-Year model where Impact strategies have a positive insignificant effect on the Sharpe ratio. Notably, across all three models, Impact funds with impact strategy are associated with significantly lower volatility compared with traditional funds. This is likely an indication of the long-term investment horizons of these funds (Bec & Gollier, 2009).

Whilst the effects on performance should be interpreted with caution as they do not provide a unanimous significant result across all three models, general conclusions can be drawn for investors. The results indicate that superior performance can be obtained by electing to use a responsible strategy. Investors seeking to minimise Volatility within their funds should adopt a responsible strategy, with Screening and Impact strategies showing the greatest performance improvement against Traditional strategies. This generalised result supports the findings that responsible strategies are utilised as a risk management tool by investors rather than to generate abnormal returns (van Duuren, Plantinga, & Scholtens, 2016; Lee, Humphrey, Benson, & Ahn, 2010; Verheyden et al., 2016). However, the pursuit of lower volatility does appear to come at the cost of absolute return performance. The extent to which these variables affect risk-adjusted returns will depend on their relative magnitude.

b) Constant

The constant, β_0, is significant at the 1% level across all models, with the exception of the 5-Year model for the Sharpe ratio, where the constant is insignificant.

The constant in our models infers the risk-free rate of return, volatility, or risk-adjusted return an investor can expect, as described under CAPM. Focussing on absolute returns, this is notably lower than the current rates on the South African long-term (30-year) government bonds, which at the time of writing, are showing yields and coupons of 10.6%

and 8.75% respectively. As we have controlled for regional mandate differences, the implication of this result is that CISs in South Africa are either incorrectly pricing they local systemic of market risk, or the bond markets are over pricing the systemic risk. However, as yields are above coupon rates on long-dated South African bonds the latter is unlikely.

c) Control Variables

As expected, fund Size is positively related to fund performance across all measures. Specifically, a positive relationship with Returns, and Risk-adjusted Returns and a negative relationship with volatility. The results are significant across both the 5-Year and Panel models, with the risk adjusted return results being significant in the 3-Year model. These results are consistent with the literature supporting economies of scale advantages associated with larger funds (Elton et al., 2012; Indro et al., 1999; Reuter & Zitzewitz, 2010).

Fund Age results indicate a small insignificant improvement in fund Returns, offset by a marginal and significant increase in volatilities (in Models 2 and 3) resulting in an insignificant decrease in Risk adjusted Returns. Age was used as a proxy for fund manager tenure (Golec, 1996; Webster, 2002) with the expectation of a positive relationship with performance. The results identify that Age should not act as a proxy for Manager Tenure and that fund Age is not related to fund performance.

The group of Asset Class variables; Interest Bearing, Real Estate, and Multi Asset, all exhibit a significant effect on returns, volatility, and risk-adjusted returns. This finding supports evidence by Blake, Lehmann & Timmerman (1999) and Ibbotson & Kaplan (2000). The results for Interest Bearing Funds and Multi-asset funds can be interpreted in the same manner; a significant negative effect on Returns and Volatility, leading to a significant positive effect on Risk-adjusted returns. The exception being the multi-asset effect on the Sharpe Ratio which is insignificant. Real estate funds exhibit significantly lower returns, higher volatility, and lower risk adjusted returns. The implications of this results are that investors choice of asset class should be determined by their preferred measure of performance; those seeking lower volatilities and higher risk adjusted returns

should choose either an Interest Bearing or Multi-Asset fund, those looking for absolute returns should choose an Equity asset class.

The coefficients of geography dummies (Regional and Global) are found to be positive and significant for returns and risk across all models which suggests that CISs with a South African mandate earn significantly lower returns but exhibit significantly lower volatilities than those with Regional or Global mandates. The results for Risk-Adjusted returns exhibit both positive and negative results which are largely insignificant. The results therefore partially support the work of Coval & Moskiwitz, (2001) and Krugman (1990) that Geographic fund decisions are a deterministic factor in fund performance. The implications for investors will be driven by preferences. Those seeking higher Returns should invest in Global or Regional funds, but those seeking lower volatilities should invest in South African Funds.

Lastly, the Period dummy which controls for return variation across the two periods. Highlights that performance over the 5-year period significantly increases the predicted fund return and significantly reduced the volatility and risk adjusted returns over the 3-year period. This cannot be expected to be a predictor of future returns, rather controls for the external factors of CIS fund performance in the additional two years captured in the 5-year data.

4.8.2 Sensitivity Analysis: Grouped Strategies

The models are re-estimated by controlling for the small sample bias within the Screening and Impact groups. This was done by combining the strategies (Grouped Strategies) into three categories, traditional (reference strategy), ESG and Screening and Thematic and Impact strategies and estimated under the same models used for the individual strategies. The results are presented in **Table 14**.

a) Investment Strategy

The ESG & Screening strategies have a significant negative relationship with Returns for Model 4 and Model 6. Consistent with the individual strategies analysis, the grouped strategies exhibit a reduction in fund volatility, although, these results are insignificant. Risk-adjusted returns are also insignificantly reduced against the Traditional comparison. As with the individual strategies the result supports the work of Fabozzi, Markowitz, Kolm,

& Gupta (2011), Nagy, Kassam, and Lee (2015), Verheyden et al. (2016), and conflicts with that of Halbritter & Dorfleitner (2015), Bello (2005), and Utz & Wimmer (2014).

Impact and Thematic results indicate a reduction in Returns and Volatility compared to Traditional strategies. Over the 3-Year (Model 4) period this results in a positive relationship with Risk-adjusted returns, significant for the Sharpe ratio. Over the 5-Year (Model 5) period the relationship becomes negative and insignificant. The result of the Panel data are inconclusive with the Sharpe Ratio improving but the Sortino ratio decreasing. This result contradicts the work performed by Whittaker, Spinoso, Lee, Stiehler, & Müller (2018) as absolute returns do not improve. Equally, finding performance improvements contradicts Nandipa's (2020) study but coincides with Viviers et al. (2008) that the performance of ESG funds has varied.

Generalising the results leads to a different implication for investors. The grouped strategy analysis implies that investors do accept a performance trade-off for adopting a responsible strategy compared against traditional strategies. However, Thematic and Impact funds, those which are delivering measurable impact, do exhibit an improvement in risk-adjusted returns under certain conditions (Model 4), the volatility is sufficiently improved to overcome the poor return performance.

b) Constant & Control Variables

The results of the constant and control variables are robust to the grouped model specification and should be interpreted as described under the individual strategies analysis.

4.8.3 Contradictory Results

The regression results do identify some contradictory results when compared against the ANOVA analysis. The expectation was that investment strategies would have a significant effect on Returns and that no relationship would be found for Volatility and Risk-adjusted Returns under either the individual or grouped strategies. Comparisons should be made against the Panel data Models, 3 & 6, due to the full panel being analysed under the ANOVA.

The grouped analysis is robust and generates the expected results. Investment Strategy only has a significant effect on Returns.

The individual analysis does identify some contradictory results when compared to the ANOVA results. The ANOVA pairwise comparison of returns under Thematic and Traditional strategies identified a significant difference. This result is not replicated in the regression analysis. Similarly, significant results are found for the effects of the Screening and Impact strategies on volatilities and the effects of ESG Integration on the Sharpe ratio. While the ANOVA results suggested no significant differences.

These differences be explained by two factors. Firstly, the regression analysis includes external factors or control variables which are not specified under the ANOVA analysis. The inclusion of these variables within the regression models will partially explain the contradictory results. Secondly, the individual models contain small sample sizes for both the Screening and Impact classes, which can lead to spurious results. Hence, why the grouped analysis was performed. Therefore, these contradictory results do not detract from the analysis performed under either method.

	Model 4 3-Year Returns				Model 5 5-Year Returns				Model 6 Both Periods			
Regression	OLS				OLS				Fixed-Effects			
Independent Variable	Returns	Volatility	Sharpe	Sortino	Returns	Volatility	Sharpe	Sortino	Returns	Volatility	Sharpe	Sortino
Coefficients												
Constant	4.373*	17.223*	0.763**	0.430*	4.106*	14.395*	0.742	0.352*	3.370*	16.659*	0.891*	0.424*
ESG & Screening	-0.697**	-0.194	-0.304	-0.059	0.092	-0.156	-0.357	-0.074	-0.439***	-0.160	-0.332	-0.069
Thematic & Impact	-1.461	-0.514	1.572***	0.018	-0.209	-1.125	-0.222	-0.040	-0.951	-0.762	0.736	-0.006
Size (Rm)	0.024	-0.019	0.058*	0.010*	0.020**	-0.017***	0.066*	0.011*	0.022**	-0.018**	0.062*	0.011*
Age	0.033	0.040***	-0.011	-0.006	-0.004	0.055*	-0.016	-0.005	0.013	0.046*	-0.014	-0.006***
Interest Bearing	-5.943*	-10.866*	7.338*	1.898*	-4.168*	-9.223*	7.207*	2.619*	-5.155*	-10.157*	7.266*	2.230*
Real Estate	-16.543*	8.837*	-1.311**	-0.643*	-15.428*	8.116*	-1.531**	-0.665*	-15.964*	8.514*	-1.406*	-0.649*
Multi-asset	-2.067*	-7.661*	0.445	0.217*	-2.113*	-6.560*	0.307	0.222*	-2.136*	-7.172*	0.378	0.214*
Regional	9.158*	2.237*	-0.119	0.198	1.602	2.931*	-1.176	-0.478	6.154*	2.601*	-0.539	-0.053
Global	11.755*	1.467*	0.210	0.220*	5.016*	3.037*	0.090	-0.057	8.969*	2.155*	0.077	0.101***
Period	-	-	-	-	-	-	-	-	1.752*	-1.542*	-0.290	-0.044
Model Summary												
F Stat.	129.396*	148.349*	23.955*	57.724*	104.890*	150.495*	21.504*	65.211*	183.705*	267.102*	48.340	107.940*
R Square	0.532	0.565	0.225	0.330	0.547	0.620	0.189	0.408	0.503	0.589	0.206	0.360
Adjusted R Square	0.528	0.562	0.218	0.325	0.542	0.616	0.181	0.401	0.500	0.587	0.202	0.357
Std. Error	5.728	4.437	3.863	0.839	3.395	3.514	4.443	1.005	5.056	4.064	4.126	0.925
Number of CIS	-	-	-	-	-	-	-	-	1,031	1,034	1,032	1,061
Observations	1,031	1,034	1,032	1,061	790	839	836	861	1,821	1,873	1,868	1,922

***Table 14**: Grouped Strategy Regression Results (* 1% Significance Level, ** 5% Significance Level, *** 10% Significance Level)*

Chapter 5: Conclusions & Recommendations

5.1 Introduction

Chapter 5 reviews the research conducted in the preceding chapters and reaffirms the limitations. In response to the research questions and objectives, recommendations are made to the stakeholders of the study.

5.2 Summary of the Study

This study sought to identify whether South African CISs, and investors, accept a trade-off between impact and financial performance, building on the previous work of Nandipa's (2020) and Viviers et al. (2008). Performance was measured by; returns, risk, and risk-adjusted returns. Using secondary data on South African Collective Investment Schemes (CISs) and quantitative analysis, this paper fills a gap in the responsible investing literature by reviewing the problem under a different design, considering the full spectrum of responsible investing strategies, and focussing on a new geographic area: South Africa.

The descriptive statistics identified that the majority of South African CISs are still adopting traditional strategies (65%). Of the responsible strategies used the most popular is ESG integration, adopted by 32% of our sample. Only 2.3% of retail funds in South Africa are adopting strategies that seek to have a net-positive impact. This landscape is reflective of that identified by the *The African Investing for Impact Barometer* (Dhlamini, Giamporcaro, & Makhabane, 2017).

Using quantitative methodology of quasi-experimental design, with the two methods of analysis being a non-parametric ANOVA and multiple regression (OLS and fixed effects), the results indicate a weak relationship with the absolute returns performance measure, both positive and negative, but fail to establish a relationship for volatilities and risk-adjusted returns. The latter suggests that measurable real-world impact can be attainted alongside financial performance. A result which questions why more capital is not being utilised under high-impact strategies. A reallocation that would help to bridge the $3.3 – $4.5 trillion financing gap to fulfil the *2030 Agenda for Sustainable Development* (UN, 2015).

The primary stakeholders of this study were identified as; responsible investors, both individuals and institutions; South African CISs; and asset managers. The results of the study improve individual investor's and investment manager's understanding of responsible investing, ESG factors and the relationship with risk and returns. Refining asset allocation and risk-profiling to better reflect investors utility functions.

5.3 Conclusions

a) Returns

The results of the ANOVA analysis performed on Returns identified that there are significant differences between the mean returns of the five strategies under review. Thematic strategies exhibited returns that were significantly lower than the other strategies. Conversely, Screening strategies exhibited higher mean returns than the other strategies. The regression analysis supports the ANOVA's findings that Screening strategies exhibit higher returns than traditional strategies. The remaining strategies underperformed compared to traditional strategies. This suggests that responsible strategies can generate outperformance against those used by traditional funds. However, when controlling for the small sample bias in the studies strategy groupings the results indicate there may be a financial cost to adopting responsible investing strategies.

These results, provide weak evidence that investing strategy is a deterministic factor of returns, driving both over- and under-performance. Suggesting that there is a relationship between real world impact and financial performance, when measured by returns.

b) Risk

The results of the ANOVA analysis identified that there were no statistical differences in the means of responsible investing strategies in South African CISs for the risk performance measure.

The regression analysis identified a negative relationship between volatilities and strategies, suggesting an improvement in performance compared to traditional strategies. However, the generalised insignificance of the results indicates that responsible investing strategy is not a deterministic factor in fund volatility. Suggesting there is no relationship between real-world impact and financial performance, when measured by volatility.

c) Risk-adjusted Returns

The results of the ANOVA analysis identified that there were no statistical differences in the means of responsible investing strategies in South African CISs for the risk-adjusted returns performance measure.

The regression analysis identified both negative and positive relationships between Risk-adjusted Returns and responsible strategies depending on the relative decrease in Returns against the improvement in Volatility. However, the generalised insignificance of the results indicates that responsible strategy is not a deterministic factor in fund risk-adjusted returns. Suggesting there is no relationship between real-world impact and financial performance, when measured by volatility.

d) Implications

These results have important implication for investors and investment managers who are seeking to use responsible investing strategies in South Africa to generate returns, mitigate risk, or manage risk-adjusted returns. All common reasons for adoption of responsible investing strategies (Lee et al., 2010; van Duuren et al., 2016; Verheyden et al., 2016). The inability to statistically distinguish between strategies implies that no performance benefit can be gained from choosing one responsible strategy over the other.

Contrary, to existing papers exploring responsible investing and CAPM (Fabozzi, Markowitz, Kolm, & Gupta, 2011; Dam & Scholtens, 2015; Heinkel et al., 2001; Mackey et al., 2007) the results show that certain responsible investing strategies can improve returns. However, the results more closely follow APT (Giese et al., 2017; Gregory et al., 2020; Pollard et al., 2017) where investors using ESG factors can better identify arbitrage opportunities, potentially, but not necessarily, leading to improved returns.

In a South African context, the results support Nandipa's (2020) finding that TDIs do not exhibit significant differences in fund performance. In comparison to the results of Viviers et al. (2008), this study establishes a more detailed relationship between responsible investing and performance and corroborates that performance can both outperform and underperform benchmarks.

5.4 Limitations

The results of the study are applicable to the South African market from which the data was collected. This has provided an in-depth analysis of the South African responsible investment landscape. However, the generalisation of the results is limited and conclusions cannot be made about the responsible investing landscapes in other geographies.

Data collection on the responsible investing strategy was limited due to a lack of published data on this fund characteristic. South African CISs are not required to report on their specific strategy. Data was compiled from several sources including the PRI and Alexander Forbes. Advances in this data will further research in the area of responsible investing and allow for a more comprehensive study of this factor and fund performance. ASISA should consider implementing such a classification.

In addition, this study categorised fund into absolute strategy variables. A fund had to use one and only one of the five strategies described in Chapter 3. Funds often will utilise several strategies collectively. Future research should look to interact the strategy variables to account for this.

The analysis and results of the study may be limited due to the small sample bias existing within two groups: Thematic and Impact. To ensure the results where robust and inferences could be made over the full population of South African CISs additional analysis was performed on Group Strategies increasing the sample sizes with our groups. As the studies total sample accounted for 66% of the total population, this risk was considered minimal.

5.5 Recommendations

In the context of the result indicating that there is no trade-off between impact and financial performance should support the adoption of responsible strategies. Increasing the assets which are creating a real-world impact, supporting the South Africa's pursuit of their development objectives.

The primary stakeholders of this study were identified as; responsible investors, both individuals and institutions; South African CISs; and asset managers. All will interpret the results of this study differently depending on their preferred fund performance measure. Where fund performance is measured via risk-adjusted returns or volatility metrics,

stakeholders can adopt any responsible investing strategy without affecting performance. This will allow for a broader range of retail products to be developed by asset managers. In turn, this will enable retail investors to better reflect their utility functions under the three-dimensional risk-return-impact model. On the other hand, if the key performance indicator is returns the selection of strategy should be undertaken with more due care and attention.

All stakeholders should exercise caution when considering the results of this study. As with other fund factors and performance drivers, past performance in not a predictor of future performance.

This study builds on the previous work of Nandipa's (2020) and Viviers et al. (2008) investigating of the relationship between responsible strategies and performance in South African capital markets. Whilst the results of the three studies are building a strong case of responsible investing in South Africa, more research is required before coming to an academic consensus. To date these studies have focussed on funds where publicly available performance and fund data is available. To further this area of research future studies should look to incorporate funds operating in private capital markets. Dhlamini, Giamporcaro, & Makhabane (2017) identify that these private funds account for 74% of all impact and thematic funds in South Africa. Equally, better methodologies need to be established for identifying the strategies used by funds. This study calls on ASISA, Financial Services Conduct Authority (FSCA), and funds to make this data publicly available to support future studies.

References

Alexander Forbes. (2021). *Alexander Forbes Manager Watch Annual Survey*. Retrieved from https://issuu.com/alexanderforbescomms/docs/manager_watch__annual_survey_2020

Alin, A. (2010). Multicollinearity. *Wiley Interdisciplinary Reviews: Computational Statistics*, *2*(3), 370–374. https://doi.org/10.1002/WICS.84

Alkassim, R. S., Tran, X., Rivera, J. D., Etikan, I., Abubakar Musa, S., & Sunusi Alkassim, R. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Amel-Zadeh, A., & Serafeim, G. (2018). Why and How Investors Use ESG Information: Evidence from a Global Survey. *Financial Analysts Journal*, *74*(3), 87–103.

ASISA. (2018). *ASISA Standard on Fund Classification for South African Regulated Collective Investment Schemes*.

ASISA. (2021). Fund prices, statistics, foreign and local. Retrieved September 4, 2021, from https://www.asisa.org.za/statistics/collective-investments-schemes/

Auer, B., & Schuhmacher, F. (2016). Do Socially (Ir)responsible Investments Pay? New Evidence from International ESG Data. *The Quarterly Review of Economics & Finance , 59*, 51–62.

Barber, B. M., Morse, A., & Yasuda, A. (2021). Impact investing. *Journal of Financial Economics*, *139*(1), 162–185. https://doi.org/10.1016/j.jfineco.2020.07.008

Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: the curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, *27*(11), 1101–1122.

Bec, F., & Gollier, C. (2009). *Asset Returns Volatility and Investment Horizons: The French Case* (No. 2622).

Bello, Z. Y. (2005). Socially Responsible Investing and Portfolio Diversification. *Journal of Financial Research*, *28*(1), 41–57.

Berk, J. B., & Green, R. C. (2002). *Mutual Fund Performance and Performance in Rational Markets* (No. 9275). Cambridge.

Bérubé, V., Ghai, S., & Tétrault, J. (2014). *From Indexes to Insight: The Rise of Thematic Investing*. Montréal.

Bezuidenhout, R.-M., Davis, C., & du Plooy-Cilliers, F. (2014). Research Matters. In *Research Matters: A Cambridge Assessment Publication*. Juta and Company [Pty] Ltd.

BlackRock. (2021). Investing in the Future with Megatrends. Retrieved September 9, 2021, from https://www.blackrock.com/ae/intermediaries/themes/megatrends/what-are-megatrends

Blake, D., Lehmann, B., & Timmerman, A. (1999). Asset Allocation Dynamics And Pension Fund Performance. *The Journal of Business*, *72*.

Bouri, A., Mudaliar, A., Schiff, H., Bass, R., & Dithrich, H. (2018). *Roadmap for the Future of Impact Investing: Reshaping Financial Markets*.

Chen, J., Hong, H., Huang, M., & Kubik, J. (2004). Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization. *The American Economic Review*, *94*, 1276–1302.

Coval, J., & Moskiwitz, T. (2001). The Geography of Investment: Informed Trading and Asset Prices. *Journal of Political Economy*, *109*(4), 811–841.

Dam, L., & Scholtens, B. (2015). Toward a theory of responsible investing: On the economic foundations of corporate social responsibility. *Resource and Energy Economics*, *41*, 103–121.

Dhlamini, X., Giamporcaro, S., & Makhabane, T. (2017). *The African Investing For Impact Barometer*. Cape Town.

Eccles, R. G., & Kastrapeli, M. D. (2017). *The Investing Enlightenment*.

Elton, E. J., Gruber, M. J., & Blake, C. R. (2012). Does Mutual Fund Size Matter? The Relationship Between Size and Performance. *The Review of Asset Pricing Studies*, *2*(1), 31–55. https://doi.org/10.1093/RAPSTU/RAS001

Fabozzi, F., Markowitz, H., Kolm, P., & Gupta, F. (2011). Portfolio Selection. In *The Theory and Practice of Investment Management* (2nd ed., pp. 46–78). New Jersey: John Wiley & Sons Inc.

Faff, R., & Lee, N. (2008). Fund Size, Transaction Costs and Performance: Size Matters! Cite this paper Related papers On persist ence in mut ual fund performance. *Australian Journal of Management*.

Fages, R., Heredia, L., Carrubba, J., Eyal, O., Frankle, D., Kurihara, K., … Xu, Q. (2019). *Global Asset Management 2019: Will These 20s Roar?*

Fama, E., & French, K. (1996). Multifactor Explanations of Asset Pricing Anomalies. *The Journal of Finance*, *51*(1), 55–84.

Fama, E., & French, K. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, *116*(1), 1–22.

FSB. (2017). *Collective Investment Schemes Annual Report 2017*.

FundsData Online. (2021). FundsData Online. Retrieved September 9, 2021, from https://www.fundsdata.co.za/

Galema, R., Plantinga, A., & Scholtens, B. (2008). The stocks at stake: Return and risk in socially responsible investment. *Journal of Banking and Finance*, *32*(12), 2646–2654.

Giese, G., Lee, L.-E., Melas, D., Nagy, Z., & Nishikawa, L. (2017). *Foundations of ESG Investing: Part 1*.

GIIN. (n.d.). What You Need to Know about Impact Investing. Retrieved May 4, 2020, from https://thegiin.org/impact-investing/need-to-know/#how-do-impact-investments-perform-financially

Golec, J. (1996). The effects of mutual fund managers' characteristics on their portfolio performance, risk and fees. *Financial Services Review*, *5*(2), 133–147. https://doi.org/10.1016/S1057-0810(96)90006-2

Gregory, R., Stead, J., & Stead, E. (2020). The Global Pricing of Environmental, Social, & Governance (ESG) Criteria. *Journal of Sustainable Finance & Investment*.

GSIA. (2019). *2018 Global Sustainable Investment Review*. Retrieved from http://www.gsi-alliance.org/wp-content/uploads/2019/06/GSIR_Review2018F.pdf

Halbritter, G., & Dorfleitner, G. (2015). The wages of social responsibility — where are they? A critical review of ESG investing. *Review of Financial Economics*, *26*, 25–35.

Hallin, M. (2014). Gauss–Markov Theorem in Statistics. *Wiley StatsRef: Statistics Reference Online*. https://doi.org/10.1002/9781118445112.STAT07536

Hansmann, R., Mieg, H. A., & Frischknecht, P. (2012). Principal sustainability components: empirical analysis of synergies between the three pillars of sustainability. *International Journal of Sustainable Development & World Ecology*, *19*(5), 451–459.

Heinkel, R., Kraus, A., & Zechner, J. (2001). The Effect of Green Investment on Corporate Behaviour . *The Journal of Financial and Quantitative Analysis*, *36*(4), 431–449.

Heje Pedersen, L., Fitzgibbons, S., & Pomorski, L. (2020). *Responsible Investing: The ESG-Efficient Frontier*. Retrieved from http://dx.doi.org/10.2139/ssrn.3466417

Henke, H. M. (2016). The effect of social screening on bond mutual fund performance. *Journal of Banking and Finance*, *67*, 69–84.

Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, *93*(1), 15–36.

Huppé, G. A., & Silva, M. H. (2013). *Overcoming Barriers to Scale: Institutional impact investments in low-income and developing countries*. Winnipeg.

Ibbotson, R. G., & Kaplan, P. D. (2000). Does Asset Allocation Policy Explain 40, 90, or 100 Percent of Performance? *Financial Analysts Journal*, *56*(1), 26–33. https://doi.org/10.2469/faj.v56.n1.2327

Impact Management Project (IMP). (2021). How Investors Manage Impact. Retrieved April 10, 2021, from https://impactmanagementproject.com/impact-management/how-investors-manage-impact/

Indro, D. C., Jiang, C. X., Hu, M. Y., & Lee, W. Y. (1999). Mutual Fund Performance: Does Fund Size Matter? *Financial Analysts Journal*, *55*(3), 74–87. https://doi.org/10.2469/faj.v55.n3.2274

Keller, G. (2009). *Statistics for Management Economics* (10th ed.). Stamford, USA: Cengage Learning.

Knoll, M. (2002). Ethical Screening in Modern Financial Markets: The Conflicting Claims Underlying Socially Responsible Investment. *The Business Lawyer*, *57*(2), 681–726.

Kotler, P., & Lee, N. (2005). *Corporate Social Responsibility Doing the Most Good for Your Company and Your Cause* (1st ed.). New Jersey: John Wiley & Sons Inc.

Kotsantonis, S., Pinney, C., & Serafeim, G. (2016). ESG Integration in Investment Management: Myths and Realities. *Journal of Applied Corporate Finance*, *28*(2), 10–16.

Krainer, J., & Leroy, S. F. (2002). Equilibrium valuation of illiquid assets. In *Economic Theory* (Vol. 19).

Krugman, P. (1990). *Increasing Returns and Economic Geography* (No. 3275). Cambridge.

Latzko, D. A. (1999). Economies of Scale in Mutual Fund Administration. *Journal of Financial Research*, *22*(3), 331–339. https://doi.org/10.1111/J.1475-6803.1999.TB00731.X

Leacock, C., Rose, G., & Warrican, S. (2009). *Research Methods for Inexperienced Researchers : Guidelines for Investigating the Social World*. Kingston: Ian Randle Publishers.

Lee, D. D., Humphrey, J. E., Benson, K. L., & Ahn, J. Y. K. (2010). Socially responsible investment fund performance: the impact of screening intensity. *Accounting &*

Finance, *50*, 351–370. Retrieved from http://doi.wiley.com/10.1111/j.1467-629X.2009.00336.x

Leite, P., & Cortez, M. (2014). Style and Performance of Internationally Socially Responsible Funds in Europe . *Research in International Business and Finance* , *30*, 248–267.

Lintner, J. (1965). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolio and Capital Budgets. *Review of Economics and Statistics*, *47*, 13–37.

Mackey, A., Mackey, T., & Barney, J. (2007). Corporate Social Responsibility and Firm Performance: Investor Preferences and Corporate Strategies. *The Academy of Management Review* , *32*(3), 817–835.

Mahmoudi, A., Farrokhi, F., & Mahmoudi-Hamidabad, A. (2012). Rethinking Convenience Sampling: Defining Quality Criteria. *Theory and Practice in Language Studies*, *2*(4), 784–792. https://doi.org/10.4304/tpls.2.4.784-792

Maiti, M. (2020). Is ESG the succeeding risk factor? *Journal of Sustainable Finance & Investment*.

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

Massey, F. Jr. (1951). The Kolmogorov-Smirnov Test for Goodness of Fit. *Journal of the American Statistical Association*, 68–78.

Merton, R. (1987). A Simple Model of Capital Market Equilibrium with Incomplete Information. *The Journal of Finance*, *42*(3), 483–510.

Meyer, B. (1994). *Natural and Quasi-Experiments in Economics* (No. NBER 170).

Mudaliar, A., Bass, R., Dithrich, H., & Nova, N. (2019). *2019 Annual Impact Investor Survey*. Retrieved from https://thegiin.org/assets/GIIN_2019%20Annual%20Impact%20Investor%20Survey_webfile.pdf

Mudaliar, A., & Dithrich, H. (2019). *Sizing the Impact Investing Market Acknowledgments*. Retrieved from https://thegiin.org/assets/Sizing%20the%20Impact%20Investing%20Market_webfile.pdf

Nagy, Z., Kassam, A., & Lee, L.-E. (2015). *Can ESG Add Alpha? An Analysis of ESG Tilt and Momentum Strategies*.

Nandipa, G. (2020). *The Development Role Played by Targeted Development Investments in South Africa and Their Risk-Adjusted Performance Over a 10-Year Period*.

Orsagh, M. (2015). *CFA Institute Survey: How Do ESG Issues Factor into Investment Decisions?* Retrieved from https://blogs.cfainstitute.org/marketintegrity/2015/08/17/cfa-institute-survey-how-do-esg-issues-factor-into-investment-decisions/

Pollard, J., Pollard, J. L., Sherwood, M. W., & Klobus, R. G. (2017). Establishing ESG as Risk Premia. *The Journal Of Investment Management*, *16*(1), 1–12.

PRI. (2017). *PRI Reporting Framework Main definitions 2018*. London. Retrieved from https://www.unpri.org/download?ac=1453

PRI. (2018). *Asset Owner Strategy Guide: How to Craft and Investment Strategy*. London. Retrieved from https://www.unpri.org/download?ac=4336

PRI. (2019a). *Principles for Responsible Investment*. London. Retrieved from https://www.unpri.org/download?ac=6303

PRI. (2019b). *What is Responsible Investing*. London. Retrieved from https://www.unpri.org/download?ac=10223

PRI. (2021). Signatory Directory. Retrieved September 5, 2021, from https://www.unpri.org/signatories/signatory-resources/signatory-directory

PWC. (2017). *Asset & Wealth Management Revolution: Embracing Exponential Change*. Retrieved from www.pwc.com/assetmanagement

Reuter, J., & Zitzewitz, E. (2010). *How Much Does Size Erode Mutual Fund Performance? A Regression Discontinuity Approach* (No. 16329). Cambridge.

Revelli, C., & Viviani, J.-L. (2015). Financial performance of socially responsible investing (SRI): what have we learned? A meta-analysis. *Business Ethics: A European Review*, *24*(2), 158–185.

RIAA. (2018). *Responsible Investment Benchmark Report 2018 Australia*. Sydney. Retrieved from https://responsibleinvestment.org/wp-content/uploads/2018/08/RIAA_RI_Renchmark_Report_AUS_2018v6.pdf

Ross, S. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, *13*, 343–362.

Sharpe, W. (1964). Capital Asset Prices. *Journal of Finance1*, *19*, 425–442.

Sherwood, M., & Pollard, J. (2019). *Responsible Investing* (1st ed.). London: Routledge.

Statman, M., & Glushkov, D. (2009). The Wages of Social Responsibility. *Financial Analysts Journal*, *65*(4), 33–46.

UN. Transforming our world: the 2030 Agenda for Sustainable Development. , Pub. L. No. A/RES/70/1, Resolution adopted by the General Assembly (2015).

UN. (2018). *Unlocking SDG Financing: Good Practices From Early Adopters*. Retrieved from https://unsdg.un.org/resources/unlocking-sdg-financing-findings-early-adopters

Utz, S., & Wimmer, M. (2014). Are they any good at all? A financial and ethical analysis of socially responsible mutual funds. *Journal of Asset Management*, *15*(1), 72–82.

van Duuren, E., Plantinga, A., & Scholtens, B. (2016). ESG Integration and the Investment Management Process: Fundamental Investing Reinvented. *Journal of Business Ethics*, *138*, 525–533.

Vargha, A., & Delaney, H. (1998). The Kruskal-Wallis Test and Stochastic Homogeneity. *American Educational Research Association and American Statistical Association*, 170–192.

Verheyden, T., Eccles, R., Fenier, A., & Arabesque Partners. (2016). ESG for All? The Impact of ESG Screening on Return Risk, and Diversification. *Journal of Applied Corporate Finance*, *28*(2), 47–55.

Verney, P. (2018). ESG Country Snapshot: South Africa. *Responsible Investor*. Retrieved from https://www.responsible-investor.com/articles/esg-country-snapshot-south-africa

Viviers, S., Bosch, J. K., Smit, E., & Buijs, A. (2008). The risk-adjusted performance of responsible investment funds in South Africa. *Investment Analyst Journal*, *68*.

Vivers, S & Els, G. (2017). Responsible Investing IN South Africa: Past present and future. *African Review of Economics and Finance, 9(1), 122-155*

WCED. (1987). *Report of the World Commission on Environment and Development: Our Common Future Towards Sustainable Development*.

Webster, D. (2002). Mutual Fund Performance and Fund Age. *SSRN Electronic Journal*. https://doi.org/10.2139/SSRN.1764543

Whittaker, R., Spinoso, M., Lee, A., Stiehler, A., & Müller, P. G. (2018). *Sustainable Investing*. Retrieved from https://www.ubs.com/global/en/wealth-management/sustainable-investing/2018/single-use-plastics-the-last-straw/_jcr_content/mainpar/toplevelgrid/col1/textimage_729574904.1475385392.file/dGV4dD0vY29udGVudC9kYW0vV2VhbHRoTWFuYWdlbWVudEFtZXJpY2FzL2RvY3VtZW50cy