UNIVERSITY OF KWAZULU-NATAL

THE PERFORMANCE EVALUATION AND STYLE ANALYSIS OF SOCIALLY RESPONSIBLE INVESTMENT FUNDS IN SOUTH AFRICA

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DECLARATION

I, Jeremy Naidoo, declare that:

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GLOSSARY OF ACRONYMS

AFAC – Alexander Forbes Asset Consultants

ALBI – All Bond Index

ALSI – All Share Index

AMEX – American Stock Exchange

APT – Arbitrage Pricing Theory

ASISA - Association for Savings and Investment South Africa

AUM – Assets Under Management

B/M – Book-to-Market

CAPM – Capital Asset Pricing Model

CDFIs – Community Development Financial Institutions

CRISA - Code of Responsible Investing in South Africa

CSR – Corporate Social Responsibility

D/Y – Dividend Yield

DFI – Development Finance Institutions

E/Y – Earnings Yield

EMH – Efficient Market Hypothesis

ESG – Environmental, Social and Governance

FSB – Financial Services Board

GOVI – Government Bond Index

HBSA – Holdings-Based Style Analysis

HML – High Minus Low

JSE – Johannesburg Stock Exchange

MC – Market Capitalisation

MOM – Momentum

MPT – Modern Portfolio Theory

MSCI – Morgan Stanley Capital International

NASDAQ – National Association of Securities Dealers Automated Quotations

NAV – Net Asset Value

NYSE – New York Stock Exchange

OTHI – Other Bond Index

P/B – Price-to-book

P/E – Price Earnings

RBSA – Returns-Based Style Analysis

REITs – Real Estate Investment Trusts

ROC – Return on Capital

ROE – Return on Equity

S.A. – South Africa

SARB – South African Reserve Bank

SMB – Small Minus Big

SRI – Socially Responsible Investing/Investment

TRI – Total Return Index

U.K. – United Kingdom

U.S. – United States

U.S. SIF – United States Sustainable Investment Forum

ABSTRACT

Socially Responsible Investing (SRI) has been widely acknowledged as an integral part of modern-day investment practice, gaining significant growth since its early history. While SRI consciousness has grown steadily in South Africa; there is a paucity of research on the effect of its restrictions on investor's portfolios. Considering the limited studies documented, the extant research delves into the profile of the South African responsible investing industry, highlighting its vast development and investment strategies. To assess the viability of socially responsible investments and provide investors with the ability to make more informed decisions, scholars in finance have raised pertinent questions, primarily focused on the impact of utilising environmental, social and governance (ESG) criteria on socially responsible investment performance. As such, this study aimed to explore this research domain and position its results within the currently inconclusive literature.

The objective of the study was to evaluate active SRI in South Africa, with a focus exclusively on SRI funds. The approach followed was twofold. Firstly, by employing the Fama and French 3-factor model and Carhart 4-factor model, the study assessed the risk-adjusted performance of SRI funds relative to their conventional counterparts (conventional funds and passive benchmarks) over two evaluation periods (2009-2013 and 2014-2018). The findings showed that after significant underperformance of SRI funds in the earlier period, they tend to perform better in the latter period. The improvement in performance over the study was termed a 'learning effect' - the older funds have finally caught up with conventional funds (or outperformed them) while funds that were launched recently still trail their conventional peers. Furthermore, the models showed similar findings for the market loading, size (SMB) and value (HML) factors – SRI funds exhibited a lower sensitivity to market fluctuations as compared to non-SRI funds, a higher exposure to small-cap stocks, and exhibited a larger exposure to growth stocks in the earlier period (2009-2013) while a greater exposure to value stocks in the latter period (2014-2018).

The second research aim of the study made use of Return-Based Style Analysis (RBSA) to identify and compare the determinants of SRI funds to non-SRI funds (conventional funds). To date, this method has not been previously applied to SRI funds in South Africa. The findings of the RBSA model showed that SRI funds, on average, exhibited moderate to high levels of active management, which were also found to be substantially higher than non-SRI funds. This indicated that the imposition of additional constraints by SRI funds (through SRI criteria) does not hinder the fund manager from adding value through active management. Furthermore, the classifications of SRI funds were shown, on average, to comply with their investment mandates and relevant regulation, i.e. correctly classified. Taking into account the asset class exposures of SRI funds, the regression results showed that these exposures were found, on average, to almost mirror the exposures of the funds' actual asset holdings. With respect to

the comparative style analysis of SRI and non-SRI funds, a distinguishable asset class exposure was shown whereby SRI funds were found to have a value-tilt while non-SRI funds exhibited a growth-tilt over the evaluation period.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

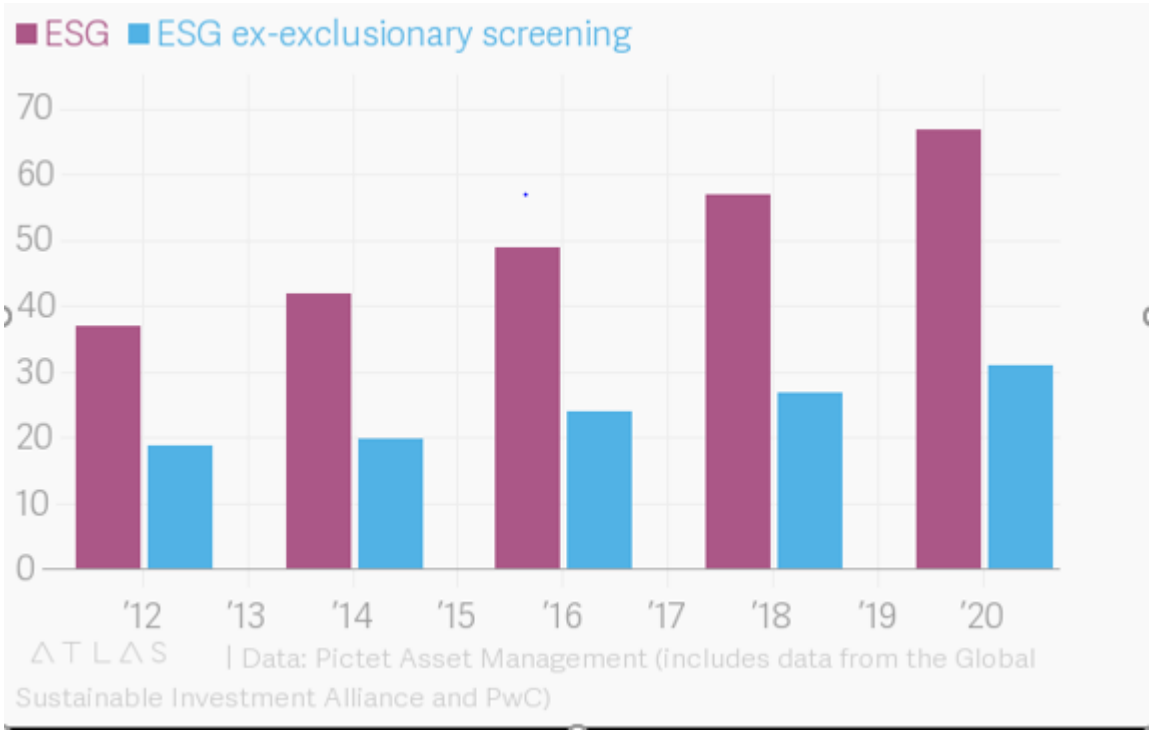
CHAPTER 1: INTRODUCTION

1.1. Background and Overview of the Study

1.1.1. Socially Responsible Investments and its Performance Attributes

The Australian Government's *Social Impact Investing Discussion Paper* (2017, p.6) defines Socially Responsible Investing/Investments (SRI) as "an investment made with the intention of generating measurable social and/or environmental outcomes in addition to a financial return". The concept of SRI has been receiving increasing interest both in practice and academia, with academic interest resting primarily on determining the impact of considering social criteria on SRI performance (Leite & Cortez, 2017). Accompanying its increased spotlight, the number of investors who incorporate Environmental, Social and Corporate Governance (ESG) criteria in their investment decisions has exponentially increased in recent years, stimulating the development of numerous socially responsible investment vehicles globally. Figure 1.1 depicts a steady increase in share growth of ESG investments in the global investment portfolio.

Figure 1.1: Share of ESG Assets in Global Investments



[Source: Quartz (2019)]

The criteria for ESG investments remain vague. It includes exclusionary screening, for instance, where funds divest from harmful industries such as weapon markers or the so-called 'sin' industries—

gambling, pornography, tobacco and alcohol. Harm may be mitigated by excluding investment in these industries, but there is not necessarily the same commitment to contributing positively to society. A fund's holdings may count as ESG investments, but still contain shares of oil companies, for example, they were not specifically excluded. Nevertheless, as shown in Figure 1.1 both investments have shown steady growth, with forecasted data suggesting that ESG assets would comprise around two-thirds of assets managed by global funds by 2020 (and 31%, excluding exclusionary spending) (Quartz, 2019).

Similar to the global frenzy surrounding ESG investments, South Africa (S.A.) has also positioned itself internationally as a proponent of SRI, with it gaining recognition as being the single largest market for sustainable investments in Southern Africa. Nearly three quarters (74%) of all sustainable investments disbursed in the region has been placed in S.A., amounting to USD 4.9 billion of non-DFI[1] capital and more than USD 24.2 billion of DFI capital. This is close to 15 times the amount deployed in Zambia, which ranks second in the region in terms of impact capital disbursed (Global Impact Investing Network, 2018). Tied to the heightened concerns on Corporate Social Responsibility (CSR), the growth in SRI can largely be attributed to the popularity in disfavouring the motive of profit maximisation at society's cost. As a consequence, calls have arisen for firms to assimilate expectations and concerns of all shareholders directly and indirectly influenced by the firm's corporate activities (stakeholder theory[2]) through the integration of ESG concerns. Thus, in terms of the investment decision-making process, SRI involves the selection of stocks on the basis that the underlying firms incorporate ESG concerns in their business practices (Huimin, Kong & Eduardo, 2010).

The origins of ethical finance, which evolved into what is now known as SRI, can be traced to the genesis of the Judeo-Christian and Islamic civilisations, in which religious and moral dispositions provided the impetus for the original development of many social and financial practices (Barwick-Barrett, 2015). Principally, these practices focused on the adoption of the Old Testament and Koran derived values into an assortment of loan and investment restrictions within the ancient European and Asian peninsulas (Renneboog, Horst & Zhang, 2008). Subsequently, the geographical spread of these religions catalysed the prevalent adoption of their fundamental moral principles, including those that affected economic paradigms. As a result, there is a diverse and consistent history of groups associating financial activities with moral responsibilities. Prominent historical examples include the 17th century Quakers who restricted investments in armament manufacturers, and the 1908 adoption by the US Federal Council of Churches of a 'Social Creed', which essentially constituted a set of moral investment

[1] A Development Finance Institution (DFI) is a financial institution that provides risk capital for economic development projects (RisCura, 2019).

[2] Stakeholder theory indicates that the purpose of a firm is to provide value all stakeholders and not just shareholders. The stakeholders include; customers, suppliers, employees, communities and shareholders (Fontaine, Haarman & Schmid, 2006). Stakeholder theory will be discussed in more detail in Chapter Two.

restrictions for their members including the non-investment in alcohol and gambling companies (Barwick-Barrett, 2015).

SRI's early rich history and establishment in investment practices over time essentially led to contemporary financial theory encompassing psychological return as an additional potential driver within investment decisions (Cummings, 2000). This theorem evolves from the widely acknowledged neoclassical financial economic view which asserts that investment decisions are made solely on the basis of expected return and risk, thereby implying that these investment characteristics represent an individual's entire spectrum of interest within investment decisions. In view of contemporary financial theory, ethical investors can capture psychological return in two ways (Barwick-Barrett, 2015). The first is the psychological benefit they receive through selecting their investments on the basis of ethical criteria as well as financial criteria. For instance, an ethical investor may acquire a psychological return by only investing in mutual funds that do not hold the stock of tobacco companies, if the ethical investor does not wish to support tobacco companies and benefit from their success. The second form of psychological return is captured through the shareholder voting of SRI mutual funds. Many SRI funds actively promote their proxy voting strategies within their prospectuses and claim through their proxy voting to support shareholder proposals that promote the firm's environmental and social actions. An ethical investor may receive a psychological return if they invest in SRI funds with proxy voting strategies that promote environmental and social actions if they value the SRI fund's promotion of these actions (Barwick-Barrett, 2015).

Although there are undoubtedly plausible reasons why investors would opt for SRI, including amongst other reasons, changing firm behaviour through funds redistribution from disapproved to approved activities (Knoll, 2002); the business case for SRI is still debatable. For investors who go beyond philanthropic affinities, the question of financial return is consequently vital. Hence, the question of how SRI performs relative to conventional investments calls for an empirical review. From a theoretical basis, SRI critics highlight (i) increases in monitoring costs, and (ii) a restricted investment universe which limits the potential for diversification results in SRI investments under-performing conventional investments. However, proponents of SRI contend that any loss in deriving mean-variance efficient portfolios as a result of a constrained investment universe is compensated for by the desirable profile characteristics which include the ability to raise funds (Waddock & Graves, 1997); and an ability to hire a quality workforce (Greening & Turban, 2000) of the screened assets' underlying companies. This view is anchored in the belief that screens eliminate firms with undesirable characteristics that the market or society will eventually penalise over time (stakeholder theory).

To date, empirical evidence on the existence of performance differences between SRI and non-SRI are mixed at best. On the one hand, there are studies that report that SRI under-performs non-SRI (Bauer,

Koedijk & Otten, 2005; Galema, Plantinga & Scholtens, 2008; Renneboog et al., 2008; Lee, Humphrey, Benson & Ahn, 2010; Hong & Kostovetsky, 2012;) and on the other hand, there are studies that highlight that SRI out-performs non-SRI (Derwall, Guenster, Bauer & Koedijk, 2005; Kempf & Osthoff, 2007; Derwall & Koedijk, 2009; Nofsinger & Varma, 2012; Wikstrom, 2014). Furthermore, certain studies report no significant performance differences (Sauer, 1997; DiBartolomeo & Kurtz, 1999; Statman, 2006; Bauer, Koedijk & Otten, 2007; Schröder, 2007; Traaseth & Framstad, 2016; Christensson & Skagestad, 2017; Taivainen, 2018).

With a wide array of ambiguous results predominantly from developed countries, it is worthwhile to empirically analyse the performance of SRI in a developing (or emerging) market and position the results within the currently inconclusive literature. Furthermore, a gap in literature exists for the performance evaluation of SRI funds in S.A., with the extant literature largely addressing SRI developments and SRI strategies (Giamporcaro and Pretorious, 2012; Heese, 2005). In fact, since the pioneering study on SRI performance at the fund-level documented by Viviers (2007), the only other known study to exist to date, was that by Du Plessis (2015). The findings of both these studies, however, was shown to be contradictory thereby providing no consensus on the performance of SRI funds in S.A., which in turn, further establishes the quest for this research.

1.1.2. Style Analysis

According to Chen & Wermers (2005) and Muller & Ward (2013), investors and fund managers, in the process of making portfolio allocation decisions, begin by classifying the assets available to them for investment into a few broad classes. These broad asset classes used by investors are often referred to as ‘styles’. Examples of such styles, or asset classes, would be value stocks, growth stocks, stocks of varying capitalisation levels, and government bonds (Hoffman, 2012). The process by which investors allocate capital among the different styles, rather than individual securities, has come to be known as ‘style investing’ (Strugnell, Gilbert & Kruger, 2011).

Essentially, the investment style of a fund is shown as a combination of long positions in passive indices, which most closely replicates the actual performance of a fund over a specified period (Deb, 2006). The identification of this is achieved through a statistical evaluation approach known as style analysis. This technique is useful to both, investors and fund managers as it can be utilised as a tool for diversification of risk, prediction of future returns, construction of peer groups, and selection of appropriate style-specific benchmarks.

Furthermore, by using the approach of style analysis, systematic patterns may be identified in the exposure of the fund to relevant style factors, which may be explained by the investment style strategies

employed by fund managers (Cumming, Fleming & Schwienbacher, 2009). In this regard, the pattern of exposures can either be consistent with the fund's proposed investment style, i.e. correctly classified or have exposures to asset classes different to that stated in the fund's mandate, commonly known as style drifting (Eraslan, 2013). This drift can be largely attributed to the fund manager's engagement in tactical asset allocation across different asset classes. Adding tactical asset allocation to the portfolio strategy essentially results in the fund manager varying from strategic asset allocation weights to take advantage of perceived short-term opportunities (Chartered Financial Analyst, 2018a). In light of this, it is therefore important for investors to understand the style benchmark of the funds, both for investment consideration and investments undertaken, to gain an idea of the active management skill of the fund manager in pursuing these value creation opportunities. As such, the effectiveness of active management is seen as the fund manager's ability to generate returns in excess to the given style benchmark.

Although style analysis is widely regarded as a valuable tool, there is much debate about how style should be measured. To date, two main approaches to style analysis are proposed - Holdings-Based Style Analysis (HBSA) and Return-Based Style Analysis (RBSA). The type of analysis required essentially determines the choice of model. HBSA is employed if the analysis was based on the underlying stocks that constitute the fund. This would entail an evaluation of these stock's characteristics over several points in time, which will aid in providing a classification of the fund based on the characteristics of its core securities (Kaplan, 2003). Alternately, the RBSA method, advocated by Sharpe (1992), compares the fund's total returns to the total returns of various style-based indices, allowing for inferences to be made about its style-based and active return components (Morningstar, 2007). As such, the objective of this study is to identify the determinants of return of SRI funds, which invariably led to the use of the RBSA approach.

This research, therefore, seeks to detect patterns in return series that are inherent to style factors, using RBSA. Essentially, the study will investigate whether SRI portfolio managers have the ability to add value after adjusting for style exposures. Employing the RBSA approach in collaboration with statistical tools, allows for the return series of SRI funds (and non-SRI funds) to be characterised by some combination of these factors - in order to assert the most apt combination that describes the portfolio's constituents, namely, identifying the style exposures of the fund (while accounting for any systematic pattern of exposures shown among the funds), and its investment style (Deb, 2006).

International studies have provided an array of findings regarding the style exposures of SRI funds. Studies have shown that SRI funds tend to exhibit moderate to high levels of active management (Deb, 2006) while having both a small-cap bias and growth-tilt (Bauer et al., 2005; Renneboog et al., 2008). These international findings will aid in the analysis of the results of the study by identifying any

similarities or differences to these findings. The fundamental assertion for the pursuit of this research area was largely based on the fact that no empirical studies on the style analysis of SRI funds were found to exist for S.A. Therefore, this study will seek to add to the body of knowledge regarding this research area.

1.1.3. Overview of the Approach to the Study

The aim of the study is to evaluate active SRI in S.A., with a focus exclusively on SRI funds. The approach followed is twofold (i.e. two research objectives), based on the gap in literature alluded to in sections 1.1.1 and 1.1.2. Firstly, it will provide a (risk-adjusted) performance evaluation of SRI funds relative to its matched funds (conventional funds) and passive benchmarks (which are either proxy or composite benchmark indices). Secondly, using RBSA, the study will identify and compare the determinants of return SRI funds to non-SRI funds. The return determinants are presented in two forms. Firstly, the proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active management). Secondly, the style factor/asset class exposures that contribute to the overall return of the fund.

1.2. Research Problem

With the practice of SRI receiving increasing interest in recent years, scholars in finance have raised apposite questions, primarily focused on the impact of utilising ESG criteria on SRI fund performance. The broad literature surrounding this field have yielded arguments supporting the over-under-and neutral performance of SRI funds relative to its conventional counterparts in S.A., with no consensus shown among the limited empirical studies surrounding this research domain (Viviers, 2007; Du Plessis, 2015). The fundamental assertion in favour of SRI claims that significant levels of CSR are indicators of firms with high quality and effective management and could potentially reflect comparative advantages over those considered less socially responsible. Also, in light of SRI funds, the restricted universe imposed by SRI criteria (e.g. screening) would convey value-relevant information, allowing for fund managers to gain more intimate knowledge of stocks that constitute SRI funds, translating into them outperforming their conventional peers. However, critics of SRI sustain that the additional costs associated with the monitoring of social performance and the imposition of additional constraints will essentially deter the formation of an optimal portfolio, resulting in reduced diversification benefits and a lowered risk-adjusted return (Cortez, Silva & Areal, 2009). The latter argument highlights the contradiction of SRI principles with the assumptions of Modern Portfolio Theory (MPT). Therefore, as the performance debate continues, and SRI gains its vast establishment in investment practices, it is essential to provide clarity on the performance attribute of these funds.

Furthermore, SRI funds are distinguishable from conventional funds based on the screening process utilised in the portfolio construction process. Various debates are proposed on whether the imposition of additional constraints on SRI funds (imposed by the use of SRI screening) has an impact on the fund manager's active involvement in a given fund. As no empirical studies on the style analysis of SRI funds were found to exist for S.A., by adding to the body of knowledge, this research area considers the restricted investment universe of SRI funds and evaluates the impact of the implied constraints in two approaches. Firstly, by determining whether it impacts (or limits) the SRI fund manager's ability to add value through active management (i.e. add value after adjusting for style exposure). Insights into which will be gained by assessing the extent of their active involvement in the fund both in isolation and relative to conventional fund managers. Secondly, if it influences the style exposures (while also identifying the exposures) of SRI funds, translating into any systematic pattern of exposures shown among these funds - for example, a growth bias or small-cap bias as shown in international studies. If a significant pull to any style exposure is identified, this could potentially result in a given fund having style exposures different to those stipulated in its mandate (its proposed investment style), which could provide an indication of style drift. Additionally, it will evaluate the exposures of SRI funds relative to non-SRI funds and identify if there are any differences or similarities in their exposures.

1.3. Research Objectives

The focal point of this study is to evaluate the active SRI in S.A., with a focus exclusively on SRI funds. To achieve this overall objective, the following sub-objectives will be outlined.

1. To evaluate the risk-adjusted performance of SRI funds relative to their matched funds (conventional funds) and respective passive benchmarks (proxy or composite indices).
2. To identify and compare the determinants of return of SRI funds to non-SRI funds (conventional funds).

1.4. Research Questions

To aid in the performance evaluation of active SRI in S.A. and to elucidate the evaluation focus, two research questions will be addressed:

1. How do SRI funds perform (risk-adjusted performance) in comparison to its matched funds and respective passive benchmarks?
2. What are the determinants of return of SRI funds, and how do they compare to non-SRI funds?

1.5. Significance of Research

As the study focuses on two research objectives, namely; the performance evaluation of SRI funds and the style analysis of SRI funds, the significance of this research will be presented based on the aforementioned objectives.

In respect of the performance evaluation of SRI funds, the contribution of this research is fourfold. Firstly, this is one of only a few studies that focus on S.A., an emerging market. The vast majority of the studies of this nature have been documented for the U.S. and European countries, with limited research on emerging markets. Additionally, while SRI consciousness has grown steadily in S.A.; there is a paucity of research in the SRI domain. Considering the limited studies documented, the extant research delves into (i) the profile of the responsible South African investing industry and opportunities and challenges in the SRI sector (Herringer, Firer & Viviers, 2009) and (ii) the degree to which investors integrate ESG factors into their investment choices (Giamporcaro & Pretorius, 2012). Therefore, the question of financial performance of SRI in S.A. has rarely been addressed at the fund-level. In fact, with the pioneering study by Viviers (2007) documented almost a decade ago, the only other known study that exists, to date, was that by Du Plessis (2015). The findings of both these studies, however, was shown to be contradictory, thereby providing no consensus on the performance of SRI funds in S.A., which in turn, establishes a field requiring further research.

Secondly, the study period considered is extensive and provides a comprehensive analysis of the most recent performance of the funds. With a focus exclusively on the evaluation period, this study can be viewed as merely an extension on the research of the pioneering study by Viviers (2007), as the commencement of this study's sample period coincides with the end of the evaluation period of the said study – but not accounting for the 2007/08 global financial crises, which the study opted to exclude. As further support to this view, Viviers (2007) recommends as further research that a follow-up study be undertaken in the next three to five years (which is approximately the commencement of this study's period) to determine whether the findings of their study actually hold over the longer term as the SRI market becomes more established (for example the study's finding of improved performance of SRI funds over the long term). This is an essential part to consider, as the SRI fund sector has experienced significant growth and has become vastly established in investment practices over the past decade. Therefore, sound intuition suggests that this growth should be accompanied by additional or extended research in order to, firstly, ensure its continuous growth and existence in the market, and secondly, to provide investors with the ability to make more informed decisions regarding this investment approach.

Thirdly, the extant research on the performance evaluation of SRI for S.A. focused on evaluating passive SRI in S.A., more specifically, comparing the performance of the JSE SRI Index to the JSE All Share Index (JSE ALSI) and other conventional indices in S.A. (Chawana, 2014). The overlapping conventional stocks between the JSE SRI Index and other conventional indices (mainly the JSE ALSI), raises the pertinent issue of not testing the financial performance hypothesis of pure conventional stocks against pure SRI stocks. Although, this attribute may also exist among SRI funds when compared to its conventional counterparts, it tends to exist at a lower scale (relative to the JSE SRI Index) due to the intense screening and smaller universe of stocks held by these funds, on average, in comparison to the JSE SRI Index, as well as the fund manager having more control and discretion over the choice of stocks that constitute the given fund.

Lastly, the study provides a holistic view to SRI fund performance, whilst also considering the performance of the various fund styles that constitute the sample. Relative to the aforementioned studies, this is pioneering research for S.A. The benefit of this approach is that it draws attention to all fund styles within a given sample regardless of its relative size in the overall sample. This, in some way, eliminates the 'averaging effect' on the findings of the study which is obtained with a holistic approach. Furthermore, investors are known to not only invest in the complete market of SRI funds but rather, may target certain fund styles of their preference, thereby requiring performance data regarding it.

In terms of the style analysis of SRI funds, the contribution of this study is twofold. Firstly, as no empirical studies on the style analysis of SRI funds was found to exist for S.A.; this study will add to the body of knowledge regarding this investment approach. By considering the imposition of additional constraints posed on SRI funds through intense screening, the study will identify whether these constraints limit the SRI fund manager's ability to add value through active management. The insights to which will be gained by assessing the extent of their active involvement in the fund both in isolation and relative to conventional fund managers.

Secondly, international studies (although limited) have provided an array of findings regarding the style exposures of SRI funds, with various studies showing SRI funds to have both a small-cap bias and growth-tilt (Bauer et al., 2005; Renneboog et al., 2008). This analysis will identify the style exposures of SRI funds in S.A., allowing for inferences and comparability to be made with respect to international findings. The research, drawing attention back to the respective fund styles, will also include a review of SRI funds exposures within each fund style, in addition to a holistic review of their exposures as shown by international studies. This will indicate whether these funds are correctly classified with respect to their fund style. Furthermore, it will also evaluate the exposures of SRI funds relative to non-SRI funds and identify if there are any differences or similarities in their exposures.

The motivation for the pursuit of this research area, i.e. style analysis, is based on the astonishing belief in the fund management sphere, that style consistency can be indicative of both a skilful fund manager and a successful risk management system. Hence, it forms an advisable distinction when searching for and retaining managers, in addition to the implied benefits in the portfolio construction process. The vast majority of academic research infers that there is a positive relationship between investment style consistency and performance. Furthermore, it is important for investors to understand the style benchmark of the funds, both for investment consideration and investments undertaken, to gain an idea of the active management skill of the fund managers. The fund manager should, in holding different securities within each asset class other than that included by the benchmark representing that asset class (selection), generate an excess return over the given style benchmark, to ensure the effectiveness of active management.

1.6. The Scope and Method of the Study

1.6.1. Scope of the Study

The focus of the study is primarily centred on the analysis of SRI funds. However, in fulfilment of the study's research objectives, the SRI funds' conventional counterparts were considered. These included both conventional funds and benchmark indices. The selection of the conventional funds was achieved through a matched-pairs analysis as proposed by Mallin, Saadouni & Briston (1995). The benchmark indices used were either the SRI fund's proxy benchmark or composite benchmark if no proxy benchmark existed for a given fund.

The study comprises two sample periods: sample period one comprised of the years January 2009 - December 2018 (further divided into two equal sub-periods) and sample period two of the years January 2014 – December 2018. Both sample periods were employed in the performance evaluation of SRI funds, whilst a single sample period (Jan 2014 – Dec 2018, namely, sample period two) was used for RBSA. The second sample period was utilised to give rise to the use of a larger sample size.

1.6.2. Methodology

The study will make use of quantitative analysis to address the research questions. The research is aimed at evaluating active SRI in S.A., with a focus exclusively on SRI funds. This will entail the use of two assessment methods in line with the fulfilment of the two research objectives of the study. Firstly, it will provide a risk-adjusted performance evaluation of SRI funds relative to both its matched funds and passive benchmarks. The study will employ two statistical models to effect the performance evaluation of SRI funds, namely, Fama and French (1993) 3-factor model and Carhart (1997) 4-factor model. The

resulting output of these models will be analysed using statistical measures to test the models' explanatory power and the validity of their results. These measures include the adjusted R-squared (R^2) and p-value.

The second research aim of the study made use of Return-Based Style Analysis (RBSA) to identify and compare the determinants of SRI funds to non-SRI funds (conventional funds). The return determinants obtained using the RBSA model will be presented in two forms. Firstly, the proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active component) and secondly, the style factor/asset class exposures that contribute to the overall return of the fund.

1.6.3. Structure of the Study

Chapter One – Introduction: This chapter presents a background and overview of the study, providing a justification for an analysis of this nature in a South African context. The specific research objectives are then outlined in detail. Next, a holistic view pertaining to the study's sample period and sample constituents are presented. This is then followed by a brief discussion of the methodological approach of the research, highlighting the models employed and its intended purpose.

Chapter Two – Theoretical Discussion of SRI and Style Analysis: The chapter provides a background and development of SRI from both an international and South African perspective. An outline of SRI, the approaches to SRI and a categorical view of socially responsible investors, will then follow. Lastly, the theoretical foundations of the research - SRI performance and style analysis - relating to the two research objectives are outlined.

Chapter Three – A Review of Empirical Evidence: The chapter provides a detailed review of empirical evidence surrounding the performance evaluation and style analysis of SRI funds from an international and South African perspective. Similar to the theoretical discussion in Chapter Two, the empirical evidence was subdivided according to the respective research objectives - performance evaluation of SRI funds (research objective one) and style analysis of SRI funds (research objective two).

Chapter Four – Research Design, Data and Methodology: The chapter focuses exclusively on the techniques used in the performance evaluation and style analysis of SRI funds, thereby specifically addressing the two research objectives of the study. Firstly, an overview of the sample and the data collection methods will be provided. Three quantitative models (and statistical measures based on these models) will be employed in fulfilment of the set objectives. An outline of each model, the justification for its use in the study, and the purpose it intends to fulfil will then follow.

Chapter Five – Empirical Results and Findings: This chapter reports on the quantitative data analysis and empirical findings of the study. This is presented by two main sections, which comprise the results of the model(s) used to address the respective research objectives. A discussion of the results and appropriate conclusions to each section will form the latter part of these sections.

Chapter Six – Summary, Conclusions and Recommendations: This chapter entails a summary of the findings of the study with respect to the objectives sought out and presents concluding remarks to the study. In addition, it offers recommendations for investors and future studies in this field of research. Lastly, the chapter will highlight the challenges encountered in the investigation of the research objectives, described as limitations to the study.

CHAPTER 2: THEORETICAL DISCUSSION OF SRI AND STYLE ANALYSIS

2.1. Introduction

The chapter provides the background and development of SRI from an international and South African perspective, followed by an overview of SRI, the approaches to SRI and a categorical view of socially responsible investors. Lastly, the theoretical foundations of the research relating to the two research objectives are outlined, i.e. SRI performance and style analysis.

2.2. Historical Background and Development of Socially Responsible Investing (SRI)

2.2.1. International Development of SRI

Socially responsible investing (SRI) has a rich history. In biblical times, ethical investing was mandated by Jewish law 'Tzedek' (which means justice and equality), which comprised rules to correct the imbalances in creation that humans cause (Lumberg, 2017). According to Jewish tradition, these rules apply to all aspects of life, including the government and the economy. Ownership carries rights and responsibilities, one of which is to prevent immediate and potential harm (Sparkes and Cowton, 2004).

Several hundred years later, the religious teachings of Islam, based on the Quran, have evolved to what are now Shariah-compliant standards. One of the more common ones is Riba, whose overarching goal is to prevent exploitation. Banning usury, it extends to forbidding all interest payments. Rooted in a philosophy that governs the relationship between risk and profit, Shari'ah law delineates the responsibilities of institutions and individuals. In addition to financial dictates, it also rules out investments in alcohol, pork, gambling, armaments, and gold and silver, other than spot cash, or money that is paid for goods immediately (Sparkes and Cowton, 2004).

The evolution of SRI since its founding practices first began in the United States (U.S.) in the 18th century. The Methodists, under the aegis of John Wesley, eschewed the slave trade, smuggling, and conspicuous consumption, as well as resisted investments in companies manufacturing liquor or tobacco products or promoting gambling (Lumberg, 2017). The Methodists were followed in 1898 by the Quakers, who forbid investments in slavery and war, and then by a group in Boston who founded the first publicly offered fund, the Pioneer Fund, in 1928. Most of these early strategies applied screens to eliminate 'sin' industries (Giamporcaro and Pretorius, 2012). SRI ramped up in the 1960s when Vietnam War protestors demanded that university endowment funds no longer invest in defence contractors. SRI's long-standing principles, gaining momentum in the 1970s, progressed to represent a

consistent investment philosophy aligned with investors' concerns. These ranged from avoiding the slave trade, war and apartheid and supporting fair trade, to issues more common today concerning the ethical impact of ESG (Viviers, 2007).

In the process, several success stories emerged. A significant breakthrough for SRI occurred in 1970, when Ralph Nader, a consumer advocate, environmentalist and later independent candidate for president of the United States, succeeded in getting two socially-based resolutions on the annual meeting proxy ballot of General Motors, the country's largest employer at the time. Although both votes failed, it was the first time that the Federal Securities Exchange Commission permitted social responsibility issues to appear on a proxy ballot. In 1977, Congress passed the Community Reinvestment Act, which forbade discriminatory lending practices in low-income neighbourhoods (Viviers, 2007).

The early 1980s was also a time when several mutual funds were founded to cater to the concerns of socially responsible investors. These funds applied positive and negative screens to their stock selections. The funds included Calvert Social Investment Fund Balanced Portfolio and the Parnassus Fund. The screens included the basic concerns of the Methodists-weapons, alcohol and tobacco and gambling-but also more modern issues, such as nuclear energy, environmental pollution and the treatment of workers. Repercussions from Chernobyl and Three Mile Island nuclear disasters in the 1980s spawned anxiety over the environment and climate change, leading to the launch of the U.S. Sustainable Investment Forum (US SIF) in 1984 (Pan & Mardfin, 2001).

By 1990, there had been sufficient proliferation of SRI mutual funds and growth in popularity as an investing approach to warrant an index to measure performance. The Domini Social Index, comprising of 400 primarily large-capitalisation U.S. corporations, comparable to the S&P 500, was launched in 1990. The companies were selected based on a wide range of social and environmental criteria and provided investors with a benchmark to measure the performance of screened investments versus their unscreened counterparts. Over time, the index would help to disprove the argument that by limiting the companies they could include in their portfolios, they were settling for lower returns than traditional investors (Giamporcaro & Pretorius, 2012).

The activism that led to the identification of specific screens and the engagement of dialogue with companies with questionable corporate behaviour also propelled the growth of community investment, another major element of socially responsible investing. Support for community development financial institutions grew during the 1960s to address racial inequality. Activists argued that there was a positive social impact by investing in Community Development Financial Institutions (CDFIs), which in turn would inject that money into small businesses and housing programs in low-income communities. Loans were made to poor people, who paid them back with a rate of interest, providing a return for

investors beyond knowing their money was used in a socially positive way (Giamporcaro & Pretorius, 2012).

In modern times, SRI has continued to experience significant growth in economies globally. In 2007, the European Investment Bank issued its first green bond, a 600-million-euro equity index-linked security, whose proceeds were used to fund renewable energy and energy efficiency projects. A year later, the World Bank followed suit, and by 2017, over $155 billion worth of public and corporate green bonds had been issued, paving the way for the Seychelles government to issue the first ever 'blue bond' in 2018 - a $15 million bond to fund marine protection and sustainable fisheries (Gorce & Petkov, 2019). In 2018, a cumulative of $580 billion in green bonds were traded globally, and according to Bloomberg New Energy Finance, a further $170 billion to $180 billion are likely to be traded in 2019 (Personal Finance, 2019).

Investors, tied to the heightened concerns on CSR, demanded that companies be agents of social change, through the promotion of diversity while others stress robust corporate governance on issues such as executive compensation. A matter of rising interest is the environmental impact that firms have through carbon emissions, water use and plastic waste. Of the world's largest 250 companies, 92% reported in some way on their social and environmental impact in 2015. In 2010, the Johannesburg Stock Exchange became the first entity to require firms to incorporate these factors into their financial reporting. A similar standard took effect in the European Union in 2017, affecting about 6 000 large firms (Bloomberg, 2018).

Among the proponents of SRI lies a large proportion of the growing market share being attributed to younger investors. A report by Morgan Stanley in 2017 showed that millennials are twice as likely as the overall investor population to invest their money in firms which deploy social or environmental strategies (Morgan Stanley, 2017). The shift in mindset is gathering momentum – according to the Global Sustainable Investment Alliance (GSIA), assets being professionally managed under responsible investment strategies gained a substantial jump of 25% between the years 2014 and 2018 (Global Sustainable Investment Alliance, 2019). As a result, about a quarter of the money under professional management in 2018 - approximately $22.8 trillion - was invested in assets that incorporate socially responsible or environmental goals as well as a financial return. A significant portion of these investments comprised of Europe (53%) and the United States (38%), which are known by far to be the most established markets for SRI (Bloomberg, 2018). The largest sustainable investment strategy globally is negative/exclusionary screening, accounting for $15.02 trillion in assets, followed by the integration of ESG issues, comprising of $10.37 trillion in assets and corporate engagement/shareholder action making up $8.37 trillion (Forbes, 2018).

The success of SRI and its investment instruments reflects the fact that investors are increasingly conscious of the social and environmental consequences of the decisions that governments and

companies make. They can be quick to punish companies for child labour practices, human rights abuses, negative environmental impact, poor governance, and a lack of gender equality. Pair this with an increase in regulatory drivers post-2008 crisis, and a deepening understanding of the impacts of climate change and associated risk to performance, and this begins to highlight the need for investment models that will better address investors' concerns (Connaker & Madsbjerg, 2019).

Inevitably, the financial services sector has responded with a host of innovative financial instruments, some like those mentioned above, and others quite different. The through-line that ties together these new investing models and strategies is quite simple: While they have generated competitive returns, they all benefit society positively as well (Connaker & Madsbjerg, 2019). Essentially, what investors want is the performance promise of financial engineering combined with the assurance of a better tomorrow (Harvard Business Review, 2019).

2.2.2. Development of SRI in South Africa

Heese (2005) argued that S.A. was a major driver of SRI internationally, more especially for the U.S. market. The author claimed that it was the avoidance of South African companies that propelled SRI into the mainstream investment area. SRI in S.A. increased during the eighties, most notably through the effort to end the system of apartheid in S.A. Individual and institutional investors withdrew their investment from companies with operations in S.A. The investment decisions of churches, universities, cities, and states moved many U.S. corporations to divest themselves of their South African operations led to economic instability within S.A. and contributed to the eventual collapse of apartheid. The divestment from S.A. brought about by the U.S. soon followed to the United Kingdom (U.K.) and Australia in the 1980s (Viviers, 2007; Oh, Park & Ghauri, 2013).

Despite the inception of SRI funds for South Africa in the early 1990s, more notably, the Community Growth Equity Fund and the Future Growth Albaraka Equity Fund, lack of confidence was instilled in this investment approach as many investors (both, individual and institutional) were of the belief that SRI was accompanied with lower risk-adjusted returns and in turn large-scale losses (Viviers, Bosch, Smit & Buijs, 2008; Herringer et al., 2009). However, following the inception of the FTSE/JSE SRI Index in May 2004 (renamed as the FTSE-JSE Responsible Investment Top 30 Index in 2015), investors interest in the SRI market increased exponentially (Viviers, Bosch, Smit & Buijs, 2009). Subsequently, the South African SRI market gained an increasing market value of R18 billion in 2006, R23.28 billion in 2009 to R71.38 billion in 2018, with more than three-quarters of SA investors increasing their allocation to sustainable investments over the past five years (Viviers, 2007; Giamporcaro, Pretorius & Visser, 2010; Business Day, 2018).

Furthermore, a 2017 Global investment survey by Schroders found that 81% of South African investors reported sustainable investment growing in importance to them in recent years. 67% of these

respondents reported increasing their allocation to these investments in the five years precedent - 13% more than the global average. Among the respondents contemplating a sustainable investment, 70% indicated a willingness to provide equal or higher emphasis on social and environmental returns relative to financial criteria (Business Maverick, 2019).

In addition to investors increased interest in SRI ventures, S.A. have also followed suit. In 2018, S.A. was inducted as a partner to the global network of fighters for impact investing and became a member of the Global Steering Group (GSG) in New Delhi, an independent group of private capital holders catalysing impact investing. S.A. joined fellow African states Kenya, Ghana and Zambia which all committed to making the agenda a continental one to be owned at the level of the African Union, according to media reports. It was termed the New Marshal Plan for Africa (Fin24, 2019).

In support of South Africa's aim to position itself globally as a proponent of SRI, it has also engaged in some notable local developments, mainly in regulatory and industry-driven initiatives. These include an amendment to Regulation 28 of the Pension Funds Act establishing a requirement for funds to consider Responsible Investment (RI) in investment decisions; the launch of a Code of Responsible Investing in S.A. (CRISA), a voluntary code consisting of five principles to guide RI practices of institutional investors, and the introduction of the Sustainable Returns initiative to help retirement funds comply with Regulation 28 and CRISA to name a few (Business Maverick, 2019).

It is note-worthy that SRI is more than just incorporating ESG criteria in investment decisions but also considers the financial aspect to it as well. The phrase "doing well while doing good" is shown to highlight its objective. This is portrayed by ESG funds in emerging markets recording a total annualised return of 5.7% from 2012 to 2018, compared to the 4.3% traditional equity funds delivered over the same period (Business Day, 2019). As depicted in Figure 2.1, the superior performance exhibited by these funds is also shown to exist on a broader scale, more specifically, relating to the performance of the index used to track SRI in emerging markets.

Figure 2.1: Cumulative Index Performance of MSCI Emerging Markets SRI Index Relative to MSCI Emerging Markets Index (Gross Returns)

[Source: CG Wealth Management (2018)]

In S.A., the MSCI South Africa ESG Leaders Index, which focuses on companies with higher sustainability performance than their peers in their sector, was launched in 2007. It showed that ESG leaders recorded 14.45% annualised gross returns over a 10-year period compared to 9.75% for the MSCI South Africa Index, which is an index tracking the performance of SA equities (Business Day, 2019).

With reference to the green bond market, the JSE's green bond segment was launched in October 2018, with Growthpoint Properties becoming the first corporate in S.A. to list in this segment, issuing R1.1bn green bond. The green bond market in S.A. aims to provide a platform for companies and other institutions to raise funds that are ring-fenced for low-carbon initiatives and for investors to buy securities that are truly green. To date, the JSE has three bonds listed in its green bonds segment, with a market capitalisation of R5.10bn. The most recent issue was gained by Nedbank in May 2019, with the placement of bonds worth R1.7bn to fund renewable energy projects. The issuance was three times oversubscribed by R3.8bn (Business Report, 2019).

The development of SRI in S.A. has now evolved from the founding principles of religious and moral screens (this included amongst others, dissociating in investments that related to gambling, weaponry businesses, alcohol and tobacco manufacturers), to directing investments that are inclined to practices that are ethical and morally acceptable by society, and now finally to encouraging investments associated with highlighting and addressing the current ESG concerns. While the extant research of SRI in S.A. has focused on SRI developments and SRI strategies (Giamporcaro and Pretorious, 2012; Heese,

2005), there is limited research on the performance evaluation of SRI. Therefore, this study will seek to bridge the gap in literature regarding this research domain.

2.3. Socially Responsible Investment (SRI)

The proposed definition of Socially Responsible Investing (SRI) remains ambiguous, given the subjectivity in what it means to be a socially responsible investor. A common ground for the definition of SRI is that it is an investment that is made following the outcome of a non-financial screening process (Derwall, Koedijk & Horst, 2011). This screening process focuses on issues regarding environmental, social, governance, ethical or religious consideration (Hong & Kacperczyk, 2009). Hence, SRI can be viewed as an investment strategy that creates a definite layer of possible investments that is built as a sub-selection of the traditional investment universe (Hong & Kacperczyk, 2009; Bodie, Kane & Marcus, 2011). This means that the sub-selection is created by taking social or ethical values into account before selecting in which equities to invest. An additional crucial common denominator in the definitions of SRI is that the investment process considers both financial and non-financial attributes (Derwall et al., 2011). The object and purpose of an investment, therefore, becomes more than a purely financial gain. It strives to create financial results with a focus on non-financial matters given to ethical, environmental or moral concerns (Benson, Brailsford & Humphrey, 2006). Hence, the SRI process can be described as a two-fold investment strategy, where one factor (ethical or social considerations) supersedes the other (the financial return) (Bollen, 2007).

However, the terms 'responsible' or 'ethical investments' covers a wide range of individual investment possibilities where specific considerations are present in addition to financial return. These investment possibilities range from ethical or religious considerations to ESG screened portfolios. All these forms of investment opportunities are studied in academia under two different, albeit comparable headings: SRI or Ethical portfolios (Blowfield & Murray, 2008).

The social or ethical approach can also be applicable to any form of financial investment such as Government bonds, corporate bonds, equity investments or any other form of investment. It is also possible to apply an SRI strategy in complex financial instruments. However, this would require that the underlying asset is transparent to the investor (Renneboog, Horst & Zhang, 2011). In short, the definition adopted for this thesis is: SRI is an investment strategy which introduces the notion of extracting utility from investing capital from not only the financial return but also from the socially responsible or ethical dimension of an investment.

SRI is aimed at promoting good corporate behaviour, and in order to maximise firms' social values (which can be defined as the sum of the value generated for all stakeholders), optimise shareholder value and to influence the behaviour of companies toward ESG factors and concerns, thereby

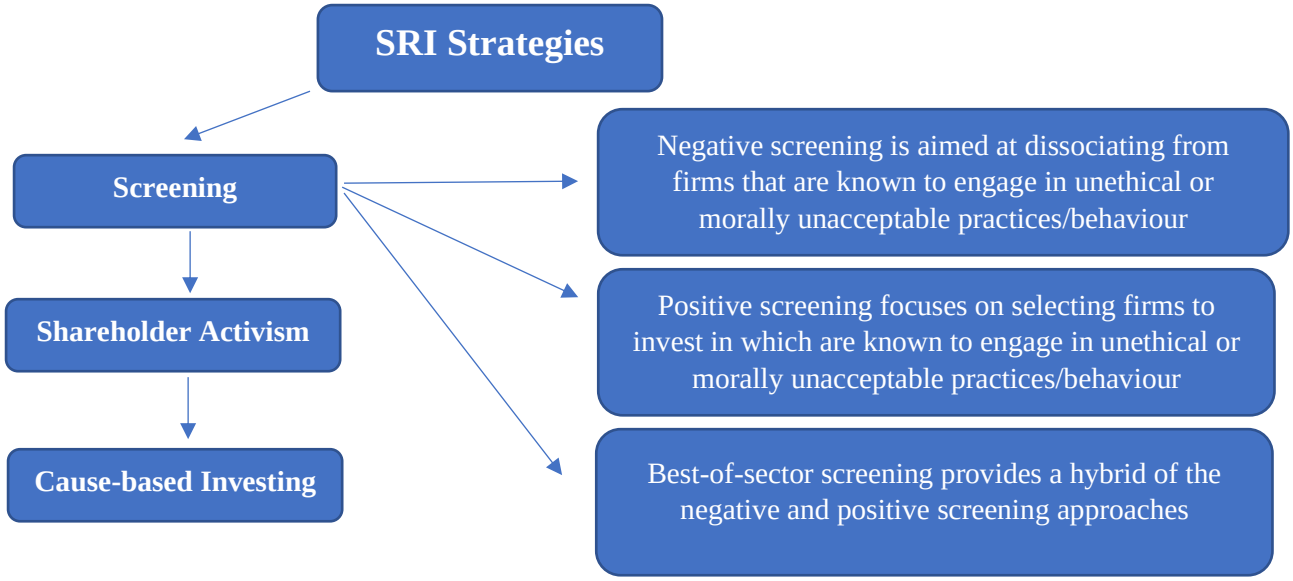
establishing an investment philosophy that is long-term in nature (Oh et al., 2013). Classical economics states that there need not be any conflict between these goals in perfectly competitive markets because resource allocation is Pareto-optimal and all firms can maximise their profits (value), in unison with their social welfare (Renneboog et al., 2008). However, companies do not operate in perfectly competitive markets, and modern economic theory states that in these circumstances, where the assumptions of the welfare theorems do not hold, profit-maximising behaviour does not necessarily lead to social welfare maximising outcomes. Instead, practically, the maximisation of shareholder value can potentially conflict with the interests of a firm's stakeholders (Renneboog et al., 2011).

Moskowitz (1972) presented several criteria by which corporations could be assessed for social performance and the potential for this performance to affect their financial performance. Subsequently, a number of academics have advocated CSR and the stakeholder model, while others have stated that companies should exclusively focus on profit maximisation and that shareholder satisfaction should be the exclusive focus of corporate management (Friedman, 1970; Besley & Ghatak, 2007). As socially responsible investing focuses on those companies which employ the stakeholder model, researchers have measured the financial performance of socially responsible investments to establish whether this model is associated with financial benefits or costs, relative to the shareholder profit maximisation approach (Bagnoli & Watts, 2003).

2.3.1. Socially Responsible Investment Strategies and Investors

The review and adoption of an investment strategy forms an essential component in the investment and portfolio construction process. Similarly, SRI strategies are applied by socially responsible investors as a way to incorporate ESG issues and factors into their investment choices. At large, three SRI strategies are known to be implemented by socially responsible investors, namely; screening, shareholder activism and cause-based investing (Du Plessis, 2015). These strategies are summarised in Figure 2.2. As ESG concerns are a major contributing factor to the decision-making process for socially responsible investments, this highlights the primary goal of these investment strategies having non-financial characteristics, whereby each applied strategy will follow its own recorded procedures to achieve this objective.

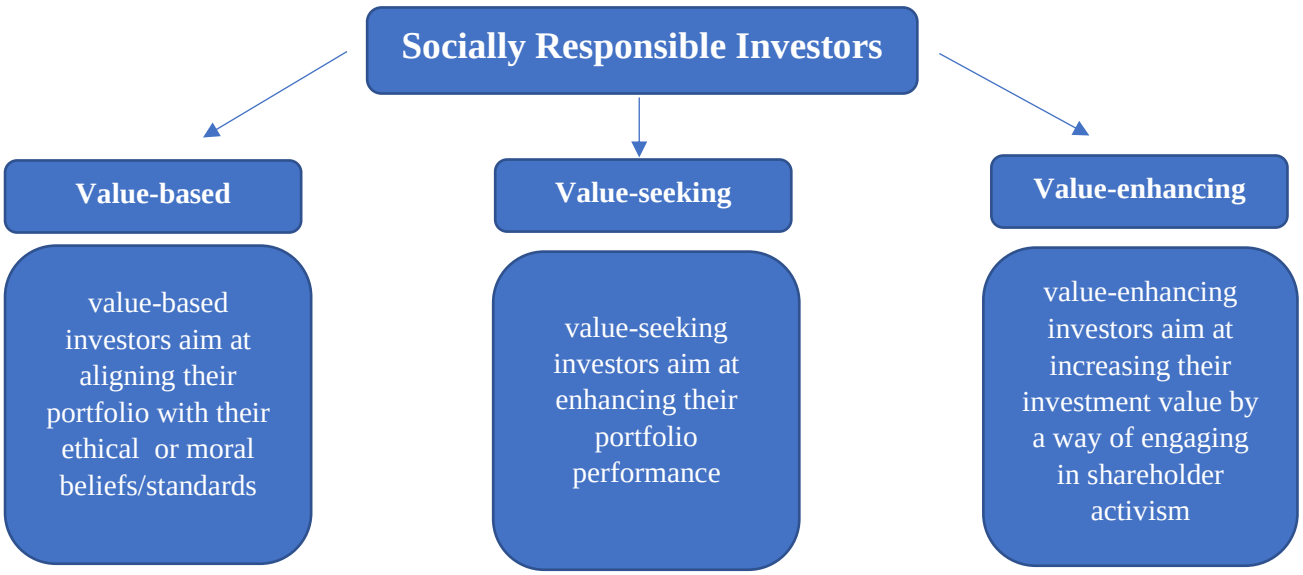
Figure 2.2: Socially Responsible Investment Strategies



[Source: Du Plessis (2015) p. 20]

Within SRI, various types of Socially Responsible investors can be identified. Kinder (2005) categorises these investors into three distinct groups. These three groups comprise; value-based, value-seeking and value-enhancing investors, as summarised in Figure 2.3.

Figure 2.3: Distinguished Socially Responsible Investors



[Source: Du Plessis (2015) p. 30]

2.4. Theoretical Foundations of SRI Performance and Style Analysis

2.4.1. Financial Performance of SRI Funds

The concept of SRI and its performance attribute has been explained by various theories and models. The application of financial theories to performance evaluation of SRI funds and conventional funds have sparked debates among scholars. On one end of the spectrum, corporate managers and executives are becoming more cognisant of the imperativeness in meeting various stakeholders, as well as the general community's expectations. Whilst, on the other hand, they also feel confident that being proactive with CSR initiatives will promote their company's image in the marketplace, attracting more respect from their consumers and the market as a whole (Renneboog et al., 2008). Additionally, Chegut, Schenk & Scholtens (2011) argue that the social theory of the firm suggests that the financial performance of responsible investments is superior to that of its counterparts (conventional theory) because SRI incorporates information that is relevant and thus allows room for a better decision-making process.

Conversely, in accordance with the neoclassical theory postulated by Friedman (1962), the duty and responsibility of the manager to maximise shareholder value; thus, CSR initiatives pose additional costs, which will result in firms deviating from their desired goal of attaining wealth maximisation. Also, in support of the neoclassical viewpoint, MPT suggests that the inclusion of non-financial restrictions will not benefit financial performance as the criteria results in lower diversification and exposes the firm to risk and additional costs (Cortez et al., 2009).

While the consensus among scholars is that SRI funds achieve similar performance compared to their conventional peers, some find contradictory or ambiguous results. As the performance debate continues, it is essential to understand the financial theories and anomalies leading to the deviation of findings from the norm, i.e. similar performance. This deviation has been categorised into underperformance and outperformance theory.

2.4.1.1. The Underperformance Theory

The underperformance theory can be in part explained from the perspective of the *value-driven* investor, i.e. one that holds or shuns certain investments for motives other than purely financial ones, which is referred to as the *shunned-stock hypothesis* (Derwall et al., 2011). These investors will shun certain investments, and as this group becomes large enough, prices of the non-ethical investments will start to deteriorate. Whilst prices fall, the expected returns of these investments increase. Consequently, if these are included in a portfolio, abnormal returns can be achieved. When considering such a rationale, one could argue that there might be a larger demand for SRI mutual funds, consequently driving up prices

and simultaneously lowering expected returns of these vehicles, ultimately materialising in poor fund performance. This finding is supported by Fabozzi, Ma & Oliphant (2008).

Critics of SRI point out that any effort regarding social responsibility of firms is costly and will result in above average costs that subsequently will manifest itself in below average financial performance. In turn, these practices place firms in a competitive disadvantage rather than the desired advantage to their peers (Friedman, 1970; Jensen, 2002). Besides the fact that socially responsible practices are costly for firms, they may also be costly for socially responsible investment funds. These funds may incur a cost related to the acquisition of the specific CSR information on investable stocks. Integrating the screening procedures can also be a time-consuming and costly activity (Laurel, 2011). Furthermore, managers claiming social responsibility should monitor the efforts of the companies that they invest in carefully, and this may lead to additional monitoring costs compared to conventional mutual funds (Areal, Cortez & Silva, 2010). Besides monitoring the investments, investors also expect the fund to enter into discussions on social issues such as sustainability. The previous duties are non-existent for conventional mutual funds, and therefore, could increase the total expense ratio of SRI funds, hurting their net performance.

Another indirect cost of screening investments is that it limits the investment horizon. This confines the possible diversification benefits of SRI funds, i.e. cost of missed diversification opportunities. Furthermore, under Markowitz's (1952) assumptions, the construction of an optimal portfolio results in a maximised risk-return ratio (portfolios found on the efficient frontier). Conforming to this theory, the imposition of social screens in the optimal portfolio variance minimisation process, by forcing to zero the share invested in those stocks which are ruled out by their CSR based selection criteria, would effectively result in a sub-optimal portfolio, producing a less favourable risk-return ratio and in turn inferior risk-adjusted financial performance. This implies that their efficient portfolio frontier is flatter than that of the conventional fund managers, i.e. for a given level of variance, the expected return is lower (Barnett & Salomon, 2006; Renneboog et al., 2008). Consequently, it is possible that the diversification cost tends to zero when the universe of investable stocks is large enough, and the negative covariance between excluded and included stocks is negligible when negative screens are not too severe (Derwall et al., 2011).

However, it is noted that the aforementioned diversification effect is highly dependent on the initial objectives of the mutual funds, the asset classes involved and the portfolio constructions. Therefore, the practical costs depend on the extent of exclusion. For example, if a part of the universe is cut-off, that is already considered off-limits in light of the investment mandate, the indirect costs will be low. Vice versa, if the cut-off part includes highly lucrative opportunities, indirect costs will be high. In contradiction to MPT, scholars have found evidence that specialised funds, (limited diversification) in some cases improve risk-adjusted fund performance (Gil-Bazo, Ruiz-Verdu & Santos, 2010), so even

though the screening limits the investment horizon, practical costs associated with this limitation might not be as severe as thought.

Lastly, socially responsible investment funds can incur a timing cost if socially responsible fund managers are forced by fund rules to sell the stock of a company which modifies its behaviour and loses its SR characteristics. This event may lead the fund manager to perform an action equivalent to a liquidity constrained sale, forcing the manager to a suboptimal transaction when the stock of that company has good return perspectives (Becchetti, Ciciretti, Hasan & Kobeissi, 2012).

2.4.1.2. The Outperformance Theory

The modern portfolio-based school is contrasted by the proponents of socially responsible investing. Proponents believe that SRI efforts result in a competitive advantage and subsequently, in superior financial performance (Porter, 1991). The underlying rationale that socially responsible efforts lead to better results is referred to as *stakeholder theory*. Advocating *stakeholder theory*, Freeman (1984) postulates that firms must not be entirely concerned with satisfying the interest of shareholders only, but rather all relevant parties and stakeholders to the business. Ultimately, *stakeholder theory* emphasises that by satiating the welfare of all stakeholders, shareholders, in turn, would gain increased value. Therefore, the fundamental argument is that SRI firms portray a higher quality of management and would, therefore, be expected to outperform its less responsible peers (Hamilton, Jo & Statman, 1993). Barnett & Salomon (2006) sum the possible advantages of investing in screened companies. Firms engaging in socially responsible efforts are able to attract capital at a lower cost, obtain well-suited employees and are able to market products and services more easily due to a better reputation. Kempf & Osthoff (2007) find evidence supporting this theory. A strategy that invests in high ESG score firms and sells those with low ESG scores achieves a 4% net outperformance or abnormal returns (AR) of up to 8.7% annually. Diltz (1995) and Derwall et al. (2005) endorse these findings whilst constructing hypothetical portfolios.

Alternatively, Jo & Statman (1993) argue that SRI funds may earn superior returns by omitting non-SRI stocks. They argue that investors underestimate the possibility of harmful information that affects non-ethical firms. An example would be underestimating the probability of an oil spill. This will lead to amplifying declines in prices of an oil manufacturer when such harmful information is released. A portfolio, which shuns these non-ethical firms, is not affected by these events. Therefore, expected returns on ethical firms will be higher and investing in them might be more rewarding. Hong and Kacperzyk (2009) acknowledge this additional risk that is associated with firms involved in gambling, tobacco and alcohol are often combined with high litigation costs. Moreover, governments also play an important role in promoting SRI investments via tax benefits. For example, the Netherlands already introduced in 1995 the ‘Green saving and Investment Plan’ that provides benefits for this special asset

class. Additionally, taxing the tobacco and alcohol industries makes these industries relatively less profitable. These initiatives would (artificially) increase returns for the retail investor.

The argument that SRI funds might suffer from a lack of diversification is countered by Bello (2005). The key conclusion of his study is that the SRI and conventional samples show similar diversification characteristics. Therefore, screening does not necessarily imply that diversification benefits diminish by a significant margin. This is in line with the argument that the screening process excludes investments already off-limit considering the funds' mandate.

In contrast to the previously discussed *shun-stock hypothesis*, Derwall et al. (2011) provide an alternative hypothesis, namely the *errors-in-expectations hypothesis*. The latter is based on the assumption that SRI screens are able to generate abnormal returns because the market finds it difficult to incorporate and identify benefits from corporate socially responsible efforts. This delay in pricing should prove profitable for SRI funds when the markets eventually learn the benefits of socially responsible efforts. In addition to the latter argument, Renneboog, Horst & Zhang (2007) stress that screening may generate value if screening yields non-public information. Generally, fund management actively discusses environmental, social and governance issues with the firms' management and subsequently tries to influence firm policy. This is not possible for an average retail investor, and therefore, may yield non-public information and in turn, increase risk-adjusted performance of the SRI mutual fund.

Besides the latter argument, best-in-class performers possibly possess valuable intangible characteristics leading to a strong corporate reputation that could fuel superior firm performance (Fombrun & Shanely, 1990). This goodwill has an insurance-like effect when firms experience negative events. As a result of this goodwill, some stakeholders temper their negative attitude towards firms in these negative events (Godfrey, Merrill & Hansen, 2009). Following this rationale, one might expect that these benefits are ultimately reflected in the differential between SRI and conventional funds. The materiality of the efforts, the incorporation in valuation models and the subjectivity of CSR practices, can lead to prices deviating from fundamental values.

Alternatively, the previously discussed arguments can be explained from a different perspective, as correlation does not necessarily mean causation. Consider the problematic phenomenon of reverse causality, which may be apparent. Firms that are profitable probably have deeper pockets, and therefore, a higher probability exists that they direct this cash to socially responsible purposes compared to a poor performing firm that is in need of cash (Stanwick, 1998). Thus, CSR can be considered a 'luxury good' only pursued by companies who are already highly profitable, whereas poor performers only focus on improving short term financial performance and have no room and/or time to engage in these practices. In essence, when firms initiate SRI practices, this simply signals that firms are doing well, and therefore, can be considered a leading indicator in picking outperforming stocks. The previous argument merits

further explanation largely due to a mistake that many investors make, namely, the assumption that an operationally and financially sound company makes a good investment. Even though companies pursuing SRI practices can be considered good companies, they do not need to be good investments.

2.4.2. Style Analysis

2.4.2.1. Returns-Based Style Analysis (RBSA)

Style analysis is an important tool that seeks to help investors to understand a fund's investment policy and objective. No direct information is available on the actual portfolio composition of a fund. Although reading the fund's prospectus seems an obvious starting point, research by DiBartolomeo & Witkowski (1997), Brown & Goetzmann (1997) and Kim, Shukla & Thomas (2000) presents evidence of serious misclassifications if self-reported investment objectives are compared to actual styles. As such, style analysis plays a vital role in identifying these misclassifications (if any do exist) by measuring and analysing a fund's portfolio composition and behaviour.

There is much debate about how style should be measured; however, two main approaches to style analysis have been widely used by both practitioners and academics – Holdings-Based Style Analysis (HBSA) and Returns-Based Style Analysis (RBSA) (Deb, 2006).

Holdings based style analysis (HBSA) is a 'bottom-up approach' in which the characteristic or style of a fund is derived by aggregating the characteristic of the securities it contains at various points in time over the period concerned. In this approach, the stocks actually held in the portfolio are examined and mapped into different styles, across time. Once a sufficient history of these holding based snapshots is developed, an estimate of the manager's average style profile can be developed (Deb, 2006). This requires two sets of data (Kaplan, 2003). First, it needs a security database, containing the characteristic of each security, in the investible universe of the funds being analysed. Second, it requires security holdings of each fund being analysed at various points in time. The data needed for HBSA are expensive to obtain and keep up to date. Because up-to-date holdings of funds are often not available, HBSA leads to poor information. This makes RBSA the more popular approach to pursue (Otten & Bams, 2001).

RBSA, pioneered by Sharpe (1988), asserts that a manager's investment style can be determined by comparing the fund's returns, to the returns of a number of selected passive style indices. The indices represent distinct investment styles within particular asset classes (e.g. value, growth, and small caps). Sharpe (1988) proposed an econometric technique to employ RBSA. This technique involves a constrained regression that uses several asset classes to replicate (or mimics) the historical return pattern of a portfolio. Essentially, RBSA entails a combination of these asset classes, which portrays a set of passively constructed reference portfolios, with each reference portfolio representing an investment style (Deb, 2006). The constraints are imposed to enhance an intuitive interpretation of the coefficients

(Otten & Bams, 2001). First, to interpret the coefficients as weights within a portfolio, the factor loadings are required to add up to one. Second, coefficients should be positive to reflect the short-selling constraint to which most fund managers are subjected. These two constraints are to ensure that the coefficients represent portfolio weights of a 'long only' portfolio of passive investments (Eddy, 2014). Non-linear regression analysis is proposed to arrive at point estimates for the portfolio weights. In turn, the style of the fund is represented by the loadings (regression coefficients) on the indices. The objective is to identify whether the estimated portfolio weights correspond with the targeted investment style of the fund (Otten & Bams, 2001).

Another objective of RBSA is to separate a portfolio manager's returns into two components, namely, style and skill. According to Fung & Hsieh (1996), style is the factor caused by market movements, whereas skill is manager specific, that is, it relates to the expertise (or ability) of a manager to generate returns in excess to the given style benchmark. Based on the RBSA model, the optimum combination of style indices to give the highest R^2 for the constrained regression is referred to as the 'style benchmark' of the fund, while the error term ($1-R^2$), which is the 'excess return' achieved by a fund over its style benchmark is known as the 'active return' (Fuerst & Marcato, 2009). A key assumption of factor models, such as the RBSA, is that the error term, or rather the non-factor return, for one asset is assumed to be uncorrelated with the error term of every other asset (Walkshäusl & Lobe, 2012). This leaves the asset factors as the only source of correlation among returns.

As per Sharpe (1992) and Kahn & Rudd (1997), a passive fund manager provides an investor with an investment style, while an efficient active manager provides style and 'active skill' and thus generates an excess return over the style benchmark. Furthermore, the active skill is often segregated into two components, namely; market timing skill and stock selection skill (Deb, 2006). Looking forward; the investor can choose an appropriate style benchmark, and then select managers to exceed that benchmark with their active skills. From an investors' or sponsors' perspective, it is very important to know this active return, as one does not hire a fund manager and incur active management fees to achieve 'style index like' returns. Those can be realised through investing in passive portfolios designed to replicate style indices. The active managers are hired, and their fees earned for their skill in stock selection and market timing (Otten & Bams, 2001).

When individual assets are identified as producing superior performances to the market or a given style benchmark, the identification of such attracts the interests of fund managers, which results in their search and pursuit for these and similar assets. This can potentially lead to fund managers drifting from their proposed investment style (Eraslan, 2013). A term commonly associated with such engagement is tactical asset allocation. Adding tactical asset allocation to the portfolio strategy essentially results in the fund manager varying from strategic asset allocation weights to take advantage of perceived short-term opportunities (Chartered Financial Analyst, 2018a). Therefore, in addition to style analysis,

assessing the skill and active return produced by the fund manager, i.e. the extent of the fund managers active involvement in a given fund, it identifies whether this involvement if excessive, results in the fund to drift from its proposed investment style.

Moreover, drawing attention to the model's constituents, the different asset classes, or styles, used by the model usually share a dominant common characteristic (Patton, 2009). These characteristics can be based on factors such as, regulation of asset, markets in which asset is traded, or the fundamental characteristics of the asset (Barberis & Shleifer, 2003; Verbeek & Wang, 2013). Therefore, the asset class categories are derived by evaluating the characteristics of the assets at hand;for example, financial assets can fall into large, medium or a small-cap category. With style investing, factors are first characterized into market indices that represent numerous asset classes (styles) of investing. Barberis & Shleifer (2003) and Cao (2012) contend that thereafter, investors select the asset class that they wish to invest in, by allocating funds into these classes as opposed to placing funds in individual assets. Across the spectrum of asset classes, it has been found that the returns emanating from these asset classes, which represent different styles, can be correlated to each other due to overlapping nature of certain individual assets within these spheres (Weng & Trück, 2011). While not obligatory, McDermott (2009) alludes that it is recommendable that the asset classes used in the RBSA model are mutually exclusive, exhaustive and have returns that have low correlations with one another, if not, then differing standard deviations. Otten & Bams (2001) state that the appropriate choice of benchmarks is a critical element that may significantly impact the results of RBSA. Additionally, the style factors/asset classes that are utilised in the model can differ in the time frame, ranging from the relatively long-term government bonds to frequently traded stocks (Cronqvist, Siegel & Yu, 2015).

- **Strengths of RBSA**

The RBSA technique presents both strengths and weaknesses, having implications on its use in practice. Lau (2007) provides support for and advocates the use of RBSA as a method to pursue more useful and suitable performance information. Using this approach, one can perform a more effective peer comparison of manager performance that would otherwise not be the case. It provides a tool to identify funds that display discrepancies between the stated investment style objectives and their actual investment style, aiding investors and fund managers to make more informed decisions (Schneeweis, Kazemi & Szado, 2012).

The only data needed to perform this method of style analysis is historical return data, which is much easier to obtain than holding data, the data required for the use of the alternative method of style analysis, i.e. HBSA (Lucas & Riepe, 1996; Domian & Reichenstein, 2009). The extensive process required in obtaining the data for HBSA could have uncertainties arising regarding the reliability and validity of the dataset employed. An HBSA approach requires the selection of a set of differentiating characteristics to establish the classification boundaries. These boundaries, which are often based on

arbitrary cut off levels of certain firm-specific attributes such as Price/Earnings (P/E) ratios, are inherently subjective and unstable. Infrequent reporting periods combined with accounting irregularities common in reported figures may result in an incorrect classification.

Furthermore, Fowler, Grieves & Singleton (2010) add that the RBSA method is both less costly and more efficient than other methods since it is based on timely information. Due to its simplistic nature, in circumstances where the fund's style is stable and consistent, this method of style analysis can be very useful if applied correctly (Christopherson, Ferson & Glassman, 1998; Wahal & Yavuz, 2013).

- **Weaknesses of RBSA**

There are issues arising from the classes of asset styles chosen, including the makeup of the style indices used to represent a particular style, as well as the extent of correlation that exists between the different indices (Pattarin, Paterlini & Minerva, 2004; Weng & Trück, 2011). 'The model is only as good as the data it is fed' is a common term from which the RBSA model is not exempted. Although every effort is made in ensuring that the selected style factors completely describe the investable options available to the fund without any areas of overlap (asset class factors in their entirety can mirror the market portfolio as closely as possible), there is no direct way of determining that this is achieved and that all style factors are accounted for as new styles too continuously. The guidelines proposed by Sharpe (1992) are generally used as a point of reference which provides indices that can be used as mere proxies for these styles, and therefore, their appropriateness in tracking a given style cannot be known with certainty. As a further concern, the study by Sharpe (1992) was documented for the U.S. Therefore, the style proxies in the study may not always be consistent (or appropriate) for other markets (especially emerging markets). Furthermore, Christopherson (1995) indicated that if the asset classes return is highly correlated; this may lead to the results from RBSA being spurious (or having the presence of multicollinearity). If there is a high correlation among the asset classes, the optimisation algorithm of the model may provide difficulty in finding the loadings for the style factors. Attributions may oscillate over time between two highly correlated asset classes and make the exposures uninformative and interpretations difficult.

Using this regression-based technique to classify manager style, implies that the future behaviour of the fund manager will be consistent with their historical performance (Christopherson, 1995; McDermott, 2009). This is not always the case, which further highlights this historical analysis as being backward looking.

The inherent assumption in RBSA, that the exposures to the different styles stay constant over time for the portfolio is rarely the case as evidence points to funds constantly drifting from their proposed investment styles (Annaert & Van Campenhout, 2007). Another limitation in this respect is that HBSA can detect a drift faster than RBSA due to it using recent data only. RBSA uses mostly past data so, it is heavily influenced by history and is slow to show drift - does not capture style drift efficiently when

a manager changes investment strategy (Uma Rao, 2018). Deb (2006), supporting this claim, argued that changes in fund styles might not be quickly identified due to the 'averaging effect'. That is, the return series used for style estimates generally span up to sixty months, if applying the period proposed by Sharpe, and therefore, any drift from the stated style in the last six months, for instance, would be overwhelmed by the remaining four and a half years of data.

The assumption of the RBSA model is that a linear relationship exists in the investment strategy of the fund being analysed. Brown & Goetzmann (1997), Ainsworth, Fong & Gallagher (2008) and Wahal & Yavuz (2013) assert that in practice it is often observed that funds follow non-linear strategies, which in some instances, creates misclassifications in the results of RBSA.

Apart from the weaknesses inherited in RBSA, this technique is useful to both investors and fund managers as it can be utilised as a tool for diversification of risk (and construction of diversified portfolios while assessing its short-term risk), prediction of future returns, construction of peer groups, and selection of appropriate style-specific benchmarks (Fung & Hsieh, 1996; Kurniawan, How & Verhoeven, 2012).

2.4.2.2. Style Analysis of SRI Funds

Theoretically, portfolio theory would suggest a differential in the sources of active returns among these two types of funds for various reasons. Essentially, the screening criteria employed by socially responsible funds may limit managers' abilities to influence performance. Studies have shown that those shares which socially responsible funds generally exclude - examples of these shares include; alcohol, tobacco, gambling, firearms, military and nuclear industries - outperform (Statman, 2000; Kacperczyk, Sialm & Zheng, 2005). Excluding these stocks from a fund could impact negatively on fund performance, whilst impeding portfolio managers from capitalising on the profitable opportunities, if any, that these market segments present.

Conversely, it is probable that the use of ethical and social screening process would convey value-relevant information, translating into portfolio managers of SRI funds outperforming its conventional counterparts. Bello (2005) argues that due to portfolio managers of SRI funds having a restricted universe of investments, they would gain more intimate knowledge, i.e. informational advantages of stocks that constitute these funds. As a result, these managers could potentially display superior skills relative to their conventional counterparts in relation to stock selection, market timing and forecasting of future trends.

Theory suggests that the performance of SRI funds is expected to differ from that of conventional peers largely due to the type of shares that these funds have a tendency to hold. Prior literature has documented these two types of funds to exhibit significantly different loadings in terms of size, book-to-market and

momentum factors, indicating that they could hold shares with differing styles (Cremers & Petajisto, 2009). Consequently, if small, value momentum stocks generate higher returns, and SRI funds are found to over-or underweight across these dimensions in comparison to conventional funds, this will then result in a return differential between SRI funds and conventional funds. As such, Galema et al. (2008) argued that firms with similar characteristics/risk but different levels of social responsibility would have different book-to-market ratios due to excess demand for socially responsible stocks. The authors indicated that the type of screening criteria utilised invariably influences the type of stocks held in terms of its book-to-market value, i.e. its value-tilt. In particular, based on their analysis of screening criteria, diversity and environment screens resulted in the selection of firms with low book-to-market value (growth stocks), whilst the use of governance screens engaged in firms with high book-to-market values (value stocks).

Furthermore, Lee et al. (2010) postulate that the type of screening also influences the size of stocks held. Firms that are able to meet the hurdles imposed by positive screening are likely to be large. In the literature, this has been attributable to the fact that it is the large firms which have the resources to spend on corporate responsibility (Freeman, 1984), and further, larger firms are more in the public's view, so they may face pressure from external stakeholders to behave responsibly (Moskowitz, 1972; Ullmann, 1985). On the other hand, negative screeners seek to avoid investments in so-called 'sin' sectors, which include businesses that yield substantial revenues from alcohol, tobacco, weapons and gambling. Sound intuition tells us that portfolios that omit these oriented sectors display a tilt towards small-cap stocks, as firms found to operate in these industries are generally large (Derwall, 2007). In addition, Islamic funds (forming a large proportion of SRI funds), which on average employ negative screens, are unlikely to invest in large companies (large stocks), as this will increase diversification efforts which in turn will increase the risk of these funds operating in sectors/industries forbidden by Islamic (Shari'ah) Law (Tower & Dean, 2010). In fact, the home bias exhibited by funds within countries predominantly known to follow broad Islamic principles explains why these funds display small-cap preferences as these economies usually host comparatively small corporations (Hoepner, Rammal & Rezec, 2011).

Based on the view that the type of screening, more specifically, positive or negative screening, influences the size of stocks held, this could essentially have implications on the return of funds utilising the said screening methods. This point merits further explanation. Proponents of SRI postulate that financial markets may possibly undervalue the impact of positive CSR information on a company's future cash flow (Benson et al., 2006). For instance, recent evidence in favour of this argument showed that firms portraying high levels of employee satisfaction generated abnormal returns (Jiang, Yao & Yu, 2007; Renneboog et al., 2008). This would essentially mean that SRI portfolio managers who apply positive screening to their portfolios and overweight firms which exhibit good behaviour in relation to a specific set of responsibility metrics, for example, employee relations, may potentially earn higher risk-adjusted returns.

To further support this view, studies have shown a positive relationship between CSR and firm performance (Statman & Glushkov, 2010). As such, with literature suggesting that large-cap firms, having the resources to spend on corporate responsibility, should portray higher levels of CSR, this could potentially mean that having significant exposure to large-cap SRI firms may result in SRI funds earning a superior risk-adjusted return relative to conventional funds. Conversely, as literature indicates that SRI funds employing negative screens are unlikely to invest in large companies as this will increase diversification efforts, which in turn will increase the risk of these funds operating in 'sin' sectors, the loss of diversification benefits which SRI funds may encounter through concentrating their stock holdings to small-cap stocks, could lead to the formation of a sub-optimal portfolio, resulting in a lower risk-adjusted return relative to its conventional peers.

2.5. Conclusion

The chapter highlighted the significant growth of the SRI market since its early inception, traced backed to biblical times. The development of its market was largely attributed to the U.S. with contagion effects shown for other countries, including S.A. The elementary phase of SRI in S.A. was found during the 1980s, most notably through an effort to end the system of apartheid. With its tremendous growth and increased interest by investors, S.A. has now positioned itself as a proponent of SRI both internationally and through local developments.

Although various definitions were proposed for SRI, a significant one to hold in academia is that it is an investment process that considers both financial and non-financial attributes, with the object and purpose of an investment, therefore, becoming more than a purely financial gain, by striving to create financial results with the focus of non-financial matters given to ethical, environmental or social concerns. As shown, SRI comprises of three approaches at large, namely; screening, shareholder activism, and cause-based investing. Additionally, within SRI, three classes of investors were shown to exist, namely, value-based, value-seeking and value-enhancing.

Lastly, the chapter outlined the theoretical aspects that provide the foundation to the empirical evidence to follow (in the next chapter). This discussion included a review of theories encompassing the deviation of findings from the norm of similar performance of SRI funds, shown by the extant literature, i.e. underperformance and outperformance. In addition, the underpinnings of the RBSA model and its approach to style analysis were presented. This also included a theoretical review on the style analysis of SRI funds, highlighting the effect of screening and a restricted investment universe on the active management and style exposures of these funds.

CHAPTER 3: A REVIEW OF EMPIRICAL EVIDENCE

3.1. Introduction

This chapter will provide a detailed review of empirical evidence surrounding the performance evaluation and style analysis of SRI funds from both an international and South African perspective. Similar to the theoretical foundation chapter (Chapter Two), the empirical evidence was subdivided according to the respective research objectives - performance evaluation of SRI funds (research objective one) and style analysis of SRI funds (research objective two).

3.2. Empirical Evidence on the Performance of SRI Funds

3.2.1. International Literature

The majority of the extant literature regarding the performance evaluation of SRI funds provides findings for both the U.S. and U.K. The consensus among studies, in these countries and others, points towards the absence of any statistical differences between the performance of SRI funds and conventional funds (Hamilton et al., 1993; Sauer, 1997; DiBartolomeo & Kurtz, 1999; Goldreyer & Diltz, 1999; Statman, 2000; Bello, 2005; Statman, 2006; Schröder, 2007; Bauer et al., 2007). However, a majority of these empirical studies have been conducted using a single-index framework, and would, therefore, be subjected to the limitations that are encountered when considering a single factor in measuring risk and accounting for style tilts.

The findings of Luther, Matatko & Corner (1992) show weak evidence of SRI funds outperforming its conventional counterparts for the U.K. market. This study, as well as a later study by Luther & Matatko (1994), highlighted the presence of a size effect, whereby SRI funds, on average, exhibited a larger exposure to small-cap stocks in comparison to its conventional peers. Gregory, Matatko & Luther (1997) postulated that the appropriate method to use in dealing with the size effect is the construction of a two-factor benchmark (accounting for size). When the size effect was incorporated into these performance evaluation models, the difference in performance, which was previously noted, disappeared. As an extension to the approach proposed by Gregory et al. (1997); Mallin et al. (1995) indicated that while the effects of size and screening on fund performance are not easy to separate, it is, however, imperative to control for these factors in evaluating performance. In response, Mallin et al. (1995) advocated the use of a matched-pairs analysis which includes the selection of a sample of conventional funds based on the SRI fund's size, age (inception date) and style. Using this method, the authors found evidence that U.K. SRI funds marginally outperformed non-SRI funds over the study (1986-1993).

A notable study by Bauer, Koedijk & Otten (2002) provided an extended review on the research of Mallin et al. (1995) by employing a matched-pairs analysis to the performance evaluation of German, U.K. and U.S. ethical funds for the period 1990-2001 (divided into three equal sub-periods). Their findings showed no significant differences in the risk-adjusted performance between ethical and conventional funds. Introducing time-variation in betas, however, led to significant underperformance of domestic U.S. funds and a significant outperformance of U.K. ethical funds relative to their conventional peers. Furthermore, the study differentiates these findings by providing evidence that SRI funds had undergone a 'learning effect'. The authors found that after significant under-performance in the early 1990s, older SRI funds (formed before 1998) tend to match the performance of their conventional counterparts during the latter period (1998-2001), while younger funds (launched after 1998) continued to trail (underperform) their conventional peers.

Contrary to the extant literature, the findings of Gjølberg & Johnsen (2003) indicated that there exists a non-symmetrical relationship between risk-adjusted returns and the economic cycle, based on a cross-sectional analysis of European and U.K. SRI funds over the period 1990-2002. Although the general conclusion of the study strongly points toward a neutral perspective, the authors found that ethical funds seem to do better when the economic cycle is upward trending or normal/neutral and that they lose in economic downturns. Gjølberg & Johnsen (2003) postulate that this phenomenon is not due to the ethical constraints on the portfolio, but rather that SRI funds are non-normal in pricing downside risk as this is evident only in abnormal situations.

Jones, Van Der Laan, Frost & Loftus (2008) found SRI funds to significantly underperform conventional funds for the Australian market (1986-2005). The authors indicated that a possible contributor to this weak performance was that many Australian SRI funds have significant under-exposure to the resources and energy sectors, both of which have by far been Australia's highest return sectors.

A global study by Renneboog et al. (2008) evaluated the performance of 463 (both in existence and non-existent) socially responsible equity mutual funds domiciled in 23 countries for the period 1991-2003. Their findings showed that SRI funds in most European and Asia-Pacific countries significantly underperformed their benchmark portfolios, whilst the U.K. and U.S. were exceptions, with SRI funds in these markets exhibiting similar risk-adjusted returns to that of their conventional counterparts. Renneboog et al. (2008) indicated that the performance of SRI funds increased with the number of SRI screens employed to model their investment universe. Furthermore, the performance of SRI funds was found to be better when funds have an in-house SRI research team to screen their portfolios.

Derwall & Koedijk (2009) analysed both fixed-income and balanced SRI funds for the U.S. market over the period 1987-2003. The findings of the study showed that fixed-income SRI funds exhibited similar performance to its matched conventional funds, while balanced SRI funds outperformed its

conventional peers. In addition, the authors found that the expenses charged by SRI funds matched those of conventional funds, indicating that the costs associated with screening do not cause SRI funds to underperform.

Extending on the research of Derwall & Koedijk (2009), Chang & Witte (2010) considered 184 SRI funds from four categories, namely; domestic (U.S.) stock funds, international stock funds, balanced funds, and fixed-income funds, over multiple sample periods (three-year, five-year, and ten-year), spanning from 1994-2008. The findings of the study showed that SRI funds in all categories except fixed-income funds had inferior reward-to-risk performance compared to the average of all mutual funds in the U.S. fund industry (per category) over the five- and ten-year periods. In addition, SRI funds in all categories except domestic funds outperformed the average fund over the three-year period, with fixed-income funds found to outperform the average fund over all the given sample periods.

Gil-Bazo et al. (2010) analysed 86 U.S. equity SRI funds for the period 1997-2005. The authors found the before- and after- fee performance of SRI funds to be, on average, higher than that of conventional funds with similar characteristics. It was noted that SRI funds that were run by management companies that specialise in SRI significantly outperformed similar conventional funds, while funds run by generalist companies underperformed their matched conventional funds. Additional findings showed no significant differences in management fees between SRI and conventional funds, except that SRI funds tend to be cheaper than conventional funds when they are offered by the same management company.

Areal et al. (2010) found mixed results for the performance of U.S. SRI funds. Using a Markov-switching conditional CAPM model to account for differing market regimes (defining different states of the market endogenously), the findings of the study showed that SRI funds underperformed in low volatility regimes and outperformed in high volatility regimes. In addition, the risk of conventional funds was higher in low volatility regimes and lower in high volatility regimes, while SRI funds showed no significant variation in risk, in relation to market conditions. The authors suggest that SRI firms may present better investment options during bear markets (or periods of the financial crisis). In fact, these conclusions, which show the ethical and social screens of SRI funds to be beneficial to investors in the presence of bear markets, are found to be consistent across SRI investment platforms. In particular, a study by Alam & Rajjaque (2010) evaluating passive SRI, found that the S&P Europe 350 Shariah Index significantly outperformed the S&P Europe Index and the market index (with the exclusion of financial firms as they were shown to be the worst affected in the period of general economic downturn), suggesting that SRI indices could provide a hedge against adverse market movements/market downturn.

Similar to Areal et al. (2010), Nofsinger & Varma (2012) found U.S. SRI funds to outperform conventional funds during periods of financial market crisis. For the period 2000-2011, the study showed that the dampening of downside risk (in a market crisis) comes at the cost of underperforming

during non-crisis periods. The authors indicated that the outperformance of SRI firms in periods of market crisis could be largely attributed to both better corporate governance and high employee satisfaction measures, which will essentially lead to reduced bankruptcy risk and in turn allow these firms to be more suited in dealing with adverse systematic economic shocks. In addition, Nofsinger & Varma (2012) postulated that investors with Prospect Theory utility functions[3] would appreciate the skewness of these returns. This asymmetric return pattern is driven by the mutual funds that focus on ESG attributes and is especially pronounced in ESG funds that use positive screening techniques. Furthermore, the observed patterns were attributed to socially responsible attributes and not the differences in fund management or the characteristics of the companies in fund portfolios. The authors thus reject the hypothesis that SRI-funds are attractive for certain investors because of the impact of externalities occurring from ethical portfolio constraints on the investors' utility function. Nofsinger & Varma (2012) indicated that the principles of behavioural finance could be more closely linked to SRI in comparison to conventional investing, as according to conventional financial theory, the world and its participants are, for the most part, rational 'wealth maximisers'.

Wikstrom (2014) found conventional funds to outperform SRI funds marginally in Sweden for the period 2004-2014. The author indicated that a possible reason for the inferior performance of SRI funds could be the holdings and screening policies by these funds – with high screening intensity negatively impacting SRI funds' returns. In addition, the study found that SRI funds with a global investment strategy tend to perform better, which could be attributed to them having a more widely-diversified investment universe.

Barwick-Barrett (2015) evaluated the performance of both U.K. and U.S. funds relative to conventional funds over a period ranging from 1998 to 2012. The sample of U.K. funds (53 funds) comprised of both domestic and global funds while the sample of U.S. funds (95 funds) comprised of the large-cap, mid-small cap, balanced and bond funds. In line with the respective samples, the study presented two classes of findings. The study found that U.K. conventional funds outperformed SRI funds. Similar to the findings of Wikstrom (2014), the study found that SRI funds which comprised of investments both in the U.K. and globally performed better than funds that restricted their investments to the U.K., indicating that greater diversification resulted in more favourable performance. Barwick-Barrett (2015) also showed that the screening employed by these funds are more beneficial to funds that have a global investment focus as it reduces concentration risk. However, overall, screening was found to impact negatively on returns. The most severe impact was shown by negative screening. In terms of U.S. SRI funds, Barwick-Barrett (2015) found that the risk-adjusted performance of SRI funds is not significantly different from conventional funds. The exception to this finding was balanced SRI funds which were

[3] An investor will value the gain in utility for doing better in falling markets more than the loss in utility for underperforming in rising markets.

found to outperform their conventional counterparts. The author claimed that the main contributing factor to the difference in the performance of U.K and U.S. funds was the screening method employed by these funds. U.K. funds, on average, employ negative screening on a much larger scale than U.S. funds. As such, the findings of the study showed negative screening to have a more detrimental effect on fund performance than other screening methodologies.

Traaseth & Framstad (2016) assessed the performance of SRI funds relative to conventional funds that comprised of both the U.S. and U.K. market for the period 2002-2015. The findings of the study showed that there was no significant difference in the performance of SRI funds and conventional funds. Although, SRI funds that held companies with higher ESG-scores tend to perform marginally better than those that hold companies with lower ESG-scores. Similar to Barwick-Barrett (2015), Traaseth & Framstad (2016) found evidence that negative screening contributes to a loss in return for SRI funds.

Christensson & Skagestad (2017) evaluated the performance of SRI and conventional funds in emerging markets over the period 2012-2017. The analysis considered three different economic cycles: steady development, recession and recovery. The findings indicated that there was no statistically significant difference in the risk-adjusted performance of SRI and conventional funds. However, conventional funds tend to outperform SRI funds during recovery periods. In addition, the study found that SRI funds, on average, showed a lower sensitivity to market returns and small-cap stocks, with a difference in exposure to the market only present during the recession period. In terms of the size-effect, the difference in exposure to small-cap stocks was shown to be consistent in both the steady and the recession periods, but SRI funds exhibited a greater exposure to small-cap stocks relative to conventional funds during the recovery period. Overall, the findings of the study indicated that there is no additional cost related to investments in SRI funds in emerging markets, except when the economy is recovering from a recession.

Taivainen (2018) found that the difference in returns between U.S. SRI and conventional funds are not statistically significant for the period 2006-2017, thereby implying that socially responsible investors do not pay a premium for their investment choices. In addition, the study found that SRI funds exhibited a persistence in their performance over the evaluation period while also resisted periods of financial downturns relatively well. The investment styles of the funds indicated that SRI funds exhibited a marginally higher sensitivity to market fluctuations and showed a negative momentum exposure. The findings for the size factor was shown to be more consistent. Both types of funds were shown to have a small-cap preference.

A global study by Op Den Camp (2018) considered 13 countries in the performance evaluation of SRI and conventional funds. The effects of varying time periods and different financial systems were accounted for. The latter referred to the distinction made between common law and civil law countries. The study presented three classes of findings. Firstly, it indicated that SRI funds largely outperformed

conventional funds in the short-run, while underperformed or did not perform statistically different from them in the long-run. Secondly, it found that SRI funds performed better relative to conventional funds in Common Law countries than in Civil Law countries, and this performance difference increased over time. This could be attributed to the more developed and vastly established SRI markets found in Common Law countries. Lastly, the study found that international SRI funds (those with a global investment focus) performed better than domestic SRI funds (those that invested exclusively in their domiciled countries), implying that international diversification could still be an important factor in fund performance. The latter finding was similar to that of Wikstrom (2014) and Barwick-Barrett (2015).

Kiymaz (2019) evaluated the performance of U.S. SRI funds relative to their conventional benchmarks (indices selected based on the fund's group classification) for the period 1995-2015. The sample of funds was categorised into five distinct subgroups; domestic equity, institutional, global, balanced, and fixed income. The findings of the study were at best mixed, with some funds outperforming their benchmarks while others underperformed. Among the subgroups analysed, SRI Fixed Income funds exhibited the highest level of risk-adjusted returns while SRI Global funds provided the lowest returns.

3.2.2. South African Literature

The question of the financial performance of SRI funds in comparison to conventional funds has been rarely addressed in a South African context. Viviers (2007) indicated at the time of their study that no empirical work regarding the financial performance of SRI funds existed for S.A. The authors, bridging this gap in the literature, analysed the performance of SRI funds relative to three benchmarks; JSE All Share Index (JSE ALSI), its matched sample of conventional funds and, its respective benchmark indices, for the period 1992-2006 (the sample period was divided into three sub-periods). Employing risk-adjusted performance measures comprising of the Sharpe[4], Sortino[5] and Upside-potential[6] ratios, the study presented three classes of findings.

SRI funds were found to underperform relative to their respective benchmark indices during the first two sub-periods (1992-1998; 1998-2002) but significantly outperformed them during sub-period three (2002-2006). The underperformance in the former sub-periods represented a period when SRI was still relatively new in S.A. (the first fund was launched in 1992), and when there was a general market

[4] Sharpe = $\frac{Rp - Rf}{Op}$; where: Rp = Return on portfolio, Rf = risk-free rate, Op = standard deviation of portfolio.

[5] Sortino = $\frac{Rp - Rt}{Onp}$; where: Rp = Return on portfolio, Rt = Target rate of return, Onp = Downside of portfolio.

[6] UPR(t) = $\frac{\mathrm{HPM(t)}}{LPM(t)}$; where: HPM(t) is the first higher partial movement and LPM(t) is the second lower partial movement.

downturn. While the outperformance in the latter sub-period can be attributed to a period when a number of new SRI funds were launched in S.A., and capital and property markets showed renewed and consistent growth. In addition, a prominent factor shown to impact positively on their performance was the inception of the JSE SRI index in 2004, which rendered favourably for the SRI market. The authors suggest that the improved performance over time may be due to a 'learning effect', as fund managers have familiarised themselves better with socially responsible investment within the South African context. Similar learning effects were documented in other SRI markets (e.g. the U.S. market shown by Bauer et al. (2002).

Viviers (2007) also found SRI funds to exhibit similar performances to that of their matched conventional funds (over the full sample period). In addition, SRI funds were found to significantly underperform relative to the general equity market in S.A. (with the JSE All Share Index used as a proxy) during sub-period two (the decline period of SRI in S.A.), but performed on a par with the JSE All Share Index during sub-periods one and two. These findings support the EMH notion, which claims that active managers cannot beat the market.

The only other known study to exist at the fund-level to date was that of Du Plessis (2015). The study analysed the performance of SRI funds relative to three benchmark categories; the JSE SRI Index, JSE All Share Index and a matched sample of conventional (non-SRI) funds, over the period 2004-2014. The findings of the study showed that the sample of SRI funds exhibited similar performance to the passive counterparts (JSE SRI Index and JSE All Share Index), whilst underperformed against the non-SRI funds. In addition, SRI funds were found to be less sensitive to market fluctuations, more exposed to small-cap and growth stocks, and exhibited significant momentum after the period of the global financial crisis (2007/08).

3.3. Empirical Evidence on Style Analysis

3.3.1. International Literature on the Style Analysis of SRI Funds

While the preceding section of the study focused on the performance of SRI funds relative to their conventional counterparts, this portion of literature will shed light on whether constraining the portfolio has any significant impact on the underlying sources of active returns, including managerial ability, stock selection, and style biases.

Bauer et al. (2002) found the style biases (exposures) of SRI funds to vary in relation to their age (over the period 1990-2001). The study showed that newly formed funds (i.e. younger funds) changed their investment style. While the older ethical funds (post-1998) clearly deviated from conventional funds with respect to market risk, size and book-to-market exposures, the younger funds (pre-1998) follow much less pronounced investment styles. Older SRI funds were found to have lower market risk, and

significantly higher exposure to both small-cap stocks and growth stocks, relative to their conventional peers, while these exposures for younger SRI funds were shown to be relatively similar to conventional funds.

Deb (2006) evaluated the performance of SRI funds relative to their style benchmarks, as well as provided an attribution analysis of the excess return of these funds over their style benchmark (i.e. active return - segregated into selection and timing components), for the period 2000-2005. The findings of the study showed that Indian equity SRI funds underperformed their style benchmarks. In addition, the study found SRI fund managers to exhibit moderate to high levels of active management, indicating that the imposition of additional constraints by SRI funds does not necessarily limit the SRI fund manager's ability to add value through active management. By accounting for the components of the funds' active return, SRI fund managers were found to have good selection skills but poor timing skills. Their timing skills were poor enough to bring down their overall performance with respect to their style benchmarks, despite positive selection returns. In terms of the funds' style exposures, results showed that on average, mid-cap stocks, Japanese stocks, U.S. stocks, large-cap growth stocks and bonds with more than eight years maturity, comprised the dominant component of the style exposure for SRI funds. However, the mid-cap stocks asset class was by far the most dominant component of exposures of these funds.

Extending on the findings of Bauer et al. (2002) that style exposures vary based on the age of the fund, Renneboog et al. (2008) found these exposures also to vary geographically. From a global perspective, Renneboog et al. (2008) found SRI-funds to load, on average, less (load with a negative difference) on the momentum factor than conventional funds. These findings are supported by Nofsinger and Varma (2012).

In terms of the size factor, Renneboog et al. (2008) found the U.S., Canada and Japan to have a larger exposure to large-cap stocks, while Germany and the U.K. invest considerably more in small-caps. Consistent with these findings, Bauer et al. (2005) found that Germany and the U.K. load a positively, statistically significant difference from conventional funds. Only the U.S. has a negative difference in loading compared to conventional funds. This implies that the German and the U.K. SRI-funds are highly exposed to small-cap stocks, whilst the U.S. is more exposed to large-cap stocks.

Furthermore, Renneboog et al. (2008) found that SRI-funds in Norway, Canada and Japan have a larger exposure to value stocks than conventional funds. However, on average, most countries in the study exhibited a negative loading, implying a growth-tilt. This finding was largely due to the exclusion of value sectors with relatively high environmental risks, e.g. chemical, energy, and basic industries. In support of the latter finding, i.e. growth-tilt, Hong and Kaceperczyk (2009) showed that SRI impacts stock returns by lowering the book-to-market ratio of firms. The authors found that the market-to-book ratios of U.S. SRI stocks for the period 1962-2006, were on average 15% lower than those of

comparable companies. These valuation ratios, using a Gordon growth model calibration, implied excess returns of roughly 2% per year. In fact, the growth bias was shown to be consistent across all SRI investment platforms, which could result in performance differences between SRI and conventional investments over any given period being largely attributed to this factor. This can be illustrated in a study by Statman and Klimek (2005), which found that SRI indices outperformed the S&P 500 Index in the late 1990s during the tech bubble (an overweight position in the Information Technology sector, i.e. growth stocks), and subsequently lagged the S&P 500 Index in the early 2000s. These findings have also been confirmed in an updated study by Dibartolomeo and Kurtz (2011).

Similar to the approach of Renneboog et al. (2008), Hoepner et al. (2011) employed a global study for 265 Islamic funds from 20 countries. The findings of the study showed that Islamic funds exhibited a growth-tilt. It was indicated that a possible reason for this finding could be due to the lower leverage of growth stocks in comparison to value stocks as part of the Shari'ah screening criteria, it requires a debt-to-assets ratio of 33% or lower. In addition, the Islamic funds from predominantly Muslim economies showed a clear small-cap preference. This could be explained by the home bias of these funds as Islamic economies generally comprise of comparatively small corporations – since large corporations are often well-diversified firms and may offer a higher risk in terms of them having a large proportion of their revenue being earned from activities prohibited by Shari'ah law.

An empirical study by Humphrey, Boon & Warren (2013) showed that despite U.S. SRI funds outperforming conventional funds when disaggregating this performance into its constituent elements, no significant difference between the two funds was found in terms of their stock selection abilities. In addition to these findings, both funds were shown to exhibit positive and significant stock selection abilities, for which the authors inferred that constraining an SRI fund manager, at least using responsible criteria, neither hinders nor improves managerial skill. Humphrey et al. (2013) found that SRI fund managers generated superior style timing and characteristic timing performance, with the outperformance by SRI fund managers being attributed to approximately 0.52% per quarter differences (relative to conventional fund managers) in characteristic timing. This predominantly reflects conventional managers' poor timing skills combined with some success by SRI fund managers in timing the book-to-market characteristic well. Furthermore, it was found that although SRI funds outperformed over the sample period (2000-2010), these funds may generate different performances due to style biases – the study showed SRI funds underperformed conventional funds based on the size, book-to-market and momentum factors. Using the Average Style exposure measure, these style differences translate into SRI funds underperforming conventional funds by 0.15% per quarter. A large proportion of which can be attributed to SRI funds significant exposure to large-cap stocks in which small-cap stocks outperformed during the sample period, highlighting the size-effect.

Munoz, Vargas & Marco (2014) analysed the managerial abilities of SRI fund managers over the period 1994-2013 – a period that took into account both a crisis and non-crisis market. The SRI fund managers were categorised into three distinct groups; U.S fund managers, European fund managers, and global fund managers (those fund managers whose global investment category is not limited to the U.S. or European market). Over the full evaluation period, the findings of the study showed that SRI fund managers are unable to implement stock-picking or timing investment strategies successfully. In view of these findings, Munoz et al. (2014) indicated that SRI funds do not take advantage of their narrower investment universe to implement active investment strategies. When controlling for crisis and non-crisis market periods, a difference in the results was shown for the U.S. and European fund managers. U.S. SRI fund managers were found to have better managerial abilities in crisis market periods, while the opposite was found for European fund managers (i.e. showed better managerial abilities in non-crisis market periods). In terms of the style timing abilities of the fund managers, these differences were further noted. In crises periods, U.S. fund managers showed success in timing the size style and U.S. global fund managers in timing the book-to-market style, while they attained no success in properly timing any of the analysed styles in non-crises periods. The opposite was shown to exist for European fund managers and European global fund managers.

Munoz, Vicente & Ferruz (2015) found minimal differences in stock selection and style-timing abilities between SRI and conventional fund managers. Both fund managers showed negative stock selection skills, correct size and book-to-market style-timing skills, and an absence of the ability to time both the market and the momentum style. A notable finding showed that the size of the fund does not affect the style-timing abilities of conventional and SRI fund managers. In terms of the age of the fund, the results obtained for conventional funds were driven by older funds, while younger funds for both conventional and SRI funds, showed perverse market-timing skills. Furthermore, both fund managers (SRI and conventional) make use of superior information to time the book-to-market style.

In an updated study, Humphrey et al. (2016) found that there was no substantial difference in security selection skill and style timing abilities of SRI and conventional funds - in line with the extant literature that does not find any performance difference between these funds. This was based on the finding of no significant difference in their characteristic selectivity, characteristic timing and average style measures. In addition, the study found that SRI funds also had similar style exposures to those of conventional funds. Although, SRI funds did show a growth-tilt (they had a tendency to hold stocks with low book-to-market ratios). Based on the analysis of the study, Humphrey et al. (2016) presented two key findings; (i) there is no return penalty or narrowing of the style opportunity set associated with investing in SRI funds and (ii) the performance focus of SRI fund managers is generally long term in nature.

Allahverdiyev (2017) found that SRI fund managers to have positive selective ability, yet this skill does not assist them in having a 'right market timing' ability, i.e. they lack market timing ability. The findings

of the study showed a strong correlation for SRI fund managers with positive selective ability to either have negative or non-market timing ability. This implied that despite fund managers having the skill of good selective ability, they are not able to manage the portfolio in the way that diversifies its systematic risk. Furthermore, Allahverdiyev (2017) found that the size-effect influenced the performance of SRI funds relative to the market. That is, they tend to perform better when they increased their exposure to large-cap stocks as opposed to small-cap stocks. Based on the relative performance of the SRI portfolios, the study concluded that the book-to-market ratio had no effect on the difference in their performance that was noted.

A recent study by Uma Rao (2018) analysed the active and style components of return for SRI funds, more specifically, high sustainability rated funds[7] over the period 2011-2016. The author suggests that investors are better off allocating assets identified by the style benchmark using passive index funds instead of choosing actively managed SRI funds. This is based on the findings that showed style investing to hold significant power in explaining the funds' returns, i.e. SRI fund managers do not add much value through active management. Contrary to the findings of Allahverdiyev (2017), the study found SRI fund managers to have negative selective ability.

3.3.2. Style Investing/ Style Analysis in South Africa

Although it is prevalent that studies (while limited) have been conducted internationally on the style analysis of SRI funds, there is no evidence of studies of this nature found to exist for S.A. However, there have been studies documented on style investing in S.A. - with reference to style investing on the Johannesburg Stock Exchange (JSE) as well as the style analysis of conventional investments. Since the study includes a comparative style analysis with a focus on conventional funds, this portion of literature could prove beneficial to this study in two ways. Firstly, it is vital to understand the prevailing style trends in S.A. since both types of funds fall within the South African investment sphere. Therefore, these encompassing trends could have potential effects on their investment style. Secondly, it could aid in identifying any similarities or differences in the style approaches of SRI and conventional funds – which will be beneficial to the analysis of results for this study.

Van Rensburg (2001) employed a cluster analysis methodology by using dividend-adjusted monthly data obtained from industrial shares listed on the JSE, for the period 1983-1999. The study analysed more than 20 style strategies in which it found 11 of these to be statistically significant once adjusting for risk. Additional findings showed three distinct style factors being dominant: momentum, size, and value.

[7] The funds were obtained from the Morningstar database. This Morningstar Sustainability Rating provides a measure of how well the holdings in a portfolio are managing their ESG, risks and opportunities relative to their Morningstar Category peers.

Van Rensburg & Robertson (2003) extended on the preceding study by using a cross-sectional regression methodology based on both share returns and specific style factors which were similar to those considered in the Van Rensburg (2001) study. The sample period was modified to take into account the effects of a ten-year period: 1990-2000. In contrast to the study documented by Van Rensburg (2001), Van Rensburg & Robertson (2003) found no evidence of a momentum effect. However, they did confirm significant size and value style effects being present on the JSE.

Auret & Sinclaire (2006), using a similar dataset and sample period to Van Rensburg & Robertson (2003), examined six styles, namely, book-to-market (B/M), price-to-earnings (P/E), price-to-NAV, dividend yield, cash-flow to price and size. By employing a multiple regression analysis, the findings of the study showed that book-to-market has a significant positive relationship with share returns. Further findings show that when B/M is accounted for in the Van Rensburg & Robertson (2003) model of size and price-to-earnings, the effects of size and P/E are almost entirely absorbed by B/M.

Mutooni & Muller (2007) examined whether style timing strategies could prove profitable to firms listed on the JSE over a 20-year period: 1986-2006. Their findings showed that value stocks, on average, outperform growth stocks across the size spectrum. Also, the authors found that timing the style spreads proved to be a more profitable investing strategy than simply buying and holding the JSE All Share Index (which is essentially a fixed/passive style strategy).

Basiewicz & Auret (2009) utilised a sample of JSE listed company returns and financial statement data ranging from 1992 to 2005. The study made use of dividend-adjusted returns and controlled for both survivorship bias and corporate actions. Basiewicz and Auret (2009) found the independent existence of a size-effect and P/E effect even after adjusting for illiquidity. However, as with Auret & Sinclaire (2006), they note "that the best measure of the value premium is the book to market ratio, which, in univariate sorts has produced the widest spread of returns and has been found to subsume all other value indicators in multivariate regressions" (Basiewicz & Auret, 2009: 35).

Hoffman (2012) investigated the share return anomalies present on the JSE. Similar to Basiewicz & Auret (2009), the study made use of dividend-adjusted returns (for the period 1985-2010) and controlled for both survivorship bias and corporate actions. In addition, it employed an equal weighted and a market value-weighted portfolio approach. Hoffman (2012) found the size, B/M and momentum effects as well as to a lesser extent an Earnings to Book (E/B) and 'new shares in issue' (NS) effect being present on the JSE.

Muller & Ward (2013) re-examined the significant investment styles considered in theory on firms listed on the JSE. A distinction with this study was that it utilised an improved data set and methodology over a longer time frame in comparison to prior research conducted in S.A. The study employed a graphical time series approach for the period 1985-2011, which comprised of both JSE share price data and firm-specific financial statement information. Muller & Ward (2013) found persistent and

significant excess returns being present for nine styles: momentum, dividends yield (D/Y), earnings yield (E/Y), cash flow to price, price-to-book (P/B), liquidity, return on equity (ROE), return on capital (ROC) and interest cover.

Additionally, the authors found no evidence of a size effect on the JSE except for young (start-up) firms, contrasting results documented in earlier studies. It was noted that a combined style strategy that comprises of momentum, cash flow to price, ROC and E/Y styles yielded the most optimal result which is evident by persistently outperforming the JSE All Share Index by approximately 14% per annum (Muller & Ward, 2013). The aforementioned styles were effectively included in these.

Maya (2014) evaluated the average annual real long-term returns for large-cap, mid-cap and small-cap value and growth styles in S.A. for the period 1990-2013. The findings of the study showed that over the long run, value stocks outperformed both the market and growth stocks by 2.8% and 4.8% per annum, respectively. In particular, small-cap value stocks were shown to be the most successful in which it outperformed the market by 8.6% a year. Despite these findings, the study found that almost half of the equity market (i.e. 48%) and in turn investors capital lies in growth style investing while less than half of this amount (i.e. 21.6%) lies in value style investing.

Hsieh (2015) investigated the value-effect in both small-cap and large-cap segments on the JSE for the period 1997-2013. The study comprised of the earnings-to-price (E/P) ratio, the book-to-price (B/P) ratio and the sales-to-price (S/P) ratio as the relative valuation proxies. Hsieh (2015) found that although the E/P and S/P portfolios exhibit a value effect; and the B/P portfolios exhibit a growth effect, independent value and growth effects were shown to be weak over the complete sample and across different firm size segments on the JSE. Based on these results, the author concluded that different examination periods and samples could lead to different findings regarding the independence of the value effect on the JSE. A notable finding for the value-effect was that value portfolios seemed to have a higher sensitivity to market movements and presented as riskier investments than the growth portfolios. Furthermore, the study found a significant size effect to be present regardless of the portfolio's value or growth tilt, indicating that the size-effect dominated the value-effect on the JSE over the evaluation period.

Thobejane (2015) analysed the managerial ability of S.A. equity fund managers for the period 2007-2014. The findings of the study showed that equity fund managers exhibited weak stock selection and market timing ability. The latter finding was shown to be similar to that Allahverdiyev (2017), which also found SRI fund managers to have weak market timing ability. Furthermore, Thobejane (2015) found weak evidence of persistence in the performance of these funds that was spread equally across all funds (winning and losing funds) and was shown to exist even for funds that showed superior stock selection and market timing ability relative to the others.

Langa (2016) evaluated the effectiveness of value investing in S.A. over the period 2000-2015. This entailed an analysis of value style investing relative growth style investing over different market regimes. Similar to Hsieh (2015), the findings of the study indicated that there is limited evidence of value premium in S.A. over the examination period - there are some periods where one style is dominant over the other. Based on the constructed value and growth portfolios and the respective market conditions, the deep value[8] portfolio was found to outperform during the financial crisis period while the relative value[9] portfolio outperformed during economic slowdowns.

Naidoo (2017) conducted a relative analysis of the characteristics of active and passive equity-only funds in S.A. over an evaluation period ranging from 2003 to 2016. Although mixed findings were shown in their performance attributes, a similarity was shown among them in that both types of funds exhibited a small-cap preference and a growth-tilt. These findings were shown to be similar to that documented for both Islamic and SRI funds in global studies (Renneboog et al., 2008; Hoepner et al., 2011).

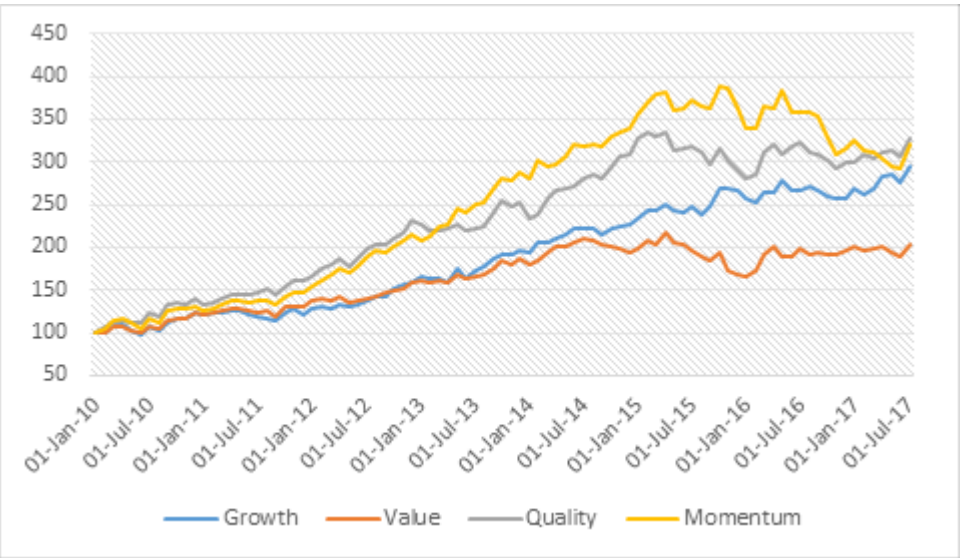
A recent analysis by Phillips (2018) considered the dominant investment styles in S.A.: value, growth, quality[10] and momentum, while assessing their relative success over varying time-periods. The proxies used to evaluate these investment styles included; JSE Growth Index, JSE Value Index, S&P South Africa Quality Index, S&P South Africa Momentum Index. Figures 3.1, 3.2 and 3.3 depict the performance of the respective investment styles over the different time periods.

[8] Deep Value is a quantitative investing strategy which selects for investment the cheapest stocks in a universe of stocks, based on their valuation multiple - having the lowest valuation multiples in the market (Langa, 2016).

[9] Relative value is an investing method of that considers the asset's value in question relative to the value of similar assets (Langa, 2016).

[10] Quality investors typically look for stocks that are characterized by low debt, stable earnings growth and other 'quality' metrics such as: dividend growth stability, strength of a company's balance sheet, financial leverage, cash flows, strength of management, and accounting policies (Bender, Briand, Melas & Subramanian, 2013).

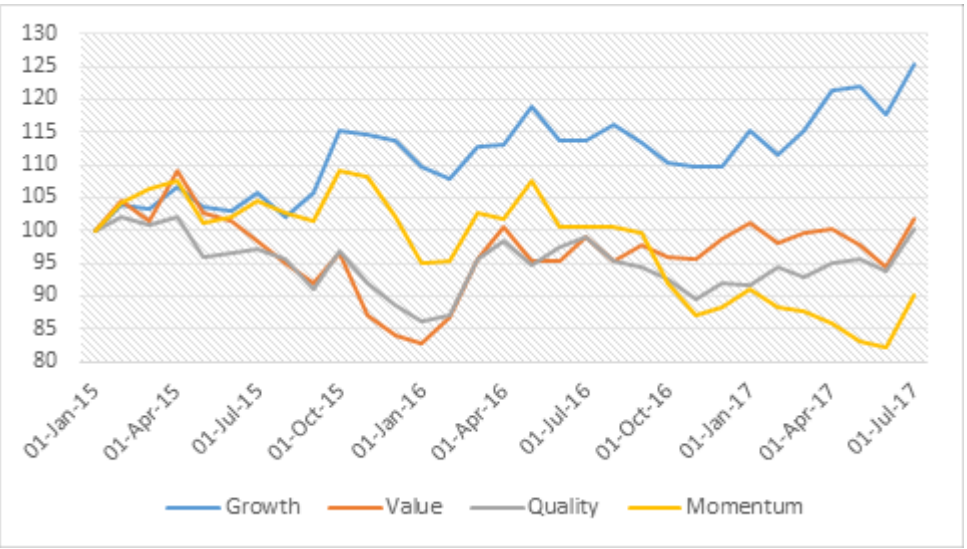
Figure 3.1: The Performance of Investment Styles in S.A. for the Period Jan 2010-Jul 2017



[Source: Phillips (2018)]

Figure 3.1 shows that quality investment style has narrowly outperformed the momentum style, while the value style was the worst performer over the period Jan 2010 - Jul 2017.

Figure 3.2: The Performance of Investment Styles in S.A. for the Period Jan 2015-Jul 2017



[Source: Phillips (2018)]

As depicted in Figure 3.2, the growth style was the top performer, followed by the value style, while the momentum style was the worst performer over the period Jan 2015-Jul 2017.

Figure 3.3: The Performance of Investment Styles in S.A. for the Period Jan 2016-Jul 2017

[Source: Phillips (2018)]

Figure 3.3 shows that the value style was the top performer, followed by the quality style, while the momentum style was the worst performer over the period Jan 2016-Jul 203.4.

3.4. Conclusion

The chapter provided empirical evidence on both the financial performance of SRI funds and the style analysis of SRI funds. Based on these two portions of literature, its pertinent findings are summarised under the following sections; summary of empirical literature on the performance of SRI funds (3.4.1) and summary of empirical literature on style analysis (3.4.2).

3.4.1. Summary of Empirical Evidence on the Performance of SRI Funds

Table 3.1 summarises the findings of studies found under the section on the performance of SRI funds.

Table 3.1: Summary of Findings on the Performance of SRI Funds

International Studies					
Year	**Author**	**Country**	**Fund Sample**	**Sample period**	**Relationship**
1992	Luther et al.	U.K.	15 SRI funds	Start date or 1984 - 1990	Positive[1]
1995	Mallin et al.	U.K.	29 SRI funds	1986 - 1993	Positive
2002	Bauer et al.	German, U.K., U.S.	103 SRI funds, 4384 Conventional funds	1990 - 2001	Neutral[2]
2003	Johnsen & Gjølberg	Europe & U.K.	European & U.K SRI Funds	1990 - 2000	Mixed Results[3]
2008	Jones et al.	Australia	89 SRI funds	1986 - 2005	Negative[4]
2008	Renneboog et al.	European & Asia-Pacific Countries	463 SRI Funds in 23 countries	1991 - 2003	Negative
2009	Derwall & Koedijk	U.S.	15 SRI bond funds 9 SRI balanced funds	1987 - 2003	Mixed Results
2010	Chang & Witte	U.S.	184 SRI funds	1994 - 2008	Mixed Results
2010	Gil-Bazo et al.	U.S.	86 actively managed, retail, domestic, equity SRI funds	1997 - 2005	Positive
2010	Areal et al.	U.S.	13 Morally Responsible Investment (MRI) funds and 38 SRI funds	1993 - 2009	Mixed Results
2010	Alam & Rajjaque	Europe	S&P Europe 350 Shariah Index	2006 - 2009	Positive
2012	Nofsinger & Varma	U.S.	240 Equity SRI Funds	2000 - 2011	Positive
2014	Wikstrom	Sweden	5 SRI funds	2004 - 2014	Positive
2015	Barwick-Barrett	U.K & U.S.	53 U.K SRI Funds and 95 U.S. SRI Funds	1998 – 2012	Mixed Results
2016	Traaseth & Framstad	U.K & U.S.	75 U.S SRI Funds and 28 U.K SRI Funds	2002 – 2015	Neutral

International Studies					
Year	**Author**	**Country**	**Fund Sample**	**Sample period**	**Relationship**
2017	Christensson & Skagestad	Emerging Markets	3009 Emerging Market SRI funds	2012 – 2017	Neutral
2018	Taivainen	U.S.	39 SRI funds	2006 – 2017	Neutral
2018	Op Den Camp	Global Study	SRI funds from 13 countries	2008 – 2017	Mixed Results
2019	Kiymaz	U.S.	152 SRI funds	1995 – 2015	Mixed Results
South African Studies					
2008	Viviers et al.	S.A.	24 SRI Funds	1992 - 2006	Mixed Results
2015	Du Plessis	S.A.	8 SRI Funds	2004 - 2014	Mixed Results

(1) A positive relationship indicates that SRI funds outperformed their conventional counterparts
(2) A neutral relationship indicates that there was no significant difference in the performance of SRI funds and their conventional counterparts
(3) Mixed results indicate that there's no consistency in the findings of the study for the performance of SRI funds relative to their conventional counterparts.
(4) A negative relationship indicates that SRI funds underperformed their conventional counterparts

The findings to date from these (and other) empirical studies are contradictory, although, with a small number of exceptions, in all cases where differences were found (higher or lower), the authors concluded that the differences were small and/or statistically insignificant. Three interesting pieces of research have given some insights as to why the empirical evidence thus far has been contradictory. Firstly, while SRI funds perform similar to conventional funds, conventional funds with a slightly higher SRI tilt tend to perform better than funds with fewer socially responsible companies (Plantinga & Scholtens, 2001).

Secondly, there is a curvilinear relationship between the number of screens used by a fund and the financial performance of the fund (Barnett & Saloman, 2005). In simple terms, this means that as the number of screens increases the returns of the funds at first decline and then begins to increase again. The explanation put forward by the researchers is that when you use only a small number of screens, you eliminate fewer companies from your portfolio and consequently, performance will not be greatly impacted. As the number of screens increases, more companies are eliminated from the portfolio, the portfolio is, therefore, less diversified, and performance suffers. However, once a certain number of screens are reached, the companies that remain in the portfolio are of a higher quality and lower inherent risk, and as such, the performance then begins to improve. Capelle-Blancard & Monjon (2010) further tested this relationship and produced similar results.

Lastly, Cortez et al. (2009) found that SRI mutual funds have shown superior performance in Europe as opposed to the United States. This may be attributed, according to the authors, to differences in SRI investment style. The European SRI approach generally used positive criteria (security selections based on the most socially responsible companies), whereas the American approach was more oriented towards negative screening (security selection based on excluding the least socially responsible companies). These results imply further support for the curvilinear relationship for SRI funds relative to conventional funds.

Additional findings from the empirical literature provided in this chapter include;

- A matched-pairs analysis was alluded to as an effective approach when comparing the performance of SRI funds to conventional funds as it accounts for the fund's size, age and fund style.
- A phenomenon known as a 'learning effect' was shown to exist among SRI funds for both international and South African studies – SRI funds showed improved performance over time as fund managers familiarized themselves better with socially responsible investments. This was also substantiated by SRI funds showing persistence in their performance.
- SRI funds performed better than conventional funds in market downturns/high volatility regimes and performed poorly relative to conventional funds in bullish markets/low volatility regimes.
- SRI funds that held companies with higher ESG-scores performed better than those that held companies with lower ESG-scores.
- SRI funds with a global investment strategy performed better than those that invested exclusively in their domiciled country.
- In terms of the respective fund styles, fixed-income SRI funds were shown to exhibit superior performance relative to conventional funds consistently - other fund styles showed mixed findings over the different evaluation periods.
- Screening, more specifically, intense screening, impacted returns negatively. Negative screening was found to have a more detrimental effect on fund performance than other screening methodologies.

3.4.2. Summary of Empirical Evidence on Style Analysis

SRI funds were found to underperform their style benchmarks. Mixed findings were shown for the SRI fund managers' levels of active management, providing no consensus of whether the imposition of additional constraints by SRI funds limits (or hinders) the SRI fund manager's ability to add value

through active management. The active management component of return can be segregated into two further components, namely; selection and timing skills. SRI fund managers were found to have a weak stock selection and market timing skills (a finding shown to be similar for S.A. conventional funds). In terms of the latter, the size of the fund was found not to affect the style-timing abilities of SRI fund managers. Relative to conventional funds, there was no substantial difference in their security selection skill and style timing abilities.

The style biases of SRI funds were found to vary in relation to both the age of the fund (inception date) and geographically. Based on a global study, SRI funds were found to load, on average, less (load with a negative difference) on the momentum factor than conventional funds. Mixed findings were shown for the size factor, with some countries shown to have greater exposure to large-cap stocks while others to small-cap stocks. Furthermore, SRI funds were found to have, on average, greater exposure to growth stocks (in comparison to value stocks). The findings for Islamic funds were shown to be more consistent. These funds showed a small-cap preference and growth-tilt (a finding shown to be similar for S.A. conventional funds).

With respect to style investing in S.A., three distinct style factors were shown to be dominant: momentum, size, and value. Timing the style spreads was found to be a more profitable investing strategy than simply buying and holding the JSE All Share Index. The book-to-market factor (i.e. value factor) showed a significant positive relationship with share returns. Additionally, value stocks were found, on average, to outperform growth stocks across the size spectrum. In fact, the value investment style was shown to be the best performer in recent years while worst performer of all investment styles over the long run (the quality investment style was the best performer over the long run). The value style portfolios, taking into account the different market regimes tend to perform better than the growth style portfolios in economic crises and economic slowdowns. Despite these findings, it was shown that almost half of the equity market in S.A. in invested in growth style investing (value style investing comprises of less than half of the value of growth style investing). Furthermore, the size-effect was shown to dominate the value-effect on the JSE, with the size-effect being present regardless of the portfolio's value or growth tilt.

CHAPTER 4: RESEARCH DESIGN, DATA AND METHODOLOGY

4.1. Introduction

The chapter focuses exclusively on the techniques used in both the performance evaluation and style analysis of SRI funds, thereby specifically addressing the two research objectives raised in Chapter One. Firstly, an overview of the sample and the data collection methods will be provided. In fulfilment of the set objectives, three quantitative models will be employed, namely; the Fama and French 3-factor model, Carhart 4-factor model, and RBSA model. An outline of each model, the justification for its use in the study, and the purpose it intends to fulfil will then follow.

4.2. Sample

The choice of sample and the evaluation period of the study is essential to the outcome of the research. Therefore, careful consideration had to be given to these elements to ensure the distorting effects of any biases that could stem from the choice of the sample were limited. This section highlights two aspects of the sample. Firstly, it will include a review of the sample constituents and the basis of its selection, i.e. selection techniques. Next, it will elaborate on the choice of sample period used for the study.

4.2.1. Sample Constituents

The focus of the study is primarily centred on the analysis of SRI funds. However, in fulfilment of the study's research objectives, the SRI funds' conventional counterparts were considered. These included both conventional funds and benchmark indices. An elaboration of these three types of constituents (i.e. SRI funds, conventional funds, benchmark indices) will follow.

4.2.1.1. SRI Funds

Socially Responsible Investing by means of collective investment schemes has been a relatively new approach for the South African market, resulting in the existence of a relatively small universe of SRI funds.

The target population of the study comprised of any South African institutional (pooled and segregated) or collective investment fund that employs SRI screening methods such as, among the many, shareholder activism, and/or cause-based (i.e. targeted) investment strategies. For the purpose of the study, Shari'ah compliant funds were included due to the approach they follow when employing

exclusionary screening practices as part of their investment strategy (investing in accordance with Islamic laws) and alignment of objectives they purport to attain.

According to AfricaSRI (2019), there were 23 SRI-labelled funds in existence in S.A. in 2019. To be an SRI-labelled fund, the following requirements had to be met:

- The fund's mandate/investment strategy must be in accordance with the ESG criteria as stipulated in the JSE's requirements for a firm listing on the JSE SRI Index (JSE, 2011);
- The fund must invest in JSE SRI index constituents and/or other international ESG or SRI-related securities;
- Greater than 75% of the fund's assets must comprise of SRI-related securities.

The study made use of all SRI-labelled funds in S.A. (i.e. 23 funds).

4.2.1.2. Conventional (non-SRI) Funds

The terms 'matched funds' and 'non-SRI funds' will also be used as a reference to conventional funds. The selection of conventional funds will be achieved through a matched-pairs analysis based on the fund's characteristics such as their age, size and fund style. This approach, proposed by Mallin et al. (1995) and applied in later studies such as Kreander, Gray, Power & Sinclair (2005), Leite & Cortez (2014) and Belghitar, Clark and Deshmukh (2017), postulates that by not accounting and controlling for the aforementioned variables could potentially distort the results of the study, as what might be perceived as disparity or similarity in performance could in fact reflect the influence of a specific characteristic that has an explicit effect on financial performance. Therefore, it is imperative to differentiate a fund's social aspects from other performance characteristics. Furthermore, Schroder (2004) advocates such procedure indicating that it aptly matches both transaction costs and management fees of socially responsible funds to that of comparative conventional funds.

The first step in the use of a matched-pairs analysis is to determine the fund styles for the respective funds. For the purpose of the study, the sample will consist of four broad fund styles, namely, equity (South African and global, respectively), balanced (multi asset), interest-bearing and real estate (property). The number of funds that constitute each fund style will vary. Using the Association for Savings and Investment South Africa (ASISA) and Fundsdata Online classifications, the aforementioned fund styles will be further subdivided into various sectors. These are as follows (including the number of funds that comprise that sector);

- South African – Equity – General (8 funds)
- South African – Equity – Large-cap (1 fund)

- South African – Multi Asset – High Equity (4 funds)
- South African – Multi Asset – Medium Equity (2 funds)
- South African – Multi Asset – Low Equity (2 funds)
- South African – Multi Asset – Flexible (1 fund)
- South African – Multi Asset – Income (1 fund)
- South African – Interest Bearing – Variable Term (1 fund)
- Global – Real Estate – General (1 fund)
- Global – Equity – General (2 funds)

The next step is to isolate conventional funds of the same fund style (same objective) and an equivalent age, calculated as the difference between a fund's oldest share or asset class (i.e. inception date) and 31 December 2018. The method of Bollen (2007) in allowing the conventional fund to be no more than three years younger or older than the SRI fund will be used. This restriction ensures that the funds will experience similar macroeconomic time-series effects.

Lastly, for a given SRI fund, all eligible conventional funds (matched by fund style and age) are scored based on the distance between the conventional fund's size and β coefficients and the SRI fund's size and β coefficients. The distance relating to how close the SRI fund (*i*) is to each of the conventional funds (*j*) will be measured using the following algorithm:

$$\text{Distance}_{i,j} = \sum_{k=1}^{n}((\beta_{i,k} - \beta_{j,k}) / \sigma_k)^2 + ((\text{TNA}_i - \text{TNA}_j) / \sigma_{TNA})^2 \quad \text{….. (Equation 1.1)}$$

Where *N* is the number of risk factors in the two models, β_k are the risk coefficients, σ_k is the cross-sectional standard deviation (CSV) of the risk coefficients, *TNA* is the maximum size reached by the fund, and σ_{TNA} is the cross-sectional standard deviation of *TNA*. Scaling by standard deviation normalises the weights placed on each matching criterion.

The formula for calculating CSV is:

$$\sigma_x = \sqrt{\sum_i w_i \, (r_i - R)^2}$$

….. (Equation 1.2)

Where;

σ_x = cross-sectional volatility

R = average return across all assets

r_i= return of asset

w_i = weight of asset

Based on the calculation shown in equation 1.1, the conventional fund with the shortest distance to the SRI fund will be selected.

4.2.1.3. Benchmark Indices

The term 'passive benchmarks' will also be used as a reference to benchmark indices. The passive benchmarks that will be used for the sample of SRI funds are either the fund's proxy benchmark index or composite benchmark index if no proxy benchmark exists for a given fund. The proxy benchmark will be determined based on the fund's sector classification. According to ASISA, proxy benchmarks existed for the following sectors (derived from its fund style):

- JSE All Share Index (South African – Equity – General)
- JSE Top 40 Index (South African – Equity – Large-cap)
- JSE/ASSA All Bond Index (South African – Interest Bearing – Variable Term)
- MSCI World Real Estate Index (Global – Real Estate – General)
- MSCI All Countries World Index (Global – Equity – General)

Due to the multi-asset sectors (i.e. balanced funds) comprising of various asset classes, no proxy benchmarks were found to exist for these funds. Therefore, the fund's composite benchmark was used. The multi-asset sectors include;

- South African – Multi Asset – High Equity
- South African – Multi Asset – Medium Equity
- South African – Multi Asset – Low Equity
- South African – Multi Asset – Flexible
- South African – Multi Asset – Income

The sample of SRI funds (i.e. 23 funds) with their proxy benchmarks and matched (conventional) funds are listed in Table 4.1. The complete table which comprises of the SRI funds salient features as well can be found in Appendix A (page no. 176).

Table 4.1: SRI funds with their Proxy Benchmarks and Matched (Conventional) Funds

SRI Fund Name	Proxy Benchmark	Matched Conventional Fund Name	Classification (Sector)
27Four Shari'ah Active Equity Prescient Fund	JSE All Share Index	Mi-plan IP beta Equity Fund	SA – General – Equity
27Four Shari'ah Balanced Prescient Fund of Funds	CPI + 3%	Element Balanced SCI Fund	SA – Multi Asset – High Equity
3 Laws Climate Change Equity Prescient Fund	JSE All Share Index	Prescient Equity Income Fund	SA – General – Equity
Community Growth Equity Fund	JSE All Share Index	STANLIB Index Fund	SA – General – Equity
Community Growth Gilt Fund	JSE/ASSA All Bond Index	STANLIB Bond Fund	SA – Interest Bearing – Variable Term
Element Earth Equity Fund	JSE All Share Index	Prudential Equity Fund	SA – General – Equity
Element Flexible Fund	CPI + 5%	Visio BCI Actinio Fund	SA – Multi Asset – Flexible
Element Islamic Balanced Fund	CPI + 3%	GFA BCI Managed Fund of Funds	SA – Multi Asset – High Equity
Element Islamic Equity Fund	JSE All Share Index	Old Mutual Rafi 40 Index Fund	SA – General – Equity
Element Islamic Global Equity SCI Fund	MSCI All Countries World Index	Old Mutual Global Emerging Markets Fund	Global – Equity – General
Element Real Income Fund	CPI + 3%	Absa Inflation Beater Fund	SA – Multi Asset – Low Equity
Kagiso Islamic Balanced Fund	CPI + 3%	ADB BCI Flexible Prudential Fund of Funds	SA – Multi Asset – High Equity
Kagiso Islamic Equity Fund	JSE All Share Index	Personal trust Equity Fund	SA – General – Equity
NewFunds Shari'ah Top 40 Index Fund	JSE Top 40 Index	Integre Large Cap Prescient Fund	SA – Equity – Large Cap

SRI Fund Name	Proxy Benchmark	Matched Conventional Fund Name	Classification (Sector)
Oasis Crescent Balanced High Equity Fund of Funds	CPI + 3%	4D BCI Moderate Fund of Funds	SA – Multi Asset – High Equity
Oasis Crescent Balanced Progressive Fund of Funds	CPI + 1%	Prescient Positive Return QuantPlus Fund	SA – Multi Asset – Medium Equity
Oasis Crescent Balanced Stable Fund of Funds	CPI	S BRO BCI Defensive Fund of Funds	SA – Multi Asset – Low Equity
Oasis Crescent Equity Fund	JSE All Share Index	Prudential dividend maximiser Fund	SA – General – Equity
Oasis Crescent Income Fund	CPI – 1%	Ashburton Multi Manager Income Fund	SA – Multi Asset – Income
Oasis Crescent International Feeder Fund	MSCI All Countries World Index	STANLIB Multi-Manager Global Equity Feeder Fund	Global – Equity – General
Oasis Crescent International Property Equity Feeder Fund	MSCI World Real Estate Index	STANLIB Global Property Feeder Fund	Global – Real Estate – General
Old Mutual Albaraka Balanced Fund	CPI + 1%	Ampersand Momentum CPI Plus 4 Fund of Funds	SA – Multi Asset – Medium Equity
Old Mutual Albaraka Equity Fund	JSE All Share Index	STANLIB SA Equity Fund	SA – General – Equity

4.2.2. Sample Period

The study comprised of two sample periods; a second sample period was utilised to give rise to the use of a larger sample size. Sample period one, used exclusively in the performance evaluation of SRI funds, comprised of the years January 2009 - December 2018. The choice of the time frame for the evaluation period was largely influenced by three main factors. Firstly, it accounted for the most recent performance history of the selected funds. Secondly, it opts to eliminate the effects of the 2007/08 global financial crisis, which can have distorting effects on the results over the full sample period. Thirdly, with a focus exclusively on the evaluation period, this study can be viewed as merely an extension on the research of the pioneering study by Viviers (2007), due to the commencement of this study's sample period coinciding with the end of the evaluation period of the said study – if not

accounting for the 2007/08 global financial crises. As further support to this view, Viviers (2007) recommended as further research that a follow-up study be undertaken in the next 3-5 years (which is approximately the commencement of this study's period) to determine whether the findings of their study actually hold over the longer term - as the SRI market becomes more established, for example, the study's finding of improved performance of SRI funds over the long term.

Furthermore, sample period one will be divided into two equal sub-periods (January 2009 - December 2013 and January 2014 – December 2018). The sample period was further subdivided into two sub-periods as Bartholdy & Peare (2005) found that when computing a fund's/firm's beta value over long time periods there is a higher probability that the value of its beta will change, thereby resulting in the computed beta being a biased estimator of the fund's/firm's true beta value. Fernandez (2009) indicates that the use of betas should be limited to a 36-60-month period. By using the following sampling criteria, sample period one consisted of 12 funds:

- Must be a unit trust (due to limited disclosure of financial data for segregated and pooled funds) with an SRI/ESG focus within Alexander Forbes Asset Consultants (AFAC), Financial Services Board (FSB) and ASISA rules;
- The fund must have a minimum of ten years' performance history (from January 2009 onwards);
- The funds must have monthly data available.

It was found that SRI funds, on average, have a relatively short existence period in the market with the majority of these funds coming into existence post-2010. Consistent with sub-period two (of sample period one), sample period two considered the years January 2014 – December 2018 (5-year period), increasing the sample's constituents to 23 funds. The abovementioned sampling criteria was also employed in the selection of these funds; however, it excluded the requirement of a 10-year performance history and included a minimum of 5 years, commencing from January 2014.

Both sample periods will be employed in the performance evaluation of SRI funds, whilst, the period January 2014 - December 2018 (i.e. sample period two) will be used for RBSA. The use of a 5-year sample period for RBSA is substantiated in the pioneering study by Sharpe (1992) which advocates a 60-month period (i.e. 5-year period) as an adequate time frame for a comprehensive analysis – longer periods may not be suitable as (recent) changes in a fund's investment style may not be quickly identifiable due the 'averaging effect' and would not be as efficient in detecting any style drift exhibited by the fund.

4.3. Data Collection

This section outlines the data collection methods utilised in ensuring the inputted data provides the models with significant explanatory predictive power. This is imperative as the study focuses on an historical analysis (i.e. use of historical data), hence the choice of data and reliability of the sources thereof is key to the validity of results of the study.

4.3.1. Sources of Data

The study utilised secondary data. The monthly data for the various indices, which included the respective proxy and composite indices for the SRI funds, the 12 asset classes used for RBSA model, and the indices required for the construction of the SMB and HML factors, will be sourced from Bloomberg and IRESS. If the composite benchmark index for a given fund is not an existing index with data readily available, then the benchmark returns will be manually calculated using excel tools, based on the weights provided in the disclosure of the fund's composite benchmark. In addition, the Net Asset Value (NAV) and the Assets Under Management (AUM) for the sample of SRI and conventional funds were sourced from the aforementioned databases. Information pertaining to the fund's style, age and size were obtained from FundsData Online or the fund's (most recent) factsheet.

The benefit of using a matched-pairs analysis (in aptly matching transaction costs of socially responsible funds to those of conventional funds) resulted in the effects of transaction costs and management fees being ignored. Their omission from the analysis can also be substantiated on the premise that both transaction costs and management fees are found to be present irrespective of the type or nature of investment (be it SRI or conventional investing) and is, therefore, not unique to a socially responsible investor.

4.3.2. Risk-Free Rate and Market Return Data

The average rate of return on the South African R2023 Bond (5-year bond) will be used as a proxy for the risk-free rate (Rf). The maturity of the bond is equivalent to the length of the 5-year sub-periods (for sample period one) as well as the 5-year sample period (sample period two).

The justification for the choice of risk-free rate was based on the following premises: Although the Fama and French 3-factor model and the Carhart 4-factor model, which builds on the traditional Capital Asset Pricing Model (CAPM), invokes the concept of a risk-free asset, the models remain elusive in terms of the properties of this risk-free asset: (i) it does not specify what this particular asset should be (ii) it does not indicate the length of the investment horizon for the use of this asset (the model only

states a common investment horizon). Therefore, in estimating the risk-free rate, a principal task is choosing a risk-free asset, or essentially a relevant proxy for the risk-free asset since no asset with zero variance in real returns exist (a risk-free asset is one with zero (to little) default risk and zero (to little) reinvestment risk) (Blake, Fallon & Zolotic, 2012).

In practice, a commonly accepted proxy for the risk-free asset is government-backed security. While these securities carry some risk of default, that risk is very low (Lally, 2010). Rates on government debt typically vary with the term of maturity of the debt instrument. In other words, the term structure of interest rates is not 'flat' (Van Horne, 2002). Given this characteristic, a particular term for the risk-free rate must be specified in order to determine the term maturity of the government bond to be applied in the CAPM.

As previously noted, the CAPM does not specify the length of this investment period (i.e. investors' common investment horizon). The typical response to this problem in practice is to specify a term consistent with the particular issue under analysis, which in light of this study, can be considered as its sample period. This choice will result in the relevant risk-free rate to be an asset with a term that matches the length of that investment horizon (Lally, 2010).

Furthermore, empirical evidence in support of the choice of risk-free rate for S.A. is shown in a study by Strydom & Charteris (2009), which evaluated the appropriateness of various instruments as proxies for risk-free rate. Whilst the study highlighted inflation risk as a major component when considering an appropriate risk-free rate, the key findings showed that the long-term Government Bond is the most suitable proxy (in comparison to a Treasury Bill), provided that the bond's maturity is equivalent or similar to the investment horizon of the investment/security being considered in CAPM.

The return on the JSE All Share Index (JSE ALSI) will be used as a proxy for the market portfolio (RM). A study by Msindo (2015) highlights the JSE ALSI as the most suitable proxy for the JSE as it represents 99% of the full market value of all ordinary securities listed on the JSE. The data for both these proxies (R2023 bond and JSE ALSI) will also be sourced from either Bloomberg or IRESS.

4.3.3. Return, Standard Deviation and Beta Computation

The study utilises monthly data, as this reduces the noise and volatility found in price oscillations when compared to daily data (Petajisto, 2011). The compounded monthly total returns for the funds and indices were calculated using their monthly closing prices as follows:

$$R = ln\left(\frac{V_t}{V_{t-1}}\right) \quad \text{….. (Equation 2.1)}$$

Where;

R = the monthly return of the fund/index

V_t = closing value of the fund/index at time t

V_{t-1} = value of the fund/index at period t-1 or previous month.

The annualised mean return for a given fund/index will be calculated as the mean monthly return (the average monthly return over a specific period) multiplied by 12.

The monthly total return indices for both the passive benchmarks for SRI funds and the style factors of the RBSA model were used throughout this study. A Total Return Index (TRI) considers changes in the share price (that is, capital gains) as well as any distributions, i.e. dividends (Lizieri, Marcato, Ogden & Baum, 2012). This implies that the TRI is equivalent to the share price adjusted for dividends, as a dividend declared is assumed to be reinvested on the ex-dividend date.

The standard deviation for a given fund/index will be calculated as follows:

$$SD = \sqrt{\frac{\sum(R_i-\bar{R})^2}{n-1}}) \quad \text{….. (Equation 2.2)}$$

The annualised standard deviation for a given fund/index will be calculated as the monthly standard deviation multiplied by the square root of 12.

The beta of each index and mutual fund will be computed using the covariance formula:

$$\beta = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})/n}{(x_i-\bar{x})^2} \quad \text{….. (Equation 2.3)}$$

Where beta is shown as the covariance of the index/mutual fund and the market divided by the variance of the market.

4.4. Methodology

The study will make use of quantitative data analysis to address the research questions raised in Chapter One. The research is aimed at evaluating active SRI in S.A., with a focus exclusively on SRI funds. This entailed the use of two assessment methods - the performance evaluation of SRI funds and the style analysis of SRI funds.

The study differs from the most recent South African study in this research domain, i.e. Du Plessis (2015) based on three defining elements. Firstly, it comprised of the complete population of SRI-labelled funds in S.A., which was found to be almost three times the sample size of the prior study (the study of Du Plessis, 2015) comprised of eight funds whilst this study comprises of 23 funds). Secondly, the period of study takes into account the most recent performance of the SRI funds. This is in addition to the exclusion of the global financial crisis period, which could have distorting effects on the results over the full sample period (this period was included in the prior study). Lastly, the most prominent factor shown to distinguish these two studies was the evaluation focus of the study and the methodology employed. This refers to the style analysis of SRI funds, which no evidence of empirical studies on this subject was found to exist for S.A. – this study focused on both the performance evaluation of SRI funds and the style analysis of SRI funds, whilst the prior study focused solely on the former.

4.4.1. Performance Evaluation of SRI Funds

In theory, portfolio managers of SRI funds are constrained by a restricted universe of investments which could potentially translate into fewer diversification benefits relative to an unconstrained fund (conventional fund), resulting in the fund earning a lower risk-adjusted return. The study drawing attention to this theoretical hypothesis will entail an analysis of the risk-adjusted performance of SRI funds relative to both a matched sample of conventional (non-SRI) funds and passive benchmarks (proxy or composite). This assessment will shed light on whether SRI funds under/outperformed (or exhibits neutral performance to) its conventional counterparts.

The study employed two statistical models, namely; Fama and French (1993) 3-factor model and Carhart (1997) 4-factor model, to effect the performance evaluation of SRI funds. Rathner (2013) postulates that these models are the most prominent measures used in evaluating index and fund performance. This notion is largely supported by both local (South African) and international studies presented in the literature review. In addition, an advantage in using these models when evaluating

performance is that they account for risk, size-effects, value-effects and momentum effects present on the JSE. Empirical evidence in support of these effects being present on the JSE is documented in studies by Van Rensburg (2001), Hoffman (2012) and Muller & Ward (2013) whose findings showed three distinct style factors being dominant: size, value and momentum (evaluated across firms listed on the JSE as well as relative to other style approaches). Furthermore, the momentum effect was found to exist (and yield abnormal returns) over both bull and bear market regimes in S.A. (Devonport, 2012) and irrespective of the momentum strategy employed - a traditional[11] momentum approach or an industry[12] momentum approach (Marx, 2015).

The benchmark index used were either the fund's proxy benchmark or composite benchmark (if no proxy benchmark existed for the respective fund). As previously indicated, all sectors except for the balanced fund style comprised of proxy benchmarks. The type of benchmark matched to each fund was sourced from ASISA (for proxy benchmarks) or the fund's factsheet (for composite benchmarks). In addition, the selection of conventional funds was achieved through a matched-pairs analysis that is based on the fund's characteristics, such as their age, size, and fund style. As the objective of the analysis is to evaluate the relative performance of SRI funds to their conventional counterparts, this will result in the use of a difference fund and difference benchmark. Similar to the approach of Derwall et al. (2005), Bauer et al. (2005), Rathner (2013) and Du Plessis (2015), the difference fund will be obtained by subtracting the returns of the matched conventional fund from the returns of the SRI fund, while the difference benchmark will be obtained by subtracting the returns of the SRI fund's benchmark from the returns of the SRI fund. A statistically positive alpha by the difference fund indicates that the SRI fund outperformed relative to the non-SRI fund whilst a statistically negative alpha implies that the SRI fund underperformed relative to the non-SRI fund. If the difference fund generates an alpha value of zero and/or is statistically insignificant then this will suggest that there is no significant difference in the performance of the SRI fund and non-SRI fund. The same will apply in the analysis of the difference benchmark.

4.4.1.1. Fama and French 3-Factor Model

The model specifies that a portfolio's excess return (R_j - R_f) can be explained by the correlation of the portfolio's returns with three distinct risk factors: the market portfolio's excess return ($R_M - R_f$), the difference in return for a portfolio of small-cap versus large-cap shares (SMB, denoting small minus big) and the difference in return for a portfolio with high versus low book-to-market (B/M) shares (HML, denoting high minus low) (Fama and French, 1996). The three aforementioned risk factors

[11] The strategy is based on returns of individual whereby 'losers' over a specific period are sold and 'winners' are bought (Marx, 2015).

[12] The strategy is based on the purchase (sale) of shares from industries that have outperformed (underperformed) in the past (Marx, 2015).

capture the non-diversifiable variance (market risk) of stocks. More specific, the excess return of a portfolio is given by:

$$R_j - R_f = \alpha_j + \beta_{0j}\,(R_M - R_f) + \beta_{1j}\,SMB + \beta_{2j}\,HML + \varepsilon_j \qquad \text{….. (Equation 3.1)}$$

Where:

- R_j implies the return earned by investing in stock/portfolio *j*,
- R_f is the risk-free interest rate,
- R_M denotes the market portfolio's return,
- ε_j is a random error that yields a zero expected value,
- $\beta_{0j}, \beta_{1j}, \beta_{2j}$ are slopes (weightings) in time-series regressions,
- α_j is the Fama and French performance measure for portfolio *j*.

Alpha is the measure of the difference between a fund's actual returns and its expected performance, given its level of risk as measured by beta. A statistically significant positive alpha indicates the fund has performed better than its beta would predict i.e. generated an excess return. In contrast, a statistically significant negative alpha indicates the fund's underperformance, given the expectations established by the fund's beta. In the preceding regression (Equation 3.1), ideally, αj should be statistically indistinguishable from zero, however, if it is found to be zero and/or statistically insignificant, this suggests that an investment has earned a return commensurate with the risk undertaken.

SMB has been constructed to measure the additional component of return historically earned by investors through investing in shares of firms that are known to have fairly low market capitalisation. This added component of return is commonly known as the 'size premium'. The words small and big refers to the size of the market capitalisation (MC) of a firm, i.e. the firm's share price multiplied by the number of shares outstanding.

HML is designed to capture the 'value premium' received by investors for investing in firms with high B/M values, i.e. B/M is denoted as the firm's value established by accountants relative (as a ratio) to the value of the firm as perceived by public markets (Auret & Sinclaire, 2006).

The portfolio construction procedure proposed by Fama and French (1993) outlined the derivation of the risk factors SMB and HML. For the sample period, shares listed on the NYSE (from a South African perspective will entail the use of the JSE as opposed to the NYSE) are apportioned to two distinct groups, namely; small or big (S or B), determined based on the firm's MC being either below or above the median MC for NYSE shares. An independent sort is then used to allocate NYSE shares to three B/M equity groups, constructed based on percentile breakpoints of B/M values for NYSE shares. These breakpoints are bottom 30% – low (L), middle 40% – medium (M), and top 30% – high (H). Finally,

the intersection of the two market capitalisation portfolios and the three B/M groups will form the ultimate six portfolios (S/L, S/M, S/H, B/L, B/M and B/H). Thus, for example, the B/L portfolio will include shares that constitute both the Big-size portfolio and the low-B/M group. Excess return on the six constructed portfolios in a given month is computed as the mean excess return of all individual shares that constitute the respective portfolios. An individual share's excess return is the value differential between the return on an individual share and risk-free rate.

In a given month, SMB is calculated as the differential between the mean returns on the three small-cap share portfolios and the mean returns on the three large-cap share portfolios.

$$\mathrm{SMB} = [(\mathrm{S/L}+\mathrm{S/M}+\mathrm{S/H}) - (\mathrm{B/L}+\mathrm{B/M}+\mathrm{B/H})]/3 \qquad \text{….. (Equation 3.2)}$$

In a given month, HML is calculated as the difference between the mean returns on the two high book-to-market portfolios and the mean returns on the two low book-to-market portfolios.

$$\mathrm{HML} = [(\mathrm{S/H}+\mathrm{B/H}) - (\mathrm{S/L}+\mathrm{B/L})]/2 \qquad \text{….. (Equation 3.3)}$$

For the purpose of the study, the above method proposed by Fama and French (1996) will be modified within a South African context. Since the JSE already has indices constructed according to the firms' market capitalisation and book-to-market ratio, the study will make use of these indices to compute the SMB and HML factors. Based on the return differential between small-sized and large-sized firms, SMB will be calculated by subtracting the logged monthly returns of the JSE Top 40 index (large-sized firms) from the logged monthly returns of the JSE Small-Cap index (small-sized firms). A similar approach will be followed for the construction of the HML factor, i.e. Value minus Growth stocks, calculated by subtracting the logged monthly returns of the JSE Growth Index from the logged monthly returns of the JSE Value Index (Atsin & Ocran, 2015).

A statistically significant positive coefficient for the SMB factor implies that the fund exhibited, on average, a larger exposure to small-cap stocks in comparison to large-cap stocks over the evaluation period, while a statistically significant negative coefficient implies that the fund showed a greater exposure to large-cap stocks. A statistically significant positive coefficient for the HML factor implies that the fund exhibited, on average, a larger exposure to value stocks in comparison to growth stocks over the evaluation, while a statistically significant negative coefficient implies that the fund showed a greater exposure to growth stocks.

4.4.1.2. Carhart 4-Factor Model

While literature acknowledges the benefits of using the Fama and French 3-factor model in performance evaluation, the model's parameters are, however, subject to further improvement. Carhart (1997), supporting empirical evidence claiming that the three-factor model has insufficient capacity in explaining the Jegadeesh and Titman (1993)-momentum strategy, proposed an additional momentum factor to be incorporated within existing models in order to account for the persistence in performance. Essentially, the momentum variable (*MOM)* is constructed to measure the tendency of a stock to continue rising, if it has been increasing in value, or continue declining if it has been decreasing in value (Carhart, 1997). The resultant four-factor model has been designed to produce consistent and reliable data regarding a fund's comparative performance, whilst allowing for further estimates to be made on the extent to which a fund can engage in a variety of accepted investment strategies.

The Carhart 4 factor model is calculated as follows:

$$R_j - R_f = \alpha_j + \beta_{0j}\,(R_M - R_f) + \beta_{1j}\,SMB + \beta_{2j}\,HML + \beta_{3j}\,MOM + \varepsilon_j \qquad \text{….. (Equation 4.1)}$$

All variables are identical to the Fama and French 3-factor model with the exception of the additional momentum factor (and relative weighting), i.e. $\beta_{3j}\,MOM$. The alpha (α_j), in this instance, denotes the Carhart performance measure for portfolio *j*.

The momentum loading is derived from the 'momentum return' of all individual shares listed on the JSE, which can be expressed as a share's return from month t_{-12} through month t_{-2}. (In order to avert a spurious correlation being formed between the 'momentum' and returns for month t, month t_{-1} has been omitted. This correlation may be the result of the share being infrequently traded and/or the bid-ask spread, which could potentially result in the firm's share price for month t_{-1} being distorted) (Lee et al., 2010). Following a similar approach to the formation of the risk factors, SMB and HML, an independent sort is used to allocate NYSE (from a South African perspective will entail the use of the JSE as opposed to the NYSE) shares to three distinct 'momentum return' groups, constructed based on percentile breakpoints of momentum return values for NYSE shares. These breakpoints are bottom 30% – low (L), middle 40% – medium (M), and top 30% – high (H). Finally, the intersection of the two market capitalisation portfolios (small and big firms i.e. S and B) and the three momentum return groups (W - high (winners), N - neutral, and L - low momentum (losers) shares) will form the resulting six portfolios (SW, SN, SL, BW, BN, and BL). For example, the B/L portfolio will include shares that constitute both the Big-size portfolio and the low-momentum return group (i.e. the bottom 30%) (Carhart, 1997).

Next, the return for each of the six portfolios is computed as the average return of the shares included in the respective portfolios. The MOM factor is calculated as:

$$\text{MOM} = 1/2\ (\text{RSW} + \text{RBW})\ -\ 1/2\ (\text{RSL} + \text{RBL}) \qquad \text{….. (Equation 4.2)}$$

Where R is the return of the respective portfolios.

A stock is showing momentum (i.e. a positive value) if its prior 12-month average of returns is positive and vice versa.

Since there are no relevant indices that could be used as a proxy for the momentum factor (as found above with the construction of risk factors, SMB and HML), momentum portfolios will be constructed. For the purpose of the study, the above method proposed by Carhart (1997) will be modified, resulting in the construction of two portfolios as opposed to six. The momentum factor will be calculated as the return differential between the top 10% and bottom 10% of selected (JSE) stocks ranked based on their prior 12-month performance (Margolis, 2014).

In addition, only a subset of stocks is used for determination of the two portfolios. This point merits further explanation. Fama and French (1993) formed their six portfolios using breakpoints of the NYSE listed shares and did not include NASDAQ and AMEX stocks. In other words, they foresaw that the use of the entire cross-section in the determination of the breakpoints would actually result in a portfolio containing "very small" instead of "small" stocks. Simply put, cutting the cross-section of listed shares in half results in one of the portfolios being filled with many tiny capitalisation shares. This problem would be particularly severe for the JSE as there are many "very small" firms listed on the exchange. In order to address this problem, Charteris et al. (2018) used the largest 160 stocks listed on the JSE each year. This number was shown to follow Ward and Muller (2012) who identified these stocks as a good estimate of the largest stocks on the JSE, as they represent approximately 99% of the market capitalisation. Considering this view, a JSE listed index, known as the JSE All Share Index, has been shown to comprise of 99% of the full market value of all ordinary securities listed on the JSE, which also contains, on average, the leading 164 securities measured by market capitalisation (JSE, 2011). Therefore, in light of the above, the constituents of the JSE ALSI was used in the derivation of the two portfolios.

Furthermore, the relevant portfolios will be subsequently held for the duration of one year (this implies that the MOM factor constructed for January will be used through to December of that year). Basciewicz & Auret (2010), argue that the process of annual rebalancing is preferable as it guards against confounding the model's risk premia with the short-term reversal effect of Jegadeesh (1990). Due to this effect being linked to trading costs, it is highly probable to be severe on the JSE.

The analysis of the model's risk factors will be similar to that of the Fama and French 3-factor model. However, the only exception to the analysis was the additional momentum variable (MOM) which the model accounted for. A statistically significant positive coefficient for MOM implies that the fund is showing positive momentum over the evaluation period, and vice versa. A statistically insignificant coefficient indicates that there is no momentum effect present.

4.4.1.3. Statistical Measures

The resulting output of the Fama and French 3-factor model and the Carhart 4-factor model will be analysed using statistical measures to test the explanatory power of these models and the validity of its results. These measures include; the adjusted R-squared[13] (R^2) and p-value.

The adjusted R^2 measures the degree of linear explanation provided by the model, i.e. the proportion of the variation in *Y* that can be explained by the regression model. As suggested by Gujarati & Porter (2010), the adjusted R^2 indicates the goodness of fit of a multiple regression model more accurately than the R-squared[14], as the adjusted R^2 is adjusted for the number of explanatory variables in the regression model.

While the R^2 (and adjusted R^2) measure estimates the strength of the model's relationship with its dependent variable, it does not allow for formal hypothesis testing to be conducted on this relationship. Therefore, in order to determine whether a given relationship is statistically significant, the p-values of the coefficients were used. The p-value is the level of marginal significance within a statistical hypothesis test representing the probability of the occurrence of a given event (Lavrakas, 2008). The p-value is used as an alternative to rejection points, which provides the smallest level of significance at which the null hypothesis would be rejected. A smaller p-value means that there is stronger evidence in favour of the alternative hypothesis (CFI, 2019). The p-value will be assessed relative to conventional levels[15] (1%, 5% and 10%) in determining the statistical significance of the given coefficient - all coefficients are individually considered i.e. t-statistic. The hypothesis used in the p-value test is as follows:

H_0: α_j or $\beta_{ij} = 0$

H_1: α_j or $\beta_{ij} \neq 0$

[13] Adjusted R^2 = 1 - $\frac{(1-R^2)(N-1)}{N-P-1}$; where: R^2 = sample R-squared, P = No. of predictors, N = sample size

[14] R-squared = 1 - $\frac{SS_{Res}}{SS_{Tot}}$; where: SS_{Res} is the residual sum of squares and SS_{Tot} is the total sum of squares. Both of which can be obtained from the ANOVA table of the regression.

[15] To illustrate the level of significance of a given variable for the results to follow, a single asterisk (*) will be used to denote statistical significance at the 10% level, two asterisks (**) to denote statistical significance at the 5% level, and three asterisks (***) to denote statistical significance at the 1% level.

If the p-value is less than the conventional levels, then the null hypothesis will be rejected and will conclude that the alpha or beta value is distinguishable from zero.

If the p-value is greater than the conventional levels, then the study will fail to reject the null hypothesis and will conclude that the alpha or beta value is indistinguishable from zero.

4.4.2. Style Analysis of SRI Funds

Employing the Return-Based Style Analysis (RBSA) model, the study will identify and compare the determinants of return of SRI funds to non-SRI funds. The RBSA model was selected on the following premises: in view of style analysis, two main approaches can be considered, namely; Holding-based Style Analysis (HBSA) and Return-based Style Analysis (RBSA). The type of analysis required essentially determines the choice of model. Since the objective of this study is to identify the determinants of return of SRI funds, the RBSA approach was used. This approach compares the fund's total returns to the total returns of various style-based indices, allowing for inferences to be made about its style-based and active return components (Morningstar, 2007). Alternately, HBSA would have been used if the analysis was based on the underlying stocks that constitute the fund. This would entail an evaluation of these stock's characteristics over several points in time, which will aid in providing a classification of the fund based on the characteristics of its core securities (Kaplan, 2003).

As indicated by diBartolomeo & Witkowski (1997), a Returns-Based Style Analysis is also preferred to one based on a set of observable characteristics for several reasons. Firstly, investors are primarily concerned with maximising positive returns and are often less concerned with the specific sources of return variation so long as their expected cash flow profile is realised. Secondly, a characteristics-based approach requires the selection of a set of differentiating characteristics with which to establish classification boundaries. These boundaries, which are often based on arbitrary cut off levels of certain firm-specific attributes such as Price/Earnings ratios, are inherently subjective and unstable. Infrequent reporting periods and the lack of data available, coupled with accounting irregularities common in reported figures are some of the common factors that may result in incorrect classification. Moreover, Morningstar (2007) proposes that RBSA, on average, delivers more accurate results as compared to HBSA, with an added advantage of providing ease of accessibility to the required data.

The return determinants obtained by the RBSA model are presented in two forms. Firstly, the proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active management). Secondly, the style factor/asset class exposures that contribute to the overall return of the fund. Based on these classifications of return, the second objective of the study will be achieved by highlighting two main sources of findings. Firstly, it will identify the extent of the fund manager's active

involvement in the management of these funds (evaluated both in isolation and relative to non-SRI funds), shedding light on whether the imposition of additional constraints impacts (or limits) the portfolio manager's ability to add value through active management i.e. add value after adjusting for style exposure. Secondly, it will determine the style exposures of SRI funds and in turn their investment styles, which will aid in identifying any patterns of style exposures shown among these funds as well as whether SRI funds are correctly classified with respect to their investment mandates. Additionally, it will evaluate the exposures of SRI funds relative to non-SRI funds and identify if there are any differences or similarities in their exposures.

4.4.2.1. Return-Based Style Analysis Model

The key study on the concept of return-based style analysis (RBSA) was documented by Sharpe (1992). This approach analyses a fund's style indirectly from its return. The RBSA model, also known as the 'asset class factor model', allows a portfolio's return to be segregated into both style and selection components. Having applied the RBSA model to a sample of U.S. mutual funds, Sharpe (1992) made use of return data from 12 broad asset classes. This comprised of stock and bond indices, from both domestic and international markets. A description of each index is provided in Appendix B (page no. 180). Essentially, RBSA can be defined as a statistical method, which formulates a regression of a fund's historical returns against a sample of passive indices that are closely related to the fund's asset allocation/style (Deb, 2006). The return-based approach evaluates style exposures and risks undertaken by a fund manager (Eddy, 2014). In addition, it is possible to observe the average style of a fund over the sample period (Yu, 2008). Sharpe's asset class factor model is illustrated as follows:

$$R_p = [\beta_{p1}F_1 + \beta_{p2} + \ldots + \beta_{pn}F_n] + \varepsilon_p \qquad \text{….. (Equation 5.1)}$$

Given: $0 \leq \beta_{pn} \leq 1$

And: $\sum_{p=1}^{n} \beta_{\text{pn}} = 1$

Where:

- R_p is the return on asset p,
- F_n is the return on asset class n,
- β_n is the sensitivity of R_p to factor R_p,
- ε_p is the non-factor component of return on asset p.

Given Equation 5.1, the summed terms within the brackets denotes the return earned on the style benchmark, whilst, the proportion of return that cannot be explained by the style benchmark, i.e. the random error term (ε_p), is defined as the value-added return earned as a result of the portfolio manager's selection.

Unlike ordinary regressions, the above regression applies a quadratic programming algorithm that requires additional constraints, requiring all coefficients (also known as asset class weightings) to be non-negative with a summed value equal to one to emulate a long portfolio comprising of passive investments (Yu, 2008). In addition, the 'style benchmark' is defined as the amalgamation of indices that yields the highest R-squared (R^2), whilst the 'active return' (non-factor component) is denoted as the return in excess of the style portfolio ($1\text{-}R^2$). The latter component relates to the proportion of the fund's return variability that is not systematically related to co-movements in the returns to the style benchmarks. As such, the model's objective is achieved by providing the 'best' combination of asset class exposures (i.e. β_{pn}) which both sum up to 100% and lie between zero and one (Sharpe, 1992).

The selection of appropriate benchmarks (style indices) is imperative to the outcome of the analysis of this study. Sharpe (1988) suggests guidelines for selecting these asset class factors. The principle of RBSA differs from the underpinnings of factor analysis models, in that it neglects to designate asset classes to specific sectors of the economy such as industrials or resources. If a fund is adequately diversified among industries and economic sectors, then the inclusion of sector return factors will not contribute any descriptive power to a model that explains the fund's return. Sharpe (1988) indicates that in order for the model to be of any significant power, the asset classes should be mutually exclusive (have differing returns) and exhaustive. The latter implies that the factors must completely describe the investable options available to the funds, without any areas of overlap (asset class factors (i.e. F_1 through F_n) in their entirety can mirror the market portfolio as closely as possible). The mutually exclusive and exhaustive requirements essentially constrain the summed portfolio weights to one. Therefore, in practice, all relevant asset class factors should be selected to make these two constraints valid.

Christopherson (1995) indicated that if the asset classes return is highly correlated; this may lead to the results from RBSA being spurious (or having presence of multicollinearity). If there is a high correlation among the asset classes, the optimisation algorithm of the model may provide difficulty in finding the loadings for the style factors. Attributions may oscillate over time between two highly correlated asset classes and make the exposures uninformative and interpretations difficult. To explore this possibility, and in turn, to achieve the desirable property of the asset classes being mutually exclusive (have differing returns), a correlations test will be conducted among the selected asset classes. A correlation test is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship (Research Methodology, 2019). In terms of the strength of the relationship,

the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. The direction of the relationship is indicated by the sign of the coefficient; a + sign indicates a positive relationship and a – sign indicates a negative relationship (Statistics Solutions, 2019).

While the latter constraint is sought after, i.e. an exhaustive class of style factors, there is no direct means of determining if the asset classes are exhaustive, hence the guidelines proposed by Sharpe (1988) in selecting these asset classes will be used. The only adjustment made to the proposed method was the analysis of South African funds instead of U.S. funds. As previously mentioned, the funds under consideration should hold a majority of assets whose returns are adequately described by the style factors. This means that a shift of focus from U.S. funds to S.A. funds warranted a different set of investable asset class factors. The style factors have remained the same, with only the relevant indices used to proxy them, in relation to Sharpe's style analysis, has changed. These factors can be categorised into two broad groups: Bonds and Stocks.

The bonds describe the portfolio's exposure to interest rates of varying durations and sensitivities. Longer-term interest rates are proxied by long-term bonds, and more sensitive interest rate return exposures are proxied by exposures to the corporate bond index. Weightings attributable to the government bonds, more specifically, treasury bills, were often found as a proxy for the fund's liquid holdings, such as cash.

1. Long Term Domestic Government Bonds: include those with maturities of ten years or more, the SA 10-year government bond was used (R186).

2. Intermediate-Term Domestic Government Bonds: with maturities between one and ten years, the 5-year SA government bond was used (R2023).

3. Short Term Treasury Bills: with maturities of less than three months, the South African 91-day Treasury Bill was used with its rates obtained from the South African Reserve Bank.

Whilst an index of these style factors is recommended, the deviation from Sharpe's recommendation can be justified by citing the fact that the sample comprises of S.A. funds. Therefore, their investments are inclined to constitute largely of S.A. assets. Furthermore, this factor is often given weight when the fund under analysis holds cash on reserve to meet the regulatory requirement. The most accurate weighting will thus be obtained when limiting this factor to characteristics inherent to South African Bonds and Bills, as movements in international interest rates are only likely to convolute the calculation

of weightings. Using an index is likely to give a less accurate indication of actual weights when the fund's predominant investments are domestic. This decision was also motivated by data constraints involved in acquiring the relevant indices.

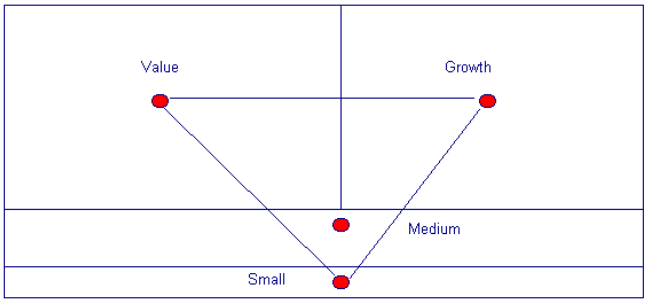
4. Corporate Bonds: These bonds had to have a rating of at least Baa by Moody's or the equivalent of a BBB by Standard & Poor's. For this factor, obtaining an index was vital as unit trusts can easily invest in a multitude of companies' debt. Therefore, the JSE Other Bonds Index (OTHI) was used, which is one half of the JSE All Bonds Index (ALBI).

5. International Government Bonds: An index of non-SA government bonds with intermediate maturities is recommended as a proxy for this style factor. However, acquiring such a factor proved untenable. Consequently, the U.S. 5-year government bond was used as a proxy, as this bond generally exhibits a significant influence on global trade. This is largely evident by its impact during the 2007/2008 financial crisis.

Bonds are often used as a means to mitigate loss during unfavourable economic conditions. However, it is stocks that are the primary vehicle used to achieve unit trust returns – money market and bond mutual funds were excluded. Consequently, a portfolio's composition in relation to what *type* of stocks it includes is pivotal to any analysis on returns. Sharpe's guidelines categorise domestic stocks into one of four distinct groups.

Initially, stocks are divided into three groups by market capitalisation – creating three distinct categories: large-capitalisation (cap), medium cap and small cap stocks. The large-cap stocks are further decomposed into one of two categories based on their book to market ratio. High book to market ratio stocks are deemed value stocks, whilst stocks with lower book to market ratios are growth stocks. Any positive holding of all four categories of domestic stock falls into the area of Sharpe's triangle:

Figure 4.1: Sharpe's (1988) Triangle for Domestic Stock Categories



[Source: Sharpe (1988) p. 27]

6. Value Stocks: Large capitalisation stocks from the JSE Top 40 with high book to market ratios were grouped into an index, the J330.

7. Growth Stocks: Large capitalisation stocks from the JSE Top 40 with low book to market ratios were grouped into an index, the J331.
8. Mid Cap Stocks: The J201, a Mid Cap Index that comprises the next 60 largest stocks by market capitalisation that are not in the JSE Top 40 but that are in the All Share Index, was used.

9. Small Cap Stocks: The J202, an index of equity that forms part of the ALSI but with market capitalisation values smaller than that of the mid and large capitalisation stocks, was used.

International stocks had to be included to fulfil the requirements of creating an exhaustive list of potential investment options available to the sample of funds.

10. European Stocks: An index of the top 300 stocks by market capitalisation was attained – the FTSE Eurotop 300 (recently named Eurofirst 300).

11. Japanese Stocks: The index of the NIKKEI 225 was used as a proxy for the returns of this asset class.

A related investment is that of property equity. Various property equity proxies that could be used, with Sharpe recommending asset-backed security. This diverges from Sharpe's recommendations because these securities have become more thinly traded following the events of the sub-prime crisis.

12. Property: The index of property-based unit trust returns index proxies the returns earned from property investments. This led to the use of the MSCI World Real Estate Index due to its robustness in tracking global property investments.

Although South African indices were used to ensure the applicability of the model in a South African context, the guidelines of Sharpe also recommend that the style factors used, encompass the investable universe of the sample of funds. It was found most preferable to use a global property index to track the property style factor, taking into consideration the fact that the property funds included in the sample are global funds (i.e. a majority, if not all, of their exposure comprise of global property investments), with the other sample constituents shown to have little to no exposure to South African property stocks (based on the funds factsheets).

A regression based on the sample data will be performed using quadratic programming and constrained regression via Microsoft Excel Solver to achieve the desired asset allocation. The method of constrained regression is one that limits the total allocation of assets to 100%. However, due to the regression function not being flexible enough to allow for some constraints, the regression equation would have to be modified with the constraint, $\beta_{p1} + \beta_{p2} + \ldots + \beta_{pn} = 1$, before applying the constructed regression function.

Based on the applied regressions, the objective of the RBSA model will be to identify the determinants of return for a given fund. This is presented in two forms. Firstly, the proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active management). This can be identified using the adjusted R^2 value of the model. Secondly, the style factor/asset class exposures that contribute to the overall return of the fund, which can be identified by the coefficient values obtained using Excel Solver.

While RBSA is widely acknowledged as a beneficial tool to both investors and fund managers, there are, however, two main areas of concern regarding the use of the RBSA model. With regards to the style benchmarks, if a high correlation exists among the chosen indices; this may result in the distortion of results. Barberis & Shleifer (2003) indicate that due to the constrained nature of the regression, highly correlated benchmarks could potentially result in an oscillation among the correlated indices. Hence, this study is restricted with regards to the selection of appropriate benchmarks. Furthermore, the adjusted R^2 measure estimates the strength of the model's relationship with its dependent variable. Simply put, it assesses the exposure of the fund to the selected asset classes. Therefore, a low adjusted R^2 does not necessarily mean that the fund engages in a high level of active management, as it could possibly indicate that the fund is holding assets in its portfolio which are not well explained by the benchmarks used in the analysis.

4.5. Conclusion

This chapter was shown to be pertinent in addressing the research questions as it provided an overview of the measures employed in the performance evaluation and style analysis of SRI funds. As highlighted, the models used in the performance evaluation approach showed similar characteristics, in which, the Carhart 4-factor model was merely an improvement on the parameters of the Fama and French 3-factor model, due to it having insufficient capacity in explaining the momentum effect of JSE stocks. The limitations of these models were also considered, providing a note of caution when interpreting the results of the study. In addition to the said similarities of the aforementioned models' parameters, the analysis of results for these models will follow a similar approach. In light of the style analysis of SRI funds, the RBSA model's parameters provide two forms of interpretation. Firstly, the

proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active management), which can be identified using the adjusted R^2 value of the model. Secondly, the style factor/asset class exposures that contribute to the overall return of the fund, which can be identified by the coefficient values obtained using Excel Solver.

The relatively small sample of SRI funds is justified by the SRI sector in S.A. being in existence for a relatively short period. This property could manifest certain biases, which are addressed in the limitations to the study. Furthermore, the chapter highlighted that the selection of the conventional counterparts to the respective SRI funds, more specifically the conventional (non-SRI) funds. This will be achieved through a matched-pairs analysis based on the fund's characteristics, such as their age, size and fund style. By not accounting for and controlling the aforementioned variables could potentially distort the results of the study, as what might be perceived as disparity or similarity in performance could, in fact, reflect the influence of a specific characteristic that has an explicit effect on financial performance. Based on sample constraints, two sample periods were established for the performance evaluation approach (as this included the greatest number of funds in the analysis), while a single sample period was used for RBSA of SRI funds. Collectively, this chapter provided a base for approaching the analysis phase of this research (the chapter to follow).

CHAPTER 5: EMPIRICAL RESULTS AND FINDINGS

5.1. Introduction

This chapter reports on the quantitative data analysis and empirical findings of the study. This is in fulfilment of the two research objectives:

1. To evaluate the risk-adjusted performance of SRI funds relative to their matched funds (conventional funds) and respective passive benchmarks (proxy or composite indices).
2. To identify and compare the determinants of return of SRI funds to non-SRI funds (conventional funds).

This chapter consists of two main sections (for each research objective), which comprise the results of the model(s) used to address the said objectives. As noted in the previous chapter (research methodology), the Fama and French 3-factor model and the Carhart 4-factor model were employed in the performance evaluation of SRI funds. The analysis of the results of these models will comprise the first section of this chapter. Furthermore, the results obtained from the RBSA model for the style analysis of SRI funds will then follow

5.2. Performance Evaluation of SRI Funds

5.2.1. Risk-Return Analysis of Sample Constituents

The samples constituent's mean returns, standard deviations, and betas were computed to allow risk-return comparisons of SRI funds and its matched funds and passive benchmarks. Table 5.1 presents the risk-return comparisons for the two periods, which constitute the study.

Table 5.1: Risk – Return Comparisons for Sample Constituents

	Jan 2009 – Dec 2013 (1)				Jan 2014 – Dec 2018 (2)		
Fund Styles	***Annualised Mean Return (%)***	***Annualised Standard Deviation (%)***	***Beta***		***Annualised Mean Return (%)***	***Annualised Standard Deviation (%)***	***Beta***
Equity Fund Style							
SRI funds (3)	13.43	11.83	0.72		3.26	11.48	0.65
Matched Funds (3)	17.95	13.51	0.88		3.86	11.15	0.81
Benchmarks (3)	15.53	14.91	0.89		5.14	12.28	0.86
Balanced Fund Style							
SRI funds	11.85	5.88	0.34		4.71	5.93	0.27
Matched Funds	13.38	6.79	0.33		4.67	4.97	0.26
Benchmarks	6.88	1.24	0.00		6.86	1.34	0.00
Interest-Bearing Fund Style							
SRI fund	8.07	6.42	0.10		7.41	7.67	0.05
Matched Fund	8.18	6.54	0.10		7.47	7.93	0.05
Benchmark	7.43	6.08	0.11		7.37	7.88	0.05
Real Estate Fund Style							
SRI fund	16.60	14.14	0.39		6.69	15.07	0.36
Matched Fund	15.36	16.80	0.49		9.19	17.06	0.26
Benchmark	12.63	16.25	0.62		8.23	14.70	0.42
Average for SRI funds (4)	12.49	9.57	0.39		5.52	10.04	0.33
Average for Matched Funds (4)	13.72	10.91	0.45		6.30	10.28	0.35
Average for Benchmarks (4)	10.60	9.62	0.41		6.92	9.05	0.33

(1) Jan 2009 - Dec 2013 refers to sub-period one; (2) Jan 2014 – Dec 2018 refers to sub-period two and sample period two;
(3) The average of all SRI funds, matched funds and passive benchmarks within the fund style; (4) The average of all SRI funds, matched funds and passive benchmarks for the sample

SRI funds exhibited a lower return and lower risk (total risk and market risk) in comparison to non-SRI funds over the full evaluation period. Relative to its passive benchmarks, SRI funds showed a higher return and lower risk (both total risk and market risk) in sub-period one and vice versa in sub-period two. Although, on average, mixed findings were shown for SRI funds with respect to its lower/higher return and risk relative to its conventional counterparts, the SRI fund from the interest-bearing fund style was found to exhibit similar risk-return attributes relative to its matched fund and passive benchmark.

The risk-return trade-off[16] was established to analyse the risk-return relationship for the sample constituents. Compared to its conventional counterparts, SRI funds exhibited a superior[17] risk-return trade-off for sub-period one and a poorer[18] risk-return trade-off for sub-period two.

As shown in Table 5.1, the mean annual return of SRI funds was shown to significantly decrease over the evaluation period (from sub-period one to sub-period two). This was accompanied by an increase in its total risk, as measured by the standard deviation. A similar trend was also found to exist for its matched funds and passive benchmarks. The higher average annual unadjusted return for SRI funds and its conventional counterparts in sub-period one may be attributed to the bull market in S.A. (beginning in March 2009, approximately the start of sub-period one), showing improved economic conditions after the global financial crises. On the other hand, the lower return in sub-period two can be ascribed to the bear market in S.A. This is depicted by the advance-decline line[19] which peaked in October 2013, one month before the South Reserve Bank (SARB) declared a business cycle recession (approximately the end of sub-period one) and presented a downward trajectory ever since (Sharenet, 2017).

However, despite the decrease in return shown by the interest-bearing and real estate fund styles, the decrease was at a smaller margin in comparison to the equity and balanced fund styles (and had a higher level of return in the bear market). This could be attributed to the lower correlation of the bond and property market with the general stock market. In addition to these findings, global equity funds exhibited a lower decrease in return in comparison to S.A. equity funds, indicating that these funds were less affected by the bear market in the latter period.

[16] Risk-Return trade-off (amount of return for a unit of risk) = Return ÷ Standard Deviation

[17] **Sub-period one –** SRI fund = $\frac{12.49}{9.57}$= 1.3052; Matched funds = $\frac{13.72}{10.91}$= 1.2573; Benchmarks = $\frac{10.60}{9.62}$= 1.1016

[18] **Sub-period two –** SRI fund = $\frac{5.52}{10.04}$= 0.5497; Matched funds = $\frac{6.30}{10.28}$= 0.6127; Benchmarks = $\frac{6.92}{9.05}$= 0.7646

[19] For each day it is calculated as the number shares that decreased in value subtracted from the number of shares that increased in value, which is then added to the result of previous day's value. This provides an equal weighting to every one of the 400 odd shares listed on the JSE irrespective of their market capitalisation (Sharenet, 2017).

Furthermore, SRI funds exhibited a decrease in market risk, as shown by the lower beta values. Based on the risk-return trade-off and investors being rewarded for systematic risk exclusively, could substantiate the lower return for the lower level of (market) risk. With the market risk of SRI funds shown to decrease over the study period and its total risk found to increase, this finding indicates that SRI funds have increased its unsystematic risk, which in turn, could potentially create an opportunity for greater diversification benefits. However, empirical evidence and verification are required to support this statement. Based on the evaluation of the average total risk for each fund style, the balanced fund style was found to have the lowest risk. This could be indicative of it being a more well-diversified investment, due to the funds that constitute this fund style comprising of both bonds and stocks, from multiple asset classes. Similarly, the real estate fund style was found to have the highest risk. This can be attributed to these funds concentrating their holdings largely to property stocks.

As expected, equity SRI funds had the highest beta value (strongest correlation with the equity market) while interest-bearing SRI funds, which largely comprise of bonds, had the lowest. Within the sample of SRI funds, growth-type funds were shown to have high levels of risk (by both its standard deviation and beta), signifying its greater inherent risk and the higher market risk premium required for these types of investments. Furthermore, the large-cap SRI fund was found to exhibit the highest market risk (and total risk) of all sample constituents. This was found to be in accordance with its investment mandate, as it concentrates its investment holdings exclusively to Shari'ah compliant stocks listed on the JSE Top40 index (i.e. concentration risk).

5.2.2. Fama & French 3-Factor Model Results

The Fama & French 3-factor model was used in the assessment of the risk-adjusted performance of SRI funds, its matched conventional funds and passive benchmarks. This was in fulfilment of the first objective of the study. To aid in the comparison of the SRI fund to its respective conventional fund and passive benchmark, a difference fund and difference benchmark regression was used. The matched fund and passive benchmark for a given SRI fund are found in Table 4.1 (page no. 57).

Table 5.2 presents the results obtained from the respective regressions for the various fund styles. The fund styles (also found Chapter 4) include; equity (with South African and global equity shown separately), multi-asset (balanced funds), interest-bearing and real estate (property). The analysis of results for SRI funds commenced with a focus on funds that constitute sample period one, followed by those funds that constitute sample period two. As sub-period two is equivalent to sample period two (both take into account the period Jan 2014 – Dec 2018), the results shown under sub-period two was used in the analysis of results for sample period two. The SRI funds exposure to the three risk factors;

market loading (β), size factor (SMB) and value factor (HML), was analysed on both a standalone basis (in isolation) and relative to non-SRI funds. One asterisk (*) denotes statistical significance at the 10% level, two asterisks (**) denotes statistical significance at the 5% level, and three asterisks (***) denotes statistical significance at the 1% level.

Table 5.2: Fama and French 3-Factor Model Regression Results – Sample Period One & Two

	Equity Fund Style							
	South African Equity							
SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
27Four Shari'ah Active Equity Prescient Fund								
Alpha (α)	-0.00192	0.00193*	-0.00895***	-0.00701***	0.00296	0.00127	-0.00007	0.00120
Market (β)	0.93240***	0.97966***	0.63440***	0.61407***	0.83607***	0.95115***	0.58947***	0.54063***
SMB	0.23483***	0.22000***	0.63227***	0.85228***	0.31779***	0.13909***	0.66311***	0.80220***
HML	0.05366	0.10023**	-0.06048	0.03974	0.10606	0.01631	-0.17238	-0.15606
Adj R^2	0.9472	0.9834	0.7653	0.7374	0.8973	0.9863	0.7015	0.6779
Community Growth Equity Fund								
Alpha (α)	-0.00102	0.00256**	-0.01252***	-0.00996***	0.00185	0.00077	-0.00068	0.00009
Market (β)	1.00186***	0.99445***	0.68907***	0.68353***	0.98086***	0.99476***	0.69066***	0.68542***
SMB	0.18964***	0.06688***	0.76020***	0.82708***	0.06610***	0.04901	0.47150***	0.52051***
HML	-0.07167	-0.07426	0.13201	0.05775	-0.05280	-0.08129**	-0.08150	-0.16280*
Adj R^2	0.9713	0.9848	0.7382	0.7232	0.9600	0.9834	0.8008	0.7750
Element Earth Equity Fund								
Alpha (α)	-0.00267	0.00326**	-0.01488***	-0.01162***	0.00211	0.00211	-0.00175	0.00035
Market (β)	0.94310***	0.94930***	0.68786***	0.63096***	0.87499***	0.90699***	0.67256***	0.57955***
SMB	0.35703***	0.15397***	0.84050***	0.99447***	0.21385***	0.14560***	0.55266***	0.69826***
HML	0.01600	0.01504	-0.01296	0.00208	0.44974***	-0.04471	0.38445***	0.33974***
Adj R^2	0.9174	0.9648	0.6449	0.6186	0.8990	0.9739	0.7165	0.7194
Element Islamic Equity Fund								
Alpha (α)	-0.00366	-0.01982***	-0.01454***	-0.01260***	0.00227	0.00435	-0.00384	0.00051
Market (β)	0.90327***	0.35907***	0.58068***	0.58494***	0.79344***	1.00122***	0.49677***	0.49800***
SMB	0.23037***	1.30911***	0.90203***	0.86781***	0.20739***	0.06793	0.62387***	0.69181***
HML	-0.02561	-0.14739	-0.15908	-0.03953	0.31732***	0.41320***	-0.20587*	0.20732*
Adj R^2	0.9234	0.4211	0.5530	0.5842	0.8578	0.9731	0.5670	0.6532

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Oasis Crescent Equity Fund								
Alpha (α)	-0.00033	0.00304**	-0.01232***	-0.00927***	0.00101	0.00161	-0.00236	-0.00074
Market (β)	0.87771***	0.93885***	0.62053***	0.55938***	0.76066***	0.87286***	0.59236***	0.46522***
SMB	0.33727***	0.16881***	0.80590***	0.97472***	0.19448***	0.10551***	0.57338***	0.67889***
HML	-0.31717***	-0.01449	-0.31660**	-0.33110**	0.15324***	-0.07340	0.11664	0.04324
Adj R^2	0.9409	0.9726	0.6592	0.6072	0.9178	0.9686	0.7434	0.6902
Old Mutual Albaraka Equity Fund								
Alpha (α)	0.00130	0.00138	-0.00902***	-0.00763***	0.00172	-0.00196	-0.00191	0.00004
Market (β)	0.89746***	1.02753***	0.55159***	0.57913***	0.82456***	0.97484***	0.55427***	0.52912***
SMB	0.37149***	0.19427***	0.81466***	1.00894***	0.25634***	0.11873**	0.62202***	0.74075***
HML	-0.12438	0.13390**	-0.27221*	-0.13831	0.05626	-0.07062	0.01690	-0.05372
Adj R^2	0.9451	0.9724	0.5877	0.6317	0.9200	0.9542	0.6926	0.7418
3 Laws Climate Change Equity Prescient Fund								
Alpha (α)					-0.00206	0.00374	-0.00757	-0.00383
Market (β)					0.87364***	1.03858***	0.53961***	0.57820***
SMB					0.33144***	0.31256***	0.40329***	0.71586***
HML					0.30898	0.23902***	-0.31003***	-0.07100
Adj R^2					0.9400	0.9205	0.5493	0.7244
Kagiso Islamic Equity Fund								
Alpha (α)					0.00378*	-0.00124	-0.00326	0.00202
Market (β)					0.76780***	0.89955***	0.57281***	0.47236***
SMB					0.28180***	0.01781	0.74841***	0.76622***
HML					0.14509***	0.03607	-0.00097	0.03510
Adj R^2					0.9086	0.9521	0.7369	0.7332

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
NewFunds Shari'ah Top 40 Index Fund								
Alpha (α)					-0.00032	0.00133	-0.00248	-0.00034
Market (β)					0.87678***	1.02755***	0.53827***	0.57273***
SMB					-0.18317***	0.32304***	-0.02102	0.41360***
HML					0.71782***	-0.01203	0.60822***	0.64771***
Adj R^2					0.8587	0.9283	0.6014	0.7496
	Global Equity							
Oasis Crescent International Feeder Fund								
Alpha (α)	0.00120	0.00220	-0.00994***	-0.01082***	0.00200	0.00273	-0.00249	-0.00400
Market (β)	0.71893***	0.77404***	0.62656***	0.58909***	0.52375***	0.55324***	0.67506***	0.61952***
SMB	0.68280***	0.62607***	0.59418***	0.73165***	0.07892	0.03799	0.52535***	0.52441***
HML	-0.58579***	-0.61852***	0.01879	-0.02795	-0.36628***	-0.38920***	-0.08707	-0.03008
Adj R^2	0.6053	0.6762	0.6579	0.5970	0.5631	0.5975	0.7693	0.7889
Element Islamic Global Equity SCI Fund								
Alpha (α)					0.00117	0.00019	-0.00757*	-0.00807*
Market (β)					0.56487***	0.87004***	0.53961***	0.96940***
SMB					0.11711	0.09709	0.40329***	0.67693***
HML					-0.47431***	-0.23349**	-0.31003**	0.37519***
Adj R^2					0.5759	0.8041	0.5492	0.7977

	Balanced (Multi-Asset) Fund Style							
SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***					***Sub-period 2 (Jan 2014 – Dec 2018)***		
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Oasis Crescent Balanced Progressive Fund of Funds								
Alpha (α)	-0.00014	-0.00305	-0.00603***	-0.00536***	0.00127	0.00209	-0.00258	-0.00417***
Market (β)	0.73952***	0.75782***	0.79336***	0.80955***	0.71560***	0.79195***	0.62820***	0.71372***
SMB	0.42543***	0.30379***	0.75909***	0.43865***	0.24264***	0.33749***	0.38956***	0.22789***
HML	-0.13828*	-0.08191	-0.07029	-0.15783*	0.04467	-0.07784	0.01252	0.01142
Adj R^2	0.9297	0.7305	0.8007	0.9236	0.9224	0.9095	0.8806	0.9145
Element Real Income Fund								
Alpha (α)	0.00124	-0.00351	-0.00419	-0.00564*	0.00315	0.00386*	-0.00247	-0.00396*
Market (β)	0.74843***	0.77857***	0.65153***	0.74847***	0.73560***	0.78915***	0.65101***	0.73372***
SMB	0.65458***	0.66212***	0.62991***	0.66780***	0.39649***	0.46561***	0.41529***	0.38174***
HML	-0.09981	-0.01371	-0.10003	-0.11936	0.06195	-0.08652	-0.08542	-0.09520
Adj R^2	0.7932	0.8145	0.7395	0.7877	0.8839	0.8866	0.8330	0.8744
Element Flexible Fund								
Alpha (α)	-0.00185	0.00935***	-0.02015***	-0.01040***	0.00265	0.00067	0.00021	-0.00191
Market (β)	0.78126***	0.87963***	0.58330***	0.78130***	0.76462***	0.90944***	0.55973***	0.67406***
SMB	0.55841***	0.61802***	0.57783***	0.57162***	0.31728***	0.32540***	0.48629***	0.51021***
HML	-0.15783	-0.01662	-0.15513	-0.17737	0.07975	-0.20920***	0.17896	-0.09517
Adj R^2	0.8525	0.8301	0.4284	0.8469	0.8911	0.9228	0.6342	0.7204
Old Mutual Albaraka Balanced Fund								
Alpha (α)					0.00245	-0.00105	0.00174	-0.00299*
Market (β)					0.74587***	0.70442***	0.74600***	0.74400***
SMB					0.32099***	0.48434***	0.32106***	0.30624***
HML					0.05628	-0.11009	-0.05618	-0.08953*
Adj R^2					0.9352	0.8469	0.9352	0.9248

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***					***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***		***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Oasis Crescent Income Fund									
Alpha (α)						0.00297	0.00428*	-0.00307	-0.00080
Market (β)						0.67031***	0.74293***	0.63193***	0.66843***
SMB						0.43562***	0.48648***	0.43355***	0.42088***
HML						-0.12842*	-0.10931	-0.12910*	-0.16167**
Adj R^2						0.8386	0.8504	0.8337	0.8228
27Four Shari'ah Balanced Prescient Fund of Funds									
Alpha (α)						0.00191	0.00336	-0.00322	-0.00520***
Market (β)						0.74780***	0.76918***	0.68318***	0.74592***
SMB						0.29064***	0.42590***	0.34914***	0.27589***
HML						0.07549	0.04062	-0.22611*	-0.10874**
Adj R^2						0.9401	0.7913	0.6586	0.9314
Element Islamic Balanced Fund									
Alpha (α)						0.00364	0.00157	0.00031	-0.00346
Market (β)						0.74076***	0.82688***	0.61843***	0.73888***
SMB						0.28291***	0.23519***	0.53213***	0.26817***
HML						0.12901*	-0.07122*	0.09025	0.09577
Adj R^2						0.8786	0.9604	0.6873	0.8652
Oasis Crescent Balanced High Equity Fund of Funds									
Alpha (α)						0.00158	0.00051	-0.00070	-0.00553***
Market (β)						0.72876***	0.80965***	0.62367***	0.72689***
SMB						0.22260***	0.23758***	0.48943***	0.22785***
HML						0.08257	-0.16571***	0.13829*	0.04933
Adj R^2						0.9275	0.9619	0.8153	0.9210

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Kagiso Islamic Balanced Fund								
Alpha (α)					0.00260*	0.00066	0.00017	-0.00450***
Market (β)					0.74888***	0.84110***	0.61234***	0.74700***
SMB					0.29275***	0.22630***	0.55086***	0.27800***
HML					0.02356	-0.15424***	0.06781	-0.00969
Adj R^2					0.9446	0.9737	0.8122	0.9388
Oasis Crescent Balanced Stable Fund of Funds								
Alpha (α)					0.00192	0.00275	-0.00260	-0.00268
Market (β)					0.68998***	0.76375***	0.63078***	0.68811***
SMB					0.30581***	0.39409***	0.39614***	0.29107***
HML					0.02846	-0.13799**	-0.00047	-0.06172
Adj R^2					0.9089	0.9249	0.8229	0.8969
	Interest-Bearing Fund Style							
Community Growth Gilt Fund								
Alpha (α)	-0.00577*	-0.00586*	-0.00886***	-0.00841***	0.00449*	0.00460*	-0.00188	-0.00179
Market (β)	0.94552***	0.95801***	0.66917***	0.68528***	0.99474***	1.00306***	0.69623***	0.69782***
SMB	0.88585***	0.88104***	0.63263***	0.66300***	0.74955***	0.74496***	0.47982***	0.49113***
HML	0.03988	0.05148	-0.02552	-0.02415	0.17971	0.16909	-0.12062	-0.11581
Adj R^2	0.8152	0.8207	0.7730	0.7716	0.8408	0.8383	0.848	0.8519
	Real Estate (Property) Fund Style							
Oasis Crescent International Property Equity Feeder Fund								
Alpha (α)	0.00195*	0.00067*	-0.00631	-0.00368	0.00243*	0.00321*	-0.00354	-0.00237
Market (β)	0.91362***	1.02950***	0.56578***	0.53275***	0.56459***	0.53273***	0.73641***	0.60862***
SMB	0.86861***	0.95234***	0.55371***	0.72095***	0.08497***	0.16211	0.40727***	0.45631***
HML	-0.54273***	-0.39071	-0.16594	-0.18084	-0.40794***	-0.49311***	-0.02481	0.0216
Adj R^2	0.6830	0.6804	0.4312	0.3918	0.5056	0.3894	0.781	0.7288

Sample period one comprised of 12 SRI funds (seven funds from the equity fund style, three funds from the balanced fund style, one fund from the interest-bearing fund style and one fund from the real estate fund style). An analysis of the results for sample period one showed that 84% of SRI funds generated statistically insignificant alphas, 8% statistically significant negative alphas and 8% statistically significant positive alphas in sub-period one while 33% of non-SRI funds exhibited statistically insignificant alphas, 50% statistically significant positive alphas and 17% statistically significant negative alphas over this period. These findings indicate that non-SRI funds, on average, performed better than SRI funds in terms of the return generated for their given level of risk. For sub-period two, 83% of SRI funds generated statistically insignificant alphas and 17% statistically significant positive alphas while 75% of non-SRI funds exhibited statistically insignificant alphas and 25% statistically significant positive alphas, indicating that both SRI and non-SRI funds have earned, on average, a return commensurate with the risk undertaken.

The findings for the difference funds were shown to be consistent to that of the SRI and non-SRI funds on an individual basis. 83% of the difference in the performances (alphas) of the SRI and non-SRI funds (i.e. difference fund) were found to be negative and statistically significant for sub-period one (17% of them were statistically insignificant) while all alphas were shown to be statistically insignificant for sub-period two. These findings indicate that SRI funds underperformed, on average, against the non-SRI funds over sub-period one while there was no significant difference in the performance of SRI and non-SRI funds in sub-period two. Furthermore, 92% of the difference in the performances (alphas) of the SRI funds and its passive benchmarks (i.e. difference benchmark) were found to be negative and statistically significant in sub-period one (8% of them were statistically insignificant) while 83% of them were statistically insignificant in sub-period two (17% of the difference benchmarks generated statistically significant negative alphas). Similar to the findings of the difference funds, this indicates that SRI funds underperformed, on average, relative to their passive benchmarks in sub-period one while exhibited no significant difference in their performances relative to them in sub-period two.

The underperformance of SRI funds in sub-period one could be ascribed to the screening process, more specifically, intense screening, used by the sample of SRI funds. Literature has shown that intense screening can provide adverse effects on SRI funds. Kacperczyk et al. (2005) and Adler & Kritzman (2008) showed that the higher the intensity of screening employed, the greater are the limits imposed on the investable universe of securities (i.e. the smaller is its investable universe). Accounting for the imposition of additional constraints and the limited investment universe could essentially deter the formation of an optimal portfolio, resulting in reduced diversification benefits and lowered risk-adjusted returns (Cortez et al., 2009).

Additionally, Lee et al. (2010) and Capelle-Blancard & Monjon (2014) found that the larger the number of screens used (i.e. more intense screening used), the greater the amount of return that is sacrificed due to screening. As such, with the majority of the sample of SRI funds comprising of Shari'ah screened funds (which as stated previously, are found, on average, to have high levels of screening), this could further explain the inferior performance shown by SRI funds relative to non-SRI funds. The finding of high screening intensity by Shari'ah funds hurting performance is also highlighted in a study by Nainggolan et al. (2013), whereby the authors showed this finding to be most prominent among Shari'ah equity funds (resulting in them underperforming relative to conventional funds). Similarly, the findings of the underperformance of SRI funds relative to conventional funds for sub-period one was found to be the most severe for the equity fund style in which all SRI equity funds were found to underperform against their matched funds.

Taking into account the bull (sub-period one) and bear (sub-period two) market regimes, the findings for the SRI funds were shown to support the extant literature, showing these funds (with Shari'ah funds included as part of SRI funds) to perform better in bear markets and perform poorer in bullish markets (Abdullah, Hassan & Mohamad, 2007; Nofsinger & Varma, 2012; Nainggolan, How & Verhoeven, 2013; Allahverdiyev, 2017). Additionally, an analysis of the interest-bearing fund style showed that the SRI fund generated a negative alpha in sub-period one and a positive alpha in sub-period two (this finding was also shown for its matched fund). Accounting for the low correlation of bonds with the overall stock market, this may have resulted in these funds performing worse in bull markets and performing better in bear markets. In addition, the poorer performance in the bullish market by these funds can be further explained by a prominent factor known as redemption risk. As interest rates rise in bull markets, to avoid further losses, investors in bond-type funds will generally liquidate their shares. When fund managers are faced with this pressure, they may be forced to redeem bonds prematurely in order to make available the cash required to meet the redemption requests. This could have an adverse effect on the net asset value (NAV) of the fund (Forbes, 2013). While the findings are at best mixed for the respective sub-periods, the findings for the real estate fund style was shown to be more consistent over both sub-periods - the SRI and non-SRI fund generated positive alphas over both sub-periods. Its superior performance can be attributed to the booming property market, achieving exponential growth since the global financial crises – with it being the best-performing asset class (compared to equities and bonds) in S.A. for the period 2009-2016 (approximately the time frame of the sample period) (Allan Gray, 2019).

Similar to the findings of Viviers (2007), SRI funds showed improved performance over the sample period - underperformed in the earlier sub-period of the study, whilst exhibited no significant difference in performances in the latter sub-period, or, despite underperforming in both sub-periods, the fund underperformed by a smaller margin in sub-period two as compared to sub-period one. This is indicated

by the improved alphas for the SRI funds, difference funds and difference benchmarks from sub-period one to sub-period two. Several reasons are put forth to explain the improved performances shown for SRI funds, more specifically for the respective fund styles. As shown in Table 5.2, the equity fund style showed the greatest improvement in the number of alpha values from sub-period one to sub-period two. While literature has indicated that SRI funds perform better in bear markets and poorly in bull markets, this finding was shown to be most prominent among Shari'ah equity funds (Abdullah, Hassan & Mohamad, 2007; Nainggolan et al., 2013) and SRI equity funds (Nofsinger & Varma, 2012)., which could further highlight the reason for its substantial improvement in its performance relative to the other fund styles (reference is made to both types of equity funds since a large proportion of equity funds were found to employ Shari'ah screening).

The improvement in the performance of SRI balanced funds may be attributed to two main practices (The Economic Times, 2016). Firstly, SRI balanced funds generally book profits regularly to reinvest it in other profitable investments, rather than trying to time market sentiment for maximum profit, which allows for steady growth (or improvement) in the fund's capital (the funds typically show a lower volatility in its returns). Secondly, these funds are regularly rebalanced due to (i) their multiple asset class holding required to conform to the constantly changing SRI universe (resulting in a high turnover) and (ii) their asset allocation plan (must maintain certain weightings to stocks and bonds based on the fund's categorisation; conservative, moderate or aggressive). This will generally result in greater diversification benefits and an optimal mix of its portfolio's assets to various asset classes, achieving a continuous enhancement in the fund's return. Regular rebalancing is also used as an approach to buy low and sell high. The strategy behind it is that by decreasing the fund's exposure to the portion of its holdings that just performed best, while increasing its exposure to the portion of the fund that underperformed should improve the fund's performance (Forbes, 2018).

In terms of the interest-bearing fund style, the SRI fund was found to exhibit the greatest improvement in performance from all SRI funds that constitute the sample. The significant improvement in the performance of the SRI fund between the two market regimes may be attributed to its asset holdings. The fund has substantial holdings in long-term bonds (76.9% of its asset holdings). As long-term bonds are highly sensitive to interest rate changes i.e. higher duration[20], and in turn market cycles (with bullish markets generally followed by increasing interest rates, adversely affecting bondholders, and vice versa for bearish markets), this may have resulted in the significant change from a negative alpha in sub-period one to a positive alpha in sub-period two for the fund. As indicated previously, the property

[20] There is a greater probability that interest rates will rise over a longer time period as compared to a shorter period. As such, investors who invest in long-term bonds and attempt to sell these bonds prior to their maturity could face a deeply discounted market price (The Economic Times, 2019).

market has achieved exponential growth since the global financial crises, which could have resulted in the real estate SRI fund's continual improvement in performance. In addition, the SRI fund's holdings comprised largely of Real Estate Investment Trusts (REITs) stocks. Holding these stocks will generally result in the fund earning a substantial portion of its profits as dividends since as required by law REITs stocks must distribute 90% of their taxable income to shareholders annually (Forbes, 2019). This allows the fund to reinvest this income in other profitable investments, resulting in a steady growth (or improvement) of the fund's capital (compared to focusing solely on timing the market to earn a maximum return – which could result in high volatility in its return).

Relative to the non-SRI funds, 83% of SRI funds exhibited a lower exposure to the market loading factor (market beta) in sub-period one, while 92% of them showed lower exposure to this factor in sub-period two. This indicates that SRI funds showed, on average, a lower sensitivity to market fluctuations than the non-SRI funds over the sample period. The market betas of both funds (SRI and non-SRI) were statistically significant at all conventional levels in both sub-periods. These findings are consistent to those of Renneboog et al. (2008) – an empirical study employed on a global scale, and Oikonomou, Brooks & Pavelin (2012), which indicated that socially responsible behaviour has a weak negative correlation to systematic risk, while 'irresponsible behaviour' is strongly correlated to systematic risk. In addition, Lee et al. (2010) found that SRI funds sensitivity to market returns is further weakened when fund managers employ intense screening. As such, with the majority of the sample comprising of Shari'ah screened funds (74% of the sample), which, on average, are found to have high levels of screening, i.e. multiple screens (Hayat, 2015), this could further explain the lower market risk shown by SRI funds relative to the non-SRI funds. The Shari'ah screening criteria aids in Islamic funds, having a lower risk by two main screening requirements (Binmahfouz, 2012; Chowdhury & Masih, 2015). Firstly, the screening criteria avoid, at best, firms that yield a substantial amount of revenue from activities prohibited by Shari'ah law. These are firms found, on average, to have a strong correlation with the market, i.e. highly volatile; for example, firms providing gambling products or services. Secondly, it avoids investing in firms that are heavily financed by debt i.e. risky firms (requires a debt-to-assets ratio of 33% or lower). An example of a sector that comprises of such firms is the resources sector, which is also found to show a strong correlation with the market.

Furthermore, SRI funds were found to reduce their market risk over the sample period (as indicated by the lower market beta from sub-period one to sub-period two). These findings suggest that SRI funds showed lower risk in periods of market downturns than in periods when the economic cycle was upward trending accounting for the bull (sub-period one) and bear (sub-period two) market regimes. Bouslah, Kryzanowski & M'zali (2018) attribute SRI funds lower risk in bearish markets to the use of a risk mitigation approach (a risk management argument based on the stakeholder theory), whereby firms with higher social performance (that these funds hold) will develop goodwill (i.e. intangible assets) or

moral capital that will function as 'insurance-like' protection during bad times. As such, Allahverdiyev (2017) indicated that SRI funds should be mainly be used as an 'insurance' tool rather than an 'investment' instrument. A notable finding for SRI funds in terms of their market risk exposure over both sub-periods was that the growth fund (i.e. Community Growth Equity fund) exhibited the highest level of market risk. This was found to support the extant literature showing the strong correlation of investments in growth-type assets with higher market betas[21] (Harris & Marston, 1994).

Similar to the findings of Bauer et al. (2005), all SRI funds showed a higher level of sensitivity to variations in returns of small capitalisation (small-cap) stocks, as compared to large capitalisation (large-cap) stocks over both sub-periods. This is indicated by the statistically significant (at all conventional levels) positive betas of the size factor (SMB) (only one beta was found to be statistically insignificant at the conventional levels). Relative to the non-SRI funds, 67% of SRI funds exhibited a higher positive beta for the size factor in both sub-period one and two – indicating that SRI funds showed a larger exposure, on average, to small-cap stocks relative to non-SRI funds. Although SRI funds showed a strong preference for small-cap stocks, further analysis indicated that SRI funds, on average, reduced their exposure to these stocks over the sample period. This finding, viewed in terms of the higher equity risk premium ascribed to small-cap stocks as compared to large-cap stocks (as a result of their higher cost of capital and greater business risk), could suggest a possible reason for the reduced market beta from sub-period one to sub-period two (Rolnick, Hecht & Hampson, 2014).

Furthermore, taking into account the bull and bear market regimes, the increased exposure to large-cap stocks from sub-period one to sub-period two (the move from a bull to bear market) could signify the general belief that small-cap stocks provide more viable investments in bull markets whilst large-cap stocks provide safe investments in bear markets. Conventional wisdom suggests that small-cap stocks have historically outperformed large-cap stocks in periods of rising interest rates i.e. bull markets (The Wall Street Journal, 2018). A rising rate environment usually occurs at the commencement of an economic recovery, or a period when the Reserve Bank feels that they no longer need to decrease interest rates to stimulate economic growth (essentially the period after the financial crises – the beginning of sub-period one). Small firms generally raise a significant portion of their capital from investors by selling shares of stock. Large firms, on the other hand, borrow large sums of their capital through the sale of bonds. Therefore, higher interest rates will have a less negative effect on the ability of small firms to achieve growth due to them not relying heavily on bonds to expand operations and

[21] As growth stocks, on average, trade at a premium valuation, they tend to be more susceptible to big price swings. During bull markets, growth stocks typically rise at a more rapid rate than the overall market, due to investors feeling increasingly comfortable with risk when the market experiences an upward spiral. Conversely, growth stocks tend to decline at a faster pace in bear markets as a result of investors reducing their risk profile (Feroldi, 2018).

fund projects (The Balance, 2019). On the contrary, large firms generally have strong balance sheets and a substantial operational history, showing signs of a defensive stock, which will result in their share price being less susceptible to a larger fall during market downturns i.e. bear markets (Forbes, 2019). As further support to this view, empirical evidence on the relative performance of the small-cap index and large-cap index (which were used as proxies), showed small-cap stocks to perform better, on average, relative to large-cap stocks in sub-period one whilst performed poorer relative to them in sub-period two (based on three performance measures; (i) their computed average return over the period and (ii) the CAPM[22] (iii) the Sharpe ratio. Refer to Appendix C (page no. 182), for the computed output). This could further justify the respective exposures found.

In terms of the value factor, equal but opposite exposures were found for the two sub-periods. That is, 75% of SRI funds exhibited negative betas for the value factor in sub-period one, while 75% of them generated positive betas in sub-period two. This indicates that SRI funds were, on average, more growth-oriented in sub-period one and more value-oriented in sub-period two. Relative to the non-SRI funds, the findings of the value-tilts for SRI funds in the respective sub-periods were shown to be consistent. That is, 67 % of SRI funds showed greater exposure to growth stocks (had lower betas[23] for the value factor) in sub-period one, while 83% of them exhibited greater exposure to value stocks (had higher betas[24] for the value factor) in sub-period two. A notable finding in terms of the funds' value exposures was that global SRI funds (the global equity fund and global property fund) showed a substantially high exposure to growth stocks (the largest exposure of all SRI funds that constituted the sample) which was also found to be consistent over the sample period (larger exposure to growth stocks in both sub-periods). The growth-tilt of these funds were consistent to the findings of studies that have been documented for developed markets (e.g. Bauer et al., 2005), which are markets that these funds comprise a large exposure to; therefore, SRI funds with significant global exposure could provide a possible reason for their growth-tilt. In addition, the findings of a larger exposure to small-cap stocks and growth stocks by the global SRI funds are consistent to the findings of Renneboog et al. (2008) - a global study documented for 23 countries.

Despite the mixed findings shown for the value exposures of SRI funds for the respective sub-periods, these funds were found, on average, to increase their exposure to value stocks over the sample period. Considering the bull and bear market regimes, the significant change in the exposure to the value factor in the respective sub-periods can be explained by two perspectives. Firstly, it could indicate that SRI

[22] The CAPM was used in place of the Fama and French 3-factor model and Carhart 4-factor model due to the distortion of results caused by the use of the small-cap and large-cap indices in the construction of the SMB factor.

[23] The more negative the beta coefficient is, the lower is its beta value.

[24] The more positive the beta coefficient is, the higher is its beta value.

funds made two exposure adjustments to account for the transition from a bull to bear market. The larger exposure to growth stocks in sub-period one and value stocks in sub-period two could signify the general belief that growth stocks provide more viable investments in bull markets while value stocks hold as safer investments in bear markets (Lakonishok, Shleifer & Vishny, 1994; Reuter, 2017). Growth stocks become more attractive in bull markets due to the rising price environment having favourable effects on their fundamentals. A prominent fundamental used to evaluate growth stocks is its Price-to-Earnings (P/E) ratio. With a continuous hike in prices, this will result in a greater deviation of its market price from its potential earnings. As a result, these stocks will pose as attractive investments due to them being perceived as having greater growth potential - in terms of their growth in revenue, earnings and cash flow (Reuter, 2017).

Conversely, high valuations (such as high P/E ratios) make it cumbersome for value investors to identify attractive equity investments. Consequently, bear markets provide an opportunity for previously overvalued stocks (higher price than its fundamentals) to become viable investments again (Forbes, 2019). Furthermore, value stocks are often firms associated with high levels of debt. These high levels of debt coupled with the lower interest rates found in bear markets allow for lower servicing costs on the firm's debt and in turn the ability to generate higher profits (Forbes, 2019). Additionally, these stocks, on average, pay a large part of these profits as dividends. Since dividends account for a significant portion of gains from stocks, holding these investments make bear markets less painful to weather (The Balance, 2019). As further support to this view, using the value index and growth index as proxies, the significant exposure to growth stocks in sub-period one and their greater exposure to value stocks in sub-period two can be justified based on the fact that growth stocks were found to perform better, on average, relative to value stocks in sub-period one whilst performed poorer relative to them in sub-period two (based on three performance measures; (i) their computed average return over the period and (ii) the CAPM[25] (iii) the Sharpe ratio. Refer to Appendix D (page no. 185), for the computed output).

The second perspective can be explained by SRI funds making only a single adjustment to account for the transition to a bear market. The extant literature that includes both South African (Du Plessis, 2015) and international (Renneboog et al., 2008; Hoepner et al., 2011) studies have found SRI funds to have a growth-tilt. Renneboog et al. (2008) indicated that this finding for SRI funds was largely due to their exclusion of value sectors, which has relatively high environmental risks, including amongst others, chemical, energy, and basic industries. The reasons for this finding shown among Shari'ah funds pertain largely to the Shari'ah screening guidelines utilised. Since a major component of the screening criteria

[25] The CAPM was used in place of the Fama and French 3-factor model and Carhart 4-factor model due to the distortion of results caused by the use of the value and growth indices in the construction of the HML factor.

requires the selection of firms with a debt-to-assets ratio of 33% or less, this results in them being more inclined, on average, to growth stocks than value stocks. This is due to the growth stocks generally found to have a lower leverage (Campbell & Vuolteenaho, 2004; Hoepner et al., 2011). In addition, these funds typically exclude industries that yield a substantial amount of revenue from activities prohibited by Shari'ah law – alcohol, tobacco, and entertainment (gambling) (Tower & Dean, 2010; JSE, 2013). Sound intuition suggests that these are generally found to be value industries (Derwall, 2007). Therefore, based on this view, it could suggest that the SRI funds have a strong preference for growth stocks while altering this exposure largely to account for the presence of a bear market.

In addition to the possibility that the reduction in the exposure to small-cap stocks by SRI funds resulted in the reduction of their market risk over the sample period, the increased exposure to value stocks (reduced exposure to growth stocks) by these funds from sub-period one to sub-period two could have been another contributing factor. This is based on the findings of growth-type investments yielding higher levels of market risk - both found in this study and in literature (Harris & Marston,1994).

As shown by the findings for sample period one, SRI funds, on average, deviated from non-SRI funds both in their performances and exposures to the model's risk factors (i.e. market loading, size, and value factors). However, a closer analysis of the respective fund styles showed that the interest-bearing SRI fund showed similar performances to its matched fund (in terms of their individual alphas) as well as exhibited similar exposures with respect to the market loading (market risk), size, and value factors. This may be attributed to their asset class holdings, in which, they showed similar percentages in their composition holdings (i.e. a similar percentage in their exposures to the given classes of securities); for example, to long-term or intermediate bonds but not necessarily the individual securities that make up these asset classes.

Sample period two comprised of 23 SRI funds (eleven funds from the equity fund style, ten funds from the balanced fund style, one fund from the interest-bearing fund style and one fund from the real estate fund style). An analysis of the results for sample period two showed that 83% of SRI and non-SRI funds generated statistically insignificant alphas and 17% statistically significant positive alphas. This indicates that both SRI and non-SRI funds have earned, on average, a return commensurate with the risk undertaken. In terms of the difference fund and difference benchmark, 96% of difference funds generated statistically insignificant alphas and 4% statistically significant negative alphas while 70% of difference benchmarks exhibited statistically insignificant alphas and 30% statistically significant negative alphas. These findings indicate that, on average, there was no significant difference in the performance of SRI funds relative to both the non-SRI funds and passive benchmarks over the sample period.

As indicated by the difference fund, the underperformance of SRI funds relative to their passive benchmarks was strongly driven by SRI funds from the balanced fund style (in which 6 of the 7 SRI funds that underperformed their passive benchmarks were from the balanced fund style). its significant underperformance relative to its passive benchmarks could be partially explained by the regular rebalancing generally shown by these funds. Regular rebalancing essentially leads to higher transaction costs, which could have adverse effects on the return of the fund (Reuter, 2017). As their passive benchmarks are constructed CPI indices, they avoid such costs. Furthermore, based on these passive benchmarks being CPI constructed indices, this could imply that investments in balanced SRI funds do not necessarily provide a good hedge against inflation or earn a real return over inflation (based on whether CPI or CPI plus an additional percentage was used as a benchmark). Despite its limitations, CPI is found to be a widely used benchmark for balanced funds. In a goal-based world, earning an absolute return (nominal or real) is vitally important when saving towards a goal, as one would need a mechanism to discount their investments and liabilities. CPI plus an additional percentage (which were found to be the benchmarks for the majority of funds) provides a suitable benchmark to all investors as it represents a real return over inflation (relative value of money) (Stanlib, 2018).

Relative to the non-SRI funds, 91% of SRI funds exhibited a lower exposure to the market loading factor (market beta) over the sample period. This indicates that SRI funds showed less variation, on average, to market fluctuations than the non-SRI funds. The market betas of both funds (SRI and non-SRI) were found to be statistically significant at all conventional levels. Similar to sample period one, all SRI funds exhibited a larger exposure to small-cap stocks (of which 21 of the 23 betas were found to be statistically significant at all conventional levels). However, this was with the exception of the SRI fund from the large-cap sector (NewFunds Shari'ah Top 40 Index Fund), which in line with its investment mandate, showed a higher exposure to large-cap stocks. Relative to the non-SRI funds, 56% of SRI funds were found to have a higher beta for the size factor, indicating that approximately half of these funds showed a larger exposure to small-cap stocks. In terms of the value factor, 78% of SRI funds exhibited a higher exposure to value stocks i.e. a value-tilt. As alluded to in the analysis of results for sample period one, the larger exposure to value stocks over this period (as sample period two constitutes the same time frame as sub-period two) could be attributed to the general belief that these stocks hold as more viable investments in bear markets. Additionally, the largest exposure to value stocks was shown for the SRI fund from the large-cap sector. This again was found to be in accordance with its investment mandate, in which the fund invests predominantly in large-cap value stocks. Relative to the non-SRI funds, 87% of SRI funds were shown to have a higher beta for the value factor (HML), indicating that SRI funds, on average, showed a larger exposure to value stocks.

The accuracy of the model in explaining expected fund returns (i.e. adjusted R^2 measure) was shown to be relatively high for S.A. equity, balanced, and interest-bearing funds (SRI and non-SRI funds) for

both sample periods, as the adjusted R^2 measure, averaged approximately 95%, 88% and 82%, respectively. However, caution must be given to interpretation of results of global equity and real estate funds (SRI and non-SRI funds) as the explanatory power of the model for these funds were shown to be relatively low for both sample periods, as indicated by the adjusted R^2 measure which averaged approximately 64% and 56%, respectively.

5.2.3. Carhart 4-Factor Model Results

Similar to the Fama and French 3-factor model, the Carhart 4-factor model was used in fulfilment of the first objective of the study. The analysis of results using this model was consistent with the approach of the Fama and French 3-factor model. However, the only exception to the analysis was the additional momentum variable which the model accounted for. Table 5.3 presents the results obtained from the respective regressions for the various fund styles. One asterisk (*) denotes statistical significance at the 10% level, two asterisks (**) denotes statistical significance at the 5% level, and three asterisks (***) denotes statistical significance at the 1% level.

Table 5.3: Carhart 4-Factor Model Regression Results – Sample Period One & Two

	Equity Fund Style							
	South African Equity							
SRI Fund & Regression Statistics	***Sub-period 1(Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
27Four Shari'ah Active Equity Prescient Fund								
Alpha (α)	0.00622	0.00737	-0.00864	-0.01148	0.00835	-0.00284	0.01185	0.01922
Market (β)	0.92937***	0.97711***	0.59193***	0.54335***	0.83586***	0.95141***	0.62461***	0.60173***
SMB	0.28414***	0.21096***	0.67671***	0.81727***	0.24664***	0.14055***	0.59769***	0.80866***
HML	0.06829	0.11259**	-0.18736*	-0.17265	0.04480	0.01471	-0.01318	0.09941
MOM	-0.05598	-0.06425	0.42506	0.47048	-0.03597	0.04541	-0.24580*	-0.31006**
Adj R^2	0.9469	0.9835	0.7012	0.6780	0.8955	0.9861	0.7735	0.7507
Community Growth Equity Fund								
Alpha (α)	-0.00817	-0.00545	-0.01159	-0.03794	0.00976	0.00364	0.00815	0.00269*
Market (β)	1.00522***	0.99822***	0.69327***	0.68785***	0.98036***	0.99458***	0.67935***	0.67757***
SMB	0.20152***	0.08020**	0.48594***	0.53394***	0.05331	0.04799	0.72583***	0.80604***
HML	-0.05542	-0.09249*	-0.09740	-0.17758*	-0.04973	-0.08018***	0.17903	0.08654
MOM	0.08446	0.09473*	0.45092	0.41927	-0.08718	-0.03165	-0.24433	-0.14960
Adj R^2	0.9714	0.9853	0.8027	0.7756	0.9594	0.9831	0.7428	0.7217
Element Earth Equity Fund								
Alpha (α)	-0.03485	0.01369**	-0.01907*	-0.01257*	-0.01539	-0.00349	-0.01821	-0.00451
Market (β)	0.95527***	0.93819***	0.67749***	0.58484***	0.87735***	0.90735***	0.68943***	0.62762***
SMB	0.37814***	0.13663**	0.57994***	0.72752***	0.22689***	0.14757***	0.84603***	0.98266***
HML	-0.01287	0.03877	0.35440***	0.30752***	0.43537***	-0.04688	-0.02053	0.01823
MOM	0.15011	-0.12328	0.85219	0.91393*	0.40747	0.06174	0.03932	-0.08396
Adj R^2	0.9182	0.96572	0.7249	0.7319	0.9000	0.9735	0.6386	0.6127

SRI Fund & Regression Statistics	***Sub-period 1(Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Element Islamic Equity Fund								
Alpha (α)	-0.02661	0.03139	-0.06076	-0.02433*	-0.01077	-0.01356	0.00974	0.00009
Market (β)	0.90662***	0.33498***	0.50040***	0.50277***	0.79529***	1.00237***	0.56925***	0.57897***
SMB	0.24219***	1.22398***	0.64396***	0.71821***	0.21759***	0.07425*	0.86166***	0.84671***
HML	-0.04179	-0.03093	-0.22799*	0.17824	0.45609***	0.40623***	-0.10384	-0.01067
MOM	0.08407	-0.60517**	0.62733	0.82487*	0.31841	0.19753	-0.28702	-0.15000
Adj R^2	0.9228	0.4486	0.5714	0.6643	0.8573	0.9732	0.5584	0.5804
Oasis Crescent Equity Fund								
Alpha (α)	-0.00416	0.00856	-0.01195	-0.01188	0.01301*	0.00007	0.01532*	0.02388*
Market (β)	0.87143***	0.93626***	0.59552***	0.46848***	0.76099***	0.87296***	0.60752***	0.54379***
SMB	0.31508***	0.15965***	0.59087***	0.69693***	0.19630***	0.10606***	0.75994***	0.91959***
HML	-0.28681***	-0.00195	0.09737	0.02337	0.15122***	-0.07400*	-0.25374*	-0.25569
MOM	-0.15777*	-0.06516	0.54649	0.56357	0.05711	0.01707	-0.32669*	-0.39185**
Adj R^2	0.9427	0.9725	0.7469	0.6952	0.9164	0.9681	0.6731	0.6291
Old Mutual Albaraka Equity Fund								
Alpha (α)	-0.00322	0.01721***	-0.01257	-0.01094*	0.01751**	0.00163	0.01116*	0.02838*
Market (β)	0.88984***	1.02008***	0.55774***	0.53236***	0.82487***	0.97461***	0.54210***	0.56219***
SMB	0.34455***	0.16795***	0.64125***	0.75871***	0.25809***	0.11746**	0.78111***	0.94907***
HML	-0.08752	0.16990***	-0.00427	-0.07350	0.05434	-0.06923	-0.22631	-0.05640
MOM	-0.19153	-0.18706***	0.60059	0.56098	0.05452	-0.03961	-0.23854	-0.42561**
Adj R^2	0.9484	0.9749	0.6975	0.74677	0.9186	0.9534	0.5919	0.6559

SRI Fund & Regression Statistics	***Sub-period 1(Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
3 Laws Climate Change Equity Prescient Fund								
Alpha (α)					-0.03280	0.02481	-0.01053**	-0.02052**
Market (β)					0.87560***	1.03724***	0.54584***	0.58309***
SMB					0.34229***	0.30513***	0.43779***	0.74292***
HML					0.02703	0.24721***	-0.34802***	-0.10081
MOM					0.33880	-0.23223	1.07750**	0.84526**
Adj R^2					0.9413	0.9198	0.5788	0.7390
Kagiso Islamic Equity Fund								
Alpha (α)					-0.02846	-0.01083	-0.02534*	-0.02618**
Market (β)					0.76986***	0.90016***	0.57718***	0.47735***
SMB					0.29318***	0.02119	0.77262***	0.79381***
HML					0.13256*	0.03234	-0.02763	0.00471
MOM					0.35546	0.10576	0.75616*	0.86192**
Adj R^2					0.9101	0.9514	0.7473	0.7519
NewFunds Shari'ah Top 40 Index Fund								
Alpha (α)					0.01327**	0.02628	-0.01239***	-0.01823***
Market (β)					0.87048***	1.02874***	0.52775***	0.56379***
SMB					-0.14295	0.31546***	0.04618	0.47064***
HML					0.65739***	-0.00065	0.50722***	0.56199***
MOM					0.82066**	-0.26757	2.37420***	2.01496***
Adj R^2					0.8692	0.9273	0.6525	0.7814

	Global Equity							
SRI Fund & Regression Statistics	***Sub-period 1(Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Oasis Crescent International Feeder Fund								
Alpha (α)	0.01459	0.02539	-0.02458	-0.02304	0.02638	-0.00854	0.01186	0.00530
Market (β)	0.70708***	0.76313***	0.67647***	0.62073***	0.52295***	0.55396***	0.61630***	0.58150***
SMB	0.54094***	0.58752***	0.53314***	0.53113***	0.07448	0.04197	0.55793***	0.70483***
HML	-0.52852***	-0.56579***	-0.09565	-0.03748	-0.36139***	-0.39358***	0.06838	0.00873
MOM	-0.29759	-0.27398	0.24342	0.20981	-0.13874	0.12428	-0.25768	-0.19066
Adj R^2	0.6090	0.6791	0.7667	0.7864	0.5559	0.5907	0.6637	0.5963
Element Islamic Global Equity SCI Fund								
Alpha (α)					0.01285	-0.01546	0.00990**	-0.01043*
Market (β)					0.56413***	0.87104***	0.86913***	0.97338***
SMB					0.11299	0.10262	0.56346***	0.69894***
HML					-0.46977***	-0.23958**	0.09232	0.35095***
MOM					-0.12870	0.17259	-0.06458	0.68737
Adj R^2					0.56874	0.8011	0.5788	0.7995
	<u>Balanced (Multi-Asset) Fund Style</u>							
Oasis Crescent Balanced Progressive Fund of Funds								
Alpha (α)	-0.01227	-0.03545	-0.02453	-0.01768	0.01133	0.01193	0.01027	0.00691
Market (β)	0.73412***	0.75077***	0.62960***	0.71458***	0.71646***	0.79435***	0.78570***	0.80378***
SMB	0.28635***	0.30887**	0.39730***	0.23266***	0.24742***	0.35074***	0.73199***	0.41826***
HML	-0.11218	-0.04783	0.00399	0.00617	0.03940	-0.09243	-0.03322	-0.12994
MOM	-0.13562	-0.17710	0.24189	0.14895	0.41929	0.31386*	-0.19259	-0.14493
Adj R^2	0.9311	0.7303	0.8805	0.9136	0.9216	0.9121	0.8022	0.9253

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Element Real Income Fund								
Alpha (α)	-0.05134**	-0.03519	-0.02386**	-0.05842**	0.01966	0.01533	0.01520	0.01357
Market (β)	0.73977***	0.76971***	0.65492***	0.73720***	0.73907***	0.79164***	0.64241***	0.73943***
SMB	0.62396***	0.63080***	0.43695***	0.40096***	0.41572***	0.47939***	0.59768***	0.63587***
HML	-0.05793	0.02913	-0.10928	-0.11637*	0.08313	-0.10170	-0.05594	-0.07568
MOM	-0.21766	-0.22263	0.67660**	0.60028**	0.60062**	0.43048	-0.22910	-0.22697
Adj R^2	0.7968	0.8183	0.8448	0.8821	0.8917	0.8889	0.7448	0.7918
Element Flexible Fund								
Alpha (α)	-0.05477**	-0.01621	-0.04628**	-0.04130	0.01226	-0.00489	0.02802	0.00450
Market (β)	0.77463***	0.88633	0.56525***	0.67658***	0.76829***	0.91052***	0.56065***	0.77429***
SMB	0.53495***	0.64170	0.51680***	0.52411***	0.32754***	0.33137***	0.49776***	0.54685***
HML	-0.12573	-0.04901	0.14535	-0.11047	0.05743	-0.21577***	-0.04560	-0.14349
MOM	-0.16678	-0.18829	0.95320**	0.43420	0.63294**	0.18619	-0.56915**	-0.17609
Adj R^2	0.8540	0.8303	0.6517	0.7200	0.8991	0.9221	0.4654	0.8488
Old Mutual Albaraka Balanced Fund								
Alpha (α)					-0.02190	-0.04693*	-0.02269	-0.02732
Market (β)					0.74742***	0.70735***	0.74756***	0.74555***
SMB					0.32958***	0.50053***	0.32968***	0.31482***
HML					-0.06574	-0.12792*	-0.06567	-0.09898*
MOM					0.26846	0.50569	0.26923	0.26812
Adj R^2					0.9361	0.8512	0.9361	0.9255
Oasis Crescent Income Fund								
Alpha (α)					-0.04244	-0.04474	-0.00542	-0.04619
Market (β)					0.67320***	0.74606***	0.63463***	0.67133***
SMB					0.45165***	0.50378***	0.44849***	0.43689***
HML					-0.14607*	-0.12836	-0.14556**	-0.17931**
MOM					0.50064*	0.54038*	0.46671	0.50029
Adj R^2					0.8435	0.8550	0.8382	0.8274

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
27Four Shari'ah Balanced Prescient Fund of Funds								
Alpha (α)					-0.02025	-0.05335	-0.01461	-0.02733
Market (β)					0.74921***	0.77279***	0.68390***	0.74733***
SMB					0.29846***	0.44592***	0.35317***	0.28370***
HML					-0.08411*	0.01858	-0.23054*	-0.11735**
MOM					0.24430	0.62513	0.12562	0.24396
Adj R^2					0.9407	0.7959	0.6528	0.9319
Element Islamic Balanced Fund								
Alpha (α)					-0.03229	-0.01579	-0.02422	-0.03937
Market (β)					0.74305***	0.82799***	0.62255	0.74117***
SMB					0.29560***	0.24132***	0.55490	0.28084***
HML					0.11504	-0.07797*	0.06517	0.08182
MOM					0.39612	0.19138	0.71120	0.39578
Adj R^2					0.8805	0.9606	0.6943	0.8668
Kagiso Islamic Balanced Fund								
Alpha (α)					-0.02377	-0.01076	-0.02072	-0.03085
Market (β)					0.75056***	0.84183***	0.61622***	0.74868***
SMB					0.30205***	0.23033***	0.57235***	0.28730***
HML					0.01330	-0.15868***	0.04414	-0.01993
MOM					0.29074	0.12604	0.67116*	0.29039
Adj R^2					0.9460	0.9736	0.8222	0.9401
Oasis Crescent Balanced High Equity Fund of Funds								
Alpha (α)					-0.01413	-0.01228	-0.01958	-0.02122
Market (β)					0.72976***	0.81047***	0.62678***	0.72789***
SMB					0.24209***	0.24814***	0.50668***	0.23339***
HML					0.07646	-0.17067***	0.11929	0.04323
MOM					0.17325	0.14097	0.53873	0.17291
Adj R^2					0.9271	0.9618	0.8204	0.9205

SRI Fund & Regression Statistics	***Sub-period 1 (Jan 2009 – Dec 2013)***				***Sub-period 2 (Jan 2014 – Dec 2018)***			
	SRI Fund	***Matched Fund***	***Difference Fund***	***Difference Benchmark***	***SRI Fund***	***Matched Fund***	***Difference Fund***	***Difference Benchmark***
Oasis Crescent Balanced Stable Fund of Funds								
Alpha (α)					-0.01605	-0.02658	-0.03719	-0.02063
Market (β)					0.69113***	0.76563***	0.63299***	0.68925***
SMB					0.31216***	0.40444***	0.40834***	0.29740***
HML					0.03545	-0.14940***	-0.01391	-0.06869
MOM					0.19817	0.32340	0.38122	0.19782
Adj R^2					0.9086	0.9264	0.8244	0.8963
	Interest-Bearing Fund Style							
Community Growth Gilt Fund								
Alpha (α)	-0.05363*	-0.06129*	-0.00405	-0.04874	0.02706*	0.02831*	0.00961	0.01139
Market (β)	0.93008***	0.94194***	0.69866***	0.67597***	0.99844***	1.00726***	0.66049***	0.70081***
SMB	0.82904***	0.82645***	0.49329***	0.63007***	0.77280***	0.76546***	0.60193***	0.50769***
HML	0.11455	0.12919	-0.13545*	0.02088	0.19470*	0.20230*	0.01647	-0.13406*
MOM	-0.38800**	-0.40381**	0.42073	-0.23403	0.72631*	0.64059*	-0.21826	0.51746*
Adj R^2	0.8265	0.8329	0.8503	0.7772	0.8435	0.8424	0.7778	0.85681
	Real Estate (Property) Fund Style							
Oasis Crescent International Property Equity Feeder Fund								
Alpha (α)	0.01828*	0.02219*	-0.00696	-0.00067	0.04656*	0.01766*	0.03588	0.02458
Market (β)	0.90594***	1.01875***	0.55954***	0.53134***	0.56171***	0.52926***	0.73994***	0.61003***
SMB	0.84147***	0.91433***	0.53165***	0.71596***	0.06905	0.14290	0.42677***	0.46415***
HML	-0.50560**	-0.33871	-0.13577	-0.17401	-0.39040***	-0.47195***	-0.04629	0.01297
MOM	-0.49738	-0.60012	-0.15681	-0.03549	-0.19293	-0.27019	0.60919	0.24483
Adj R^2	0.6806	0.6798	0.4247	0.3809	0.5037	0.3872	0.7859	0.7257

The performance evaluation for sample period one showed that 67% of SRI funds generated statistically insignificant alphas, 8% statistically significant positive alphas and 25% statistically significant negative alphas in sub-period one while 67% of non-SRI funds generated statistically insignificant alphas, 8% statistically significant negative alphas and 25% statistically significant positive alphas over this period. For sub-period two, 67% of SRI funds generated statistically insignificant alphas and 33% statistically significant positive alphas while 83% of non-SRI funds exhibited statistically insignificant alphas and 17% statistically significant positive alphas. The findings for sub-period one and two indicate that both SRI and non-SRI funds have earned, on average, a return commensurate with the risk undertaken. Similar to the findings of the Fama and French 3-factor model, SRI funds were found to perform better in bear markets and perform poorer in bullish markets. This could be largely attributed to the reduced market risk (systematic risk) found for SRI funds and its exposure adjustments shown for the transition from a bull to bear market – increasing its exposure to large-cap stocks (as compared to small-cap stocks) and value stocks (as compared to growth stocks), which were found, on average, to outperform over this period. Additionally, the findings for the interest-bearing and real estate fund style was also shown to be consistent under this model.

75% of the difference in the performances (alphas) of the SRI and non-SRI funds (i.e. difference fund) were found to be statistically insignificant for sub-period one (25% of them were negative and statistically significant) while 83% of the difference funds exhibited statistically insignificant alphas for sub-period two (17% of them were positive and statistically significant). Furthermore, 67% of the difference in the performances (alphas) of the SRI funds and its passive benchmarks (i.e. difference benchmark) were found to be statistically insignificant for sub-period one (33% of them were negative and statistically significant) while 75% of the difference benchmarks generated statistically insignificant alphas in sub-period two (25% of them were positive and statistically significant). The findings for the difference fund and difference benchmark indicate that SRI funds exhibited, on average, no significant difference in their performances relative to both their matched funds and passive benchmarks over both sub-periods.

Similar to the findings under the Fama and French 3-factor model, SRI funds showed improved performance over the sample period. The greatest improvement in performance was shown by the equity fund style in terms of the performance of the SRI funds relative to their passive benchmarks. That is, 50% of SRI equity funds underperformed their passive benchmark in sub-period one (the remaining 50% exhibited no significant difference in performance relative to their benchmarks) while 50% of SRI equity funds outperformed their passive benchmark in sub-period two (the remaining 50% exhibited no significant difference in performance relative to their benchmarks) – equity SRI funds also accounted for all outperformances relative to their passive benchmarks in sub-period two. As the JSE ALSI, the passive benchmark used for S.A. equity funds, is widely acknowledged as a proxy for the market

(Msindo, 2015), the outperformance shown, on average by S.A. equity SRI funds relative to their passive benchmarks, could suggest that these funds provide a better performance, on average, than the market over the long term.

Relative to the non-SRI funds, 75% of SRI funds exhibited a lower exposure to the market loading factor (market beta) in sub-period one, while 92% of them showed a lower exposure to this factor in sub-period two. This indicates that SRI funds showed, on average, a lower sensitivity to market fluctuations than the non-SRI funds over the sample period. The market betas of both funds (SRI and non-SRI) were statistically significant at all conventional levels in both sub-periods. A consistency in findings shown by both models (Fama and French 3-factor model and Carhart 4-factor model) was that all SRI balanced funds were found to exhibit lower market risk than the non-SRI funds in both sub-periods. As indicated previously, SRI balanced funds are more prone to frequent rebalancing (due to screening and their asset allocation plan), which may allow for increased diversification, resulting in a greater reduction in their levels of risk. In addition, another finding shown to be consistent among both the models in this respect was that global equity funds showed a lower level of risk than S.A. equity funds (in their respective sub-periods and for sample period two). Similar to Wikstrom (2014), Barwick-Barrett (2015) and Op Den Camp (2018), this could be attributed to the SRI screening process employed by these funds, in which despite the restricted universe that it offers, the funds that have a global investment strategy are presented with greater flexibility and a larger investment universe in comparison to local funds, allowing for a more diversified portfolio (which will, for example, reduce concentration risk.

Furthermore, all SRI funds showed a larger exposure to small-cap stocks (of which all betas were statistically significant at all conventional levels in sub-period one, and 9 of the 12 betas were statistically significant at all conventional levels in sub-period two). Relative to the non-SRI funds, 50% of SRI funds exhibited a higher beta for the size factor in sub-period one, while 67% of them showed a higher beta for this factor in sub-period two. This indicated that relative to non-SRI funds, half of the SRI funds showed a larger exposure to small-cap stocks in sub-period one, while SRI funds, on average, exhibited a larger exposure to small-cap stocks in sub-period two. The mixed findings shown for the relative exposures to the size factor is largely due to the contradictory findings shown for the two major fund styles in the sample. That is, the equity fund style showed, on average, a larger exposure to the size factor (all funds except one) while the balanced fund style (all funds) exhibited a lower exposure.

In terms of the value factor, 83% of SRI funds exhibited negative betas for the value factor in sub-period one, while 75% of them generated positive betas in sub-period two. This indicates that SRI funds showed, on average, a growth-tilt in sub-period one and a value-tilt in sub-period two. Relative to the non-SRI funds, the findings of the value-tilts for SRI funds in the respective sub-periods were shown

to be consistent. That is, 83 % of SRI funds showed greater exposure to growth stocks (had lower betas for the value factor) in sub-period one, while 92% of them exhibited greater exposure to value stocks (had higher betas for the value factor) in sub-period two. Although the mixed findings shown on average for the relative exposures to the size factor, the findings for the balanced fund style were shown to be more consistent. That is, all balanced SRI funds exhibited a large exposure to the value factor relative to their matched funds in both sub-periods, indicating that balanced SRI funds showed a larger exposure to value stocks relative to non-SRI funds.

The findings for the momentum factor i.e. MOM showed that the momentum effect was, on average, not statistically significant for the sample of SRI and non-SRI funds. However, from the findings of statistically significant MOM factors, two SRI funds showed negative momentum in sub-period one while three SRI funds showed positive momentum in sub-period two. A notable finding based on the respective fund styles was the interest-bearing SRI fund which showed the greatest improvement in momentum over the sample period (was the only fund found to have a statistically significant MOM factor over both sub-periods). Taking this into consideration could provide a possible reason for the fund exhibiting the greatest improvement in performance of all SRI funds that constitute the sample. The greatest improvement in momentum and its performance may be attributed to its asset holdings sensitivity to the differing market regimes i.e. its substantial holdings in long-term bonds.

Consistent with the findings of the Fama and French 3-factor model, SRI funds were found, on average, to reduce their market risk and exposure to small-cap stocks, whilst increased their exposure to value stocks over the sample period. As noted previously, the SRI funds increased exposure to large-cap stocks and value stocks could be indicative of the general belief that these stocks provide more viable investments in bear markets. Essentially, these findings showed that as SRI funds tend to perform better, volatility lowers, the tendency for a ‘small-firm’ effect weakens, the ‘growth-orientation’ swaps for a ‘value-orientation’, and the momentum strategy strengthens.

An analysis of the results for sample period two showed that 78% of SRI funds generated statistically insignificant alphas and 22% statistically significant positive alphas while 87% of non-SRI funds exhibited statistically insignificant alphas, 9% statistically significant positive alphas and 4% statistically significant negative alphas. This indicates that both SRI and non-SRI funds have earned, on average, a return commensurate with the risk undertaken. In terms of the difference fund and difference benchmark, 74% of difference funds exhibited statistically insignificant alphas, 13% statistically significant negative alphas and 13% statistically significant positive alphas while 70% of difference benchmarks generated statistically insignificant alphas, 13% statistically significant positive alphas and 17% statistically significant negative alphas while. These findings indicate that, on average,

there was no significant difference in the performance of SRI funds relative to both the non-SRI funds and passive benchmarks over the sample period.

Based on the performance findings for sample period one and two, it is hypothesised that a strong age effect exists for S.A. equity SRI funds when these funds are divided based on their inception date. Funds that were formed before 2009 i.e. older funds (funds that comprised both sample period one and two), on average, performed better than funds that were launched after 2009 i.e. younger funds (funds that solely comprised of sample period two). This is based on evidence that any outperformance shown by S.A. equity SRI funds relative to its conventional counterparts in sample period two were strongly driven by older funds, as all funds that outperformed in sample period two were funds formed before 2009. The difference in performance noted further supports the learning effect whereby, the older funds have finally caught up with or outperformed conventional funds while funds that were launched recently still trail their conventional peers. Similarly, with respect to SRI funds performing better than their conventional counterparts in the bear market, a distinction can be made between older and younger funds, whereby this finding was shown to be more prominent for older funds than younger funds.

Furthermore, a trend was also shown for sample period two in that an underperformance of SRI funds relative to its matched fund was followed by an underperformance against its passive benchmark and vice versa (the only exception to this finding was an S.A. equity fund, which outperformed its passive benchmark and exhibited no significant difference in its performance relative to its matched fund). This pattern in performance provides a consensus (or a greater sense of clarity) on its collective performance against both its active and passive conventional counterparts, allowing for investors to make more informed decisions on which offers a more viable investment option (i.e. SRI investments or conventional investments - as compared to the difficulty in identifying such if the SRI fund underperforms its matched fund and outperforms its passive benchmark or vice versa).

Relative to the non-SRI funds, 91% of SRI funds exhibited a lower exposure to the market loading factor (market beta) over the sample period. This indicates that SRI funds showed less variation, on average, to market fluctuations than the non-SRI funds. The market betas of both funds (SRI and non-SRI) were found to be statistically significant at all conventional levels. Similar to findings for the Fama and French 3-factor model, all SRI funds exhibited a larger exposure to small-cap stocks (of which 18 of the 23 betas were found to be statistically significant at all conventional levels), with the exception of the SRI fund from the large-cap sector (NewFunds Shari'ah Top 40 Index Fund), which in line with its investment mandate, showed a higher exposure to large-cap stocks. Relative to the non-SRI funds, 56% of SRI funds were found to have a higher beta for the size factor, indicating that approximately half of these funds showed a larger exposure to small-cap stocks. In terms of the value factor, 70% of SRI funds exhibited a higher exposure to value stocks – implying that these funds, on average, had a

value-tilt. The largest of this exposure was shown for the SRI fund from the large-cap sector. This again was found to be in accordance with its investment mandate, in which the fund invests predominantly in large-cap value stocks. Relative to the non-SRI funds, 78% of SRI funds were shown to have a higher beta for the value factor (HML), indicating that SRI funds, on average, showed a larger exposure to value stocks.

Similar to sample period one, the findings for the momentum factor i.e. MOM showed that the momentum effect was, on average, not statistically significant for the sample of SRI and non-SRI funds. Based on the statistically significant MOM factors, the findings showed that the SRI fund from the large-cap sector exhibited the greatest momentum (i.e. highest positive beta) over this period. As this fund is invested exclusively in large-cap stocks, this finding, in addition to its positive alpha, presents further evidence to the claim that large-cap stocks provide viable investments in bear markets.

The accuracy of the model in explaining expected fund returns (i.e. adjusted R^2 measure) were shown to be relatively high for S.A. equity, balanced, and interest-bearing funds (SRI and non-SRI funds) for both sample periods, as the adjusted R^2 measure averaged approximately 95%, 88% and 82%, respectively. However, caution must be given to interpretation of results of global equity and real estate funds (SRI and non-SRI funds) as the explanatory power of the model for these funds were shown to be relatively low for both sample periods, as indicated by the adjusted R^2 measure which averaged approximately 64% and 56%, respectively. The results shown for the adjusted R^2 measure for the respective fund styles were found to be similar to that using the Fama and French 3-factor model. This indicated that despite the model accounting for the additional variable, the similarities in the adjusted R^2 measures found for both models, implied that the inclusion of the additional risk factor was not statistically significant in explaining expected SRI fund returns.

5.3. Style Analysis of SRI Funds

A style analysis of SRI funds on an individual fund basis, and comparative to its non-SRI industry peers was done in fulfilment of the second objective of the study. This made use of the RBSA approach to identify and compare their determinants of return.

5.3.1. Preliminary Analysis of the 12 Asset Classes

Christopherson (1995) indicated that if the asset classes' return is highly correlated, this may lead to the results obtained from the RBSA model being spurious (or the presence of multicollinearity). If there is a high correlation among the asset classes, the optimisation algorithm of the model may provide difficulty in finding the loadings for the style factors. Attributions may oscillate over time between two

highly correlated asset classes and make the exposures uninformative and interpretations difficult. To explore this possibility, and in turn, to achieve the desirable property of the asset classes being mutually exclusive (have differing returns), a correlations test was conducted among the selected asset classes. The correlation patterns are shown in Table 5.4.

As previously noted, the 12 style factors (asset classes) include;

1. R186 – S.A. 10-year bond
2. R2023 – S.A. 5-year bond
3. SA 91-day Treasury Bills
4. OTHI (Other Bond Index)
5. U.S. 5-year Bond
6. J330 – Value Index
7. J331 – Growth Index
8. J201 – Mid-cap Index
9. J202 – Small-cap Index
10. Eurofirst300 Index
11. NIKKEI 225 Index
12. MSCI World Real Estate Index

Table 5.4: Correlation Table

	91-day T-bill	***OTHI***	***NIKKEI***	***Eurofirst300***	***MSCI World Real Estate***	***S.A 5yr Bond***
91-Day T-bill	1.00					
OTHI	-0.45	1.00				
NIKKEI	0.14	-0.53	1.00			
Eurofirst300	-0.18	0.15	0.34	1.00		
MSCI World Real Estate	0.14	-0.39	0.72	0.20	1.00	
S.A 5yr Bond	0.49	-0.93	0.51	-0.18	0.35	1.00
S.A 10yr Bond	0.46	-0.97	0.53	-0.15	0.38	0.96
Mid-Cap	-0.10	0.44	-0.22	0.20	-0.13	-0.45
Small-Cap	-0.29	0.38	-0.08	0.42	-0.09	-0.41
Growth	0.01	0.00	0.44	0.47	0.46	-0.08
Value	-0.11	0.17	-0.03	0.23	-0.03	-0.24
U.S 5yr bond	0.10	-0.47	0.31	0.22	-0.11	0.39
	S.A 10yr Bond	***Mid-Cap***	***Small-Cap***	***Growth***	***Value***	***U.S 5yr bond***
S.A 10yr Bond	1.00					
Mid-Cap	-0.43	1.00				
Small-Cap	-0.38	0.67	1.00			
Growth	-0.04	0.36	0.36	1.00		
Value	-0.18	0.76	0.61	0.55	1.00	
U.S 5yr bond	0.45	-0.19	-0.02	0.04	0.03	1.00

As shown in Table 5.4, the strongest correlation was found to exist between the selected bond asset classes for the South African market (excludes the U.S. 5-year bond). This can be seen as pre-empted due to an amalgamation of these bonds, forming the constituents to the All Bond Index (ALBI). That is, half of the ALBI composition includes the OTHI constituents (corporate bonds), while the other half the GOVI constituents (government bonds). While this is such, both indices were included (and not just the ALBI) due to certain sample constituents having vastly different exposures to both indices, which will aid in determining the extent thereof. This was also in line with Sharpe's guidelines of an exhaustive investable universe for the sample of funds.

Based on Table 5.4, the correlation coefficients of the 12 asset classes were found, on average, to be weak (-0.3 to -0.1 or 0.1 to 0.3) to moderate (-0.5 to -0.3 or 0.3 to 0.5), with the exceptions of some asset classes showing relatively strong correlations (-0.5 to -1.0 or 0.5 to 1.0). Those exhibiting relatively strong correlations, in addition to the aforementioned bond style factors, include; the NIKKEI 225 Index and MSCI World Real Estate Index, the Value Index to both the Small-cap and Mid-cap Indices, and the Small-cap Index and Mid-cap Index. As previously noted, RBSA is most accurate when the correlations between the benchmark indices are low. If the indices chosen perform in a highly correlated fashion, attributions may oscillate between the two closely correlated asset classes. Therefore, based on the correlation coefficients (ranging, on average, from low to moderate) there is a minimal possibility that the style exposure estimates would be spurious (or the presence of multicollinearity). Furthermore, had it been the case that the choice of the proxies to be employed was purely based on their correlation with other variables, the proxies with high correlations would have been considered unsuitable for inclusion in the construction of the RBSA model. Nevertheless, given the satisfaction of the other validation constraint imposed on the model (that is, exhaustive), the asset class variables chosen for the RBSA model were rendered suitable proxies. The focus of the analysis will now shift to the style exposures and asset allocations (to the selected style factors) of SRI funds.

5.3.2. RBSA Model Results

The summarised output, provided in Table 5.5 – Table 5.9, include the weights of the twelve style factors and the style (adjusted R^2) and skill (1 – adjusted R^2) components of return. The results of the RBSA model are presented and analysed under the four broad fund styles – equity (S.A. & global), balanced, interest-bearing and real estate. While the performance evaluation of SRI funds comprised of two sample periods, the RBSA approach only made use of a single sample period. This took into account the period Jan 2014 – Dec 2018. Within each fund style, the analysis of results focused firstly, on SRI funds (on an individual fund basis) and thereafter provided a comparative analysis of these funds to their matched (non-SRI) funds.

5.3.2.1. Equity Fund Style

5.3.2.1.1. South African Equity

Table 5.5: Style Weights of South African Equity Funds

SRI Funds								
S.A-General-Equity								
Fund name	**27Four Shari'ah Active Equity Prescient Fund**	**Community Growth Equity Fund**	**Element Earth Equity Fund**	**Element Islamic Equity Fund**	**Oasis Crescent Equity Fund**	**Old Mutual Albaraka Equity Fund**	**3 Laws Climate Change Equity Prescient Fund**	**Kagiso Islamic Equity Fund**
Style factors	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*
91-day T-bill	6.83	0	0	2.11	0	0	2.35	0
OTHI	5.74	2.06	0	0	1.78	0	4.25	0
NIKKEI	12.20	6.00	0	4.54	11.36	16.67	7.05	8.54
Eurofirst300	5.68	0	0	5.09	0	0	2.67	0
MSCI World Real Estate	2.73	0	0	0	0	0	0	0
S.A 5yr Bond	0	0	0	0	0	0	0	0
S.A 10yr Bond	8.24	0	16.39	21.18	21.89	12.45	9.43	20.06
Mid-Cap	0	4.45	26.21	18.58	0	11.92	0.76	1.97
Small-Cap	20.17	0	7.56	6.23	19.66	21.59	17.73	29.18
Growth	16.83	59.65	0	0	7.31	13.17	23.81	6.06
Value	20.46	27.85	49.84	42.26	38.00	24.20	31.30	31.66
U.S 5yr bond	1.12	0	0	0	0	0	0.66	2.53
Style (%)	54.17	85.15	71.76	63.38	72.23	69.98	75.71	75.64
Skill (%)	45.83	14.85	28.24	36.62	27.77	30.02	24.29	24.36

Table 5.5 continued…								
Non-SRI Funds								
S.A-General-Equity								
Fund name	**Mi-plan IP beta Equity Fund**	**STANLIB Index Fund**	**Prudential Equity Fund**	**Old Mutual Rafi 40 Index Fund**	**Prudential dividend maximiser Fund**	**STANLIB SA Equity Fund**	**Prescient Equity Income Fund**	**Personal Trust Equity Fund**
Style factors	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*
91-day T-bill	3.10	0	0.94	0	0	0	0	5.24
OTHI	4.50	1.00	2.60	4.12	0	4.65	16.79	0
NIKKEI	7.63	0	13.55	0	16.64	2.29	0	0
Eurofirst300	3.50	0	5.36	0	5.14	0	0	1.75
MSCI World Real Estate	0	0	0.79	0	0	4.06	4.82	0
S.A 5yr Bond	0	1.25	0.11	0	0	2.03	0	2.98
S.A 10yr Bond	0	0	0.13	0	4.02	0	0	4.74
Mid-Cap	7.61	5.83	0	0.84	0	8.01	37.52	0
Small-Cap	2.30	0	7.98	1.90	6.89	0.41	0	0
Growth	38.95	68.00	37.00	17.79	38.65	55.25	26.71	48.78
Value	31.30	23.29	28.62	73.68	26.63	22.15	10.40	35.12
U.S 5yr bond	1.11	0.62	2.93	1.68	2.02	1.15	3.76	1.39
Style (%)	94.83	93.50	91.97	91.48	91.99	81.89	78.59	80.32
Skill (%)	5.17	6.50	8.03	8.52	8.01	18.11	21.41	19.68

Table 5.5 continued…		
Large cap		
	SRI Fund	**Non-SRI fund**
Fund name	**NewFunds Shari'ah Top 40 Index Fund**	**Integre Large Cap Prescient Fund**
Style factors	*Weighting (%)*	*Weighting (%)*
91-day T-bill	0	0
OTHI	0	26.32
NIKKEI	0	0
Eurofirst300	0	0
MSCI World Real Estate	0	4.79
S.A 5yr Bond	0	0
S.A 10yr Bond	7.41	0
Mid-Cap	0	14.53
Small-Cap	0	0.51
Growth	0	30.27
Value	89.04	19.52
U.S 5yr bond	3.55	4.05
Style (%)	79.80	77.30
Skill (%)	20.20	22.70

Based on Table 5.5, using the average of the adjusted R^2 measure of SA equity funds, the percentage of return of funds within this fund style that can be attributed to asset allocation (style) was found to be approximately 71.98% (with 27.02% due to the skill or asset selection of the fund managers i.e. active component). In addition, the Community Growth Equity Fund was shown to have the highest proportion of returns attributed to asset allocation (85.15%), whilst the 27Four Shari'ah Active Equity Prescient Fund showed the lowest (54.17%). The low adjusted R^2 value of the 27Four Shari'ah Active Equity Prescient Fund indicates that the fund exhibited a high level of 'active management' rather than tracking a passive benchmark. This high level of active management could stem from the fund managers engagement in tactical asset allocation across different asset classes. Adding tactical asset allocation to the portfolio strategy would essentially result in the fund manager varying from the fund's strategic asset allocation weights to take advantage of perceived short-term opportunities (Chartered Financial Analyst, 2018a). This hypothesis is also highlighted by the fund's exposure to the various asset classes, with it being one of two funds under this fund style (the other is the 3 Laws Climate Change Equity Prescient Fund) shown to have the highest number of exposures to the selected asset classes (10 of the 12 style factors). Taking into account this finding, the fund's vast exposures across the selected asset classes could be indicative of a well-diversified portfolio.

It can be observed in Table 5.5 that S.A. equity funds showed a significant weighting to the value and growth style factor, comprising, on average, more than 50% of the funds' exposures. According to

Hayat (2015), the general inclination of equity SRI funds towards these factors (meaning emphasis placed on value and growth stocks in comparison to other asset classes) can be attributed to the Shari'ah screening guidelines (which is a screening method utilised by a significant number of equity funds in this sample) where book-to-market value[26] of total assets is ascribed a high weighting (and a major component) in Shari'ah quantitative screening. However, despite the funds showing the largest exposure to these factors, a distinction made between these factors showed that SRI funds, on average, had a larger coefficient belonging to the value style factor. Taking into account the bull and bear market regimes (and as alluded to under the performance evaluation of SRI funds), the larger exposure to value stocks could signify the general belief that these stocks hold as better investments in bear markets (as identified previously that the period 2014-2018 highlighted a bear market in S.A.). In addition, the larger exposure can also be justified based on the fact that value stocks were found to outperform, on average, against growth stocks over this period – using the value index and growth index as proxies. Therefore, portfolio managers of these funds may have considered weighting higher to these stocks to benefit from its superior performance. The findings thus far supplement those shown for the Fama and French 3-factor model and the Carhart 4-factor model in terms of value factor (HML). That is, although SRI funds showed significant exposure to both value and growth stocks, this exposure was, however, found to be greater to value stocks (i.e. had a value-tilt).

Furthermore, the largest coefficient belonging to the value style factor was found for the NewFunds Shari'ah Top 40 Index Fund (large-cap fund), having 89.04% attributed to this factor. This was found to be in line with the fund's composition, in which it comprised of large-cap value stocks. As noted previously, large-cap stocks are allotted to both the value and growth index, based on their book-to-market ratios. Hence, the significant weighting to the value factor could be indicative of its exposure to both large-cap stocks and value stocks (this is also shown under the Fama and French 3-factor model and Carhart 4-factor model in which it exhibited a larger exposure to large-cap stocks and values stocks). Based on both the fund's regression results and its investment holdings, its concentrated holdings to one style factor could essentially lead to increased risk (i.e. concentration risk). This is visible by its mandate which restricts its investments to Shari'ah compliant stocks on the JSE Top40 index, as well as its significant tilt towards the resources sector, making up 55.86% of the overall fund (known to be a highly volatile sector). Empirical findings to this hypothesis are also highlighted under the risk-return analysis section 5.2.1, showing it to have the highest risk (both total risk and market risk) of all funds that constitute the sample.

The exception to this finding, of a value-tilt, was the Community Growth Equity Fund, which showed the largest exposure to the growth style factor. Similar to the large-cap fund, this was found to be in line

[26] Book-to-market value has been widely acknowledged as the best measure of value premium (Auret & Sinclaire, 2006; Basiewicz & Auret, 2009).

with its investment mandate. However, a noteworthy finding shown by the style factor coefficients of the Community Growth Equity Fund is its given exposure to the value style factor. This exposure averaged 27.85%. As growth and value attributes form opposite scales, this could possibly suggest a movement in the fund's stock composition over time. This finding is also highlighted under the Fama and French 3-factor model and the Carhart 4-factor model, showing the fund to increase its exposure to value stocks over the study. As alluded to previously, value stocks may offer a more viable investment in bear markets (supported also by empirical evidence, whereby value stocks performed better, on average, relative to growth stocks over this period), which could have resulted in the fund's increased exposure to value stocks. However, despite the latter finding, it is observed that the NewFunds Shari'ah Top 40 Index Fund and the Community Growth Equity Fund are correctly classified with respect to their investment styles, as the largest coefficient can be ascribed to the value and growth style factor, respectively.

As shown in Table 5.5, a majority of the funds' exposures comprised of equity style factors. This finding reflects the sector's classification, which relates to it having a large exposure to general equity stocks. Due to the return exposure of these funds having a substantial weighting to equities, it is hypothesised that these funds may be highly sensitive to the business cycle. This is also highlighted in the risk-return analysis section 5.2.1, showing equity SRI funds to have the highest level of market risk relative to other fund styles – was found to have the highest beta value.

Surprisingly, the 10-year S.A. bond style factor was shown to have a significantly high coefficient relative to other factors for majority of funds within this fund style (on average, almost quarter of their exposure), despite these funds' having little to no exposure to it based on their fund composition data (according to their published factsheets). This finding is supported by Sharpe (1992) indicating, that although funds may be classified as equity type funds, their exposures to fixed income asset classes could suggest that their returns are 'sticky' because of the regulatory process, resulting in their return series to have both 'bond like' and 'stock like' features.

SRI funds showed substantially higher levels of active management in comparison to non-SRI funds. The exception was the NewFunds Shari'ah Top 40 Index Fund, which showed a marginally lower level of active management than its matched fund. This finding could be attributed to the classification of these funds. According to the funds' proposed investment mandates, both funds generally invest in large-cap value stocks. As previously noted, this was found to be consistent for the NewFunds Shari'ah Top 40 Index Fund. However, based on the regression results, its matched fund (Integre Large Cap Prescient Fund) showed a large exposure to growth stocks. Therefore, the drift from its proposed investment style could justify the lower percentage fund's return being attributed to asset allocation (style).

SRI funds contrasted to non-SRI funds with respect to its size and value exposures. SRI funds showed a higher exposure to small-cap stocks in comparison to non-SRI funds - with non-SRI funds in fact shown to have little to no exposure to the small-cap style factor. Since no index was accounted for to exclusively track large-cap stocks and the majority of non-SRI fund's exposure was to the growth and value style factor, this could be indicative of its greater exposure to large-cap stocks (in comparison to small-cap stocks). As a majority of the sample of equity SRI funds comprised of Islamic funds which employ Shari'ah screening, the criteria utilised by this screening method could have implications on the size of stocks held, and in turn, the larger exposure of SRI funds to small-cap stocks in comparison to non-SRI funds. Shari'ah screeners seek to avoid investments in so-called 'sin' sectors, which include businesses that yield substantial revenues from alcohol, tobacco, weapons and gambling, as these sectors are forbidden by Islamic (Shari'ah) law (Tower & Dean, 2010; JSE, 2013). Sound intuition tells us that portfolios that omit these oriented sectors display a tilt towards small-cap stocks, as firms found to operate in these industries are generally large (Derwall, 2007). In fact, the home bias exhibited by funds within countries predominantly known to follow broad Islamic principles explains why these funds display small-cap preferences as these economies usually host comparatively small corporations (Hoepner et al., 2011). Furthermore, as Shari'ah funds are not allowed to invest in firms with high debt to total asset ratios (debt must be less than 33% of total assets), this leaves them prone to holding sub-optimally leveraged firms. Investing in low debt firms could potentially signify a high exposure to firms that have difficulty in receiving debt financing, such as start-up firms. The size of start-up firms is generally small i.e. small-cap stocks (Hayat, 2015).

In terms of their value exposure, SRI funds were found to have a value-tilt whilst non-SRI funds showed a growth-tilt. The exception to this finding was the Old Mutual Rafi 40 Index Fund (non-SRI fund), which, in accordance with its investment mandate, showed significant exposure to the value style factor. Value stocks are those considered to be undervalued (trading at market price below its fundamentals); hence they are purchased in anticipation of the market to recognise their value. Once such is achieved (market price equals fundamentals), sound intuition suggests that these stocks will then be traded (to further search for other undervalued stocks), as continually holding them will not be as profitable to the investor (Reuter, 2017).

Growth stocks, on the other hand, are those stocks trading at a market price above their fundamentals due to them being perceived as having greater growth potential. This growth potential is understood by investors to only be achieved further in the future. Although this may also be the case for value stocks, growth stocks, however, may be required to be held longer, on average, to provide a greater opportunity to realise their true value, as growth stocks offer greater upward potential than value stocks - gains more in value, or is seen as more attractive, the greater the deviation in its market price above its fundamentals, whilst value stocks are generally more valuable when the price rises from their previous lower level (i.e. price at purchase) to the current level of its fundamentals (i.e. its capped at its level of

fundamentals) (Forbes, 2019). Taking this into consideration, the holding period of these stocks will have implications on the fund's frequency in turnover and rebalancing. Considering the claim that value stock's shorter holding period may require a higher frequency, the value-tilts shown by these funds could provide a possible reason for SRI funds showing a higher level of active management than non-SRI funds. In addition, based on the general belief of value stocks providing safer investments in bear markets, this finding suggests that relative to non-SRI funds, SRI funds are more inclined to asset exposure (holdings) adjustments in bear markets in this respect. This further substantiates the claim of their use as an 'insurance' tool in such periods (Allahverdiyev, 2017).

Furthermore, SRI funds showed a higher exposure to bonds (taking into account all bond style factors) in comparison to non-SRI funds, with SRI funds' large exposure to the S.A. 10-year bond index also not found to exist for non-SRI funds. As Sharpe (1992) indicated that due to the regulatory process equity type fund's returns could have both 'bond like' and 'stock like' features, this essentially could provide some support to the extant literature showing Shari'ah equity funds (Abdullah et al., 2007; Nainggolan et al., 2013) and SRI equity funds (Nofsinger & Varma, 2012) to perform better than conventional equity funds in bear markets - with consideration given to the fact that if the equity stocks held by these funds show bond return characteristics, this will result in them having lower correlation (than other equity stocks) to the general stock market.

5.3.2.1.2. Global Equity

Table 5.6: Style Weights of Global Equity Funds

Global-equity-general					
	SRI funds			**Non-SRI funds**	
Fund name	**Element Islamic Global Equity SCI Fund**	**Oasis Crescent International Feeder Fund**		**Old Mutual Global Emerging Markets Fund**	**STANLIB Multi-Manager Global Equity Feeder Fund**
Style factors	*Weighting (%)*	*Weighting (%)*		*Weighting (%)*	*Weighting (%)*
91-day T-bill	1.95	0		0	0
OTHI	0	0		0	0
NIKKEI	64.76	57.81		24.42	62.71
Eurofirst300	10.35	0.33		0.38	1.42
MSCI World Real Estate	0	0		0	0
S.A 5yr Bond	0	0		0	0
S.A 10yr Bond	14.32	24.64		4.42	17.19
Mid-Cap	0	0		0	0
Small-Cap	0	3.73		10.63	0
Growth	8.62	13.35		48.02	17.05
Value	0	0		12.13	0
U.S 5yr bond	0	0.14		0	1.63
Style (%)	75.80	75.46		64.73	84.44
Skill (%)	24.20	24.54		35.27	15.56

Both funds showed similar return exposures to both asset allocation and asset selection abilities of the fund manager. This was an adjusted R^2 measure of 75.8% for the Element Islamic Global Equity SCI Fund and 75.46% for the Oasis Crescent International Feeder Fund. Consistent with the said similarity i.e. of overall return exposures, these funds also showed similar exposures to the style factors. That is, those factors that they exposed to and those that they are not, and not their coefficient values. In addition, both funds were found to have the greatest exposure to the NIKKEI style factor, which was significantly higher than other style factors. As shown by both the Fama and French 3-factor model and the Carhart 4-factor model, global equity funds exhibited a greater to exposure to growth stocks (in comparison to value stocks), a finding shown to be consistent under the RBSA model. The growth bias of SRI funds has also been documented in studies for developed markets (e.g. Bauer et al., 2005), which are markets that these funds comprise a large exposure towards. Reflecting the fund style's classification, a majority of the funds' exposures comprised of global equity style factors. That is, 75.11% of the Element Islamic Global Equity SCI Fund's exposure comprised of the NIKKEI and Eurofirst300 style factors, while 58.14% of the Oasis Crescent International Feeder Fund's exposure comprised of these factors. Similar to S.A. equity funds, the 10-year S.A. bond style factor was shown to have a significantly high coefficient relative to other factors despite both funds showing no exposure to it. This is based on their fund composition data obtained from their factsheets.

SRI funds, on average, had marginally lower returns attributed to active management in comparison to non-SRI funds. Consistency was shown among these funds in terms of their tilt to the value factors. That is, both SRI and non-SRI funds showed larger exposure to the growth style factor. In addition, SRI and non-SRI funds showed similar exposures to the style factors. A notable finding was that although global equity funds should generally show significant exposure, on average, to global equities, this was however not the case for the Old Mutual Global Emerging Markets Fund (non-SRI fund), which was found to have the largest exposure to the growth style factor (comprising almost half of its total exposure). A possible reason for this finding is that the fund allocates its investments to firms operating in emerging markets, in which the style factors used in this model accounts largely for global stocks listed in developed countries (this highlights a potential weakness of the model in which the guidelines used in the selection of the global style factors account largely for developed markets and does not include a style factor to track emerging markets).

5.3.2.2. Balanced (Multi-Asset) Fund Style

Table 5.7: Style Weights of Balanced Funds

	Multi asset - income			Multi asset - flexible	
	SRI fund	Non-SRI fund		SRI fund	Non-SRI fund
Fund name	**Oasis Crescent Income Fund**	**Ashburton Multi Manager Income Fund**		**Element Flexible Fund**	**Visio BCI Actinio Fund**
Style factors	*Weighting (%)*	*Weighting (%)*		*Weighting (%)*	*Weighting (%)*
91-day T-bill	0.83	2.34		7.08	0
OTHI	53.67	61.02		20.00	15.08
NIKKEI	5.36	2.78		9.10	9.78
Eurofirst300	0	0		0.33	5.62
MSCI World Real Estate	1.60	3.17		0	1.67
S.A 5yr Bond	2.25	0		0.20	0
S.A 10yr Bond	33.89	27.65		20.89	2.12
Mid-Cap	0	0		6.96	8.65
Small-Cap	1.25	0		9.19	11.99
Growth	1.03	1.84		2.21	38.87
Value	0.13	0.52		24.03	1.50
U.S 5yr bond	0	0.68		0	4.71
Style (%)	51.49	63.01		47.99	66.96
Skill (%)	48.51	36.99		52.01	33.04

Multi asset – low equity					
	SRI funds			Non-SRI funds	
Fund name	**Oasis Crescent Balanced Stable Fund of Funds**	**Element Real Income Fund**		**S BRO BCI Defensive Fund of Funds**	**Absa Inflation Beater Fund**
Style factors	*Weighting (%)*	*Weighting (%)*		*Weighting (%)*	*Weighting (%)*
91-day T-bill	1.21	2.39		0	0
OTHI	31.24	34.46		39.65	54.84
NIKKEI	13.00	15.02		8.40	1.46
Eurofirst300	0	0.32		0	0
MSCI World Real Estate	0	1.03		4.97	4.78
S.A 5yr Bond	0	0		0	0
S.A 10yr Bond	28.77	22.35		23.35	22.86
Mid-Cap	0	0.74		0	0
Small-Cap	6.21	11.68		6.43	2.09
Growth	3.37	0.09		13.79	7.57
Value	16.20	11.93		3.14	4.48
U.S 5yr bond	0	0		0.28	1.91
Style (%)	66.40	37.79		79.70	56.39
Skill (%)	33.60	62.21		20.30	43.61

Table 5.7 continued…								
Multi asset - high equity								
	SRI funds					**Non-SRI Funds**		
Fund name	**27Four Shari'ah Balanced Prescient Fund of Funds**	**Element Islamic Balanced Fund**	**Kagiso Islamic Balanced Fund**	**Oasis Crescent Balanced High Equity Fund of Funds**	**Element Balanced SCI Fund**	**GFA BCI Managed Fund of Funds**	**ADB BCI Flexible Prudential Fund of Funds**	**4D BCI Moderate Fund of Funds**
Style factors	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*	*Weighting (%)*
91-day T-bill	0.11	4.21	4.28	0	0	1.51	0	0
OTHI	22.03	17.18	9.31	14.44	16.79	8.92	15.76	19.28
NIKKEI	15.46	7.41	7.50	12.11	8.75	17.66	12.58	13.90
Eurofirst300	2.38	6.06	2.74	0	6.72	4.48	2.55	5.13
MSCI World Real Estate	0	0	0	0	0	6.71	1.57	1.83
S.A 5yr Bond	0	0	0	0	0	0	2.03	0
S.A 10yr Bond	21.30	24.82	21.59	25.29	23.05	10.12	9.84	15.14
Mid-Cap	0	17.17	0	0	9.47	0	0.59	4.23
Small-Cap	10.60	0.36	20.63	13.88	22.61	9.58	7.54	1.86
Growth	12.35	0	11.55	4.89	0	19.77	34.91	29.70
Value	15.71	22.80	21.19	29.38	12.61	20.97	12.64	8.93
U.S 5yr bond	0.07	0.00	1.22	0	0	0.27	0	0
Style (%)	79.94	52.82	79.35	71.25	89.96	89.44	92.09	91.63
Skill (%)	20.06	47.18	20.65	28.75	10.04	10.56	7.91	8.37

Table 5.7 continued…					
Multi asset – medium equity					
	SRI funds			**Non-SRI funds**	
Fund name	**Old Mutual Albaraka Balanced Fund**	**Oasis Crescent Balanced Progressive Fund of Funds**		**Ampersand Momentum CPI Plus 4 Fund of Funds**	**Prescient Positive Return QuantPlus Fund**
Style factors	*Weighting (%)*	*Weighting (%)*		*Weighting (%)*	*Weighting (%)*
91-day T-bill	0	0		0	2.37
OTHI	20.37	16.85		18.71	44.35
NIKKEI	13.38	13.73		16.88	1.23
Eurofirst300	0	0		2.81	0
MSCI World Real Estate	0	0		6.46	1.00
S.A 5yr Bond	0	0		0	0
S.A 10yr Bond	23.14	25.96		18.74	22.99
Mid-Cap	8.58	0		0	0
Small-Cap	12.93	11.92		12.33	0
Growth	12.02	5.62		20.88	18.39
Value	9.59	25.90		2.72	9.50
U.S 5yr bond	0	0		0.46	0.17
Style (%)	68.69	69.83		76.16	78.23
Skill (%)	31.31	30.17		23.84	21.77

Based on Table 5.7, using the average of the adjusted R^2 measure of SA equity funds, the percentage of return of funds within this fund style that can be attributed to asset allocation (style) was found to be approximately 62.56% (with 37.44% due to the skill or asset selection of the fund managers), resulting it in being the fund style with the highest level of active management. However, due to this fund style comprising of various sectors with great dispersions in the adjusted R^2 value among these sectors, a closer analysis of each sector's average adjusted R^2 (or the adjusted R^2, if the sector comprises of one fund) will be more insightful. Under the multi-asset style, an average adjusted R^2 measure of 70.84% was found for the high equity sector, 69.26% for the medium equity sector and 52.10% for the low equity sector, while an adjusted R^2 of 51.49% and 47.99% was shown for the income and flexible sector, respectively (both sectors comprised of one fund only).

With respect to the high equity sector, the 27Four Shari'ah Balanced Prescient Fund of Funds was shown to have the highest proportion of returns attributed to asset allocation (79.94%), whilst the Element Islamic Balanced Fund showed the lowest (52.82%). Both medium equity funds showed similar return exposures to asset allocation and asset selection abilities of the fund manager. This was an adjusted R^2 measure of 68.69% for the Old Mutual Albaraka Balanced Fund and 69.83% for the Oasis Crescent Balanced Progressive Fund of Funds. Consistent with the said similarity i.e. of overall return exposures, these funds also showed similar exposures to the style factors. That is, those factors that they exposed to and not their coefficient values.

Regarding the low equity sector, a large difference was found between the two fund's asset allocations. The Oasis Crescent Balanced Stable Fund of Funds showed an adjusted R^2 of 66.4%, whilst the Element Real Income Fund a value of 37.79%, resulting in it being the fund with the lowest asset allocation under this fund style (and in turn the highest level of asset selection/skill). Based on Table 5.7, it can be identified that the balanced fund style's high level of active management was strongly driven by three funds, namely; the Element Real Income Fund, the Element Flexible Fund and the Oasis Crescent Income Fund. Several reasons are put forth to justify their high level of active management - in addition to the possibility that these funds could hold assets in its portfolios which are not well explained by the benchmarks used in the analysis (which would have resulted in a low adjusted R^2).

Firstly, these funds were found to have the highest number of exposures to the selected asset classes (within this fund style), indicative of the fund manager actively diversifying its exposure across the various asset classes. Secondly, the type of securities that the funds invest in should be taken into consideration. According to their factsheets, the Element Real Income and Oasis Crescent Income funds' investment holdings comprised largely of assets with short-term and medium-term maturities (both bonds and money market instruments). This attribute may require a higher level of active management when employing rebalancing measures, as these financial instruments generally have a higher turnover relative to equities (since they have to be replaced continuously). This is largely due to them having frequent maturities (Chartered Financial Analyst, 2018b). Thirdly, as further support to the claim that more frequent rebalancing results in higher levels of active management, the investment style of the fund should be considered. The Element Flexible Fund, being a flexible fund, is typically performance focused, and will, therefore, rebalance more frequently to realise profits in order to increase its cash holdings in anticipation of the next opportunity (Viljoen, 2015). Its high cash holdings can also be viewed from the regression results which showed it to have the highest exposure to the 91-day treasury bill style factor within this fund style (this may be indicative of the fund's holding towards cash according to Sharpe's guidelines used for the selection of the style benchmarks – highlighting a potential weakness of the model's assumptions, in which the detection of styles is based on return characteristics).

Lastly, the type of SRI strategy utilised by the funds was found to influence its level (or extent) of active management. The Element Real Income Fund and Element Flexible Fund, which showed the highest levels of active management employed an Engagement SRI strategy – also referred to as 'Responsible Engagement'. Engagement is quite different from other SRI approaches as it is more focused on what an investment house does with the assets they hold rather than placing emphasis on buy/sell strategies (SRI Services, 2019). The SRI strategy of screening (utilised by most funds) is generally employed by an in-house team, and apart from sending questionnaires, interaction between the fund management team and firms or explicit pressure applied on these firms to instil change are generally not part of the screening process. Engagement, on the other hand, involves frequent contact between the fund

management team and firms through use of dialogue, voting and other forms of responsible shareholder activism – such as shareholder resolutions, and is, therefore, more actively involved in the management of the assets that constitute the fund (Wagemans, Van Koppen & Mol, 2013). They seek to influence firms with the objective of enhancing shareholder value and actively strives to change corporate behaviour.

Balanced funds showed relatively large exposure to the bond style factors, more specifically the OTHI and S.A. 10-year bond (represents approximately 40% of the exposure for six funds, more than half of the exposure for three funds, and approximately 30% of the exposure for one fund). The largest of the exposure to the bond style factors was the Oasis Crescent Income Fund, accounting for 89.81% of the fund's total exposure. This was found to be contrary to its actual holdings as the fund is largely invested in money market instruments, which according to its factsheet, accounts for 85.96% of the fund's asset holdings. The drift from its investment holdings could justify the lower percentage of return of the fund being attributed to asset allocation (style). However, caution should be given to the interpretation of these results. As income generating securities include bonds, with no style benchmark used to track all types of money market instruments (although the use of the 91-day treasury bill style factor), this could potentially result in the model identifying the return of the fund to have similar return characteristics to bonds (as an alternate income generating asset). Furthermore, as predicted, the exposure to bonds was found to decrease when viewed in relative terms from high equity to medium equity to low equity funds. With respect to the funds' equity exposure, 70% of the balanced funds showed, on average, the highest exposure to the value style factor. Consistent with this finding, as well to the Fama and French 3-factor model and the Carhart 4-factor model, balanced funds, on average, were found to have a value-tilt (as opposed to a growth-tilt). This is shown by 80% of the SRI funds having higher exposure to the value factor than to the growth factor.

SRI funds showed substantially higher levels of active management in comparison to non-SRI funds for all sectors that comprise this fund style (as well as the highest for all fund styles). The higher level of active management identified for SRI funds could be indicative of both the screening process implemented and the constantly changing SRI universe (due to securities conforming and non-conforming to SRI criteria on a regular basis), thereby requiring a high level of (or continuous) active involvement of fund managers in the construction and rebalancing of the portfolio/fund to ensure the alignment of its investment decisions with the fund's mandate and SRI investment criteria (for example, selecting stocks that conform to ESG criteria). In theory, the balanced (multi-asset) fund style should comprise of the greatest number of financial instruments and asset classes, thus requiring multiple screening criteria, and in turn, could possibly justify the significantly higher level of active management. In addition to balanced funds rebalancing regularly due to the screening process employed, these funds are also rebalanced frequently due to their asset allocation plan - must maintain certain weightings to stocks and bonds, based on the fund's categorisation; conservative, moderate or

aggressive. Furthermore, as mentioned previously, SRI strategies such as Engagement, found largely for balanced funds, require a substantially higher level of active involvement than conventional SRI strategies (such as screening), which could provide an additional reason for balanced funds exhibiting a higher level of active management.

The exposure of balanced funds can be segregated into two components, namely; equity and bond style factors. Similar to the equity fund style, SRI funds contrasted to non-SRI funds in terms of value factor exposures, with non-SRI funds showing, on average, a greater exposure to the growth style factor. The findings for the bond style factors were shown to be more consistent. That is, non-SRI funds were also found to have significant exposure to both the OTHI and S.A. 10-year style factors. The OTHI style factor was, however, found to be the most dominant of these exposures, indicating that both SRI and non-SRI funds showed significant exposure to corporate bonds. This was found, on average, to be consistent with their asset holdings. A notable finding was shown for the multi-asset income sector, which comprised of both the SRI and non-SRI exhibiting the largest exposure to the bond style factors. However, a distinction was shown in the classification of these funds to their composition data. As previously noted, the regression results for the Oasis Crescent Income Fund showed that it followed an investment strategy contrary to its actual investment holdings, while the Ashburton Multi Manager Income Fund, on the other hand, was found to comply with its investment holdings (which could also justify its higher percentage of returns attributed to asset allocation relative to the matched SRI fund).

Furthermore, the large exposure of these funds to bonds (on average, almost 50% of the funds' holdings comprised of bonds – with SRI funds showing a marginally higher exposure) could indicate that these funds will perform better than equity funds in bear markets due to their lower correlation with the overall stock market. The lower correlation of balanced funds is also highlighted under the risk-return analysis section 5.2.1 in which balanced funds were found to exhibit a lower beta (market risk) than equity funds.

5.3.2.3. Interest-Bearing Fund Style

Table 5.8: Style Weights of Interest-Bearing Fund

South Africa-Interest bearing – variable term		
	SRI fund	**Non-SRI Fund**
Fund name	**Community Growth Gilt Fund**	**STANLIB Bond Fund**
Style factors	*Weighting (%)*	*Weighting (%)*
91-day T-bill	2.48	2.28
OTHI	90.97	93.56
NIKKEI	0	0
Eurofirst300	0.92	0.15
MSCI World Real Estate	0	0
S.A 5yr Bond	0.99	0
S.A 10yr Bond	0.06	0
Mid-Cap	0	0
Small-Cap	2.29	1.80
Growth	1.64	1.13
Value	0	0
U.S 5yr bond	0.65	1.08
Style (%)	98.56	97.40
Skill (%)	1.44	2.60

Based on the adjusted R^2 measure, 98.56 % of the Community Growth Gilt Fund's return can be attributed to asset allocation, whilst 1.44% to the skill of the fund manager. This was found to have the highest asset allocation of all funds that constitute the sample. This substantial proportion of the fund's returns being attributed to the style of investing that the fund follows (asset allocation), as compared to asset selection, suggests that style investing holds significant power in explaining the returns with respect to the fund invested in the interest-bearing fund style. Following the viewpoint that funds with substantial short-term to medium-term maturities may require a higher level of active management due to their constant turnover (expressed under the balanced fund style), the substantial exposure of the Community Growth Gilt Fund to long-term bonds (76.9% of its asset holdings) could provide a possible reason for its low level of active management – as long-term bonds will require a lower turnover.

In addition, the regression results suggest that the Community Growth Gilt Fund is correctly classified with respect to its investment style, as the largest coefficient is attributed to the OTHI style factor (90.97%). The OTHI factor accounts for all corporate bonds included in the ALBI (one half of the ALBI), which according to the fund's proposed investment mandate stated that the fund invests predominantly in corporate bonds, more specifically, with an emphasis in reconstruction and development. This is further highlighted by the composition of the fund (based on its factsheet), in which corporate bonds comprised approximately 95.3% of its asset class holdings. In fact, the fund's

holdings comprised of only two asset classes. That is, 95.3% in corporate bonds and 4.7% in cash, which as shown by the regression results are also the two largest coefficients of the fund (90.97% in corporate bonds and 2.48% in cash). This is in addition to them forming the majority of the exposure of the fund's regression (93.45%). The exposure to treasury bills returns may be indicative of the fund's regulatory requirement to hold cash, which is specified in the fund's factsheet as a liquidity requirement. However, as shown by the fund's concentrated holdings to one style factor i.e. the OTHI factor, this exposure can essentially lead to increased risk.

SRI and non-SRI funds showed similar levels of active management. Similar to the SRI fund, the non-SRI fund showed the largest exposure to the OTHI Style factor (in line with its investment mandate) and the highest asset allocation of all non-SRI funds that constitute the sample. With over 90% of the funds' (SRI and non-SRI) returns being attributed to the factor that comprises the style of the fund (largest found for all funds that had the highest exposure to the style factor which comprised its fund style), this could potentially provide a reason for these funds having the largest proportion of return being attributed to asset allocation. In addition, the largest exposure shown by these funds to the given style factor (i.e. OTHI style factor) and in turn the highest return attributed to asset allocation could be ascribed to their fund style, with a distinction made between stock and bond asset classes (this whilst also considering the funds' significant exposure to corporate bonds based on its actual asset holdings). Bonds are generally segregated into two distinct asset classes, namely; government bonds and corporate bonds, hence the asset class universe is relatively small. Stocks, on the other hand, constitute of various asset classes, for example, growth stocks, therefore comprise of a larger universe. Furthermore, these asset classes could contain securities that have return characteristics which overlap, for example, small-cap growth stocks. As style analysis considers the detection of styles based on the return characteristics of the asset classes, this allows for a greater concentration of the return distribution to the selected (bond) style factors for a fund comprising largely of bonds.

5.3.2.4. Real Estate (Property) Fund Style

Table 5.9: Style Weights of Real Estate Fund

Global-property-general		
	SRI Fund	**Non-SRI Fund**
Fund name	**Oasis Crescent International Property Equity Feeder Fund**	**STANLIB Global Property Feeder Fund**
Style factors	*Weighting (%)*	*Weighting (%)*
91-day T-bill	2.20	0
OTHI	0	0
NIKKEI	0	0
Eurofirst300	0	0
MSCI World Real Estate	82.90	93.36
S.A 5yr Bond	0.47	6.63
S.A 10yr Bond	13.20	0
Mid-Cap	0	0
Small-Cap	0	0
Growth	0	0
Value	0	0
U.S 5yr bond	1.24	0
Style (%)	82.94	89.14
Skill (%)	17.06	10.86

82.94% of the Oasis Crescent International Property Equity Feeder Fund's return can be associated with asset allocation, with the remaining 17.06% attributed to the fund manager's skill. Almost identical to the fund's asset allocation, 82.90% of the fund's exposure was allocated to the MSCI world Real Estate style factor. Similar to the findings of the interest-bearing fund style, the significant exposure to this asset class suggest that the Oasis Crescent International Property Equity Feeder Fund is correctly classified with respect to its style (as according to the fund's proposed investment mandate, it invests predominantly in foreign property stocks).

Based on the fund's composition (as shown by its factsheet), the regression results were found to mirror these exposures. That is, according to the fund's factsheet, it comprised of four asset holdings; foreign property (86.27%), S.A. property (4.86%), cash (5.49%) and Bonds (3.38%), which, based the coefficients of the model, the total exposure of the fund was shown to be weighted to 3 of the 4 aforementioned asset classes. The exception being the S.A. property factor as no index was included in the model to account for this factor. The fund's holding of cash (shown by both the regression results and actual asset holdings) could be indicative of its exposure to REITs stocks, which as indicated previously, distribute 90% of their taxable income as dividends. However, as shown by the fund's concentrated holdings to one style factor i.e. the MSCI world Real Estate factor, this exposure can

essentially lead to increased risk (which as shown under the risk-return analysis section exhibited the highest level of risk of all fund styles).

The SRI fund had a larger proportion of its return attributed to the skill of the manager. Similar to the SRI fund, the non-SRI fund showed the largest exposure to the MSCI World Real Estate Style factor (93.36%). This was found to be consistent with its investment mandate, in addition to it almost mirroring the actual exposure of the fund to this style factor (according to its factsheet, the fund's exposure to foreign property is 94.70% of total assets). While both funds showed significant exposure to the property style factor, the non-SRI fund exhibited a relatively larger exposure to this factor, which could potentially provide a justification for the STANLIB Global Property Feeder Fund having a larger proportion of return being attributed to asset allocation (style). Furthermore, the reason for the larger exposure of the non-SRI fund to the MSCI World Real Estate Style factor can be ascribed to the fund having exposure to foreign property exclusively, whereas, the Oasis Crescent International Property Equity Feeder Fund has exposure to both foreign and domestic property (although a significantly larger exposure to foreign property). This is based on the actual holdings of the funds shown in their factsheets.

5.4. Conclusion

The chapter presented the results of the three quantitative models used in addressing the research questions of the study. As indicated, the Fama and French 3-factor model and the Carhart 4-factor model were employed in the performance evaluation of SRI funds, while the RBSA model was used for the style analysis of SRI funds.

The findings under the Fama and French 3-factor model showed that SRI funds underperformed, on average, relative to its matched funds and passive benchmarks in sub-period one while exhibited no significant difference in performance relative to their conventional counterparts in sub-period two and sample period two. The findings under the Carhart 4-factor model were shown to be more consistent. That is, SRI funds exhibited no significant difference in performance relative to their conventional counterparts over both sample periods. However, despite the mixed findings shown by the models in terms of their performances relative to their conventional peers, a consensus was shown by them in that they found SRI funds to exhibit improved performance over the study. This was termed as a 'learning effect' - the older funds have finally caught up with conventional funds (or outperformed them), while funds that were launched recently still trail their conventional peers. Furthermore, the models showed similar findings for the market loading, size (SMB) and value (HML) factors – SRI funds exhibited a lower sensitivity to market fluctuations as compared to non-SRI funds, a higher exposure to small-cap stocks, and exhibited a larger exposure to growth stocks in the earlier period (2009-2013) while a greater exposure to value stocks in the latter period (2014-2018).

The findings of the RBSA model showed that SRI funds, on average, exhibited moderate to high levels of active management, which were also found to be substantially higher than non-SRI funds. Additionally, the balanced fund style showed the highest level of active management (both in isolation and relative to non-SRI funds). The classifications of SRI funds were shown, on average, to comply with their investment mandates and relevant regulation, i.e. correctly classified. Furthermore, based on the regression results, the exposures of SRI funds were found, on average, to almost mirror the exposures of their asset holdings, as shown by their factsheets (that is, the types of asset classes they invest in, while in some instances, showing similar exposures to them in value terms).

CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter entails a summary of the findings of the study with respect to the objectives sought out and presents concluding remarks to the study. In addition, it offers recommendations for both investors and future studies along this field of research, based on the findings to the research questions addressed. Lastly, the chapter will highlight the challenges encountered in the investigation of the objectives, described as limitations to the study.

6.2. Summary of Findings

6.2.1. Performance Evaluation of SRI Funds

The study sought to fulfil two objectives. The study evaluated the risk-adjusted performance of SRI funds relative to both conventional funds (non-SRI funds) and their passive benchmarks in fulfilment of its first objective. The broad literature surrounding this field have yielded arguments supporting the over-under-and neutral performance of SRI funds relative to its conventional counterparts in S.A., with no consensus shown among the limited empirical studies surrounding this research domain, i.e. Viviers (2007) and Du Plessis (2015). The fundamental assertion in favour of SRI claims that significant levels of CSR are indicators of firm's with high quality and effective management and could potentially reflect comparative advantages over those considered less socially responsible. Also, in light of SRI funds, the restricted universe imposed by SRI criteria (e.g. screening) would convey value-relevant information, allowing for fund managers to gain more intimate knowledge of stocks that constitute SRI funds, translating into them outperforming their conventional peers. However, critics of SRI sustain that the additional costs associated with the monitoring of social performance and the imposition of additional constraints (through the SRI screening process) will essentially deter the formation of an optimal portfolio, resulting in reduced diversification benefits and lowered risk-adjusted returns (Cortez et al., 2009). This assessment, drawing attention to the proposed arguments, will shed light on whether SRI funds under/outperformed or exhibited a neutral performance compared to its conventional counterparts.

The study employed two statistical models; Fama and French 3-factor model and the Carhart 4-factor model, to aid in the performance evaluation of SRI funds. The performance evaluation was conducted over two sample periods for four broad fund styles (i.e. equity, balanced, interest-bearing and property). Table 6.1 presents a summary of the findings for the respective models. Although mixed findings were shown under the Fama and French 3-factor model and the Carhart 4-factor model, a consensus shown

by the models on the improved performance of SRI funds and its exposure to the market loading (β), size (SMB) and value (HML) factors.

Table 6.1: Summary Table for the Performance Evaluation of SRI Funds

	Fama & French 3-factor Model				**Carhart 4-factor Model**		
	Average alpha for SRI funds *(1)*	***Difference Fund (alpha)*** *(2)*	***Difference Benchmark (alpha)*** *(2)*		***Average alpha for SRI funds***	***Difference Fund (alpha)***	***Difference Benchmark (alpha)***
Sub-period one	-0.000318	83% Negative 17% Insignificant	92% Negative 8% Insignificant		-0.011788	75% Insignificant 25% Negative	67% Insignificant 33% Negative
Sub-period two	0.000577	100% insignificant	83% Insignificant 17% Negative		0.008678	83% insignificant 17% Positive	75% Insignificant 25% Positive
Sample period two	0.000578	96% insignificant 4% Negative	70% insignificant 30% Negative		0.005105	74% insignificant 13% Positive 13% Negative	70% insignificant 13% Positive 17% Negative
(1) average alpha value of all SRI funds for the respective period (both statistically significant and statistically insignificant) *(2) the percentage of statistically positive and negative alphas and statistically insignificant alphas for the respective period*							

The Fama and French 3-factor model showed mixed findings. That is, SRI funds were found to underperform, on average, relative to its matched funds and passive benchmarks in sub-period one while exhibited no significant difference in performance relative to their conventional counterparts in sub-period two and sample period two. The significant underperformance of SRI funds relative to their conventional counterparts in sub-period one could be partially explained by the screening process used by SRI funds - which is a defining attribute shown to distinguish SRI funds from non-SRI funds. Literature has shown that the larger the number of screens used (i.e. more intense screening used), the greater the limits imposed on the investable universe of SRI funds – the smaller the investment universe, resulting in reduced diversification benefits, i.e. sub-optimal portfolio (Cortez et al., 2009), and the greater the amount of return that is sacrificed due to screening (Lee et al., 2010; Capelle-Blancard & Monjon, 2014). As such, the majority of the sample comprised of Shari'ah screened funds (74% of the sample) which are found, on average, to have high levels of screening, i.e. multiple screens (Hayat, 2015).

The findings of the Carhart 4-factor model showed that SRI funds exhibited no significant difference in performance relative to their conventional counterparts over both sample periods. Furthermore, the analysis of the relative performance of SRI funds within each fund style for sample period two showed a trend in which, the underperformance of SRI funds relative to its matched funds followed an underperformance to its passive benchmark as well. This also applied to the outperformance of its matched funds and passive benchmarks. The only exception to this finding was an S.A. equity fund, which outperformed its passive benchmark and exhibited no significant difference in its performance relative to its matched fund. Relative to the Fama and French 3-factor model, this pattern in performance

provides a consensus (or greater sense of clarity) on its collective performance against both its active and passive conventional counterparts, allowing for investors to make more informed decisions on which offers a more viable investment option (i.e. SRI investments or conventional investments - as compared to the difficulty in identifying such if the SRI fund underperforms its matched fund and outperforms its passive benchmark or vice versa).

Despite the mixed findings shown under the Fama and French 3-factor model and the Carhart 4-factor model, a consensus was shown by the models in that they found SRI funds to exhibit improved performance over the study i.e. underperformed in the earlier sub-period of the study, while outperformed or exhibited no significant difference in performance in the latter sub-period (or despite underperforming in both sub-periods, the fund underperformed by a smaller margin in sub-period two as compared to sub-period one) – as shown by the alpha of the SRI funds (its average alpha found in Table 6.1), the difference funds and difference benchmarks. This finding could possibly suggest that the SRI sector in S.A. had undergone a learning effect - fund managers have enhanced their skills within the SRI market, resulting in them achieving improved fund performance with the progression of time. Such an effect would also be consistent with the size of the South African SRI market which has increased over time, enabling asset management firms to recruit fund managers that are more familiarised with the various dimensions of SRI. Similar learning effects were also documented for SRI markets in Australia (Cummings, 2000; Bauer et al., 2006), the U.K. (Mill, 2006) as well as in the U.S. and in Germany (Bauer et al., 2005). This finding might also be attributed to the nature of the SRI strategies employed by South African SRI funds, with many having a substantial holding in equities, either by means of screening or shareholder activism strategy (Viviers, 2007).

Other contributing factors could include the increasingly high commodity and property prices. Additionally, SRI funds, more specifically balanced funds are generally found to rebalance regularly (largely due to SRI screening and the constantly changing SRI universe). Engaging in such creates an opportunity for holding an optimal mix of portfolio assets, while also decreasing the fund's exposure to the portion that just performed best and increasing its exposure to the portion that underperformed, which could essentially result in a continuous enhancement of the fund's performance.

Furthermore, the findings for the Carhart 4-factor model showed a strong age effect for S.A. equity SRI funds when these funds were divided based on their inception date. Funds that were formed before 2009 (funds that comprised both sample period one and two), on average, performed better than funds that were launched after 2009 (funds that solely comprised of sample period two). This is based on the evidence that any outperformance shown by S.A. equity SRI funds relative to its conventional counterparts in sample period two were strongly driven by older funds, as all funds that outperformed in sample period two were funds formed before 2009. The difference in performance noted further supports the learning effect whereby, the older funds have finally caught up with conventional funds or

outperformed them while funds that were launched recently still trail their conventional peers. Similarly, with respect to SRI funds performing better than their conventional counterparts in the bear market, a distinction can be made between older and younger funds, whereby this finding was shown to be more prominent for older funds than younger funds.

Based on these findings, i.e. improved performance, it is suggested that SRI funds are more viable as long-term investments. This is shown to be in line with the objective of SRI whereby its approach is aimed at both sustainable investing and having positive long-term effects on ESG concerns, which in turn will aid firms in achieving their desired goal of sustainability and a 'going concern'[27] (for example, through strong corporate governance). Also, by focusing on creating long term value firms that incorporate ESG concerns in their strategic decision making may even be able to help mitigate the impact of risks beyond their control – such as droughts, high energy costs or labour unrest, which will allow them to be profitable even during crises periods (Caplan, Griswold & Jarvis, 2013). Furthermore, the long-term investment approach of SRI funds can also be attributed to the long tenure in the performance focus of SRI fund managers, whereby the SRI market requires these managers to have specialist skills which are gained only through experience (Humphrey et al., 2016).

In addition to the improvement in performance being attributed to a 'learning-effect' by SRI fund managers, the finding of a negative alpha (average alpha value) for SRI funds in sub-period one and the change to a positive alpha in sub-period two (as well as the positive alpha in sample period two) could also highlight the fact that these funds performed better in the bear market (sub-period two) whilst performed poorly in the bull market (sub-period one). This could be largely attributed to the reduced market risk (systematic risk) found for SRI funds and its exposure adjustments shown for the transition from a bull to bear market – increasing its exposure to large-cap stocks (as compared to small-cap stocks) and value stocks (as compared to growth stocks), which were found, on average, to outperform over this period.

Further to the improved performance being a uniform finding among both models, SRI funds showed less variation to market fluctuations than non-SRI funds, with these funds shown to reduce its market risk over time, as indicated by the reduction in its market betas over the evaluation period (a lower market risk in the bear market period). This finding is supported by Renneboog et al. (2008) and Oikonomou, et al. (2012), in which, the latter author indicated could be a possible reason for the extant research showing SRI funds to exhibit superior performance over conventional funds in periods of financial crisis or market downturn (due to its low correlation with the market, i.e. lower systematic

[27] Going concern refers to an accounting term used for a firm indicating that it has the necessary resources required to continue operating indefinitely until it shows evidence to the contrary. This term also makes reference to a firm's ability to generate enough capital to fund operations and avoid bankruptcy (De Villiers, 1999).

risk). Nofsinger & Varma (2012) further added that the outperformance of SRI firms in periods of market crisis could be largely attributed to both better corporate governance and high employee satisfaction measures, which will essentially lead to reduced bankruptcy risk and in turn allowing these firms to be more suited in dealing with adverse systematic economic shocks.

Additionally, Lee et al. (2010) found that SRI funds sensitivity to market returns is further weakened when fund managers employ intense screening. As such, with the majority of the sample comprising of Shari'ah screened funds, which, on average, are found to have high levels of screening (Hayat, 2015), this could further explain the lower market risk shown by SRI funds relative to non-SRI funds. As support to this claim, Abdullah et al. (2007) found that Shari'ah funds exhibited lower risk than conventional funds, which also aided in these funds outperforming their conventional counterparts in bear markets. Furthermore, another finding shown to be consistent among both the models in this respect was that global equity funds showed a lower level of risk than S.A. equity funds (in their respective sub-periods and for sample period two). Similar to Wikstrom (2014), Barwick-Barrett (2015) and Op Den Camp (2018), this could be attributed to the SRI screening process employed by these funds, in which despite the restricted universe that it offers, the funds that have a global investment strategy are presented with greater flexibility and a larger investment universe in comparison to local funds, allowing for a more diversified portfolio which, for example, will reduce concentration risk.

Moreover, in terms of its equity exposure (SMB and HML factors), the findings for the size factor showed SRI funds to have, on average, a larger exposure to small-cap stocks (in comparison to large-cap stocks). As the sample comprised largely of Shari'ah funds, the small-size bias shown by these funds relates to the findings of Tower & Dean (2010), which indicates that funds employing Shari'ah screening are unlikely to invest in large companies (large-cap stocks), as this will increase diversification efforts which in turn will increase the risk of these funds operating in sectors/industries forbidden by Shari'ah law ('sin' sectors). Although SRI funds showed a strong preference for small-cap stocks, further analysis indicated that SRI funds reduced their exposure to these stocks over sample period one. The finding of reduced small-cap exposure viewed in support of the Efficient Markets Hypothesis (EMH) – which implies a higher equity risk premium ascribed to small-cap stocks as compared to large-cap stocks (as a result of their higher cost of capital and greater business risk), could possibly indicate the reduction in market risk of SRI funds (Rolnick et al., 2014). Furthermore, taking into account the bull and bear market regimes, the increased exposure to large-cap stocks from sub-period one to sub-period two (the move from a bull to bear market) could signify the general belief that small-cap stocks provide more viable investments in bull markets whilst large-cap stocks provide safer investments in bear markets.

As further support to this view, empirical evidence on the relative performance of the small-cap index and large-cap index (which were used as proxies), showed small-cap stocks to perform better, on

average, relative to large-cap stocks in sub-period one whilst performed poorer relative to them in sub-period two (based on three performance measures; (i) their computed average return over the period and (ii) the CAPM (iii) the Sharpe ratio). Therefore, portfolio managers of these funds may have considered weighting higher to these stocks to benefit from its superior performance.

The findings for the value factor showed that SRI funds exhibited a larger exposure to growth stocks in sub-period one while a greater exposure to value stocks in sub-period two and sample period two (which are essentially the same time frame). Considering the bull and bear market regimes, the significant change in the exposure to the value factor in the respective sub-periods can be explained by two perspectives. Firstly, it could indicate that SRI funds made two exposure adjustments to account for the transition from a bull to bear market. The larger exposure to growth stocks in sub-period one and value stocks in sub-period two could signify the general belief that growth stocks provide more viable investments in bull markets while value stocks hold as safer investments in bear markets (Lakonishok, Shleifer & Vishny, 1994; Reuter, 2017). As further support to this view, using the value index and growth index as proxies, the significant exposure to growth stocks in sub-period one and their greater exposure to value stocks in sub-period two can be justified based on the fact that growth stocks were found to perform better, on average, relative to value stocks in sub-period one whilst performed poorer relative to them in sub-period two (based on three performance measures; (i) their computed average return over the period and (ii) the CAPM (iii) the Sharpe ratio). This could further justify the respective exposures found.

The second perspective can be explained by SRI funds, only making a single adjustment to account for the transition to a bear market. This is based on the extant literature, that includes both South African (Du Plessis, 2015) and international (Renneboog et al., 2008; Hoepner et al., 2011) studies showing Islamic and SRI funds to have a growth-tilt – mainly due the screening criteria employed. Furthermore, although SRI funds showed, on average, differing exposures to the value factor based on changing market conditions (bull and bear markets), consistency was shown for global funds (the global equity fund and global property fund) in which they exhibited a larger exposure to growth stocks in both sub-periods (in addition to them showing the largest exposure to growth stocks). This further validates the claim that SRI funds are shown to have a tendency for a growth-tilt.

Furthermore, in addition to the possibility that the reduction in the exposure to small-cap stocks by SRI funds resulted in the reduction of their market risk over the sample period, the increased exposure to value stocks (reduced exposure to growth stocks) by these funds from sub-period one to two could have been another contributing factor. This is based on the findings of growth-type investments yielding higher levels of market risk - both found in this study and literature (Harris & Marston, 1994).

Relative to non-SRI funds, the exposures of SRI funds to the size (SMB) and value (HML) factors showed mixed results. However, similarities were shown for the models with respect to their findings. In terms of the size factor, SRI funds exhibited, on average, a higher exposure to small-cap stocks over sample period one (both sub-periods), while only a marginally higher exposure to these stocks in sample period two (almost an equal number of funds showed a higher exposure to small-cap stocks). For the value factor, the findings were shown to be consistent with the value-tilts found for SRI funds in isolation. That is, SRI fund showed, on average, a larger exposure to growth stocks in sub-period one and value stocks in sub-period two and sample period two (the latter two periods constituted the same time frame). Furthermore, the findings showed stronger evidence for the HML factor than for the SMB factor. This was largely due to the consistency in findings shown for the two major fund styles in the sample for the HML factor (both the equity and balanced fund styles showed, on average, a larger exposure to the value factor) and the contradictory findings shown for these fund styles regarding the SMB factor (the equity fund style showed, on average, a larger exposure to the size factor while the balanced fund style exhibited, on average, a lower exposure). With respect to the momentum factor (MOM), the Carhart 4-factor model that the momentum effect was, on average, not statistically significant for the sample of SRI and non-SRI funds (shown by both the p-value test and the adjusted R^2 of the model).

In terms of the performances of the respective fund styles, the findings are as follows:

- Equity SRI funds may provide a better performance, on average, than the overall market (using the JSE ALSI as a proxy) over the long term.
- Investments in balanced SRI funds, on average, may not provide a good hedge against inflation or earn a real return over inflation. A possible reason for such is that balanced SRI funds generally engage in regular rebalancing. This essentially leads to higher transaction costs, which could have adverse effects on the return of the fund. As their passive benchmarks are constructed CPI indices, they avoid such costs.
- Interest-bearing SRI funds provide a low correlation with the market due to its substantial holding of bonds. Therefore, they are found to perform better in bear markets whilst performing poorly in bullish markets.
- Real Estate SRI funds are found to be a profitable investment in both bull and bear markets. This can be attributed to the booming property market, experiencing exponential growth in recent years (after the global financial crises) – best performing asset class in S.A. for the period 2009-2016. However, due to the high concentration of its asset holdings to property stocks, this resulted in the fund style being found to have the highest risk (i.e. largely attributed to concentration risk).

6.2.2. Style Analysis of SRI Funds

In fulfilment of the second research objective, the study conducted both a style analysis of SRI funds on an individual fund basis and comparative to its non-SRI industry peers. In light of the style analysis of SRI funds, there are no empirical studies on the style analysis of SRI funds that was found to exist for S.A. (although studies were found to exist internationally). Therefore, adding to the body of knowledge, the study, through employing the RBSA model, aimed to identify the determinants of return of SRI funds. The RBSA model's parameters provided two forms of interpretation. Firstly, the proportion of return that can be attributed to the fund's asset allocation ('style') and managers 'skill' (active management). Secondly, the style factors/asset classes exposures that contributed to the overall return of fund (which were identified by the coefficient values obtained using Excel Solver). Based on these interpretations, the second objective of the study was achieved by highlighting three sources of findings. Firstly, it determined whether SRI funds were correctly classified with respect to its investment mandate, based on the exposures of the fund to the selected asset classes. Secondly, it identified the extent of the fund manager's active involvement in the management of these funds (assessed both in isolation and relative to conventional fund managers), shedding light on whether or not the imposition of additional constraints limits the portfolio manager's ability to add value through active management. Lastly, the fund's style exposures and its return composition were determined.

The study employed the RBSA model to identify their determinants of return to aid in the style analysis of both SRI and non-SRI funds. The motivation for the pursuit of this research area is based on the astonishing belief in the fund management sphere, that style consistency can be indicative of both a skilful fund manager and a successful risk management system. Hence, it forms an advisable distinction when searching for and retaining managers, in addition to the implied benefits in the portfolio construction process. In fact, the vast majority of academic research infers that there is a positive relationship between investment style consistency and performance. Furthermore, it is important for investors to understand the style benchmark of the funds, both for investment consideration and investments undertaken, to gain an idea of the active management skill of the fund managers. The fund manager should, in holding different securities within each asset class other than that included by the benchmark representing that asset class (selection), generate an excess return over the given style benchmark, to ensure the effectiveness of active management.

The analysis commenced with a focus on the correlations among the 12 selected assets. The findings of which showed the asset classes, on average, to have relatively low to moderate correlations (with the exception of some asset classes having relatively high correlation coefficients). Establishing the constraints of the RBSA model of having both mutually exclusive and exhaustive asset classes, a constrained regression was conducted on the funds' returns against the returns of the selected asset classes. The interpretation of the adjusted R^2 value and their exposures to the respective style factors

then followed. It should be noted that one of the shortcomings with respect to the interpretation of the adjusted R^2 measure is that it is dependent on the degree to which a specific model fits the provided data.

Based on the interpretation of the adjusted R^2 value, SRI funds were found, on average, to exhibit moderate to high levels of active management, which were also shown to be substantially higher than non-SRI funds. This indicates that fund managers, in an effort to manage the portfolio's holdings 'actively', invested in various securities within each asset class than the style benchmarks, and had differing asset allocations than that suggested by the passive style benchmarks, thereby resulting in the difference from the style benchmark. Based on the respective fund styles, the balanced fund style was found to have the highest level of active management both in isolation (averaged approximately 37.44% due to active management) and relative to non-SRI funds. The fundamental assertion in favour of the level of active management identified for SRI funds is that both the screening process implemented and the constantly changing SRI universe (due to securities conforming and non-conforming to SRI criteria on a regular basis, resulting in a high turnover), may require a high level of (or continuous) active involvement of fund managers in the construction and rebalancing of the portfolio/fund to ensure the alignment of its investment decisions with the fund's mandate and SRI investment criteria (for example, selecting stocks that conform to ESG criteria). In theory, the balanced (multi-asset) fund style should comprise of the greatest number of asset classes, thus requiring a higher level of screening, and in turn, could possibly justify its highest level of active management. In addition to balanced funds rebalancing regularly due to the screening process employed, these funds are also rebalanced frequently due to their asset allocation plan (must maintain certain weightings to stocks and bonds, based on the fund's categorisation; conservative, moderate or aggressive) - further substantiating its high level of active management.

Furthermore, within the sample of SRI funds, the funds shown to have the highest level of active management can be explained by various findings. Firstly, it was found that funds with high active management tend to exhibit a greater proportion of return attributable to asset selection, while actively diversifying their exposure across the highest number of asset classes (showed, on average, the largest number of exposures to the 12 asset classes). In light of this finding, it is hypothesised that the fund managers of these funds could be engaging in tactical asset allocation across different asset classes, which, in turn, will result in a higher level of active involvement in the fund. Secondly, attention was drawn to funds with a substantial holding in assets with short-term and medium-term maturities (both bonds and money market instruments). This attribute may require a higher level of active management when employing rebalancing measures, as these financial instruments generally have a higher turnover relative to equities (since they have to be replaced continuously). This is largely due to them having frequent maturities (Chartered Financial Analyst, 2018b).

Thirdly, funds that constituted the respective fund styles showed distinguishable differences in active management, thereby implying that the investment style of the fund largely impacted the level of active management exhibited by the fund. Funds that generally book profits regularly to reinvest it in other profitable investments, rather than trying to time market sentiment for maximum profit, resulting in a higher turnover and more regular rebalancing, were found, on average, to have higher levels of active management (for example, the SRI fund from the multi-asset flexible sector). Lastly, the type of SRI strategy utilised by the funds was shown to influence its level (or extent) of active management. The funds which employed an Engagement SRI strategy were found to have the highest levels of active management for the sample of SRI funds (found largely for the balanced fund style) – this approach requires a higher level of active involvement than SRI screening (utilised by majority of SRI funds) as it involves frequent contact between the fund management team and firms through use of dialogue, voting and other forms of responsible shareholder activism (such as shareholder resolutions), resulting in more active involvement in the management of the assets that constitute the fund (Wagemans et al., 2013).

Similar to the findings of the balanced fund style showing the highest level of active management (both in isolation and relative to non-SRI funds), the findings for RBSA indicated that style investing was shown to hold significant power in explaining fund returns with respect to the interest-bearing fund style. This is based on evidence that the SRI and the non-SRI fund from this fund style (only constituted of one SRI fund) were found to have the highest asset allocation of all funds that constitute the sample (an adjusted R^2 of 98.56% for the SRI fund and 97.40% for the non-SRI fund). Following the viewpoint that funds with substantial short-term to medium-term maturities may require a higher level of active management due to their constant turnover, the substantial exposure of these funds to long-term bonds could provide a possible reason for their low level of active management – as long-term bonds will require a lower turnover.

Regarding the funds' exposures to the respective style factors, similarities were noted for both SRI funds within their respective fund style and the complete sample of funds. In terms of the funds' exposure to the equity style factors, SRI funds were found, on average, to have a value tilt. However, further analysis of the respective fund styles showed, S.A. equity and balanced (multi-asset) funds to have, on average, a value-tilt, while global equity funds showed a growth-tilt (and significant exposure to the global equity asset classes, which was found to be in line with its investment mandate). Taking into account the bull and bear market regimes (and as alluded to under the performance evaluation of SRI funds), the larger exposure to value stocks could have resulted based on the general belief that these stocks hold as better investments in bear markets (as identified previously that the period 2014-2018 highlighted a bear market in S.A.). In addition, the larger exposure can be justified on the fact that value stocks were found to perform better, on average, relative to growth stocks over this period (based on (i) their average return over the period and (ii) their alpha values using the Fama and French 3-factor model

and Carhart 4-factor model). Therefore, portfolio managers of these funds may have considered weighting higher to these stocks to benefit from its superior performance.

On the contrary, the growth-tilt of global equity funds were consistent with the findings of studies that have been documented for developed markets (e.g. Bauer et al., 2005), which are markets that these funds comprise a large exposure to; therefore, SRI funds with significant global equity exposure could provide a possible reason for their growth-tilt. In addition, non-SRI funds contrasted SRI funds in terms of their exposure to the value factor, showing a greater exposure, on average, to growth stocks (i.e. SRI funds showed, on average, a value-tilt). Taking into consideration the value-tilts of these funds and the holding periods associated with value and growth stocks (with value stocks generally having shorter holding periods, resulting in more frequent turnover and rebalancing for funds comprising a higher exposure to these stocks), could provide a possible reason for SRI funds exhibiting a higher level of active management than non-SRI funds.

Furthermore, SRI funds showed, on average, significant exposure to small-cap stocks. A limitation to such finding, is its direct comparability to large-cap stocks (as in the case of the two performance evaluation models), as this factor was not exclusively accounted for in the RBSA model (the effects of large-cap stocks were included in both the growth and value indices). However, despite this shortfall, the results, regarding SRI funds' equity exposures, shown under the RBSA model was found to be consistent to that of the Fama and French 3-factor model and the Carhart 4-factor model (with reference to the size factor – which indicated a higher exposure to small-cap stocks in comparison to large-cap stocks). Relative to non-SRI funds and similar to the findings of the value factor exposure, the small-cap bias of SRI funds was shown to persist, whereby these funds were found to have a larger to small-cap stocks in comparison to non-SRI funds. This can be largely attributed to the nature of Shari'ah funds – which, as indicated previously, are more inclined to small-cap stocks.

With reference to the funds' exposure to the bond asset classes, the S.A. 10-year bond style factor was shown to have significant exposure on funds within all fund styles. Surprisingly, this included the equity fund style, which Sharpe (1992) classifies such return as being 'sticky' largely due to the regulatory process, resulting in the return series of funds within this fund style to have both 'bond like' and 'stock like' features. As hypothesised, the exposure to the bond style factors of balanced funds and the interest-bearing fund were greater than that of equity type funds (S.A. and global equity funds), with significant exposure being attributed to both the OTHI and S.A. 10-year style factors for these funds. Similar to SRI funds, non-SRI funds were also found to have significant exposure to both the OTHI and S.A. 10-year bond style factors. While both funds showed significant exposure to the bond style factors, based on the regression results, the SRI funds, on average, exhibited a relatively larger exposure to these factors, more especially, the equity fund style. The significant exposure to bonds for SRI funds may be

attributed to the booming green bond market both in S.A.[28] and globally[29], achieving exponential growth in recent years. Furthermore, taking into account the bond's low correlation (relative to equity stocks) with the general stock market, this could potentially provide some support to the extant literature showing SRI funds to perform better than non-SRI funds in bear markets.

Overall, the RBSA model has provided findings to the three main objectives addressed. Firstly, the classifications of SRI funds, on average, complied with their investment mandates and relevant regulation. Secondly, the imposition of additional constraints by SRI funds does not hinder the fund manager from adding value through active management. Lastly, based on the regression results, the exposures of SRI funds were found, on average, to almost mirror the exposures of their asset holdings, as shown by their factsheets (that is, the types of asset classes they invest in, while in some instances, showing similar exposures to them in value terms). As a further point to note, SRI funds often fulfilled a priori expectations formed by observing their risk and return profiles – with funds generating greater returns (and greater risk) investing in growth type stocks and low to moderate risk funds showing exposure to asset classes with minimal risks.

6.3. Recommendations

Based on the research conducted, various key areas pending further research were identified. This will add to the body of knowledge regarding the field of SRI, more specifically, SRI funds. In addition, the findings of the study presented strategic implications that investors should consider in their Socially Responsible Investment strategy.

6.3.1. Strategic Implications and Recommendations for Socially Responsible Investors

As indicated earlier, despite empirical evidence indicating contradictory findings (in some respects) based on the models used, a consensus was shown by them in that they found SRI funds to exhibit improved performance over the study. Based on this finding, which alludes to the fact that SRI fund performance improves over the longer term, essentially implies that investors should adopt a long-term investment orientation. It is thus recommended that investors, firstly, before investing, give due consideration to the level of expertise and skill of the SRI fund manager (information which can be obtained from the fund's factsheet), and secondly, evaluate the performance of SRI funds relative to long-term benchmarks.

[28] For example, a recent Green Bond issue on the JSE in the month of May 2019 was three times oversubscribed by R3.8bn (Business Report, 2019).

[29] A cumulative of $580 billion in green bonds were traded for the year 2018, and according to Bloomberg New Energy Finance, a further $170 billion to $180 billion are likely to be traded in 2019 (Personal Finance, 2019).

The long-term investment horizon is further substantiated by the reduction in risk shown by SRI funds over such period. It is recommended that taking all matters into account, investors give careful consideration to the type of SRI strategy (or combination of strategies) that would best align their return requirements with their level of risk tolerance. A South African study by Viviers (2007) found that Cause-based investments, in particular (which is in relation to other types of Socially Responsible Investments), to offer great diversification benefits as they generally tend to display low levels of correlation with listed securities. Furthermore, in light of the investor's choice of investment strategy, emphasis can also be drawn to the style of the strategy pursued, namely, momentum strategy. This is with reference to SRI funds showing improved momentum over the study, with older SRI funds shown to benefit from such effect in bear markets (resulted in these funds outperforming conventional investments).

Taking into account the performance and risk characteristics of SRI funds, attention should be given to the type of screening employed by funds. As literature has shown, the use of intense screening by SRI fund managers can have both positive effects (by reducing the risk of the fund) and negative effects (by lowering the fund's return due to a limited investable universe) on the fund. Therefore, this brings about a risk-return trade-off faced by the investor.

Another consideration for investors to note is the fund's differing asset class exposures based on changing market conditions (bull and bear markets). Although consistency was shown for SRI funds in terms of their higher exposure to small-cap stocks in comparison to large-caps, they tend to show a higher exposure to growth stocks in bull markets and a larger exposure to value stocks in bear markets. In addition, a further distinction can be made between local and global funds, whereby the differing value exposures were shown for local funds, while global funds were found to be more consistent. That is, these funds showed a larger exposure to growth stocks over both market regimes. This should be taken into consideration when drafting of the investor's investment policy statement (IPS) with respect to their preferences, more specifically, their risk appetite, and the fund's risk-return profile. This is drawing investors' attention to the fact that a combination of small-cap stocks and growth stocks (or small-cap growth stocks) could potentially result in a higher risk than an amalgamation of small-cap stocks and value stocks (or small-cap value stocks). As such, one must note that although small-cap stocks and growth stocks (or small-cap growth stocks) offer the potential for higher returns, they are also accompanied by greater risk. Therefore, despite the reduction in risk shown by SRI funds over the longer term, significant exposure to a combination of these stocks could possibly provide a higher risk profile for investors than that stated in the fund's mandate. However, a conflicting view arises in this respect in that although funds with global investment strategy may offer a higher risk due to their size and value exposures, the greater flexibility (with its screening criteria) and the larger investment universe that it presents (relative to local funds) could potentially reduce this risk through a more widely-diversified portfolio.

Consideration should also be given to the level of active involvement by SRI fund managers. This sheds light on SRI fund managers found to portray higher levels of active management relative to non-SRI funds - in particular for funds found under the balanced fund style (shown to have the highest level of active management both in isolation and relative to non-SRI funds). The higher transaction costs resulting from the high level of active management (because of high turnover and regular rebalancing) may be passed on as higher management fees. Therefore, both the before- and after-fee performances should be taken into consideration when opting for such investments. Furthermore, as shown that the investment style (i.e. balanced fund style) largely impacted the level of active management, the type of SRI strategy employed was also found to have such effect. This is with reference to an Engagement SRI strategy which yielded the highest level of active management.

6.3.2. Recommendations for Further Research

Regarding the performance evaluation of SRI funds, four research recommendations were proposed. Viviers (2007) found S.A. SRI funds to have, on average, higher expense ratios in comparison to conventional (non-SRI) funds. The higher cost of SRI funds can be attributed to the complexities related to the measurement of non-financial screens, the valuation of private equity ventures and the time required to engage with management boards. Therefore, as this study ignored the effects of transactions costs and fees, the inclusion of which, and its effects thereof (on the performance of these funds), could prove vital in performance evaluation paradigm.

As this study and others such as Viviers et al. (2008), Chawana (2014) and Du Plessis (2015) focused exclusively on the evaluation of active SRI or passive SRI, a collective assessment of both could shed light on the performance of the SRI market in S.A., as well as the relative performance between both approaches (to engage on which provides a more profitable investment approach).

As stated previously, SRI funds were found to have undergone a ‘learning effect’. Therefore, it is suggested that further research should be aimed at determining the extent that these funds (or fund managers of these funds) have improved their skills with respect to identifying and evaluating SRI opportunities. Additionally, in addressing the adoption of a long-term Socially Responsible Investment orientation (as suggested in the previous section), a follow-up study can be conducted to establish whether SRI funds do in fact yield better risk-adjusted returns over the long run. As more data becomes available, the Fama and French 5-factor model can be employed, as well as the use of correlation analyses to provide further insights into the drivers of SRI fund performance in S.A.

Lastly, research can be aimed at evaluating the impact of the different types of SRI screening employed by fund managers (e.g. Best-in-class screening) on fund performance. Its impact should be quantified, measured and could be evaluated relative to its conventional counterpart’s process of stock selection.

Similar to the performance evaluation recommendations, four aspects in the field of the style analysis of SRI funds were identified as warranting pioneering research in S.A. Firstly, it is suggested that research can be focused on evaluating the SRI fund manager's selection skills and market timing skills, in isolation, as well as relative to non-SRI funds (as these two components generally form the active management component of return, i.e. skill). A Holding-Based Style Analysis (HBSA) could also be useful in this assessment.

Secondly, studies can be conducted to examine the extent to which SRI funds drift from, or maintain, the styles specified in their mandates, while exploring which set of SRI funds deliver superior and persistent returns between the style consistent funds and those identified as drifters.

Contrary to the traditional quantitative approach, it is suggested that qualitative research be documented, through means of case studies or interviews, in order to establish the asset holdings and composition of SRI funds. The case studies or interviews could answer questions such as: "To what extent are local SRI funds different from traditional collective investment schemes?" and "How strictly do local SRI managers apply SRI criteria when making investment decisions, particularly when faced with adverse economic conditions, i.e. bear markets?"

Lastly, research could be conducted at evaluating the impact of fund size and investment style on SRI fund performance, extending to account for funds which align to their investment styles (consistent funds) against funds which drift from their proposed styles (drifters). This will also partially aid in aligning the two objectives of this study, namely, the performance evaluation (objective one) and the style analysis (objective two) of SRI funds.

6.4. Limitations to the Study

Although measures were taken to ensure the reliability and validity of the research, it is, however, with the benefit of hindsight, possible to identify some limitations to the study.

The main limitation addresses the relatively small sample of SRI funds, which was available for the study. This could, however, not be prevented for the following reasons:

- The SRI sector in S.A. has only been in existence for a relatively short period;
- Some SRI funds' inception dates were after the commencement of the research period (sample period two - January 2014) and therefore, could not be included in the study;
- Monthly performance data were not available for several SRI funds;
- Certain types of funds (segregated and pooled funds) were not at liberty to disclose historical performance data due to confidentiality clauses; and
- Some SRI funds were not classified as separate legal investment vehicles and thus could not be included in the study.

Given the relatively small sample and the nature of the sample's constituents, the study might be prone to potential biases. These biases include; a success bias (whereby only SRI fund managers with a reasonable track record might have been willing to disclose performance data), a size bias (in which only larger funds might have had monthly data available), and a survivorship bias. The latter bias is the most imminent as only those funds that both survived through the study period and had reported monthly returns were included. The survivorship bias stems from the truncation of data set due to the disappearance of the fund from the sample. To the extent fund attrition is due to poor performance, studying only funds that survive, might overstate measured performance. Given these issues, suitable procedures, such as the use of a matched-pairs analysis, was adopted to ensure that the reliability and validity of the findings would not be jeopardised.

The limitations of RBSA should also not be ignored. RBSA is found to be most accurate when the correlations between the benchmark indices are relatively low. Therefore, if the selected style factors perform in a highly correlated fashion, attributions may oscillate between two closely correlated asset classes. The correlations of some style factors were found to be relatively high, which could pose as a matter of concern. However, due to the correlations among the selected classes being found, on average, to be weak to moderate, there is a minimal possibility that the style exposure estimates would be spurious (or the presence of multicollinearity). Furthermore, as the effects of large-cap stocks were included in the growth and value indices, no index was used to track large-cap stocks exclusively.

While using RBSA, changes in fund styles may not be quickly identifiable due to the 'averaging effect', that is, the return series used for style estimates spanned up to sixty months, and therefore, any drift from the stated style in the last six months, for instance, would be overwhelmed by the remaining four and a half years of data. As such, a note of caution must be made in interpreting the style exposure patterns of these funds.

6.5. Conclusion

The theory of behavioural finance illustrates how investors can employ various investment criteria in order to achieve a common objective - to earn a profitable risk-adjusted return. In light of such, the question of whether the performance of SRI funds is affected by the consideration of social screens has been a pertinent issue in the recent performance evaluation literature. The study has approached this subject as part of its first objective by analysing the risk-adjusted performance of SRI funds relative to both its matched funds and passive benchmarks. The consensus amongst empirical studies is that there are no statistically significant differences in the performance of SRI funds relative to its conventional counterparts. However, a majority of these studies have been documented for the U.S. market, which has been shown by literature to be the most established market for SRI.

Traditional performance measures, such as the Fama and French 3-factor model and the Carhart 4-factor model, were employed in the study to assess the risk-adjusted performance of SRI funds. Contrary to the extant literature, the study showed mixed findings based on the models employed. However, two pertinent findings were highlighted. Firstly, SRI funds were found to exhibit improved performance over the study. This finding could possibly suggest that the SRI sector in S.A. had undergone a 'learning effect'. Secondly, SRI funds tend to perform better in bear markets and perform poorer in bullish markets, which could be largely attributed to the reduced market risk (systematic risk) found for SRI funds and its exposure adjustments shown for the transition from a bull to bear market – increasing its exposure to large-cap stocks (as compared to small-cap stocks) and value stocks (as compared to growth stocks), which were found, on average, to outperform over this period.

Based on research, no empirical studies on the style analysis of SRI funds (and comparative to its non-SRI industry peers) was found to exist for S.A. (although studies were found to exist internationally). Therefore, in fulfilment of the second objective of the study, the aim was to add to the body of knowledge regarding this subject. The findings of the RBSA model showed that SRI funds, on average, exhibited moderate to high levels of active management, which were also found to be substantially higher than non-SRI funds. This indicates that the imposition of additional constraints by SRI funds does not hinder the fund manager from adding value through active management. Furthermore, the classifications of SRI funds were shown, on average, to comply with their investment mandates and relevant regulation, i.e. correctly classified. Taking into account the asset class exposures of SRI funds, the regression results showed that these exposures were found, on average, to almost mirror the exposures of their asset holdings, as shown by their factsheets (that is, the types of asset classes they invest in, while in some instances, showing similar exposures to them in value terms).

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APPENDICES

Appendix A

Table of SRI funds (with matched conventional funds and proxy benchmarks) and its salient features

SRI Fund Name	Classification (Sector)	Date of Inception	Fund Size on 31/12/2018 (Values Rounded)	SRI Strategy	Proxy Benchmark	Matched Conventional Fund Name
27Four Shari'ah Active Equity Prescient Fund	SA – General – Equity	10-Sep-08	R250m	Shari'ah	JSE All Share Index	Mi-plan IP beta Equity Fund
27Four Shari'ah Balanced Prescient Fund of Funds	SA – Multi Asset – High Equity	06-May-11	R225m	Shari'ah	CPI + 3%	Element Balanced SCI Fund
3 Laws Climate Change Equity Prescient Fund	SA – General – Equity	12-Apr-2013	R14m	Positive Screening	JSE All Share Index	Prescient Equity Income Fund
Community Growth Equity Fund	SA – General – Equity	01-Jun-92	R91m	Positive Screening & Engagement	JSE All Share Index	STANLIB Index Fund

SRI Fund Name	Classification (Sector)	Date of Inception	Fund Size on 31/12/2018 (Values Rounded)	SRI Strategy	Proxy Benchmark	Matched Conventional Fund Name
Community Growth Gilt Fund	SA – Interest Bearing – Variable Term	14-Jul-98	R197m	Positive Screening	JSE/ASSA All Bond Index	STANLIB Bond Fund
Element Earth Equity Fund	SA – General – Equity	02-Oct-01	R245m	Engagement	JSE All Share Index	Prudential Equity Fund
Element Flexible Fund	SA – Multi Asset – Flexible	01-Oct-01	R133m	Engagement	CPI + 5%	Visio BCI Actinio Fund
Element Islamic Balanced Fund	SA – Multi Asset – High Equity	28-Apr-10	R69m	Shari'ah	CPI + 3%	GFA BCI Managed Fund of Funds
Element Islamic Equity Fund	SA – General – Equity	01-Feb-06	R130m	Shari'ah	JSE All Share Index	Old Mutual Rafi 40 Index Fund
Element Islamic Global Equity SCI Fund	Global – Equity – General	29-Oct-2012	R71m	Shari'ah	MSCI All Countries World Index	Old Mutual Global Emerging Markets Fund
Element Real Income Fund	SA – Multi Asset – Low Equity	07-Oct-02	R132m	Engagement	CPI + 3%	Absa Inflation Beater Fund
Kagiso Islamic Balanced Fund	SA – Multi Asset – High Equity	03-May-11	R1,259b	Shari'ah	CPI + 3%	ADB BCI Flexible Prudential Fund of Funds

SRI Fund Name	Classification (Sector)	Date of Inception	Fund Size on 31/12/2018 (Values Rounded)	SRI Strategy	Proxy Benchmark	Matched Conventional Fund Name
Kagiso Islamic Equity Fund	SA – General – Equity	13-Jul-09	R794m	Shari'ah	JSE All Share Index	Personal trust Equity Fund
NewFunds Shari'ah Top 40 Index Fund	SA – Equity – Large Cap	06-Apr-09	R48m	Shari'ah	JSE Top 40 Index	Integre Large Cap Prescient Fund
Oasis Crescent Balanced High Equity Fund of Funds	SA – Multi Asset – High Equity	01-Apr-10	R165m	Shari'ah	CPI + 3%	4D BCI Moderate Fund of Funds
Oasis Crescent Balanced Progressive Fund of Funds	SA – Multi Asset – Medium Equity	02-Mar-05	R1,460b	Shari'ah	CPI + 1%	Prescient Positive Return QuantPlus Fund
Oasis Crescent Balanced Stable Fund of Funds	SA – Multi Asset – Low Equity	01-Apr-10	R668m	Shari'ah	CPI	S BRO BCI Defensive Fund of Funds
Oasis Crescent Equity Fund	SA – General – Equity	31-Jul-98	R5,345b	Shari'ah	JSE All Share Index	Prudential dividend maximiser Fund

SRI Fund Name	Classification (Sector)	Date of Inception	Fund Size on 31/12/2018 (Values Rounded)	SRI Strategy	Proxy Benchmark	Matched Conventional Fund Name
Oasis Crescent Income Fund	SA – Multi Asset – Income	01-Apr-10	R2,266b	Shari'ah	CPI – 1%	Ashburton Multi Manager Income Fund
Oasis Crescent International Feeder Fund	Global – Equity – General	28-Sep-01	R1,692b	Shari'ah	MSCI All Countries World Index	STANLIB Multi-Manager Global Equity Feeder Fund
Oasis Crescent International Property Equity Feeder Fund	Global – Real Estate – General	30-Apr-07	R465m	Shari'ah	MSCI World Real Estate Index	STANLIB Global Property Feeder Fund
Old Mutual Albaraka Balanced Fund	SA – Multi Asset – Medium Equity	12-Nov-10	R2,398b	Shari'ah	CPI + 1%	Ampersand Momentum CPI Plus 4 Fund of Funds
Old Mutual Albaraka Equity Fund	SA – General – Equity	01-Jun-92	R2,058b	Shari'ah	JSE All Share Index	STANLIB SA Equity Fund

Appendix B

Sharpe's Guidelines for Asset Classes

1. **Bills**

Cash-equivalents with less than 3 months to maturity

Index: Salomon Brothers' 90-day Treasury bill index

2. **Intermediate-term Government Bonds**

Government bonds with less than 10 years to maturity

Index: Lehman Brothers' Intermediate-term Government Bond Index

3. **Long-term Government Bonds**

Government bonds with more than 10 years to maturity

Index: Lehman Brothers' Long-term Government Bond Index

4. **Corporate Bonds**

Corporate bonds with ratings of at least Baa by Moody's or BBB by Standard & Poor's

Index: Lehman Brothers' Corporate Bond Index

5. **Mortgage-Related Securities**

Mortgage-backed and related securities

Index: Lehman Brothers'Mortgage-Backed Securities Index

6. **Large-Capitalization Value Stocks**

Stocks in Standard and Poor's 500-stock index with high book-to-price ratios

Index: Sharpe/BARRA Value Stock Index

7. **Large-Capitalization Growth Stocks**

Stocks in Standard and Poor's 500-stock index with low book-to-price ratios

Index: Sharpe/BARRA Growth Stock Index

8. **Medium-Capitalization Stocks**

Stocks in the top 80% of capitalization in the U.S. equity universe after the exclusion of stocks in Standard and Poor's 500 stock index

Index: Sharpe/BARRA Medium Capitalization Stock Index

9. **Small-Capitalization Stocks**

Stocks in the bottom 20% of capitalization in the U.S. equity universe after the exclusion of stocks in Standard and Poor's 500 stock index

Index: Sharpe/BARRA Small Capitalization Stock Index

10. **Non-U.S. Bonds**

Bonds outside the U.S. and Canada

Index: Salomon Brothers' Non-U.S. Government Bond Index

11. **European Stocks**

European and non-Japanese Pacific Basin stocks

Index: FTA Euro-Pacific Ex Japan Index

12. **Japanese Stocks**

Japanese Stocks

Index: FTA Japan Index

Appendix C

CAPM output for Small-cap and Large-cap indices

JSE Small Cap Index (proxy for small-cap stocks)

Sub-period one

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.882957							
R Square	0.779613							
Adjusted I	0.775814							
Standard E	0.027556							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regressio	1	0.155794	0.155794	205.174	1.05E-20			
Residual	58	0.044041	0.000759					
Total	59	0.199835						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.003283	0.003626	0.905361	0.36902	-0.00398	0.010541	-0.00398	0.010541
Mkt - RF	0.774885	0.054097	14.32389	1.05E-20	0.666597	0.883172	0.666597	0.883172

Sub-period two

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.890768							
R Square	0.793468							
Adjusted I	0.789907							
Standard E	0.031403							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regressio	1	0.219739	0.219739	222.8283	1.59E-21			
Residual	58	0.057196	0.000986					
Total	59	0.276934						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-0.00217	0.004054	-0.53579	0.594152	-0.01029	0.005943	-0.01029	0.005943
Mkt - RF	0.978259	0.065534	14.92743	1.59E-21	0.847077	1.10944	0.847077	1.10944

JSE Top40 Index (proxy for large-cap stocks)

Sub-period one

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.997191							
R Square	0.99439							
Adjusted I	0.994293							
Standard E	0.00518							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.275807	0.275807	10280.68	5.49E-67			
Residual	58	0.001556	2.68E-05					
Total	59	0.277363						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-0.00054	0.000682	-0.78643	0.434817	-0.0019	0.000828	-0.0019	0.000828
Mkt - RF	1.031015	0.010168	101.3937	5.49E-67	1.010661	1.051369	1.010661	1.051369

Sub-period two

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.995671							
R Square	0.99136							
Adjusted I	0.991211							
Standard E	0.005814							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.224976	0.224976	6655.195	1.51E-61			
Residual	58	0.001961	3.38E-05					
Total	59	0.226936						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.000199	0.000751	-0.26537	0.791667	-0.0017	0.001303	-0.0017	0.001303
Mkt - RF	0.989847	0.012134	81.57938	1.51E-61	0.965559	1.014135	0.965559	1.014135

Sharpe ratios for Small-cap and Large-cap indices

Sharpe = $\frac{Rp - Rf}{Op}$; where: Rp = Return on portfolio, Rf = risk-free rate, Op = standard deviation of portfolio.

JSE Small Cap Index

Sub-period one

Sharpe ratio = $\frac{1.36-(-0.02)}{2.81} = 0.4925$

Sub-period two

Sharpe ratio = $\frac{0.03-(0.20)}{3.11} = -0.0547$

JSE Top40 Index

Sub-period one

Sharpe ratio = $\frac{1.26-(-0.02)}{4.71} = 0.2727$

Sub-period two

Sharpe ratio = $\frac{0.21-(0.20)}{3.11} = 0.0034$

Appendix D

CAPM output for growth and value indices

JSE Growth Index (proxy for growth stocks)

Sub-period one

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.97518							
R Square	0.950975							
Adjusted I	0.95013							
Standard E	0.014707							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.243355	0.243355	1125.076	1.12E-39			
Residual	58	0.012545	0.000216					
Total	59	0.2559						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.000271	0.001935	0.139862	0.889254	-0.0036	0.004145	-0.0036	0.004145
Mkt - RF	0.968461	0.028873	33.54215	1.12E-39	0.910665	1.026256	0.910665	1.026256

Sub-period two

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.947083							
R Square	0.896966							
Adjusted I	0.89519							
Standard E	0.022832							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.263222	0.263222	504.9207	2.62E-30			
Residual	58	0.030236	0.000521					
Total	59	0.293458						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-0.0035	0.002948	-1.18752	0.239864	-0.0094	0.0024	-0.0094	0.0024
Mkt - RF	1.070684	0.047649	22.47044	2.62E-30	0.975305	1.166063	0.975305	1.166063

JSE Value Index (proxy for value stocks)

Sub-period one

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.984663							
R Square	0.969561							
Adjusted I	0.969036							
Standard E	0.012153							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.272874	0.272874	1847.437	1.11E-45			
Residual	58	0.008567	0.000148					
Total	59	0.281441						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	-0.00083	0.001599	-0.51707	0.607075	-0.00403	0.002374	-0.00403	0.002374
Mkt - RF	1.025518	0.023859	42.98182	1.11E-45	0.977758	1.073277	0.977758	1.073277

Sub-period two

SUMMARY OUTPUT								
Regression Statistics								
Multiple F	0.978663							
R Square	0.957781							
Adjusted I	0.957053							
Standard E	0.01289							
Observati	60							
ANOVA								
	df	*SS*	*MS*	*F*	*gnificance F*			
Regressio	1	0.218629	0.218629	1315.776	1.47E-41			
Residual	58	0.009637	0.000166					
Total	59	0.228266						
	Coefficients	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*
Intercept	0.001932	0.001664	1.161143	0.25034	-0.0014	0.005263	-0.0014	0.005263
Mkt - RF	0.975785	0.026901	36.27363	1.47E-41	0.921937	1.029632	0.921937	1.029632

Sharpe ratios for Growth and Value indices

JSE Growth Index

Sub-period one

$$\text{Sharpe ratio} = \frac{1.26-(-0.02)}{3.98} = 0.3225$$

Sub-period two

$$\text{Sharpe ratio} = \frac{-0.13-(0.20)}{3.97} = -0.0828$$

JSE Value Index

Sub-period one

$$\text{Sharpe ratio} = \frac{1.23-(-0.02)}{4.84} = 0.2578$$

Sub-period two

$$\text{Sharpe ratio} = \frac{0.41-(0.20)}{3.38} = 0.0630$$

Appendix E

Ethical Clearance

Appendix F

Turnitin Similarity Report