Performance of socially responsible investment funds in South Africa

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With love to Cecile and Pete Roeloffze

A thousand thank-yous would not suffice

"Driving through the race of life. Sometimes the road seems long. Sometimes there is no end in sight, however, when you look back on the journey it will have all been worth while because during those tough times you never gave up. You kept driving through."

(Dave Hedges)

"Only one who devotes himself to a cause with his whole strength and soul can be a true master. For this reason mastery demands all of a person."

(Albert Einstein)

"I praise you because I am fearfully and wonderfully made; your works are wonderful, I know that full well."

(Psalm 139:14, NIV)

"Treat the earth well: it was not given to you by your parents, it was loaned to you by your children. We do not inherit the Earth from our Ancestors, we borrow it from our Children."

(Ancient Native American Proverb)

"Striving for social justice is the most valuable thing to do in life."

(Albert Einstein)

DECLARATION

I declare that the dissertation entitled *"Performance of socially responsible investment funds in South Africa"*, which I hereby submit for the degree Masters of Commerce in Economic Sciences, is my own work and that all the sources obtained have been correctly recorded and acknowledged. This dissertation was not previously submitted to any other institution of higher learning.

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To whom it may concern

This is to confirm that I, the undersigned, have language edited the **dissertation** of

Ruschelle du Plessis

for the degree

Magister Commercii in Risk Management

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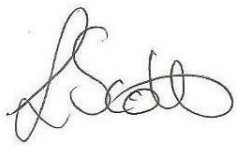
Performance of socially responsible investment funds in South Africa

The responsibility of implementing the recommended language changes rests with the author of the dissertation.

Yours truly,



Linda Scott

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ABSTRACT

Socially responsible investing has presented itself as a growing, multifaceted, advanced and sophisticated investment philosophy. Socially responsible investment (SRI) involves incorporating social, ethical and responsible investment objectives with financial investment objectives during the investment decision-making process. Social, ethical and responsible investment objectives are set in line with environmental, social and corporate governance (ESG) criteria which are established within the SRI strategy followed. SRI strategies include screening (negative, positive and best-of-sector), shareholder activism and cause-based investing.

Although international SRI markets such as that of the United States of America and the United Kingdom are sophisticated and established markets, the South African SRI market is still relatively new and is yet to reach its full potential. Thus, as a growing market, little research regarding the long term risk-adjusted performance of SRI funds in South Africa has been conducted. The long term risk-adjusted performance of the sample of SRI funds was measured through the use of five risk-adjusted performance measures, namely the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio, and through the use of three performance measurement models which included the capital asset pricing model (CAPM), Fama-French three-factor model and Carhart four-factor model.

The risk-adjusted performance of the sample of SRI funds was measured with the intent to establish if these funds out- or underperformed against three benchmark categories, namely the Financial Times Stock Exchange/Johannesburg Stock Exchange (FTSE/JSE) SRI Index, a matched sample of conventional investment (non-SRI) funds and the FTSE/JSE All Share Index. The probable effect of the 2007/08 global financial crisis was also measured to analyse whether such a hazardous market event affected the performance of the SRI funds.

According to the results and findings, the risk-adjusted performance of the SRI funds has improved over the research period. However, the SRI funds neither outperformed nor underperformed against the three benchmark categories over the research period. The performance measurement models' analysis indicated that the SRI funds were less sensitive to market fluctuations, more exposed to small capitalisation portfolios, more growth-oriented, and exhibited significant momentum after the period of the 2007/08 global financial crisis. Furthermore, the analysis indicated that the SRI funds significantly underperformed against the non-SRI funds during the

research period. Mixed results were obtained with regards to the probable effect of the 2007/08 global financial crisis on the performance of the SRI funds.

Keywords: *Socially responsible investment (SRI), risk-adjusted fund performance, Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio, Omega ratio, capital asset pricing model (CAPM), Fama-French three-factor model, Carhart four-factor model.*

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LIST OF ABBREVIATIONS

ASISA	:	Association for Savings and Investment South Africa
B-BBEE	:	Broad-Based Black Economic Empowerment
CAPM	:	Capital asset pricing model
CDF	:	Cumulative distribution function
CSR	:	Corporate social responsibility
EI	:	Ethical investment
ESG	:	Environmental, social and corporate governance
FTSE	:	Financial Times Stock Exchange
GMO	:	Genetically modified organism
GSIA	:	Global Sustainable Investment Alliance
HML	:	High minus low
JSE	:	Johannesburg Stock Exchange
M/B	:	Market-to-book
NASDAQ	:	National Association of Securities Dealers Automated Quotations
NAV	:	Net asset value
NDA	:	Non-disclosure agreement
P/E	:	Price-to-earnings
RSS	:	Residual sum of squares
S&P	:	Standard and Poor
SARB	:	South African Reserve Bank
SMB	:	Small minus big
SML	:	Security market line
SRI	:	Socially responsible investment
UMD	:	Up minus down

CHAPTER 1: INTRODUCTION, PROBLEM STATEMENT AND OBJECTIVES OF THE STUDY

1.1 INTRODUCTION

A phenomenon that has gained profound interest, in both the local and international context, is the act of investing responsibly. A new generation of investors have created an evolving trend of investing in funds that promote a greener, sustainable, and socially responsible future (Viviers, 2007:1; SRI World Group, 2014). Whether termed socially responsible investment (SRI), ethical investment (EI), sustainable investment or social investment, there is no consensus on a specific definition for those investments directed towards social and ethical concerns. However, the most frequently used and accepted definition of SRI narrates to the act taken by investors to consider both financial investment objectives as well as the commitment to social and ethical investment objectives (Oh *et al*., 2013:705).

Characterised by incorporating financial return with ethical, environmental, social and corporate governance (ESG) concerns into the investment decision-making process, SRI has risen in popularity, receiving increasing consideration during the portfolio balancing period (Viviers *et al*., 2009:1). During the investment decision-making process, socially responsible investors follow the mainstream approach of constructing a portfolio of investments, combined with one or more of the three noticeable SRI strategies. Screening, shareholder activism and cause-based investing are identified as the three SRI strategies employed by socially responsible investors (Heese, 2005:730; Viviers, 2007:4; Renneboog *et al*., 2008:1725; Viviers *et al*., 2009:4; Giamporcaro *et al*., 2010:3; Oh *et al*., 2013:705).

Considering the first SRI strategy, as noted by Viviers (2007:71) as well as Ballestero *et al*. (2012:488), three types of screening have evolved under SRI, specifically negative, positive, and best-of-sector. Negative or exclusionary screening involves acts taken by investors (or fund managers) to evade investing in companies deemed as morally and ethically undesirable (Viviers, 2007:71). Investors (or fund managers) who invest in companies that are considered to be good corporate citizens, as these companies generally pursue policies supportive of ethical and social concerns, employ a positive or inclusionary screening approach. A social investor may decide to combine positive and negative screening in order to form a best-of-sector (or hybrid) screening approach.

The second SRI strategy, namely shareholder activism, as stated by Viviers *et al*. (2009:7), also referred to as active shareholder engagement, is achieved through actively participating in accordance with the companies' management regarding ESG concerns. Viviers (2007:85) identified that investors can employ this strategy by engaging with management boards through dialogues, utilising voting rights, filing resolutions, or by ridding investments from those companies that do not conform to transformation. Concerns regarding employees, the environment, the socio-economic climate and the community can be addressed by means of shareholder activism.

Finally, socially responsible investors can employ a cause-based (or targeted) investing approach that comprises of directing finances towards particular social or ethical causes or projects. Viviers *et al*. (2009:7) noted that cause-based investors would accept lower returns on investments as supporting a particular cause receives higher objective, although market rate returns, generally, are sought after. However, investors may also direct returns earned on conventional investment (non-SRI) funds toward social causes in order to obtain a combination of traditional investment and ethical investment portfolios (Statman, 2008:40).

According to Kinder (2005:11) and supported by Oh *et al*. (2013:704), value-based investors, value-seeking investors, and value-enhancing investors are classified as the three types of investors seeking social returns. Kinder (2005:12) further recognised that the three social investors each implement a different SRI strategy to its advantage. Both value-based and value-seeking investors invest in accordance with ESG concerns, however, in differing ways, while value-enhancing investors pursue the improving of the value of investments in accordance with shareholder activism (Kinder, 2005:30; Viviers, 2007:85).

Bold (2011) asserted that investing in what an individual essentially believes in is what SRI necessitates. Furthermore, as social and environment returns are incorporated in SRIs, socially responsible investors may need to be willing to accept the risk of lower returns (Bold, 2011). Conventional investors may perceive SRI as detrimental to the performance of investment portfolios. However, Gladman (2011:7) as well as the Unitarian Universalist Association (2013) argued that SRIs do not harm the performance of investments, ironically in particular instances, SRIs may assist the performance of conventional investments. Responsible investing should be incorporated with an active portfolio management approach as the process of investor's analysis

of ESG concerns may indirectly serve as indicators for future firm and stock price performance (Gladman, 2011:4).

The historical development of SRI can be dated back hundreds of years ago, generally tracked to early religious investment considerations (Puaschunder, 2010:9). SRI received increasing consideration in the late 1920s in the United States of America, particularly after World War I, although the first screenings of ethical investments were tracked by the 18th century Quakers (Viviers, 2007:7). Viviers (2007:7) further noted that the growth of SRI rapidly amplified in the United Kingdom, the Netherlands and Sweden. This, however, was not the case for the South African SRI market.

Heese (2005:730), as well as Viviers (2007:7), identified that although SRI has received increasing attention at earlier stages in the rest of the world, the growth of the South African SRI market emerged more recently, during the early 1990s. Viviers *et al*. (2009:8) identified that the first two SRI funds were launched in South Africa in June 1992. As the emergence of SRI grew strongly during the millennium of 2000 in South Africa, the Johannesburg Stock Exchange (JSE) launched a SRI Index in May 2004 (JSE, 2014). As indicated on the Financial Times Stock Exchange (FTSE)/JSE SRI Index, it is clear that SRI rose to popularity in South Africa since 51 companies were selected in 2004, while 82 constituents were selected in 2014 (the highest number of constituents since the index's inception) (JSE, 2014).

As stated by the JSE (2014), the FTSE/JSE SRI Index has developed substantially in order to encourage sustainable development and good corporate citizenship, measuring the companies listed on the FTSE/JSE All Share Index against a number of ESG concerns as well as the latest inclusion of climate change. In June 2015, the JSE announced that they formed a partnership with the FTSE Russell (the global index provider) regarding aligning the JSE's ESG approach with that of the FTSE Russell (JSE, 2015a). While the new partnered ESG approach will replace the current SRI Index, JSE-listed companies, as well as social investors, will be provided with new opportunities to incorporate ESG considerations into the investment decision-making process (JSE, 2015a).

1.2 PROBLEM STATEMENT

Watson Wyatt Worldwide (cited by Kinder, 2005:1) asserts, *"Investment is essentially about making judgments and decisions in the present, typically with reference to the past, to cope with*

or exploit an uncertain future." This statement can be linked to the notion that, generally, conventional investors seek investments that yield the highest financial return. However, for modern (more socially responsible) investors, seeking high financial return is not the primary objective, as the investment decision-making process incorporates balancing other concerns. Thus, it is noted that SRI funds are receiving increasing inclusion in investment portfolios by modern investors as these funds incorporate ESG concerns in the achievement of social and environmental returns (Community Growth Funds, 2014).

During any form of financial crisis or economic downturn, investments are the hardest hit and investors particularly experience large financial losses or elude investing as a whole (Irons, 2009). Cropper (2010) noted that SRI funds have increased significantly throughout the 2007/08 global financial crisis. The global financial crisis has raised numerous sustainability, environmental, and social concerns, which resulted in a colossal increase in SRI participants worldwide (Van der Ahee & Schulschenk, 2013:2). Since the global financial crisis, investors started to consider social and environmental returns more significant than focussing solely on financial returns. This has led to increasing emphasis being placed on ESG concerns. Thus, it is noted that SRI funds have grown immensely on an international scale as more and more investors have increased their awareness of ESG concerns (Unitarian Universalist Association, 2013).

In South Africa, the awareness of SRI has risen to popularity indirectly through the ensuing apartheid era of the early 1970s until the 1990s, in which a number of faith-based groups and pension funds in the United States of America retracted investment from South Africa (Ethical Partnership, 2014). During the early period of SRI (1992 until 2002) in which a general market decline has occurred, SRI funds in South Africa comparatively underperformed against certain benchmark indices, predominantly due to the fact that the concept of SRI was still relatively new (Sjöström, 2011:16). However, since 2002, SRI has risen to popularity and has received significant importance in South Africa, which resulted in these funds outperforming certain benchmark indices, during 2002 until 2006, with several new SRI funds being launched (Sjöström, 2011:16).

A vast number of South African investors integrate ESG concerns in the decision-making process (Van der Ahee & Schulschenk, 2013:1). Investors that include SRIs in their investment portfolios are crucial factors in the growth of the South African economy, as these investments essentially provide a stimulus for business, employment, the environment, as well as balancing socio-economic inequities (De Jongh *et al.,* 2007:3). Given current global conditions, measuring the

performance of local SRI funds during the global financial crisis as indicated by research, and assessing whether the trend in popularity for these funds has continued to surge in the aftermath of the crisis, is of considerable importance.

Thus, it is essential to note that SRI has grown to such an extent that it plays a significant role with regard to financial, economic, socio-economic, ethical, and environmental considerations in South Africa. The significance of this research was brought about to establish if the global financial crisis has strengthened investor confidence in these indices and if the crisis led to the promotion of SRI funds, locally. As the research regarding the performance of SRI funds in South Africa has not been conducted on a continual basis, this study aimed at extending the specific research in the South African context.

1.3 OBJECTIVES OF THE STUDY

The following objectives were formulated and identified for this study:

1.3.1 Primary objectives

The primary objective of this study was to measure the performance of SRI funds in South Africa.

1.3.2 Theoretical objectives

In accordance with the primary objective, the following theoretical objectives were formulised for this study:

- Track the emergence of SRI and SRI funds;
- Analyse SRI funds within the South African context;
- Review the SRI strategies employed by investors in South Africa;
- Create a theoretical framework for SRI during the 2007/08 global financial crisis; and
- Establish whether SRI funds received increasing promotion during (and after) the 2007/08 global financial crisis.

1.3.3 Empirical objectives

In order to achieve the primary objective of this study, the following empirical objectives were formulated:

- Calculate the risk-adjusted performance of the SRI funds according to the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio, during the different time periods;

- Establish if there was an association between the results of the risk-adjusted performance measures of the first sub-division of the research period (between the two identified sub-periods);
- Establish if there was an association between the results of the risk-adjusted performance measures of the second sub-division of the research period (between the seven identified sub-periods);
- Establish if there was an association between the ranking results as calculated by the risk-adjusted performance measures, during each sub-period in the first sub-division of the research period;
- Compare the risk-adjusted performance of the SRI funds to the risk-adjusted performance of the three selected benchmark categories[1], during each identified sub-division of the research period;
- Calculate the risk-adjusted performance of the SRI funds according to the capital asset pricing model (CAPM), Fama-French three-factor model and Carhart four-factor model; and
- Establish if there was a difference between the results, as according to the three performance measurement models, of the two identified sub-periods in the first sub-division of the research period.

1.4 RESEARCH DESIGN AND METHODOLOGY

This study comprised a literature review (presented in Chapter 2) and an empirical study (presented in Chapter 3 and Chapter 4). Quantitative research, using secondary data, was used for the empirical portion of this study.

1.4.1 Literature review

The literature review (as presented in Chapter 2) focussed on the theoretical aspects of SRI. The history, strategies and other aspects pertaining to SRI were theoretically reviewed. The theoretical analysis involved the use of secondary data sources, which included relevant textbooks, journal articles, newspaper articles and the Internet.

[1] The three selected benchmark categories are discussed in Section 1.4.2.

1.4.2 Empirical study

The empirical study (as presented in Chapter 3 and Chapter 4) involved a statistical analysis in which the risk-adjusted returns of South African SRI funds were eval uated relative to three selected benchmark categories, over the specified research period. The first benchmark category was selected as the FTSE/JSE SRI Index, the second benchmark category was selected as a matched sample of local non-SRI funds, and the third benchmark category related to the general equity market of South Africa (the FTSE/JSE All Share Index). The empirical portion of this study encompassed the following methodological dimensions:

1.4.2.1 Target population and sampling frame

The target population for the empirical analysis included all SRI unit trust funds in South Africa. The sampling frame identified was based on the following specifications:

- The SRI funds should have been launched prior to 1 May 2004 and should have been active until 31 December 2014 or onwards. SRI funds that were discontinued before 31 December 2014 were excluded from the empirical analysis; and
- Due to data availability and non-disclosure agreements (NDAs), the sampling frame was limited to the inclusion of unit trust funds only. Consequently, SRI funds that were identified as either pooled or segregated funds were excluded from the empirical analysis.

As the purpose of this study was to measure the risk-adjusted performance of the SRI funds, quantitative data were sourced and collected from secondary sources on the SRI unit trust funds, selected benchmark categories and a risk-free instrument.

1.4.2.2 Data collection method and process

Quantitative data were sourced and collected from various secondary sources for the completion of the empirical analysis of this study. As presented in Section 1.4.2.3, the empirical analysis involved calculating various risk-adjusted performance measures (the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio) as well as various performance measurement models (the CAPM, Fama-French three-factor model and Carhart four-factor model).

Thus, pertaining to the risk-adjusted performance measures calculated, monthly data for the sample of SRI funds as well as the matched sample of non-SRI funds[2] (selected as the second benchmark category) were collected, over the period of 31 May 2004 until 31 December 2014, from the INET BFA (2014) financial database and the Association for Savings and Investment South Africa (ASISA, 2015). Monthly data for the first and third benchmark categories were sourced and collected from the INET BFA (2014) financial database, for the research period. Data for the risk-free instrument (selected as the short-term (91 day) Treasury bill) were collected from the South African Reserve Bank (SARB, 2015) for the research period.

Furthermore, pertaining to the performance measurement models calculated, monthly data were collected from the INET BFA (2014) financial database on the FTSE/JSE Small Cap Index (small capitalisation) and the FTSE/JSE Top 40 Index (large capitalisation), and on the FTSE/JSE Growth Index and the FTSE/JSE Value Index for the research period.

For the purpose of this study, the research period, 1 May 2004 until 31 December 2014, was divided into two parts. The first sub-division includes the following two sub-periods:

- Sub-period 1: 1 May 2004 until 30 September 2009; and
- Sub-period 2: 1 October 2009 until 31 December 2014.

The purpose of the first sub-division is justified as:

- Serve as the fundamental sub-periods of the analysis under which both the risk-adjusted performance measures and the performance measurement models were calculated;
- Relate the performance of the SRI funds over two equal time periods;
- The performance measurement models were calculated as regression models and, therefore, required a large number of observations in order for the distribution to be normal and to provide more accurate results;[3] and
- Serve as two periods in which one period included a period of a hazardous market event (such as the 2007/08 global financial crisis), and the other period excluded such a period.

The second sub-division includes seven sub-periods:

[2] The matched sample of non-SRI unit trust funds were selected based on sector category, date of inception and fund size. The sample was identified, as according to the selection criteria, from FundsData Online (2015). A detailed description of the sample of local SRI and non-SRI funds used in the empirical portion of this study is presented in Annexure A.

[3] The sample size requires at least 30 observations to be normally distributed (Gujarati & Porter, 2010:472). The number of observations for sub-period 1 and sub-period 2 was 64 and 63 respectively.

- Sub-period 1: 1 May 2004 until 31 January 2006, identified as the period of enhanced growth in the South African general equity market and the South African SRI market;
- Sub-period 2: 1 January 2006 until 31 July 2007, identified as the period prior to the global financial crisis;
- Sub-period 3: 1 July 2007 until 31 January 2009, identified as the period of the global financial crisis;
- Sub-period 4: 1 January 2009 until 31 July 2010, identified as the period including the aftermath of the global financial crisis;
- Sub-period 5: 1 July 2010 until 31 January 2012, identified as the period in which global and local financial markets were starting to recover and stabilise from the global financial crisis, and the period in which the European debt crisis emerged;
- Sub-period 6: 1 January 2012 until 31 July 2013, identified as the period including the aftermath of the European debt crisis; and
- Sub-period 7: 1 July 2013 until 31 December 2014, identified as the period in which global and local financial markets were starting to recover and stabilise from the European debt crisis.

The following justified the purpose of the second sub-division:

- Serve as the sub-periods over which several market events (both hazardous and non-hazardous), that may have had probable effects on local SRI fund performances, were isolated; and
- Serve as the sub-periods in which the risk-adjusted performance of the SRI funds was calculated according to the risk-adjusted performance measures.

1.4.2.3 Statistical analysis

The statistical (or empirical) analysis was conducted over the sample period of 1 May 2004 until 31 December 2014, as discussed in Section 1.3.1.

In order to have measured the risk-adjusted performance of the SRI funds during each identified sub-division of the research period, five risk-adjusted performance measures, which included the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio were calculated. The five risk-adjusted performance measures calculated are discussed in detail in Chapter 3.

Moreover, the CAPM, Fama-French three-factor model and Carhart four-factor model was calculated over the research period. The CAPM (Sharpe, 1964; Linter, 1965; Black, 1972) and Fama-French three-factor model (Fama & French, 1992) was extended by the inclusion of a momentum anomaly (Jegadeesh & Titman, 1993), identified by Carhart (1997:60), and, thus, referred to as the Carhart four-factor model. The three performance measurement models calculated are discussed in Chapter 3.

1.5 CHAPTER CLASSIFICATION

This study comprised the following chapters:

Chapter 1: Introduction, problem statement and objectives of the study - introduced SRI, described the problem statement, theoretical and empirical objectives, the methodology, and provided a classification of the chapters.

Chapter 2: A theoretical analysis of socially responsible investment - provided a literature review regarding all aspects of SRI. Predominantly the history, strategies, and other theoretical characteristics of SRI were analysed.

Chapter 3: Research design, data and methodology - described the methodology that was used in the empirical portion of this study, focussing on the research design and methodology, target population and sampling frame, and data collection method and process. The chapter further focused on the statistical (or empirical) analysis that was undertaken.

Chapter 4: Empirical results and findings - provided an analysis of the risk-adjusted performance of the SRI funds relative to three selected benchmark categories as compared through the use of five selected risk-adjusted performance measures. The three selected performance measurement models were presented with the intent to ascertain if the relevant risk factors of each model could explain the expected returns of the SRI funds. The results and findings were discussed in order to determine whether the SRI funds yield higher risk-adjusted returns in the long-term.

Chapter 5: Summary, conclusions and recommendations - provided a summary and conclusions for this study, based on the results and findings as presented in Chapter 4, after which potential recommendations were also detailed.

CHAPTER 2: A THEORETICAL ANALYSIS OF SOCIALLY RESPONSIBLE INVESTMENT

2.1 INTRODUCTION

This chapter discusses and addresses the theoretical objectives pertaining to this study. More specifically, this chapter focuses on conducting a widespread review of the literature relating to socially responsible investing and SRIs. The discussion principally focuses on the history, distinguished strategies, types of social investors, and the benefits and drawbacks of SRI.

This chapter consists of five main sections. Firstly, focus is placed on the definition of SRI and the historical background and development thereof in both international and local sectors. Secondly, a discussion on the traditional asset management strategies (namely active and passive management) as well as SRI strategies (namely screening, shareholder activism and cause-based investing) is presented, in which the SRI strategies employed by South African socially responsible investors and SRI funds are identified. Thirdly, three types of socially responsible investors, namely value-based, value-seeking and value-enhancing investors are identified and discussed. The fourth section of this chapter involves a discussion on the major benefits and drawbacks of SRI. In the last section of this chapter, focus shifted to a theoretical analysis of the probable effect that the 2007/08 global financial crisis had on SRI funds.

2.2 SOCIALLY RESPONSIBLE INVESTMENT

2.2.1 Defining socially responsible investment

Although SRIs have been described by a number of researchers as ethical investing, sustainable investing, green investing, targeted investing, environmental investing, responsible investing or social investing (White, 1995; Cowton, 1998; Herringer *et al*., 2009; Giamporcaro & Pretorius, 2012), Adam and Shauki (2014:224) identified that SRI is most frequently referred to as EI or SRI. Although SRI can be described through a wide range of terms, various investors refrain from relating this investment philosophy with a specific term (such as ‘ethical’) as it might infer that a specific perspective has been reserved (such that the term ‘ethical investing’ is related to religious investing) (Viviers *et al*., 2009:4; Adam & Shauki, 2014:226). However, for the purpose of this study, the term ‘socially responsible investment’ (SRI) is accepted.

Giamporcaro and Pretorius (2012:3) clarified that, fundamentally, SRI includes sustainable and responsible investments directed toward relating ESG investment objectives and conventional financial investment objectives. Furthermore, during the investment decision-making process, investors select SRIs on the basis of their perception toward ESG factors as well as financial investment objectives (Adam & Shauki, 2014:226). Therefore, the definition of socially responsible investing as the act taken to consider both financial investment objectives and the commitment towards ESG investment objectives during the investment decision-making process, as provided by Oh *et al*. (2013:705), is adopted for the purpose of this study.

Oh *et al*. (2013:705) identified that SRI funds can be classified by certain aspects, which are incorporated in the investment decision-making process. SRI funds are created to influence the behaviour of companies toward ESG factors and concerns, and while short-term performance seems unpromising, SRI funds may yield promising long-term performance as this investment philosophy is long-term in nature (Oh *et al*., 2013:706). However, as SRI is considered a broad concept, the following section provides a brief overview of its historical background and development.

2.2.2 Historical background and development of socially responsible investment

Sparkes and Cowton (2004:45) argued that, since its development, SRI has gained increasing consideration while also emerging into a more multifaceted and sophisticated investment philosophy. The history of SRI dates back hundreds of years where following religious and moral standards (or principles) were regarded as an obligation. The 18th century Quakers of the United States of America was the first group of investors to apply religious (or ethical) screening to traditional investments (Kinder & Domini, 1997:12; Viviers, 2007:7; Herringer *et al*., 2009:11). Bauer *et al*. (2005:1752) noted that the Quakers applied religious (or ethical) screens based on the promotion of human equality and non-violence. Following the religious (or ethical) screening introduced by the Quakers, mutual funds in the United States of America adopted SRI principles in the 1920s, which was, however, a result of the consequences of World War I (Viviers, 2007:7). World War I gave rise to social awareness through which the first SRI funds, introduced in the United States of America during the 1920s, were created based on evading to invest in companies associated with alcohol, gambling, tobacco and weaponry production and transactions (Viviers, 2007:7).

Giamporcaro and Pretorius (2012:1) noted that before the 1960s, SRI gained interest in the avoidance of 'sin' stocks which included stocks of companies associated with various products that were deemed unethical (such as alcohol and tobacco). Thereafter, the political climate of the 1960s brought about several campaigns directed toward raising social and responsible awareness. Civil rights, women's rights, anti-war, labour, anti-nuclear and environmental campaigns included some of the actions created during the 1960s (Pan & Mardfin, 2001:4).

Heese (2005:730) proposed a rather ironic view of the growth of SRI, particularly in international and South African terms. In the early 1970s, the apartheid era of South Africa drove the growth of international SRI markets through which, predominantly in the United States of America, a number of faith-based groups and pension funds retracted investment from South Africa (Beabout & Schmiesing, 2003:67; Ethical Partnership, 2014). Although the struggling circumstances of apartheid in South Africa spurred the growth of international SRI markets, South Africa itself was not aware of this new social investment philosophy. The Global Sullivan Principles of the United States of America, published in 1974, required that financial institutions and companies withdrew from business with South Africa on the basis of unethicality and morally unacceptable conditions caused by the ensuing apartheid era (Heese, 2005:730; Viviers, 2007:7). The divestment from South Africa brought about by the United States of America soon followed to the United Kingdom and Australia in the 1980s (Giamporcaro & Pretorius, 2012:1; Oh *et al*., 2013:705).

In 2000, as further noted by Giamporcaro and Pretorius (2012:1), the SRI markets of Belgium, Europe, France, Germany and Switzerland progressed on the basis of sustainable development. Since 2000, various individual investors and fund managers practiced socially responsible investing through either withholding investment from companies that did not focus on ESG concerns or directing investment to companies that did embrace addressing ESG concerns (Giamporcaro & Pretorius, 2012:1).

Viviers (2007:9) noted that the South African SRI market struggled to develop and grow as rapidly as the international SRI sector. Although the first two South African SRI funds (the Community Growth equity fund and the Futuregrowth Albaraka equity fund[4]) were launched in 1992, the South African SRI market did not receive as much attention given that various individual investors, financial institutions and financial managers were convinced that SRI was associated with financial sacrifice followed by large-scale losses (Viviers *et al*., 2008:39; Viviers *et al*., 2009:3).

[4] The Futuregrowth Albaraka equity fund has changed its name to the Old Mutual Albaraka equity fund.

During the 1990s, South African trade unions urged members to avoid investing in companies that did not encourage creating benefits for the previously disadvantaged individuals, which was brought about by the apartheid era (Herringer *et al*., 2009:12). However, since the establishment of the FTSE/JSE SRI Index in May 2004, the South African SRI market has received remarkable interest (Viviers *et al*., 2009:3). Granting that SRI received increased interest since 2004 in South Africa, the South African SRI market remains comparatively smaller than international SRI markets (Viviers & Fifer, 2013:218).

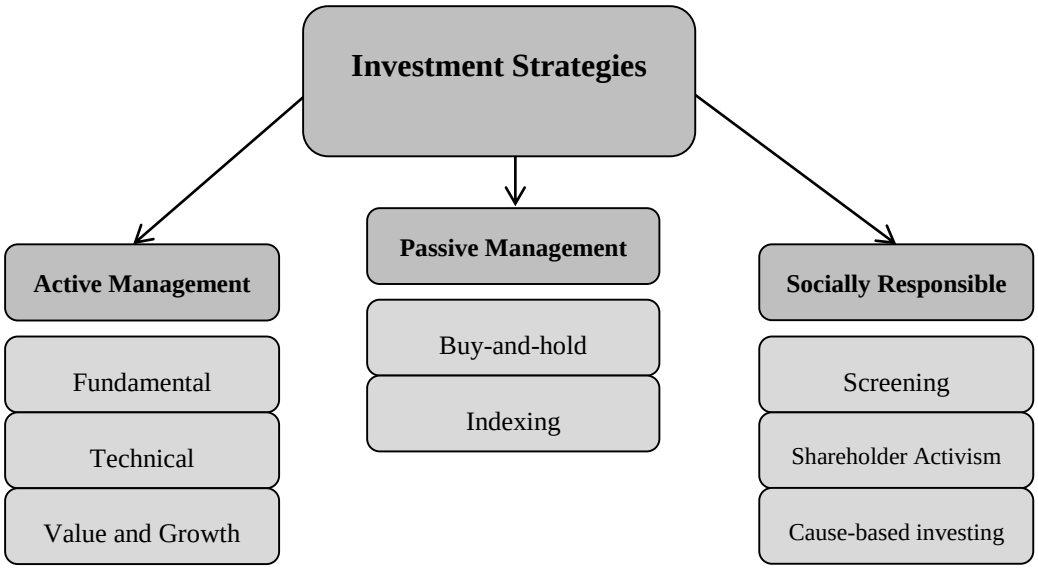
As Sparkes and Cowton (2004:45) noted that SRI started as an investment philosophy followed by a small amount of investors and investment funds (for example unit trust funds and mutual funds), larger investment institutions (for example pension funds and insurance companies) have adopted this style of investment over the years. The shift of SRI from margin to mainstream, as asserted by Sparkes and Cowton (2004:49), has been evident by large pension funds and insurance companies, predominantly based in the United Kingdom, United States of America, Australia and Canada, following this relatively new investment philosophy. In this regard, the development of SRI has contributed to the growth of the developing economies, such as the South African economy, which can be noted through multiple businesses and institutions addressing ESG concerns (De Jongh *et al*., 2007:3).

The development of SRI has shifted from originally being based on religious and moral screens (which included evading investment associated with alcohol, gambling, tobacco and weaponry production and transactions), to encouraging investment associated with ethical and morally acceptable practices, to targeting specific investments geared toward addressing and rectifying ESG concerns.

2.3 TYPES OF INVESTMENT STRATEGIES

Selecting a specific investment strategy is an essential part of the investment decision-making process. Investment strategies provide guidelines or rules for investors (or fund managers) according to which asset classes and weightings are decided upon (Reilly & Brown, 2012:36). Investors and fund managers have numerous investment strategies at their disposal; however, such strategies can be broadly categorised as active, passive and socially responsible strategies (as summarised in Figure 2.1).

Figure 2.1: Investment strategies

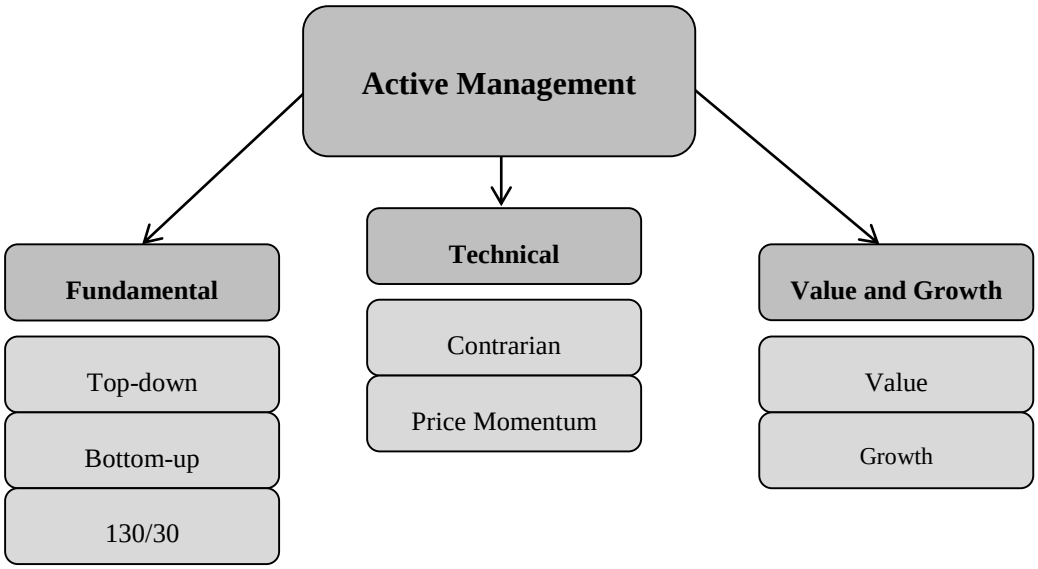


Source: Compiled by the author

2.3.1 Active investment management

Active investing can be described as an attempt to discern undervalued financial securities from those that are overvalued by timing markets, pre-selecting areas (industry or sector) of interest or forecasting market prices (Marx *et al*., 2010:275). In principal, an active investor (portfolio/fund manager) attempts to, on a risk-adjusted basis, generate excess returns above that of a passive benchmark index (Reilly & Brown, 2012:512). As an attempt to outperform the general market (benchmark), active investing requires superior market analysis in which information (generally unknown to the rest of the market) is sought after in order to generate abnormal returns (referred to as alpha (α)). Fundamental, technical, value- and growth-oriented investment strategies include some of the various strategies that active investors can follow, as summarised in Figure 2.2.

Figure 2.2: Active management strategies



Source: Compiled by the author

2.3.1.1 Fundamental strategies

Fundamental strategies are constructed so that active investors can analyse the macro-economy, the industry as well as the relevant company itself in order to determine the fair price of the company (or individual investment) (Laopodis, 2013:39). Fundamental strategies can either be followed through a top-down or bottom-up process, in which both processes include the principles of timing the market, pre-selecting an area of interest and forecasting market prices in an attempt to identify undervalued securities.

Reilly and Brown (2012:513) and Laopodis (2013:52) acknowledged that the top-down process starts with a broad macroeconomic environment analysis followed by an analysis of the industry in which a specific company operates and ultimately ends with an analysis of the company itself. This process is conducted from the broadest possible aspect that could affect the risk and return prospects of a company (or individual investment) to the most specific aspect, in order to complete the process of asset allocation (Marx *et al*., 2010:75). Contrariwise, when following the bottom-up process an investor simply analyses the specific pre-selected company (or individual investment) irrespective of any macroeconomic or industry indicators (Reilly & Brown, 2012:513).

A relatively recent active fundamental investment strategy is identified as the 130/30 strategy. This strategy enables investors to take long (positive) positions up to 130 percent of the entire

portfolio's capital value together with a short (negative) position of up to 30 percent (Reilly & Brown, 2012:516). Reilly and Brown (2012:516) further noted that the 130/30 strategy allows investors to use greater proficiency in an attempt to generate excess returns.

2.3.1.2 Technical strategies

Laopodis (2013:39) identified that technical strategies are based on the premise that the historical behaviour (pattern) of individual securities' prices will indefinitely recur in the future, thus, enabling active investors to exploit such patterns. By analysing historic security price patterns, a contrarian investment strategy or a price momentum strategy can be followed, each with its own fundamental assumption (Reilly & Brown, 2012:516). The contrarian investment strategy assumes that historic security price patterns will reverse in the future, thus, enabling investors to buy securities when prices are low (when the market is bearish) and to sell securities when prices are high (when the market is bullish). On the other hand, by assuming that historic security price patterns will move in the same direction, the price momentum strategy is followed by investors that believe undervalued (overvalued) securities will stay as such (Reilly & Brown, 2012:516).

2.3.1.3 Value- and growth-oriented strategies

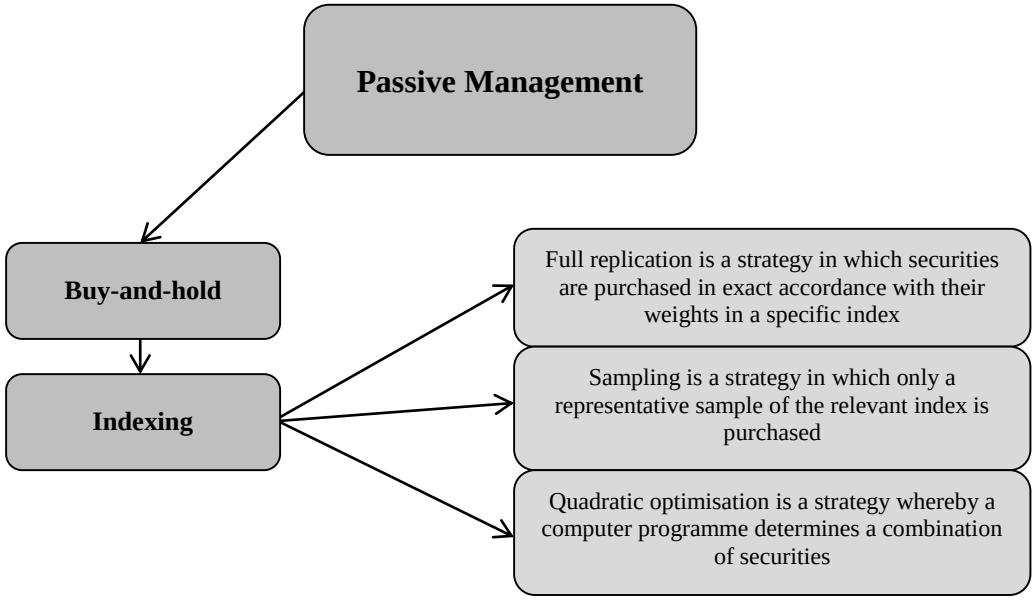
As noted by Reilly and Brown (2012:523) value- and growth-oriented investment strategies are amongst the most recent active investment management strategies that have gained considerable importance. Fidelity (2015) identified that, as active investment management strategies, both value and growth strategies aim to generate significant returns for the investor.

The value-oriented investing strategy focuses on the price of a security in order to make a relative valuation assumption. Value investors merely attempt to generate considerable returns by purchasing securities that are undervalued or selling securities that are overvalued (Farmer & Joshi, 2002:157). While, the growth-oriented investing strategy aims to identify companies (or securities) that are expected to rapidly grow in the future, focussing primarily on earnings (Jain, 2010:43; Reilly & Brown, 2012:524). As evident through a number of global empirical studies (Athanassakos, 2009; Hoekjan, 2011; Abadiga & Neibig, 2012; Asness *et al*., 2013) value stocks, which are generally referred to as stocks that have below-average price-to-earnings (P/E) and market-to-book (M/B) equity ratios, and above-average dividend yields, have consistently outperformed growth stocks over long periods of time.

2.3.2 Passive investment management

Passive investing contains a fixed strategy in which an investor (portfolio/fund manager) does not endeavour to earn excess (abnormal) returns above a specified benchmark index. In general terms, a passive investment approach can be described as one in which financial assets (such as stocks or bonds) are purchased in accordance with a predetermined goal to replicate the performance of an underlying benchmark index (such as the Standard and Poor (S&P) 500 Index, the National Association of Securities Dealers Automated Quotations (NASDAQ) Composite Index or the FTSE/JSE Top 40 Index) (Reilly & Brown, 2012:504). Marx *et al.* (2010:275) proposed that timing the market, pre-selecting an area of interest or forecasting market prices does not form part of this investment management strategy, as superior analysis is not necessary to mimic the performance of a benchmark index. Passive investing can further be clarified as either a buy-and-hold strategy or an indexing strategy, which is summarised in Figure 2.3.

Figure 2.3: Passive investment management strategies



Source: Compiled by the author

2.3.2.1 Buy-and-hold strategy

Buying a financial security and holding it for a medium to long period of time (commonly longer than five years), or until maturity, is considered a buy-and-hold passive investment strategy (Reilly & Brown, 2012:1041). Marx *et al*. (2010:276) asserted that the buy-and-hold strategy is based on the notion that all markets are efficient, given that the prices of securities reflect all available

information. As noted by Marx *et al*. (2010:276) and Shen (cited by Ling *et al*., 2014:228) the buy-and-hold strategy is one in which high-quality securities are bought to be included in a well-diversified, low risk portfolio. Ling *et al*. (2014:227) further recognised that the buy-and-hold strategy is employed irrespective of market fluctuations.

2.3.2.2 Indexing strategies

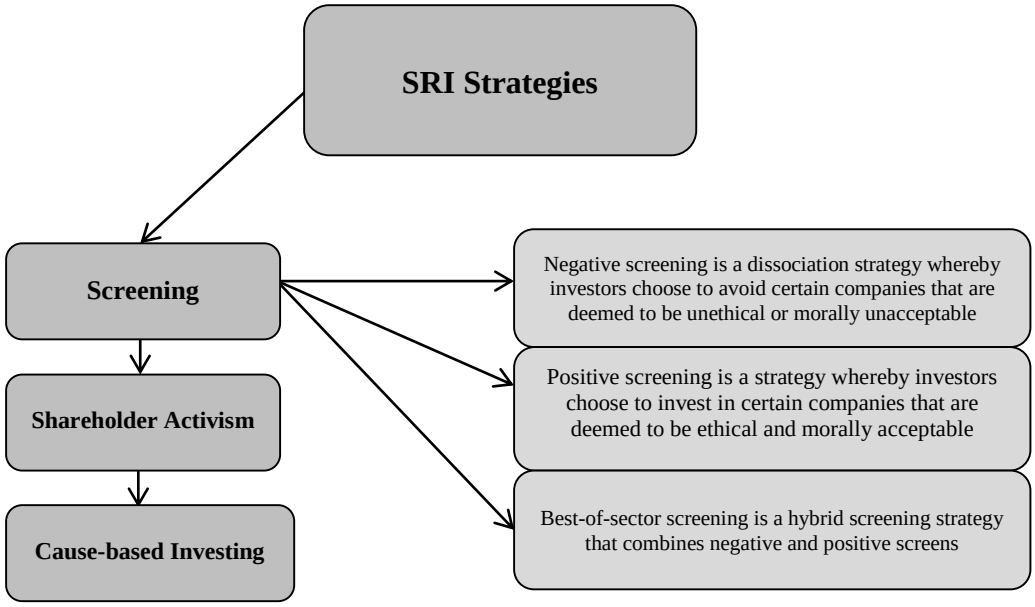
Referred to as the most frequently employed passive investment strategy, indexing is a strategy in which the selection of securities is done in such a manner that the performance thereof matches (or mirrors) that of a predetermined benchmark index (Marx *et al*., 2010:276). Reilly and Brown (2012:506) identified three methods through which an investor (portfolio/fund manager) can create an index portfolio.

Firstly, full replication is considered an indexing strategy wherein securities are purchased in exact accordance with their weights in the specific index (Reilly & Brown, 2012:506). Secondly, sampling is an indexing strategy in which only a representative sample of the relevant index is purchased in order to address the issue of having to mimic large indices (Laopodis, 2013:306). Lastly, quadratic optimisation (or programming) is referred to as an indexing strategy whereby a computer programme determines a combination of securities in such way that the difference in returns from the benchmark index is minimised. Reilly and Brown (2012:504) further noted that these programmes' outputs are based on historical information regarding the prices of securities as well as correlations between securities.

2.3.3 Socially responsible investment strategies

As summarised in Figure 2.4, screening, shareholder activism and cause-based investing are amongst the most distinguished SRI strategies. Socially responsible investors apply SRI strategies in order to integrate ESG factors and concerns into the investment decision-making process. Given that integrating ESG factors and concerns are considered the primary goal of socially responsible investors (and essentially SRIs), non-financial strategies are sought after, whereby each strategy (in conjunction with investor or fund objectives) follows its own set of procedures in order to achieve this goal.

Figure 2.4: Distinguished socially responsible investment strategies



Source: Compiled by the author

2.3.3.1 Screening strategies

As noted by Kinder and Domini (1997:12) and Kinder (2005:25), screening is a process by which investors or fund managers select certain investments or companies to be included in a portfolio or fund, which adheres to a prearranged set of principles. SRI screening, or social screening, is regarded as a vital part of the social investment decision-making process in which non-financial (essentially ESG) criteria is applied in order to select potential investments (Kinder & Domini, 1997:12).

As distinguished by Sparks and Cowton (cited by Viviers, 2007:71) the self-referential or the comprehensive criterion can be applied when developing social screens. The self-referential criterion is used as a framework for analysis whereby one agrees on what to own and what not to own (in a portfolio/fund) (Kinder & Domini, 1997:13). Kinder and Domini (1997:13) further identified that with reference to SRI, applying the self-referential criterion, non-financial assets hold the greatest concentration in the portfolio. Viviers (2007:71) recognised that with this criterion, negative screening as an SRI strategy is frequently applied.

A self-referential strategy, whereby socially responsible investors decide which companies not to invest in, is known as negative screening, or exclusionary screening. Negative screens are applied as a dissociation strategy as investors choose to avoid certain companies that do not adhere to pre-

determined ESG criteria. Negative screening, is identified by Ballestero *et al*. (2012:488) as the oldest strategy that socially responsible investors/fund managers follow in order to filter SRIs. Companies that do not conform or adhere to certain ESG criteria, such as companies that are involved in the production or sale of tobacco, alcohol, pornography, gambling, weaponry/firearms, are avoided and not included in investment portfolios/funds (Kinder & Domini, 1997:14; Viviers, 2007:72; Viviers *et al*., 2008:39; Viviers *et al*., 2009:5; Giamporcaro *et al*., 2010:3; Ballestero *et al*., 2012:488).

Steurer *et al*. (2008:11) as well as Viviers and Fifer (2013:229) asserted that companies who produce or sell products or services that are classified as unethical, irresponsible, or unsocial, can be referred to 'sinful' or 'morally unattractive' companies. As noted by Steurer *et al*. (2008:11) negative screening can be dated back hundreds of years, where religious groups chose not to invest in 'sinful' companies/industries as the operations of such companies/industries contravened their religious beliefs. Renneboog *et al*. (2008:1728) argued that more recently, investors and funds do not base negative screening on traditional principles or religious principles as often as has been done in early years.

However, as evident in South Africa, a number of SRI fund objectives are based on Islamic Shari'ah principles fundamentally designed for the Muslim community (Viviers, 2007:73). As followed by a number of SRI funds in South Africa, Shari'ah compliant funds exclude companies or financial institutions that are involved in tobacco, alcohol, pornography, non-Halaal products (for instance pork), weaponry/firearms, gambling and the payment or collection of interest (Viviers, 2007:73; Johnson & Sergie, 2014).

Other exclusions based on negative screening may include avoiding companies that are involved in abortion, the violation of human rights, animal testing, the logging of forests, 'dirty' mining (such as uranium mining), irresponsible extraneous actions, the production of bio-technology and genetically modified organisms (GMOs) or undesirable working conditions (Renneboog *et al*., 2008:1728). Schueth (2003:189) identified that the negative screening strategy is employed predominantly in the United States of America and the United Kingdom.

Although a number of SRI funds are based on traditional negative screening principles, a more modern approach to screening is followed whereby the social consciousness of companies and investors are promoted through investments (Viviers, 2007:77). A more comprehensive screening approach (as previously noted) to filter SRIs has been developed, which involves both positive (or

inclusionary) screening and best-of-sector screening. Assessing the impact that a business or organisation has on the society (in essence ESG), is regarded as the comprehensive criterion (Kinder & Domini, 1997:13; Viviers, 2007:71). Evaluating the interaction that businesses and organisations have with society is considered an attempt by investment/fund managers to alter corporate behaviour and to report to the public what is reflected as important social standards (Kinder & Domini, 1997:13). Positive screening, as well as the best-of-sector screening strategy (which combines positive and negative screens) is used frequently when applying the comprehensive criterion in evaluating potential investments (Viviers, 2007:71).

As a more comprehensive approach to screening, positive screening, or inclusionary screening, can be described as a strategy in which socially responsible investors identify certain companies that adhere to pre-determined ESG criteria. Steurer *et al*. (2008:11) emphasised that when companies are selected according to their positive social and environmental activities, or companies that are regarded beneficial to the society, positive screens are applied. As noted by Viviers (2007:77) companies that are in general referred to (or have a trustworthy reputation) as 'good corporate citizens' according to ESG criteria, are those companies that would be positively screened by socially responsible investors.

Viviers *et al*. (2008:39) argued that when the positive screening strategy is utilised, a vast number of ESG criteria is singled out concerning a company's products, policies and operations. As each country has differing societal and cultural needs, positive screens will differ from country to country. For instance, positive screens that are considered vital in South Africa include that of Broad-Based Black Economic Empowerment (B-BBEE), social infrastructural development, environmental management or water sanitation (Viviers *et al*., 2008:39; Viviers & Fifer, 2013:220). In addition, Horsely (cited by Viviers *et al*., 2008:39) identified that positive screens concentrating on climate, labour, and resource allocation, may include the fundamental application by developed countries.

Positive screens' ESG criteria include companies that exert excellent management in specific areas such as ethical and responsible product development, corporate governance, ethical codes of conduct, B-BBEE (specifically the case for South Africa), environmental concerns (such as air and water pollution), infrastructure development, human rights as well as labour rights. More specifically, companies that operate in certain industries such as health care, transport, education, renewable energy, resources, recycling, and water management, are also screened as these

industries are automatically considered to be socially responsible and sustainable for future generations (Herringer *et al*., 2009:13).

A major attribution of positive screening, as identified by Giamporcaro *et al*. (2010:3), is that in selecting companies based on their positive social and environmental performance, an investor or investment manager essentially rewards such companies in an attempt to promote ESG factors. Giamporcaro *et al*. (2010:13) identified that the positive screening strategy is widespread in the United Kingdom. As mentioned, an additional comprehensive approach to screening can be followed in which both positive and negative screens are combined in order to form a hybrid (or generally referred to as best-of-sector) screening strategy.

The best-of-sector (or best-in-class) screening strategy is a hybrid form of screening in which positive and negative screens are combined in order to decide on potential companies to be included in a portfolio or fund. The hybrid form of screening is considered a more comprehensive strategy to follow, as this strategy does not focus on the limitations placed on company selections by negative and positive screens (Becchetti *et al*., 2015:2543). As noted by Stenström and Thorell (2007:4) as well as by Renneboog *et al*. (2008:1728) the best-of-sector strategy is used frequently as a subset of the positive screening strategy whereby companies are selected based on 'passing' a minimum ESG criteria threshold. Viviers (2007:83) further noted that in the selection process of the best-of-sector screening strategy, negative screening is applied as some companies may be omitted, as they are deemed undesirable.

As the name of the strategy suggests, companies that rank best in a specific sector or class according to ESG criteria will be chosen to be included in the portfolio or fund. By evaluating and ranking each industry sector, companies are screened in accordance with both negative and positive ESG screening criteria (Renneboog *et al*., 2008:1728). Thus, companies that are considered to be top performers regarding ESG factors and concerns are selected in each industry sector in order to avoid excluding entire industries (as when applying negative screens) (Viviers *et al*., 2008:39). By investing in all industry sectors, the best-of-sector screening strategy is utilised more frequently as it tends to track industry benchmark indices more diligently, which is argued by Bauer *et al*. (2005:11) the primary reason for its development. Cowton (1998:183) and Giamporcaro *et al*. (2010:13) identified that socially responsible investors in the United Kingdom and the Western Europe, respectively prefer the best-of-sector screening strategy.

All three screening strategies use unique investment styles but can, however, be employed in conjunction with one another. However, in an attempt to transform and promote social and environmental change through active engagement by shareholders, a vast number of SRI participants are applying shareholder activism as another significant SRI strategy, which is presented in the following section.

2.3.3.2 Shareholder activism strategy

In attempt by socially responsible investors to transform and promote ESG change within companies' products, policies and practices, shareholder activism or active shareholder engagement is utilised (Viviers & Fifer, 2013:218). In order to achieve the desired transformation or promotion, socially responsible investors are urged to participate in accordance with the companies' management boards regarding specific ESG concerns. However, Viviers and Fifer (2013:218) further argue that for this strategy (as well as positive screens) to be operative, socially responsible investors would have to be creditable stakeholders in the specific company.

Engaging with management boards can be done through dialogues, utilising voting rights, filing resolutions, or through ridding investments from those companies that do not conform to transformations (Viviers, 2007:85; Viviers *et al*., 2008:39). Through these methods, socially responsible investors can make use of their influence as shareholders to increase the awareness as well as promote companies (or management boards) to integrate ESG factors (Steurer *et al*., 2008:12).

Giamporcaro and Pretorius (2012:1) assert that as a need to bring social change to companies as well as industries, the United States of America was the first country in which the shareholder activism strategy developed, as a result of the country's peace and green movements in which ethical positions were of importance. However, from a global and local perspective, the intention of this strategy is purely to increase the awareness and development of social and environmental products, policies and operations of companies in all industry sectors (Giamporcaro & Pretorius, 2012:1). Giamporcaro *et al*. (2010:13) reported that the shareholder activism strategy is employed largely in the United Kingdom.

As the last distinguished SRI strategy, cause-based investing necessitates directing investments (or finances) towards specific social or ethical causes or projects. This strategy is discussed in the following section.

2.3.3.3 Cause-based investing strategy

Cause-based investing, targeted investing or impact investing emphasises acting as a solution to certain social and environmental concerns within an economy. As stated by the Global Sustainable Investment Alliance (GSIA, 2013:36) this noteworthy SRI strategy embraces investing in communities with underprivileged individuals and/or to provide financing to companies that have transparent ESG objectives.

Viviers (2007:87) discerned that cause-based investing involves direct investments in the economy, rather than secondary investments in existing financial securities, which are prevalent through the aforementioned screening and shareholder activism strategies. Consequently, Peterson (cited by Viviers *et al*., 2008:53) proposed that cause-based investments have no (or low) association with listed securities and as such, including these investments in a portfolio can provide a high degree of diversification. More specifically, cause-based investing involves financing projects aimed at building roads, educational centres (such as schools), and medical centres (that is, social infrastructure) or financing projects aimed at promoting B-BBEE as well as fair labour practices (Viviers *et al*., 2008:39). Thus, cause-based investing unambiguously involves focussing on a specific ESG concern by financing it as a resolution.

Viviers *et al*. (2008:53) explained that in the investment decision-making process, the investor should cautiously consider each SRI strategy and how the chosen strategy may lead to the achievement of his/her investment objectives. Aligning his/her investment objectives, which may include the level of risk and return, investment horizon, liquidity and personal preferences, with a specific SRI strategy will provide the investor a manner through which he/she can achieve both financial investment objectives as well as ESG investment objectives. As is highlighted in Section 2.5, certain SRI strategies present major benefits and drawbacks which are related to the general findings (or perceptions) of investing responsibly.

The following section presents the SRI strategies followed by South African investors and fund managers. Furthermore, all available (or active) South African SRI funds are listed with each funds' employed strategy.

2.3.3.4 Review of the strategies employed by South African socially responsible investment funds

The South African SRI market was valued at approximately R18 billion and consisted of 35 active funds on 31 March 2006 (Viviers, 2007). In 2009, the market grew with three funds to a total of 38 funds, with an approximate value of R23.28 billion (Giamporcaro *et al*., 2010). In June 2015, the South African SRI market grew substantially to a market value of R71.38 billion while consisting of 42 funds.

However, as stated by Viviers *et al*. (2009:9), the variety of definitions relating to socially responsible investing renders establishing the exact size of the South African SRI market relatively difficult. As there are a number of socially responsible products available in South Africa, the size of the South African SRI market is only an approximate value.

Table 2.1 provides an overview of the SRI funds available in South Africa. The identified SRI funds do not include discontinued funds, rather only those funds that were active or operational as at 31 June 2015. Included in Table 2.1 is the inception date, size and SRI strategy of each fund.

Table 2.1: South African socially responsible investment funds

SRI Fund Name[(a)]	Inception Date	Fund Size[(b)]	SRI Strategy[(c)]
27four Shari'ah Active Equity Prescient Fund	10-Sep-2008	R 178 402 505	Negative Screening
27four Shari'ah Balanced Prescient Fund of Funds	06-May-2011	R 115 686 662	Negative Screening
AIIF South African Infrastructure Fund	1996	R 1 700 000 000	Cause-based Investing
AIIF African Infrastructure Investment Fund	2004	R 1 900 000 000	Cause-based Investing
AMB Ethical Trust Fund	07-Jan-2003	R 490 020 000	Cause-based Investing
Cadiz High Impact (SRI) Bond Fund[5]	01-Oct-2008	R 230 000 000	Positive Screening and Cause-based Investing
Cadiz Money Market Fund	01-Mar-2006	R 1 467 575 332	Positive Screening
Community Growth Equity Fund	01-Jun-1992	R 485 737 346	Positive Screening and Shareholder Activism
Community Growth Gilt Fund	14-Jul-1998	R 256 141 919	Positive Screening
Community Growth Money Market Fund	01-Aug-2002	R 16 735 954	Positive Screening
Element Earth Equity Fund	04-Oct-2001	R 73 330 930	Shareholder Activism
Element Flexible Fund	15-Oct-2001	R 214 286 415	Shareholder Activism
Element Islamic Balanced Fund	28-Apr-2010	R 104 392 923	Negative Screening
Element Islamic Equity Fund	01-Feb-2006	R 156 053 453	Negative Screening and Shareholder Activism
Element Real Income Fund	09-Oct-2002	R 189 021 107	Shareholder Activism
Futuregrowth Agri-Fund[6]	-	-	Positive Screening and Cause-based Investing
Futuregrowth Community Property Composite	01-Jun-1996	R 3 300 000 000[(c)]	Cause-based Investing
Futuregrowth Development Equity Composite	Aug-2006	R 1 700 000 000[(c)]	Positive Screening
Futuregrowth Infrastructure and Development Bond Composite	Jan-1995	R 10 000 000 000[(c)]	Cause-based Investing
Futuregrowth Power Debt Composite	Nov-2012	R 4 000 000 000[(c)]	Positive Screening and Cause-based Investing
Futuregrowth SRI Balanced Composite	Nov-2004	R 6 300 000 000[(c)]	Positive Screening and Cause-based Investing
Kagiso Infrastructure Empowerment Fund (KIEF)	2006	R 900 000 000	Cause-based Investing

[5] The Cadiz high impact (or SRI) bond fund is an unlisted fund (Cadiz Asset Management, 2015).
[6] The Futuregrowth Agri-fund is a closed-ended fund with a 12 year term and a 3 year commitment period (Futuregrowth, 2015).

SRI Fund Name[(a)]	Inception Date	Fund Size[(b)]	SRI Strategy[(c)]
Kagiso Islamic Balanced Fund	03-May-2011	R 421 985 792	Negative Screening
Kagiso Islamic Equity	13-Jul-2009	R 725 818 509	Negative Screening
Mergence ESG Equity Fund	17-Jun-2010	R 267 160 000	Positive Screening
Mergence High Impact Debt Fund	16-Jun-2010	R 132 950 000	Positive Screening
Mergence SRI Fund	14-Jun-2010	R 195 560 000	Positive Screening
NewFunds Shari'ah Top 40 Index Fund	06-Apr-2009	R 33 386 347	Negative Screening
Oasis Crescent Balanced High Equity Fund of Funds	01-Apr-2010	R 624 443 552	Positive Screening
Oasis Crescent Balanced Progressive Fund of Funds	02-Mar-2005	R 1 925 298 358	Negative Screening
Oasis Crescent Balanced Stable Fund of Funds	01-Apr-2010	R 674 728 680	Positive Screening
Oasis Crescent Equity Fund	31-Jul-1998	R 6 183 824 260	Negative Screening
Oasis Crescent Income Fund	31-Mar-2010	R 1 700 000 000	Negative Screening
Oasis Crescent International Feeder Fund	28-Sep-2001	R 1 153 628 667	Negative Screening
Oasis Crescent International Property Equity Feeder Fund	30-Apr-2007	R 539 753 700	Negative Screening
Old Mutual IDEAS Managed Fund[7]	Jan-1999	R 9 150 000 000	Cause-based Investing
Old Mutual Albaraka Balanced Fund	12-Nov-2010	R 1 012 000 211	Negative Screening
Old Mutual Albaraka Equity Fund	01-Jun-1992	R 1 913 807 450	Negative Screening
Old Mutual Housing Impact Fund	Oct-2010	R 9 150 000 000	Cause-based Investing
Old Mutual Schools and Education Investment Impact Fund	13-Dec-2011	R 1 200 000 000	Positive Screening and Cause-based Investing
Sasfin MET Equity Fund	14-Oct-2005	R 110 906 250	Positive Screening
Stanlib Shari'ah Equity Fund	01-Jul-2007	R 489 181 421	Negative Screening
	42	**R 71 381 817 743**	

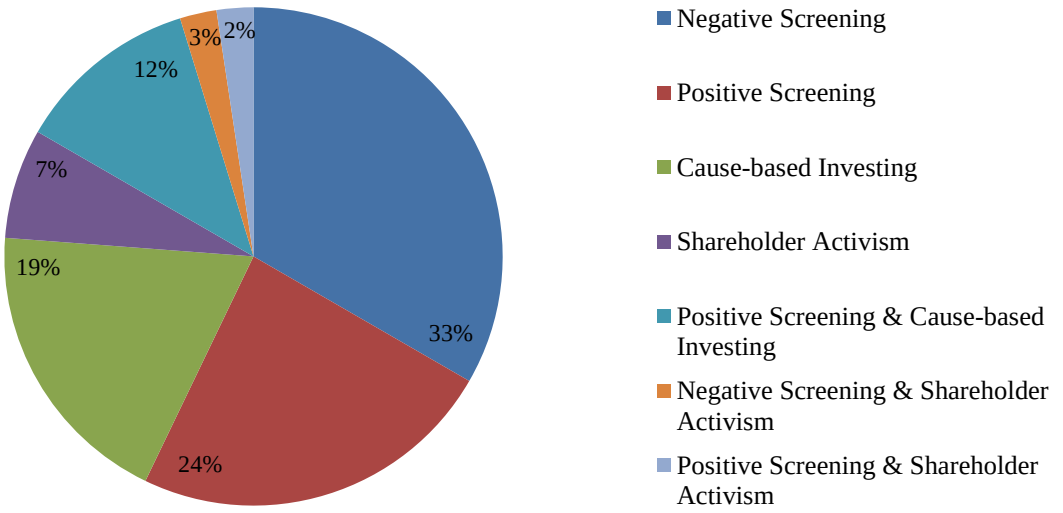
Note: (a) Funds are listed in alphabetical order;
(b) Fund sizes were sourced from FundsData Online (2015) and respective fund fact sheets as at 31 June 2015, with the exception of a few fund sizes (c) as at 30 September 2015;
(d) SRI strategies were identified according to the stated fund objective as per fund fact sheet.

Source: Compiled by the author

[7] Full fund name: Old Mutual (Alternative Investments) IDEAS (infrastructural, developmental and environmental assets) managed fund.

Figure 2.5 provides an indication of the SRI strategies followed by the previously listed South African SRI funds wherein negative screening, positive screening, shareholder activism and cause-based investing are the main strategies employed.

Figure 2.5: Socially responsible investment strategies employed by South African socially responsible investment funds



Source: Compiled by the author

From the identified South African SRI funds, as listed in Table 2.1, careful analysis was conducted to establish each fund's employed SRI strategy. As depicted in Figure 2.5, out of the total of 42 SRI funds, the majority of 14 (33%) SRI funds follow the negative (or exclusionary) screening strategy. In South Africa, the negative (or exclusionary) screening strategy predominantly focuses on Islamic Shari'ah principles. Ten (24%) of the identified SRI funds employ the positive (or inclusionary) screening strategy through which these fund place focus on sectors or companies that promote ESG factors (such as renewable energy).

The cause-based investing strategy in South Africa, followed by eight (19%) SRI funds, largely concentrates on the promotion of development, infrastructure (such as building roads, educational and medical centres) and B-BBEE. As the positive screening strategy concentrates on the promotion of ESG factors, the strategy often is combined with the cause-based investing strategy due to its mutual concentration on the promotion of infrastructure development and B-BBEE (Viviers *et al*., 2009:11; Giamporcaro *et al*., 2010:11). Consequently, five (12%) SRI funds reported to employ a combination of positive screening and cause-based investing.

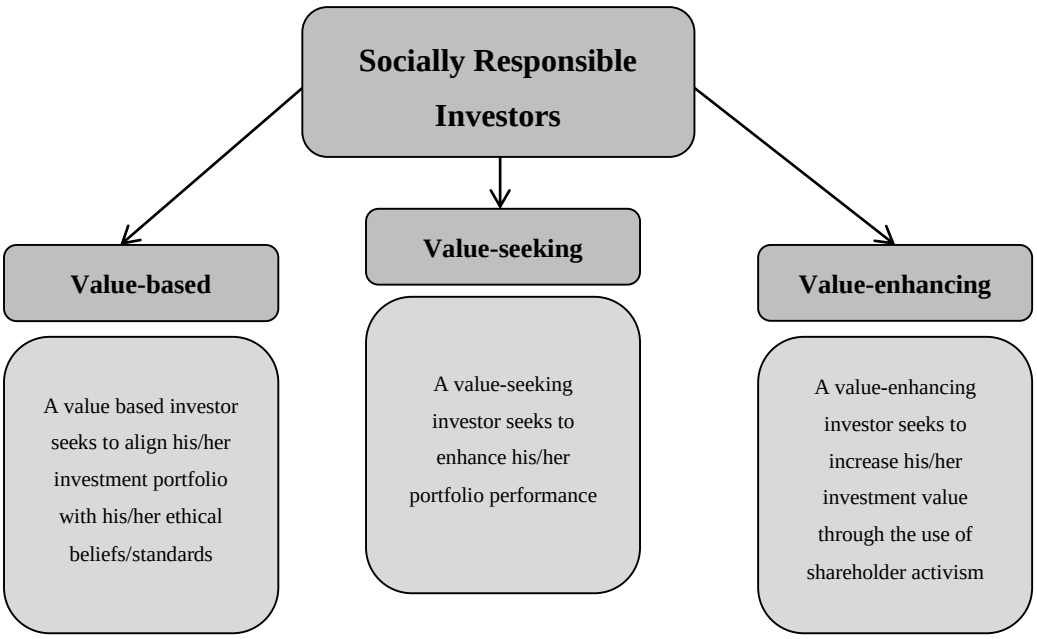
The remaining five (12%) SRI funds employ a shareholder activism strategy, either on its own or as a combination with other SRI strategies. Transforming and promoting ESG change within companies' products, policies and practices forms the basis of the SRI funds that employ the shareholder activism strategy in South Africa.

Similar to the research of Giamporcaro *et al*. (2010) it was found that the best-of-sector screening strategy (which is a hybrid form of positive and negative screening) is not employed by South African SRI funds. Giamporcaro *et al*. (2010:13) identified that this contrasts with the French SRI market in which the best-of-sector screening strategy is pervasive.

2.4 SOCIALLY RESPONSIBLE INVESTORS

Socially responsible investors, as identified by Kinder (2005:11), are categorised into three distinct groups. The three distinct groups of socially responsible investors comprise value-based, value-seeking and value-enhancing investors, as summarised in Figure 2.6.

Figure 2.6: Distinguished socially responsible investors



Source: Compiled by the author

2.4.1 Value-based investors

SRI was classified first as a value-based investment approach, which included that socially responsible investors align their investment portfolios with their personal ethical and moral

beliefs/standards (Kinder, 2005:23; Rubin, 2008:52). Until the late 1990s, the financial market and industry identified SRI through the incorporation of personal beliefs and standards into the investment decision-making process. Although SRI does not have an exact or distinct definition, the value-based investment approach formed the fundamental definition of SRI, which still is referred to by the majority of new entrants to the SRI sector.

As noted by Rubin (2008:52) value-based investors use their personal beliefs and values to make investment decisions. During the investment decision-making process, value-based investors do not give high consideration to the financial impact of their investment decision, as, according to these investors, the act of being socially responsible, deserves the greatest amount of consideration (Rubin, 2008:52). As value-based investors seek consistency, following a long-term buy-and-hold strategy, as presented in Section 2.3.2.1, provides investors that seek to achieve social investment objectives the greatest social returns (Kinder, 2005:25). Kinder (2005:25) further noted that value-based investors are classified as risk averse investors as these investors construct investment portfolios in a more conservative manner.

The shareholder activism or active shareholder engagement strategy, as presented in Section 2.3.3.2, was established in line with and based on the value-based investment approach (Kinder, 2005:11). Through shareholder activism, value-based investors tend to be actively involved in company engagement and proxy voting (Kinder, 2005:25). Value-based investors consider the promotion of positive social change through active shareholder engagement as their fundamental objective (Kinder, 2005:29). However, although value-based investors base their investment decisions on achieving social investment objectives, Rubin (2008:52) asserted that financial investment objectives also are sought after, even though the latter is given little attention.

As SRI has shifted from margin to mainstream throughout the years, SRI approaches (or socially responsible investors) accordingly shifted to accompany the various newly adjusted definitions and perceptions thereof. Consequently, socially responsible investors emerged from focussing on positive social change to focussing on the financial impact of social and environmental performance. This shift in focus, referred to as the value-seeking investment approach, is presented in the following section.

2.4.2 Value-seeking investors

The value-seeking investment approach developed during the late 1990s as an alternative to the value-based investment approach (Rubin, 2008:52). The value-seeking investment approach is based on the enhancement of investment performance. Rubin (2008:52) identified that value-seeking investors seek to ascertain how the financial performance of being socially responsible can enhance the value of investments, particularly related to the stock price (or value) of the company being invested in. Kinder (2005:33) proposed a more refined description of the value-seeking investment approach, as an approach that places focus on how ESG factors can predict stock performance. The description of the value-seeking investment approach identified by Kinder (2005:33) was based on the Domini 400 Social Index's outperformance against the S&P 500 in 2000, after which investors began to question if social and environmental aspects may have driven the performance.

The first group of investors to question the link between stock performance and social and environmental aspects was noted by Kinder (2005:33) to be the value-based investors. Rubin (2008:52) distinguished value-seeking investors from value-based investors through the prioritisation of financial return. Whereas financial return is given little attention by value-based investors, value-seeking investors give greater attention to the generation of financial return based on the impact of social and environmental screens (Rubin, 2008:52).

Kinder (2005:33), supported by Rubin (2008:53), identified that value-seeking investors form part of the mainstream investors as this investment approach is followed by the majority of socially responsible investors and SRI funds. A third group of socially responsible investors, identified as value-enhancing investors (presented in the following section), may occasionally be confused with the value-seeking investors as both approaches are closely linked to shareholder activism.

2.4.3 Value-enhancing investors

The third group of socially responsible investors is identified as value-enhancing investors. Focusing predominantly on corporate governance, the value-enhancing investment approach is an approach by which the value of investments is enhanced through the use of the shareholder activism strategy (Heimann, 2013:11). Value-enhancing investors seek to enhance the value (or price) of their portfolios through the use of shareholder activism in order to be able to meet certain promises made to beneficiaries and stakeholders (Kinder, 2005:44).

Although occasionally confused with value-seeking investors, a distinct feature of value-enhancing investors is that these investors focus on the enhancement of investment value, while value-seeking investors focus on enhancing investment performance (Crane *et al*., 2008:251). Linking corporate social performance to corporate financial performance is the fundamental aspect focused on by value-enhancing investors, through which these investors desire to ascertain that financial investment objectives set are met based on active shareholder engagement (Fung *et al*., 2010:6). Therefore, value-enhancing investors ultimately desire to affect (or change) corporate social policies (Kinder, 2005:45).

2.5 BENEFITS AND DRAWBACKS OF SOCIALLY RESPONSIBLE INVESTMENTS

Friedman (1970:179) remarkably wrote, *"There is one and only one social responsibility of business - to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud."* Friedman (1970:179) emphasised only one social responsibility that a business should encourage, that is *"increase its profits"*. By stating that corporate social responsibility should focus only on increasing profits, Matteson and Metivier (2015) argued that this may well encourage some businesses to excuse fraudulent or harmful business activities in their pursuit to increase profits. However, the famous statement written by Friedman (1970:179) over the years has been altered in order to incorporate the modern understanding of being socially responsible. Bryan (2015) asserted that various businesses have redefined the concept of social responsibility by taking responsibility of the impact, be it beneficial or harmful, on ESG factors that their pursuit to long-term profit maximisation may have.

As SRI is receiving increasing consideration, the number of participants in local and international SRI markets is growing undeniably. Thus, it is essential for the participants in SRI, be it individual investors, investment/fund managers, financial institutions or businesses, to consider the benefits and drawbacks of SRI. The various definitions or descriptions of SRI and the manner in which SRI strategies are employed, however, may hold varying understandings thereof.

Gladman (2011:2) proposed that in considering the socially responsible securities that are offered by public companies, the relationship that the company has with its stakeholders is

often regarded to have various benefits to communities, customers, employees, governments and investors. The various benefits ensuing from the company's (that regard ESG factors as important) relationship with its stakeholders might include considerations of business activities' impact on ESG factors, such as climate change and employee relations (Gladman, 2011:2). Therefore, it is apparent that investors or fund managers wishing to include a company's securities in a portfolio, may indirectly encourage the company to reflect ESG factors, effect positive social change or improved corporate governance, given the social criteria (or investment objectives) of the investors or fund managers (Heese, 2005:734).

Considering the various strategies that socially responsible investors can employ, Sparkes and Cowton (2004:55) classified the negative (or exclusionary) screening strategy to be detrimental to the efficient diversification of a portfolio. Viviers *et al*. (2009:5) explained that this drawback of negative screening is a particular concern for South African socially responsible investors as the small amount of securities listed on the JSE (as compared to the large amount listed on international securities' exchanges) does not provide an efficient amount of securities to select from, thus, harming efficient diversification. Viviers *et al*. (2008:53), however, identified that the cause-based investing strategy may well provide investors with enhanced diversification benefits as this investment strategy is correlated less with listed securities.[8] Gladman (2011:3) clarified that in analysing the diversification abilities of SRIs, the number of securities that can be selected, the correlation between these securities and the volatility of these securities should first be taken into consideration.

As SRIs are made in various asset classes, such as fixed-income, private equity and real estate, Gladman (2011:2) further identified that stakeholder concerns, eco-efficiency and affordability, and the social and environmental impact of business activities, respectively are the fundamental considerations of each SRI asset class. Therefore, each SRI asset class strives toward conveying benefits to communities, investors and economies through their respective considerations. Schueth (2003:189) acknowledged that SRIs (in either form of asset class) encourage sustainability in the form of public awareness in alternative energy and healthcare, natural foods, and sustainable and efficient construction.

[8] The cause-based investment strategy, as discussed in Section 2.3.3.3, does not involve investment in securities, rather investing in particular causes and projects – hence the low correlation with listed securities.

As explained by Bold (2011), SRI necessitates investing in what an individual believes in. During the investment decision-making process and through the incorporation of ESG factors, Bold (2011) asserted that socially responsible investors may need to be willing to accept the risk of lower returns while investing in what they believe in. However, as argued by Gladman (2011:4), future company and stock price performance may be indicated through the analysis of ESG factors. Gladman (2011:4) found that a number of researchers in the field (Derwall *et al*., 2004; Fu & Shan, 2009; Spellman & Watson, 2009; Edmans, 2011) have identified empirically that certain socially responsible companies or stocks may have outperformed (or yielded higher returns than) their counterparts, during specified time periods. Gladman (2011:7) as well as the Unitarian Universalist Association (2013) further identified that SRI funds do not harm the performance of investments portfolios but rather, in particular instances, assist the performance of non-SRI funds.

Given that SRI is considered, in modern terms, a more multifaceted and sophisticated investment philosophy, Gladman (2011:6) argued that socially responsible investing, therefore, is a specialised skill. For any investment to yield abnormal (or above-average) returns, superior investment skills are required, which is evident through the active investment management strategy (Reilly & Brown, 2012:512). Gladman (2011:6) found that SRIs that were managed under superior investment expertise and skills regularly outperformed non-SRI funds, while those SRIs that were not managed under superior investment expertise and skills, often underperformed. However, although socially responsible investors are encouraged to employ an active investment strategy, the cost of acquiring superior expertise and skills is often costly. Furthermore, Viviers *et al*. (2009:7) asserted that the shareholder activism strategy may also lead to higher costs for socially responsible investors as this strategy requires careful analysis of a company's policies, practices and procedures.

Given the vast number of benefits and equally vast number of drawbacks of SRI, the most prominent and perhaps most outstanding benefit of SRI is considered in a utility (or 'feel good') sense. Gladman (2011:7) asserted that socially responsible investors often remain socially responsible regardless of performance, as these investors tend to regard the social benefit of their investments as significant. Considering the social and environmental impact of their investments receives far greater importance than profit maximisation (Gladman, 2011:7).

2.6 THE EFFECT OF THE GLOBAL FINANCIAL CRISIS ON SOCIALLY RESPONSIBLE INVESTMENTS

Hazardous market events such as financial crises or economic downturns have proven to affect the financial performance of investments detrimentally and harmfully as investors particularly experience large financial losses or elude investing as a whole during such periods (Irons, 2009). Cropper (2010), however, noted that during the most recent detrimental crisis, the 2007/08 global financial crisis, SRI funds have increased substantially. Numerous sustainability, environmental, and social concerns have been raised during the global financial crisis, which saw a colossal increase in the number of SRI participants worldwide (Puaschunder, 2010:1; Van der Ahee & Schulschenk, 2013:2). As reported by Puaschunder (2010:1), a new era of social responsibility resulted from the consequential global financial crisis in light of achieving and promoting social progress.

As conventional investments (and funds) experienced large financial losses during this crisis period, as a result of focussing primarily on achieving long-term financial returns, investors have since started to consider social and environmental returns as more significant. Consequently, as greater consideration, awareness and emphasis have been placed on ESG factors, SRI funds have grown immensely (on an international scale) (Polívka & Pešík, 2013; Unitarian Universalist Association, 2013).

In the wake of the global financial crisis, trust in financial markets was lost principally due to negligent corporate behaviour, lack of regulation and accountability, and failures of trustee responsibilities (Puaschunder, 2010:24). However, during this period, SRIs have been awarded the potential of renewing lost trust in financial markets (Puaschunder, 2010:84). Through regenerating corporate accountability and transparency, and encouraging corporate managers to increase attention to ESG factors significantly, SRI is believed to have been leveraged by the global financial crisis into a more multifaceted and sophisticated investment philosophy (Puaschunder, 2010:88).

Puaschunder (2010:115) found that negatively screened SRI funds often underperformed market indices while remaining stable during market crises. The stability of negatively screened SRI funds is attributable to socially responsible investors' devotion to their portfolio selections during market crises (Puaschunder, 2010:115). Furthermore, Puaschunder (2010:115) found that positively screened SRI funds, such as those funds invested in solar

energy, significantly outperformed market indices before the global financial crisis and remained relatively profitable after the crisis.

In the same way, Nakai *et al*. (2011) found that, particularly in the Japanese market, SRI funds were more resilient to the shock of the global financial crisis than non-SRI funds. During the period of the global financial crisis, the negative impact experienced by SRI funds was significantly less than that experienced by non-SRI funds profoundly due to socially responsible investors being unaffected by such a shock and the market assessing corporate social responsibility (CSR) positively (Nakai *et al*., 2011:3). Becchetti *et al*. (2015) proposed that SRI funds outperformed non-SRI funds during the period of the global financial crisis as these funds provided insurance against ethical risk factors.

Although it is maintained that the global financial crisis essentially encouraged more investors to become socially responsible (Puaschunder, 2010:4), SRIs still incorporate financial investment objectives (although not primarily sought after) and employ a combination of traditional (or conventional) and socially responsible investment strategies, which ultimately still suffers from hazardous market events. However, Puaschunder (2010:1) further debated that the global financial crisis should be interpreted as a period that has created opportunities for the awareness of ESG concerns to be raised and a period after which SRI has received improved consideration and momentum. As proposed by Nofsinger and Varma (2013), if investors wish to be protected from downside risk during hazardous market events, SRI funds should be considered.

2.7 SUMMARY

This chapter provided a theoretical analysis of SRI focussing on the history, distinguished strategies, types of social investors, and benefits and drawbacks thereof. As evident from previous, as well as current research, both international and local SRI sectors are growing at an implausible speed as more and more individual investors, investment/fund managers, financial institutions and organisations as well as companies are becoming more aware of ESG factors and concerns.

Although SRI rapidly amplified at earlier stages in the rest of the world, this was, however, not the case for the South African SRI market. The growth of the South African SRI market spurred during the early 2000s and gained an increasing market value of R18 billion in March 2006, R23.28 billion in July 2009 and finally R71.38 billion in June 2015. In June 2015, the South

African SRI market consisted of 42 SRI funds in which the majority of SRI funds employed the negative screening strategy.

Although the 2007/08 global financial crisis threatened financial markets worldwide, the crisis simultaneously raised considerable interest in and awareness of ESG factors and concerns. Consequently, a number of researchers have reported that during the period of the global financial crisis, SRI funds either remained stable or outperformed non-SRI funds. The resilience of SRI funds during the global financial crisis was remarkable and primarily attributable to the commitment of socially responsible investors. The probable effect of the global financial crisis on South African SRI funds was analysed and is reported in Chapter 4.

As this chapter provided an overview of the literature pertaining to SRI, the following chapters report on the risk-adjusted performance of South African SRI funds during the period of 1 May 2004 until 31 December 2014.

CHAPTER 3: RESEARCH DESIGN, DATA AND METHODOLOGY

3.1 INTRODUCTION

This chapter contains a detailed explanation of the research design, data and methodology pertaining to the empirical portion of this study. An in depth analysis of the components used to evaluate historical risk and return profiles and to compare the risk-adjusted performance of SRI funds against non-SRI funds is also provided.

In the first section of this chapter, the research design, data sourced and methodology followed in the empirical portion of this study is discussed comprehensively. The discussion includes an explanation of the target population, sampling frame, data collection method and process.

In the second section of this chapter, performance measures that individual investors and fund/portfolio managers can employ to evaluate the historical risk and return profile of a fund or investment portfolio are presented. In addition, the importance of performance measures is highlighted. The five performance measures selected for this study include the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio. These performance measures were used to evaluate the risk-adjusted performance of SRI funds relative to three selected benchmark categories (the FTSE/JSE SRI Index, a matched sample of non-SRI funds and the FTSE/JSE All Share Index), which are discussed with reference to each measures' characteristics, advantages and limitations. In addition, three performance measurement models (the CAPM, Fama-French three-factor model and Carhart four-factor model) are presented. The discussion is presented pertaining to the development of each model, the relevant risk factor(s), assumptions as well as limitations.

3.2 RESEARCH DESIGN AND METHODOLOGY

This study includes a literature review in order to achieve the theoretical objectives pertaining to this study (presented in Chapter 2) as well as an empirical study in order to achieve the empirical objectives of this study (presented in the following sections). The following methodological dimensions were used to describe the research design and methodology that the empirical portion of this study followed.

The primary objective of this study was to measure the performance of SRI funds in South Africa for the period of 1 May 2004 until 31 December 2014. In order to measure the risk-

adjusted performance of the identified SRI funds, a comparison between the performance of these funds and the performance of the three selected benchmark categories was conducted. The first benchmark category was selected as the FTSE/JSE SRI Index, established in May 2004 (hence the starting point for the analysis of this study); the second benchmark category was selected as the matched sample of non-SRI funds[9]; and the third benchmark category related to the general equity market of South Africa, the FTSE/JSE All Share Index. Thus, the risk-adjusted performance of the SRI funds was analysed relative to each selected benchmark category. Consequently, quantitative data were sourced and collected from secondary sources on the SRI funds, selected benchmark categories and a risk-free instrument.

For the purpose of this study, the research period, 1 May 2004 until 31 December 2014, was divided into two parts. The first sub-division included the following two sub-periods:

- Sub-period 1: 1 May 2004 until 30 September 2009; and
- Sub-period 2: 1 October 2009 until 31 December 2014.

The purpose of the first sub-division is justified as:

- Serve as the fundamental sub-periods of the analysis under which both the risk-adjusted performance measures and the performance measurement models are calculated;
- Be able to relate the performance of the SRI funds over two equal time periods;
- The performance measurement models are calculated as regression models and, therefore, require a large number of observations in order for the distribution to be normal and to provide more accurate results[10]; and
- Serve as two periods in which one period includes a period of a hazardous market event (such as the 2007/08 global financial crisis), and the other period excludes such a period.

The second sub-division included seven sub-periods:

- Sub-period 1: 1 May 2004 until 31 January 2006, identified as the period of enhanced growth in the South African general equity market and the South African SRI market;
- Sub-period 2: 1 January 2006 until 31 July 2007, identified as the period prior to the global financial crisis;

[9] Following the study of Viviers (2007), non-SRI funds includes any collective investment scheme which does not employ any of the distinguished SRI strategies (screening, shareholder-activism or cause-based investing) or that is not explicitly categorised as being socially responsible (Viviers, 2007:15).
[10] The sample size requires at least 30 observations to be normally distributed (Gujarati & Porter, 2010:472). The number of observations for sub-period 1 and sub-period 2 was 64 and 63 respectively.

- Sub-period 3: 1 July 2007 until 31 January 2009, identified as the period of the global financial crisis;
- Sub-period 4: 1 January 2009 until 31 July 2010, identified as the period including the aftermath of the global financial crisis;
- Sub-period 5: 1 July 2010 until 31 January 2012, identified as the period in which global and local financial markets were starting to recover and stabilise from the global financial crisis, and the period in which the European debt crisis emerged;
- Sub-period 6: 1 January 2012 until 31 July 2013, identified as the period including the aftermath of the European debt crisis; and
- Sub-period 7: 1 July 2013 until 31 December 2014, identified as the period in which global and local financial markets were starting to recover and stabilise from the European debt crisis.

The following justified the purpose of the second sub-division:

- Serve as the sub-periods over which several market events (both hazardous and non-hazardous), that may have probable effects on SRI fund performances, are isolated; and
- Serve as the sub-periods in which the risk-adjusted performance of SRI funds is calculated according to the risk-adjusted performance measures.

3.2.1 Target population and sampling frame

The target population for this study included all SRI funds in South Africa. In order to classify a fund as being either socially responsible or not, the definition of SRI pertaining to this study should be understood. Based on the study of Viviers (2007), an SRI fund can be classified as a fund that employs either one or a combination of the distinguished SRI strategies, which includes screening, shareholder activism or cause-based investing (Viviers, 2007:237).

For the purpose of this study, the sampling frame for local SRI funds included in the analysis was based on the following specifications:

- With the purpose of this study to analyse SRI funds during the period of 1 May 2004 until 31 December 2014, the fund should have been launched prior to 1 May 2004 and should have been active or operational until 31 December 2014 or onwards. SRI funds

that were launched on or after 2 May 2004 or that were discontinued[11] before 31 December 2014 were excluded from the analysis; and

- Local SRI funds are classified as either unit trust funds, pooled funds or segregated funds. However, due to data availability, confidentiality clauses and NDAs, the sampling frame for this study is limited to the inclusion of unit trust funds only. Consequently, all SRI funds identified as pooled or segregated funds were excluded from the analysis.

Prior to filtering all SRI funds in accordance with the specification of this study, the population of active local SRI funds consisted of 42 funds, ranging from the first inception in 1992 until the last inception of 2012. Based on the listed specifications, only eight local SRI funds were selected to be included in the analysis. Thus, the selected sample[12] for this study consisted of eight local SRI unit trust funds, which were launched prior to 1 May 2004 and were still active until 31 December 2014 or onwards.

Additionally, pertaining to the objective of this study to compare the risk-adjusted performance of SRI funds relative to non-SRI funds, a matched sample of non-SRI unit trust funds were identified. With the intention of comparing the two sets of funds on an unbiased basis, the matched sample of non-SRI funds were selected according to each funds' sector category[13], date of inception and fund size.

3.2.2 Data collection method and process

For the purpose of this study, the observation period extends from 31 May 2004 until 31 December 2014 (128 months). In the selection process pertaining to the sample of matched non-SRI unit trust funds (the second benchmark category), based on sector category, inception date and fund size, the sample was sourced from FundsData Online (2015). Quantitative data were sourced and collected from various secondary sources for completing the analysis of this study. Monthly data for the sample of SRI funds as well as non-SRI funds were collected, from 31 May 2004 until 31 December 2014, from the INET BFA (2014) financial database and the ASISA (2015).

[11] A discontinued local SRI fund includes a fund that was either closed, merged with other funds or that has changed their investment mandate (Viviers, 2007:237).
[12] The selected sample is based on non-probability sampling in which certain elements were selected based on availability of data or personal judgments (Latham, 2007).
[13] The selected sample of the SRI funds can be broadly categorised into equity funds, interest bearing funds or multi-asset funds (categorisation provided by FundsData Online (2015)).

In order to measure the risk-adjusted performance of the SRI funds relative to the first and third benchmark categories, namely the FTSE/JSE SRI Index and the FTSE/JSE All Share Index respectively, monthly data for each benchmark were collected from the INET BFA (2014) financial database for the research period. As identified, the FTSE/JSE All Share Index was selected as the proxy for the general equity market of South Africa.

The risk-free rate of return was required to be used in the calculation of the performance measures of the Treynor ratio, Sharpe ratio and Jensen's alpha, as well as in the calculation of the performance measurement models of the CAPM, Fama-French three-factor model and Carhart four-factor model. Thus, for the purpose of this study the risk-free instrument, as defined by Damodaran (2008:4) to be an instrument that has zero risk and, thus, no correlation with risky investments, was selected as the short-term (91 day) Treasury bill. Data for the risk-free rate of return were collected from the SARB (2015) for the research period.

For the purpose of the application of the CAPM, Fama-French three-factor model and Carhart four-factor model, monthly data were collected from the INET BFA financial database on the FTSE/JSE Small Cap Index (as a proxy for a small capitalisation portfolio) and the FTSE/JSE Top 40 Index (as a proxy for a large capitalisation portfolio) relating to the size risk factor, and on the FTSE/JSE Growth Index (as a proxy for a portfolio consisting of growth investments) and the FTSE/JSE Value Index (as a proxy for a portfolio consisting of value investments) relating to the value risk factor.

3.3 RISK-ADJUSTED PERFORMANCE MEASURES

3.3.1 The importance of performance measures

Evaluating and analysing the historical performance of a fund is considered a vital part in the investment decision-making process, be it for individual investors or financial institutions. As historical performance is used to analyse the degree to which assets correlate (or co-vary) in their relationship to one another (Marx *et al*., 2010:272), the degree of diversification[14] and hence the risk of a portfolio of assets can be related to how these correlation structures persist in the future. However, although historical performance does not predict future performance,

[14] Diversification is the concept of investing in a number of different asset classes with low or perfectly negative correlation, in order to reduce the total risk of an investment portfolio (Marx *et al*., 2012:10).

decisions to invest in certain assets, or to include certain investments in a portfolio, are dependent (to a certain extent) on historical performance.

Thus, measuring the historical performance of a fund is essential in analysing investments and in the management of risk. To evaluate, on a risk-adjusted basis, the comparative success of a fund is the fundamental objective of performance measures (Eling & Schuhmacher, 2005). This objective is achieved by ranking different funds based on the outcome of the performance measure. By adjusting for risk, returns can be compared based on different levels of risk. Each fund will attain a certain degree of return for a given level of risk, which is precisely what financial institutions and investors want to compare (Dzikevicius, 2004). Evaluating a fund based solely on return, or solely on risk, is regarded as an incomplete assessment.

Chen and Knez (cited by Burger, 2012:34) specify that what assists investors in making investment decisions is the knowledge about how a fund compares to peers or a specified benchmark, as this information guides an investor on entry or exit as well as rebalancing judgements. As noted by Reilly and Brown (2012:934) various performance measures take the ability of a fund/portfolio manager to generate above-average returns into account (such as the Jensen's alpha), while other performance measures take into account the ability to diversify a portfolio by eliminating unsystematic risk[15] (such as the Treynor ratio). Although it would be essential to consider and differentiate between the two mentioned requirements, very few performance measures do.

There exist a vast number of performance measures or ratios, which investors can employ to evaluate the relative performance of funds. However, for the purpose of this study only five of these measures were discussed and employed. The following section provides an overview of the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio with respect to each ratios' characteristics as well as advantages and limitations.

3.3.2 Treynor ratio

Treynor introduced the first risk-adjusted performance measure in 1965 (Kanellakos, 2005:48). Generally referred to as a trade-off metric between return and risk, the Treynor ratio uses beta

[15] Unsystematic risk can be diversified away/eliminated as it is a risk that is unique to an asset which is derived from specific characteristics of that asset (Reilly & Brown, 2012:1052).

as a measure of risk, specifically systematic or market risk[16] (Zephyr, 2013a). The Treynor ratio expresses the excess return (or risk premium: $R_p - R_f$) above the risk-free rate, produced by a fund, as a ratio over the systematic risk faced by the fund (Kanellakos, 2005:48; Morningstar, 2015). Mathematically, the Treynor ratio is given as the following (Marx *et al*., 2010:284):

$$TR = \frac{R_i - R_f}{\beta_i} \tag{3.1}$$

Where TR = Treynor ratio;

R_i = the expected return of fund *i;*

R_f = the risk-free rate of return; and

β_i = the funds' beta.

The beta factor (β_i), calculated as the correlation between the returns of the market index/benchmark and the returns of fund *i,* is a measure of the sensitivity of market fluctuations; it, therefore, measures the degree of benchmark-related risk inherent in the fund (Eling & Schuhmacher, 2007:2637; Kidd, 2011:1). The fundamental principle of the Treynor ratio is that the risk, which is inherent to the whole market and, thus, non-diversifiable (systematic risk), should be penalised (Macroaxis, 2015). As market or systematic risk is non-diversifiable, the Treynor ratio, therefore, assumes complete diversification (Dzikevicius, 2004).

As the Treynor ratio is used as a ranking criterion, a high and positive ratio is preferred as it is indicative of superior risk-adjusted performance (Dzikevicius, 2004; Kanellakos, 2005:49; Zephyr, 2013a). However, abnormally high ratios are not ideal as they indicate that the beta of the fund is relatively small, which is caused by an imperfectly matched market benchmark (Zephyr, 2013a). Furthermore, if either or both the numerator (the excess return of the fund) and the denominator (the beta of the fund) of the Treynor ratio are negative, results will be skewed. Thus, attention needs to be given to ensure that the related market benchmark is perfectly matched to the fund as an imperfectly matched market benchmark accompanied with a negative excess return produced by the fund, may indicate false superior risk-adjusted

[16] Systematic or market risk cannot be diversified away/eliminated as it is a risk that stems from the variability in the market, brought about by macro-economic factors. As all risky assets are exposed to market variability, systematic or market risk cannot be diversified away (Reilly & Brown, 2012:1051).

performance. A Treynor ratio that is greater than one indicates that the fund generates more return than risk.

The foremost advantage of the Treynor ratio is that it was the first risk-adjusted performance measure, which was able to quantify a return-risk trade-off of the aggregate market (Dzikevicius, 2004). Furthermore, although its focus on systemic risk can also be seen as a limitation, the Treynor ratio discerns between systematic and unsystematic risk, which the Sharpe ratio[17] (discussed in Section 3.3.3) does not (Reilly & Brown, 2012:945).

However, as mentioned, the Treynor ratios' focus on systematic risk is argued by Bacon (2009:3) and Reilly and Brown (2012:945) to be a limitation as it ignores the risk inherent in general market fluctuations. As a consequence of this limitation, if the fund under evaluation is efficiently diversified (in which unsystematic risk is completely eliminated), the Treynor ratio and Sharpe ratio will render identical ranking results. However, in a situation in which the fund is not efficiently diversified, the total risk of the fund will be different and as a consequence the two ratios will render different ranking results (Kanellakos, 2005:50).

Furthermore, as the Treynor ratio is developed in the framework of the CAPM[18] and is linked to the security market line (SML)[19], the ratio is subject to the limitations of the theory which includes that the ratio only considers the first (mean) and second (variance) moments of a return distribution (Dzikevicius, 2004; Kanellakos, 2005:52). Due to this limitation, as explained by Kanellakos (2005:52), the use of the Treynor ratio when evaluating certain investments funds (such as hedge funds) may be inadequate as it requires the inclusion of higher order moments (skewness and kurtosis)[20] by which such funds' return distributions are characterised.

Similar to the Treynor ratio, the Sharpe ratio is another risk-adjusted performance measure, which adjusts the returns using a different risk metric. Instead of focussing solely on the systematic or market risk, the Sharpe ratio is expressed as a ratio of total risk (systematic and unsystematic risk) as measured by standard deviation (Bacon, 2009:3).

[17] As the Treynor ratio and Sharpe ratio are similar performance measures, certain advantages and limitations of these ratios will be highlighted by the use of a comparison.
[18] The CAPM is a capital market theory which indicates the required (or expected) rate of return that an investor should require from a risky asset based on the assets' systematic risk as measured by beta (β), relative to a market portfolio or index (Marx *et al*., 2010:38; Reilly & Brown, 2012:204).
[19] The SML is a graphical representation of the return-risk trade-off in the form of a straight line by which the relevant risk (systematic risk) is measured by beta (β) (Reilly & Brown, 2012:206).
[20] The concepts of skewness and kurtosis are discussed in Section 3.3.6.

3.3.3 Sharpe ratio

Sharpe, in 1966, developed a performance measure, which was named first as the 'reward-to-variability' ratio while later changing to the Sharpe ratio after gaining substantial popularity (Sharpe, 1994). The Sharpe ratio measures the risk-adjusted return per unit of total risk and, therefore, estimates both diversification and performance (Marx *et al*., 2010:285; Reilly & Brown, 2012:939). Zephyr (2013b) noted that the risk metric used by the Sharpe ratio, that is standard deviation (as a gauge of total risk), is used to measure the volatility of a funds' returns.

Farid (2011) asserted that while the Treynor ratio is identified as a systematic risk-adjusted performance measure, the Sharpe ratio is a total risk-adjusted performance measure that focuses on both systematic and unsystematic risk, however with no distinction. The Sharpe ratio can be calculated using Equation 3.2 (Sharpe, 2000:16):

$$S = \frac{R_i - R_f}{\sigma_i} \tag{3.2}$$

Where S = Sharpe ratio;

R_i = the expected return of fund *i*;

R_f = the risk-free rate of return; and

σ_i = the standard deviation of the fund.

Through Equation 3.2, the Sharpe ratio expresses the excess return (or risk premium given as $R_p - R_f$), above the risk-free rate, per unit of total risk. As with the Treynor ratio, a higher Sharpe ratio is indicative of superior outperformance when compared to a well-matched benchmark or ranked in a peer group (Kanellakos, 2005:34). If such superior performance has been indicated by the Sharpe ratio, it can be attributable to a higher return than the risk-free rate (as the numerator) and/or a lower standard deviation or risk (as the denominator). Thus, a lower Sharpe ratio indicates that a lower level of return has been produced by the fund per unit of total risk.

The Sharpe ratio generally is referred to as an absolute performance measure as the use of a market index/benchmark in its evaluation is not required (Géhin, 2012:9). Kanellakos (2005:34) argued that this is the foremost advantage of the Sharpe ratio as it consequently only focuses on the volatility of a funds' return deeming the ratio viable to evaluate alternative investments.

As noted by Rollinger and Hoffman (2013:40), the Sharpe ratio, although used frequently in analysing the risk-adjusted performance of various securities, is not without limitations. One of the most substantial limitations of the Sharpe ratio is that it does not discern between upside and downside deviation of returns. As a consequence of this limitation, the standard deviation (as the denominator and measure of total risk in the computation of the Sharpe ratio) may be amplified if the return distribution includes high positive or negative values. The amplification of the standard deviation accordingly suggests a greater level of risk, which may be misleading as some of the outliers may possibly include high positive returns (Rollinger & Hoffman, 2013.40).

Additionally, other limitations presented by the Sharpe ratio may include that if the ratio renders a negative value, ranking is impossible (Bacmann & Scholz, 2003). Eling and Schuhmacher (2007:2633) asserted that certain performance measures may be deemed inappropriate as they rely on the distribution of the funds' returns. The Sharpe ratio falls under this category as it assumes normality of the return distribution with consideration to only the mean and variance (first and second moments). Thus, if the fund under evaluation produces a non-normal (or asymmetric) return distribution, the Sharpe ratio may provide inaccurate results (Eling & Schuhmacher, 2007:2633).

Both the Treynor ratio and the Sharpe ratio are considered absolute risk-adjusted measures of performance as neither of these ratios includes a market index/benchmark in their calculations (Géhin, 2012:9).[21] Alternatively, a risk-adjusted performance measure, which does include the use of a market index/benchmark in its calculation, is considered a relative performance measure, such as the Jensen's alpha which will be discussed in the following section.

3.3.4 Jensen's alpha

Based on the CAPM, Jensen's performance measure is considered a relative measure as it requires the use of a market index/benchmark in its evaluation of a fund (Géhin, 2012:10). The Jensen's alpha, which was introduced in 1968, considers the correlation between the returns of a fund and the returns of a relative market index, which is calculated by the beta (β_i) factor

[21] The Treynor ratio does, however, make use of a market index/benchmark to estimate the beta (β) factor, which stands in contrast to the argument presented by Géhin (2012:9).

(Eling & Schuhmacher, 2007:2633). The required return, which is indicated by the CAPM, is mathematically expressed as:

$$R_i = R_f + \beta_i \left(R_m - R_f\right) \quad (3.3)$$

Where R_i = the expected return of fund *i*;
R_f = the risk-free rate of return;
R_m = the expected return of the market index/benchmark; and
β_i = the funds' beta.

As noted by Kanellakos (2005:59), alpha (α) was presented by Jensen as an additional term in order to measure a constant positive or negative periodic return, which an investor can earn over and above the required return as indicated by the CAPM. By rearranging Equation 3.3 and introducing alpha (α), Jensen's alpha can be calculated using Equation 3.4:

$$\alpha = R_i - \left[R_f + \beta_i \left(R_m - R_f\right)\right] \quad (3.4)$$

Where α = Jensen's alpha;
R_i = the expected return of fund *i*;
R_f = the risk-free rate of return;
R_m = the expected return of the market index/benchmark; and
β_i = the funds' beta.

As can be presumed, a positive alpha indicates that the fund (or fund manager) has generated excess return above that which the funds' beta can predict. Furthermore, Jensen (1968:394) proposed that for a fund to outperform the market index, the predicted alpha should be positive ($\alpha > 0$) and statistically significant, which can be determined by applying certain regression techniques. In addition to the above requirement, Kanellakos (2005:63) asserted that for the results of the Jensen's alpha to be reliable, a positive alpha should always be accompanied by a high R^2 value[22]. In contrast, a negative alpha value specifies that the fund did not generate above-average returns.

[22] The R^2 value is considered as being one of the criteria by which to judge a good model (or regression model) as it indicates the goodness of fit of the model. Thus, the R^2 value indicates whether or not the explanatory variable/(s) in the regression model accurately explain(s) the variation in the dependent variable (Gujarati & Porter, 2010:102).

Dzikevicius (2004) argued that the Jensen's alpha, similar to the Treynor ratio, is subject to the limitations presented by the CAPM. The Jensen's alpha can also only be used to evaluate a fund with a normal return distribution as only the mean and variance is considered with failure to include skewness and kurtosis in its evaluation. Furthermore, as explained by Reilly and Brown (2012:942), the Jensen's alpha explicitly ignores the diversification abilities of funds as focus is placed on only systematic risk. The ignored diversification abilities of the Jensen's alpha, similar to that of the Treynor ratio, stand in contrast to the diversification estimation abilities of the Sharpe ratio.

Results of the Treynor ratio, Sharpe ratio as well as that of the Jensen's alpha can be misleading or can be regarded as insignificant if the returns of a fund are asymmetrical, and mean-variance rules do not apply, as this is indicative that these measures are unable to capture the features of the concerned return distribution (Géhin, 2012:10). In essence, these three performance measures assume that the return distribution is normal (symmetrical) and, thus, any outliers will not be included in the results under consideration. The Sortino ratio and Omega ratio (and various other advanced performance measures) attempt to provide a solution for the limitations of the Treynor ratio, Sharpe ratio and Jensen's alpha by including upside or downside deviations of return distributions in their calculations (Géhin, 2012:10).

3.3.5 Sortino ratio

Developed in 1994 by Sortino as an alteration to the Sharpe ratio, the Sortino ratio evaluates the risk-adjusted performance similar to the Sharpe ratio, however, not by using the standard deviation of a fund (which takes both upside and downside deviation into account), but rather the downside deviation (or semi-variance) as representation of risk (Rollinger & Hoffman, 2013:41). Kanellakos (2005:76) considers the Sortino ratio rather as an alternative to the Sharpe ratio by its use of semi-variance to capture only the downside risk and allowing the asymmetry of return distributions to be taken into account.

In order to capture exactly what investors regard as risky, investors specify a minimum acceptance return threshold, which can either be zero, the risk-free rate of return or the average rate of return of the fund. Thus, the volatility of the funds' returns that falls below the minimum acceptance return threshold (specified by the investor) represents the downside risk/semi-variance of the fund (Reilly & Brown, 2012:955). Mathematically, downside risk is expressed as the following (adapted from Reilly & Brown, 2012):

$$DR = \sqrt{\frac{1}{n}\sum(R_i - \tau)^2} \quad (3.5)$$

Where DR = the downside risk of the fund or portfolio;
n = the number of fund returns that fall below the minimum acceptance return threshold;
R_i = the expected return of fund *i*; and
τ = the minimum acceptable return threshold specified.

Chaudhry and Johnson (2008:486) reasoned that the approach of lower partial moments was considered in the development of the Sortino ratio. Sortino and Price (1994) argued that risk is nothing other than the underperformance of a fund, which led to the Sortino ratio being based on downside risk. By focussing on downside risk, which is what investors wish to avoid, the Sortino ratio does not penalise upside deviation (as does the Sharpe ratio with its use of standard deviation) (Bergh & Van Rensburg, 2008:104). The Sortino ratio, therefore, measures the excess return generated by a fund as a ratio over the downside risk of that fund (Kanellakos, 2005:76). This can be calculated using Equation 3.6 (adapted from Reilly & Brown, 2012):

$$S = \frac{\bar{R}_\iota - \tau}{DR} \quad (3.6)$$

Where S = Sortino ratio;
$\bar{R}_\iota$ = the average return of fund *i*;
τ = the minimum acceptable return threshold specified; and
DR = the downside risk of the fund.

A scenario in which a fund generates considerable returns over the minimum acceptance return threshold (that is, zero, the risk-free rate or the average rate of return) would see the value of the Sortino ratio to be large. This ratio is similar in interpretation to most risk-adjusted performance ratios where the larger the value of the ratio, the better (Zephyr, 2013c).

As noted by Kanellakos (2005:76) and confirmed by Bergh and Van Rensburg (2008:119), the most advantageous aspect of the Sortino ratio is that it addresses the problem of higher moments in return distributions such as skewness and kurtosis, while also allowing asymmetry

to be taken into account. Thus, the Sortino ratio does not rely on (or assume) the normality (symmetry) of return distributions.

However, although the Sortino ratio addresses certain limitations highlighted by ratios such as the Treynor ratio, Sharpe ratio and Jensen's alpha, this ratio itself is not without limitations. The limitations of this ratio relate to its use of downside risk. As downside risk is measured against some user (investor) defined minimum acceptance return threshold, it may be over- or underestimated if the specified threshold is over- or underestimated, which leads to an inefficient measure of fund performance (Amenc *et al*., 2004:21; Kanellakos, 2005:78).

Whereas ratios such as the Sharpe ratio only takes into consideration the volatility of returns, and the Sortino ratio only the downside volatility, other ratios such as the Omega ratio, discussed in the following section, take the complete return distribution into account (Bergh & Van Rensburg, 2008:105).

3.3.6 Omega ratio

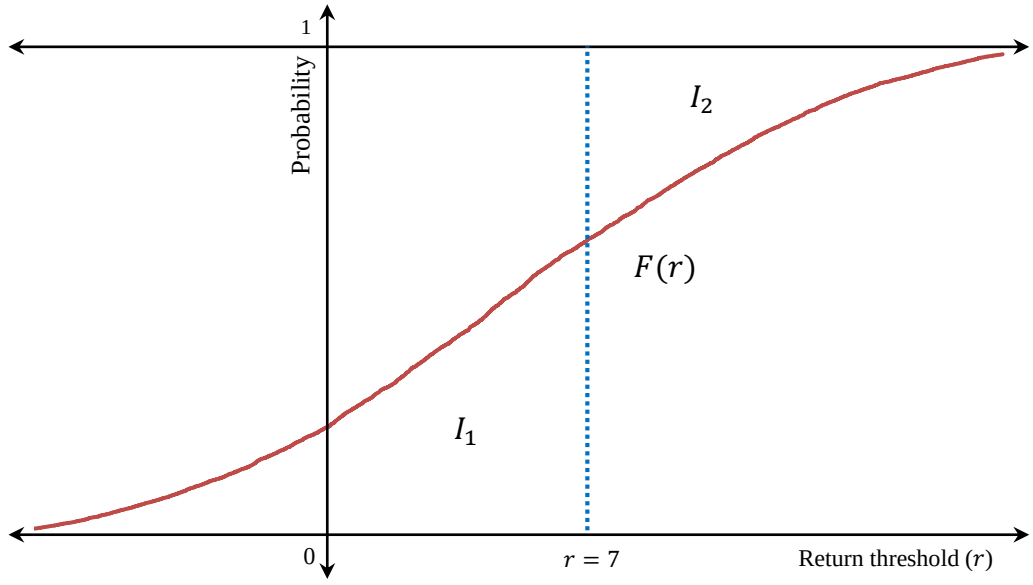
With the purpose of overcoming the limitations of most traditional risk-adjusted performance measures (as discussed in previous sections), Keating and Shadwick (2002) introduced a different measure of performance. This alternative performance measure, the Omega ratio, addresses the limitation of not taking the entire return distribution and its features, such as all the moments of the return distribution, into account (Keating & Shadwick, 2002:2; Kazemi *et al*., 2003:1; Kanellakos, 2005:84; Bergh & Van Rensburg, 2008:105; Bacon, 2009:7; Géhin, 2012:14). Bergh and Van Rensburg (2008:105) emphasised that the Omega ratio was introduced to consider all moments of the return distribution, such as mean, variance, skewness and kurtosis. Furthermore, in its evaluation, the Omega measure does not make assumptions regarding the distribution of returns such as normality (symmetry) (Géhin, 2012:14).

The skewness and kurtosis of a return distribution are considered to be the third and fourth (higher order) moments of a return distribution, as the mean and variance thereof is considered to be the first and second moments respectively (Peyper, 2014:90). The skewness of a return distribution is used as a measure of asymmetry, or rather to indicate the lack of symmetry (normality). A return distribution that is positively skewed illustrates a distribution with more negative data points than positive; whereas a negatively skewed return distribution has more positive data points than negative (Gujarati & Porter, 2010:450). As with good judgement, a negatively skewed return distribution is preferable in which the majority of returns are positive

(Bergh & Van Rensburg, 2008:104). A normal return distribution is indicated with a skewness value of zero accompanied by a kurtosis value of three (Bergh & Van Rensburg, 2008:104; Gujarati & Porter, 2010:449). Contrariwise, the kurtosis of a return distribution is used as a measure of the relative tallness or flatness thereof in which a normal distribution would have a kurtosis equal to three (referred to as mesokurtic). Return distributions that render kurtosis values greater (less) than three, are referred to as leptokurtic (platykurtic) and are slim (fat) or long-tailed (short-tailed) distributions (Gujarati & Porter, 2010:451).

In general terms, the Omega measure is expressed as a ratio of the upside deviation (the expected gains) of a fund against its downside deviation (the expected losses), however, each comparative to a shared return threshold (Kanellakos, 2005:83). As depicted in Figure 3.1, the Omega ratio includes setting a certain return threshold by which the return distribution is separated into gains (above the set threshold level) and losses (below the set return threshold), where after the probability-weighted ratio of returns above and below that level is considered (Keating & Shadwick, 2002:2).

Figure 3.1: The cumulative distribution function for the Omega ratio



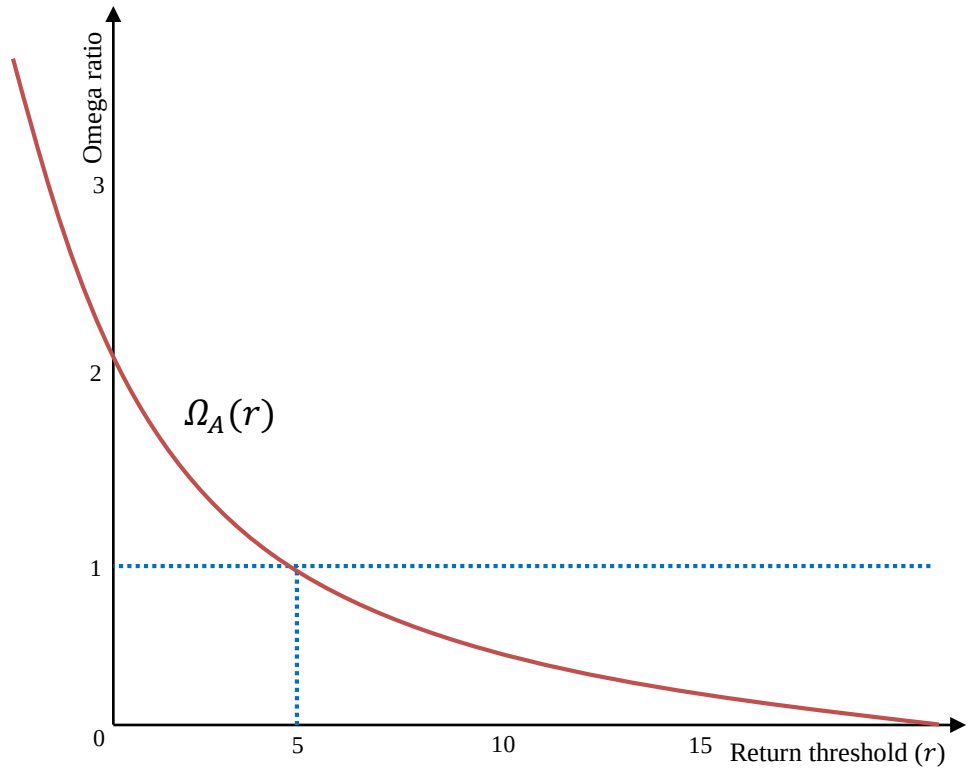
Source: Keating & Shadwick (2002:2)

The Omega ratio can be illustrated by using Figure 3.1, the cumulative distribution function (CDF) for the Omega ratio of an asset. In this example, the return threshold level is set at seven percent while the asset has a mean return of five percent. I_1 indicates the area of the distribution function to the left and below the set return threshold level (the expected losses), r, of seven; and I_2 indicates the area above and to the right of $r = 7$ (the expected gains). As further

elaborated by Keating and Shadwick (2002:2) the Omega ratio of this particular asset with a return threshold set at seven percent is given as the probability-weighted gains (area I_2) to the probability-weighted losses (area I_1).

If the Omega ratio is considered at various return threshold levels, at all levels between the lowest and highest observed return, the Omega function can be formed (illustrated by Figure 3.2) (Keating & Shadwick, 2002:3). In simple terms, as identified by Van Dyk *et al.* (2014:494), considering the Omega ratio on a continued basis is exactly what the Omega function is.

Figure 3.2: The Omega function



Source: Keating & Shadwick (2002:2)

The Omega function reveals certain properties and mathematical features, which include that the function is equal to the return distribution while considering the first four moments of the distribution and that the function takes on the value of one at the mean return (Kanellakos, 2005:84; Van Dyk *et al.*, 2014:494). The Omega ratio can be calculated using Equation 3.7 (Keating & Shadwick, 2002:3):

$$\Omega(r) = \frac{\int_r^b (1 - F(x))dx}{\int_a^r F(x)dx} \quad (3.7)$$

Where $\Omega(r)$ = the Omega ratio with respect to the return threshold;

$F(x)$ = the cumulative distribution function of the return distribution;

r = the return threshold;

b = the highest observed return in the return distribution (upper bound); and

a = the lowest observed return in the return distribution (lower bound).

Bacon (2009:7) as well as Géhin (2012:14) noted that a higher value of the Omega ratio is preferred to a lower value. Bacmann and Scholz (cited by Kanellakos, 2005:85) identified that, unlike the Sharpe ratio in which negative ratios cannot be ranked, the Omega function can be used to rank all investments at any set return threshold. The ability of the Omega ratio to include not only the first two movements (mean and variance) but also higher order moments (skewness and kurtosis) of the return distribution is the most noteworthy advantage of the ratio (Kanellakos, 2005:84). Furthermore, Kanellakos (2005:87) asserted that the Omega function can be used as a vital part in the investment decision-making process as it clearly exhibits the risk and return characteristics of a fund.

However, as with any risk-adjusted performance measure, the Omega measure faces a limitation, which is presented by the return threshold level specified by the individual investor. As an individual investor selects the return threshold and all investors perceive a different level of risk as acceptable, the Omega measure cannot be used in an aggregate form in which financial institutions can compare funds for different investors (Kanellakos, 2005:88). If specified at certain threshold levels, the Omega measure may reveal inadequate comparisons as the level specified may only represent a very small portion of the entire investor base. Van Dyk *et al*. (2014:493) noted that as the Omega ratio takes on a form of being expressed as gains to losses, it is sensitive to excess returns. Moreover, the Omega ratio is sensitive to the size of the sample and requires that at least 40 to 50 observations be included in order to render adequate results.

As the Omega ratio was introduced to include the complete distribution and its features in its evaluation, it has widely been used and has proved to be an appropriate measure of risk-adjusted performance (Kanellakos, 2005:90; Nguyen-Thi-Thanh, 2010:13; Van Dyk *et al*., 2014:508). In the following section, the three performance measurement models (the CAPM, Fama-French three-factor model and Carhart four-factor model) are discussed in detail.

3.4 PERFORMANCE MEASUREMENT MODELS

3.4.1 Capital asset pricing model

In finance, building on the concept of diversification and the modern portfolio theory presented by Markowitz (1952)[23], a number of models have been developed in attempt to derive the excess return of an investment (Eraslan, 2013:11). The purpose of asset pricing models merely can be identified as the effort to determine an appropriate price of an investment. As a selection tool used in the investment decision-making process, asset pricing models attempt to explain the relationship between risk and expected returns. The most frequently used model is the CAPM, which was developed independently by Sharpe (1964) and Linter (1965). However, in order to explain the CAPM, the relationship between risk and return should be described.

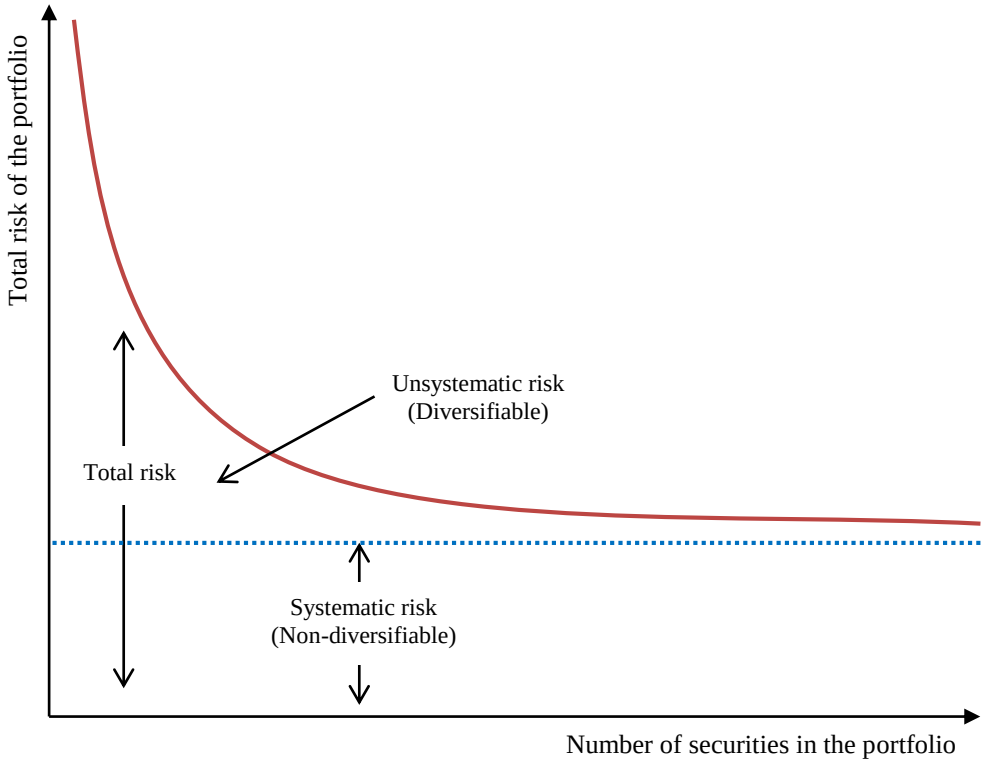
As noted by Reilly and Brown (2012:21), a positive relationship exists between risk and the required rate of return. This positive relationship is related to the notion that investors are considered to be rational and, thus, desire a rate of return that provides adequate compensation for the time period that their funds are invested, for the rate of inflation during that period and for the amount of uncertainty associated with future payments (Marx *et al*., 2010:35; Reilly & Brown, 2012:4). Accordingly, as the perceived uncertainty (risk) of the investment rises, the rate of return required by investors will increase.

As depicted in Figure 3.3, investors are exposed to both systematic risk (market risk) and unsystematic risk (idiosyncratic risk) (Marx *et al*., 2010:36). Systematic risk is defined as the risk inherent in the market as it is caused by macroeconomic factors that cannot be controlled. As systematic risk affects all risky investments, it cannot be diversified away. Conversely, unsystematic risk can be eliminated through diversification as it is defined as the unique or

[23] For a detailed explanation of the modern portfolio theory and its development see Markowitz (1952).

idiosyncratic risk of an investment caused by the individual characteristics of the investment (Marx *et al*., 2010:36; Reilly & Brown, 2012:200).

Figure 3.3: Systematic and unsystematic risk



Source: Adapted from Reilly & Brown (2012:201)

Figure 3.3 illustrates the systematic and unsystematic risk faced by investors. The figure demonstrates that as an investor increases the number of investments in the portfolio, the unsystematic risk related to the individual investments declines and consequently leads to a reduction in the total risk of the portfolio. If all unsystematic risk is eliminated through the inclusion of uncorrelated investments, the total risk of the portfolio will be equal to the systematic risk, which cannot be eliminated (Reilly & Brown, 2012:202).

The description of systematic and unsystematic risk relates to the discussion of the CAPM with regards to the CAPMs assumption of diversification. The CAPM assumes[24], among others, that investors hold only well-diversified (or fully diversified) portfolios. As a result, the CAPM expresses the total risk of a portfolio as only the systematic risk of the portfolio due to the

[24] Building on the assumptions of the capital market theory, the CAPM requires other assumptions, which also include that return distributions are normal (Reilly & Brown, 2012:205).

assumption that unsystematic risk has entirely been eliminated (Reilly & Brown, 2012:204). Within the model, systematic risk is measured by beta (β_{iM}) which represents the investments' sensitivity to market fluctuations and, thus, indicates the degree of market-related risk inherent in the investment (Eling & Schuhmacher, 2007:2637; Kidd, 2011:1).

Therefore, it can be stated that the CAPM utilises a single risk factor to describe the performance of a fund (Fama & French, 2004:25). The model in general is considered to be a capital market theory, which essentially indicates the required (or expected) rate of return that should be required (or expected) from a risky investment, based on the investments' systematic risk (as measured by beta (β_{iM})) relative to a market index (Marx *et al*., 2010:38; Reilly & Brown, 2012:204).

In essence, as stated by Eraslan (2013:11) the CAPM was developed with the intention of relating the excess return of a fund to the excess return of a market index. In this regard, the excess return of the market index serves as the risk factor by which the model attempts to explain the deviations of excess fund return. The model explicitly states that in an attempt to explain the deviations of excess fund return, the covariance between the return of the fund and the return of the market index should be analysed. Consequently, the CAPM is expressed mathematically as (adapted from Reilly & Brown, 2012:205):

$$E(R_i) = R_f + \beta_{iM}\left(E(R_M) - R_f\right) \tag{3.8}$$

Where $E(R_i)$ = the expected return of fund *i*;

R_f = the risk-free rate of return;

$E(R_M)$ = the expected return of the market index; and

β_{iM} = the funds' market beta.

From Equation 3.8, the CAPM articulates that the expected return of a fund is equal to the risk-free rate of return plus the expected market risk premium. The sensitivity that the expected return of a fund has to the expected excess return of the market is presented by the beta factor (β_{iM}) as the funds' market beta. Furthermore, the funds' market beta can be clarified as the covariance between fund returns and market returns, divided by the variance of market returns. In this regard, the CAPM takes the sensitivity of the fund to systematic risk (non-diversifiable risk) into account (Reilly & Brown, 2012:205).

In order to test the statistical reliability of the CAPM and its variables, Equation 3.8 can be rearranged into an econometric model:

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \varepsilon_i \quad (3.9)$$

Where $R_i - R_f$ = the excess return of fund *i* (above the risk-free rate);

α_i = the Jensen's alpha (the intercept of the regression);

$\beta_{iM}(R_M - R_f)$ = the funds' market beta relative to the excess return of the market index; and

ε_i = the error term.

Equation 3.9 represents the CAPM in a time-series regression-based equation in which α_i represents the Jensen's alpha and also the intercept of the regression model (Bauer *et al*., 2005:1758). As noted in Section 3.3.4, the relevant excess return (outperformance) or relevant below-average return (underperformance) is indicated by the Jensen's alpha. An error term (ε_i) is included in the equation in order to represent all those independent variables which affect the expected excess return of a fund (the dependent variable), but have however not been included in the equation (Gujarati & Porter, 2010:8).

The CAPM provides an intuitive and prevailing approach to measure the relationship between risk and expected returns (Fama & French, 2004:25). However, although the CAPM is considered the standard approach to asset pricing models, in an effort to evaluate fund performance, the need to include additional risk factors in such models has been raised by a number of researchers in the literature and empirical studies (Fama & French, 1992; 1993; 1996; 2004). As the ability to measure fund performance of a single risk factor model is questioned, multi-factor models such as the Fama-French three-factor model and Carhart four-factor model may provide a more accurate measure of fund performance by the inclusion of additional risk factors (Bauer *et al*., 2005:1760). These multi-factor asset pricing models are discussed in the following section.

3.4.2 Multi-factor models

As indicated by Panopoulou and Plastira (2014:111), the ability of the CAPM to capture the cross-sectional deviation of stock returns has proven to be inadequate. Various empirical studies have deemed the CAPM unsuccessful in attributing deviation of expected returns to expected market returns (Fama & French, 2004:35). As specified by Fama and French

(2004:35), evidence presented by Basu (1977), Stattman (1980), Banz (1981), Rosenberg *et al*. (1985), and Bhandari (1988) indicated that various factors such as P/E ratios, B/M equity ratios, market capitalisation and debt-equity ratios may provide a more accurate explanation of deviations in expected returns, which is not captured by the CAPM.

The empirical and theoretical failures of the CAPM to explain fund behaviour or performance, as well as staggering empirical evidence regarding a number of additional risk exposures to be considered, has led to the creation of the three-factor model in which two additional risk factors were added to the original asset pricing model (Fama & French, 2004:38; Panopoulou & Plastira, 2014:111). The three-factor model, suggested by Fama and French (1993, 1996) is expressed as (adapted from Fama & French, 2004:38; Bauer *et al*., 2005:1760):

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \beta_{iS}(SMB) + \beta_{iH}(HML) + \varepsilon_i \qquad (3.10)$$

Where $R_i - R_f$ = the excess return of fund *i* (above the risk-free rate);

α_i = the Jensen's alpha (the intercept of the regression);

$\beta_{iM}(R_M - R_f)$ = the funds' market beta relative to the excess return of the market index;

$\beta_{iS}(SMB)$ = the funds' size beta relative to the return difference between a small capitalisation portfolio and a large capitalisation portfolio (small minus big);

$\beta_{iH}(HML)$ = the funds' value beta relative to the return difference between a portfolio consisting of value investments and a portfolio of growth investments (high minus low); and

ε_i = the error term.

Thus, as proposed by Fama and French (1995:131), a market risk factor, size risk factor as well as a value risk factor can be used to describe the performance of expected fund returns. With the inclusion of the additional risk factors (size and value), the three-factor model provides a more improved model to predict expected returns and fund performance (Bauer *et al*., 2005:1760; Eraslan, 2013:12).

For the purpose of this study, as discussed in Section 3.2.2, the market risk premium was calculated in relation to the identified market benchmark of the SRI funds as the FTSE/JSE SRI Index, whereas the identified market benchmark of the non-SRI funds related to the

FTSE/JSE All Share Index. For both SRI and non-SRI funds, the size risk premium was calculated as the difference between the FTSE/JSE Top 40 Index (as the proxy for a large capitalisation portfolio) and the FTSE/JSE Small Cap Index (as the proxy for a small capitalisation portfolio). The value risk premium for both local SRI and non-SRI funds was calculated as the difference between the FTSE/JSE Value Index (as the proxy for a portfolio consisting of value investments) and the FTSE/JSE Growth Index (as the proxy for a portfolio consisting of growth investments).

Fama and French (2004:39) identified that theoretically, although not disastrous, the three-factor model lacks empirical support as the two additional risk factors lack predictive motivation. On the other hand, considered in an empirical sense, Fama and French (2004:40) found the most significant shortcoming of the three-factor model to be the momentum effect of returns. Bauer *et al*. (2005:1760) supported this finding by clarifying that while the three-factor model is able to address the irregularities presented by the CAPM in an effort to explain expected returns, the model fails to explain returns that exhibit momentum (or persistence). In response to the presented inability of the three-factor model, Carhart (1997) adds and presents a fourth risk factor.

The fourth risk factor added to the three-factor model is based on a momentum effect. The momentum effect of returns is captured by the observation that funds that performed well (relative to a specified market index) in the last three to 12 months, will continue to perform well in the short-term future; while funds that did not perform better than the market index in the last three to 12 months, will continue to perform poorly (Fama & French, 2004:40). By capturing the momentum anomaly by Jegadeesh and Titman (1993), the three-factor model is extended and is calculated using Equation 3.11 (adapted from Bauer *et al*., 2005:1760):

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \beta_{iS}(SMB) + \beta_{iH}(HML) + \beta_{iU}(UMD) + \varepsilon_i \qquad (3.11)$$

Where $R_i - R_f$ = the excess return of fund *i* (above the risk-free rate);

α_i = the Jensen's alpha (the intercept of the regression);

$\beta_{iM}(R_M - R_f)$ = the funds' market beta relative to the excess return of the market index;

$\beta_{iS}(SMB)$ = the funds' size beta relative to the return difference between a small capitalisation portfolio and a large capitalisation portfolio (small minus big);

$\beta_{iH}(HML)$	=	the funds' value beta relative to the return difference between a portfolio consisting of value investments and a portfolio of growth investments (high minus low);
$\beta_{iU}(UMD)$	=	the funds' momentum beta relative to the difference between a portfolio of past winners and a portfolio of past losers (up minus down); and
ε_i	=	the error term.

From Equation 3.11, Equation 3.10 is extended with one additional risk factor, the momentum risk premium. The momentum risk factor, presented by the UMD (up minus down) variable, indicates the funds' sensitivity to being exposed to the momentum effect. The UMD variable is further denoted as the difference in return between a portfolio of the past three to 12 month winners (good performers) and a portfolio of past three to 12 month losers (poor performers) (Bauer *et al*., 2005:1761).

For the purpose of this study, the fourth risk factor (the momentum risk premium) was calculated by using a three-month rolling period (lagged one month) of the average excess returns that each fund has produced over the risk-free rate. Thus, the momentum was calculated as the difference between the past three month winners (good performers)[25] and the past three month losers (bad performers)[26], based on the average excess return calculated for a three month period.

Gabriel and Wang (2004:12) asserted that an integrated and meaningful approach to measure the performance of funds is offered through the four-factor model. The model employs a set of risk factors that are equal across various types of investments. Brooks (2014:652) explained that the fundamental objective of both the three-factor model and the four-factor model is to measure excess returns, however, taking the effect of certain fund (or firm or portfolio) characteristics into account. After taking such characteristics into account, Brooks (2014:652) further inferred that investments with low P/E ratios (value investments), small capitalisation investments and investments that exhibit momentum (good performance), receive higher returns on average. For this reason, the four-factor model is considered an adequate

[25] A good performing fund is calculated as a fund with the highest excess return produced during each three month period.
[26] A bad performing fund is calculated as a fund with the lowest excess return produced during each three month period.

performance measurement and attribution model with the inclusion of explanatory risk exposures.

3.5 SUMMARY

This chapter presented the research design, data and methodology pertaining to the empirical portion of this study. For the purpose of achieving the primary objective of this study, measuring the performance of SRI funds in South Africa, the research design and methodology were discussed in a comprehensive degree. The first section of this chapter provided the target population and sampling frame as well as the data collection method and process. The sampling frame identified for this study consisted of eight local SRI unit trust funds, which were launched prior to 1 May 2004 and were still active until 31 December 2014 or onwards. Three benchmark categories were selected to which the risk-adjusted performance of the selected SRI funds were related.

The second section introduced and discussed the statistical (or empirical) analysis followed to measure the risk-adjusted performance of the SRI funds. In the discussion, various risk-adjusted performance measures were highlighted. The Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio were selected to evaluate the risk-adjusted performance of each identified SRI fund relative to the three selected benchmark categories which included the FTSE/JSE SRI Index, a matched sample of non-SRI funds and the FTSE/JSE All Share Index. Additionally, three performance measurement models were discussed, focussing on how each model attempts to attribute the expected returns of a fund to various risk factors. Although there are a number of performance measurement models, this study focussed on the CAPM, Fama-French three-factor model and Carhart four-factor model.

The statistical (or empirical) analysis that was undertaken in this study through the utilisation of the selected risk-adjusted performance measures, as well as the selected performance measurement models, is presented in Chapter 4. Throughout Chapter 4, the results on the empirical outcomes are discussed comprehensively by addressing the empirical objectives as listed in Section 1.3.3.

CHAPTER 4: EMPIRICAL RESULTS AND FINDINGS

4.1 INTRODUCTION

This chapter reports on the results and findings of the empirical objectives of this study. More specifically, this chapter presents the results of the performance of the selected SRI funds as compared to a selected range of benchmark categories over the established research period of 1 May 2014 until 31 December 2014.

The discussion of this chapter consists of four main sections. Firstly, the monthly returns were calculated for the SRI funds, the related market benchmark for SRI funds (the FTSE/JSE SRI Index), the matched sample of non-SRI funds (as a benchmark to which the performance of the SRI funds were related) and the general equity market of South Africa (the FTSE/JSE All Share Index). Secondly, the annual compound return performances of the SRI funds as well as the non-SRI funds were calculated in order to analyse the unadjusted (or raw) return performances.

Thirdly, according to the risk-adjusted performance measures used (the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio), the risk-adjusted returns of the SRI funds were calculated and related to the three selected benchmark categories. The final section of this chapter reports on the findings of the performance measurement models (the CAPM, Fama-French three-factor model and Carhart four-factor model) with the intent to ascertain if the relevant risk factors of each model could explain the expected returns of SRI funds.

This chapter is concluded by describing the results and findings relating to the risk-adjusted performance of the SRI funds. The discussion of the empirical results and findings, however, explicitly focus on identifying if the SRI funds out- or underperformed the three selected benchmark categories; if related hazardous or non-hazardous market events may have affected the risk-adjusted performance of the SRI funds; and if the established performance measurement models' risk factors efficiently predicted the expected returns of the SRI funds, each during the research period.

4.2 MONTHLY RATES OF RETURN

Calculating the monthly rates of return for the SRI funds and the three selected benchmark categories was the first stage in the data analysis section of the empirical portion of this study. As discussed in Section 3.2.2, monthly data were sourced and collected from both the INET

BFA (2014) financial database and the ASISA (2015) for the research period, extending from 1 May 2004 until 31 December 2014.

As included in the calculation of the monthly rates of return for the SRI funds and the three selected benchmark categories, the net asset value (NAV) price of a fund is calculated using Equation 4.1 (adapted from Reilly & Brown, 2012:893):

$$NAV\ price_{it} = \frac{Total\ assets_{it} - Total\ liabilities_{it}}{Total\ shares\ outstanding_{it}} \quad (4.1)$$

Where $NAV\ price_{it}$ = the NAV price (per-share value) of fund *i* in period *t*;

$Total\ assets_{it}$ = the total market value of fund *i*'s underlying investments in period *t;*

$Total\ liabilities_{it}$ = the total liabilities (expenses) due by fund *i* in period *t-1*; and

$Total\ shares\ outstanding_{it}$ = the total shares of fund *i* outstanding in period *t-1*.

Monthly rates of return for the SRI funds as well as the matched sample of non-SRI funds[27] were calculated using Equation 4.2 (Viviers, 2007:263):

$$r_{it} = \frac{NAV\ price_{it} - NAV\ price_{it-1}}{NAV\ price_{it-1}} \quad (4.2)$$

Where r_{it} = the monthly rate of return of fund *i* in period *t*;

$NAV\ price_{it}$ = the NAV price of fund *i* in period *t*; and

$NAV\ price_{it-1}$ = the NAV price of fund *i* in period *t-1*.

For the two benchmark indices, the FTSE/JSE SRI Index and the FTSE/JSE All Share Index, monthly rates of return were calculated using Equation 4.3 (Viviers, 2007:263):

$$r_{bt} = \frac{Index\ value_{bt} - Index\ value_{bt-1}}{Index\ value_{bt-1}} \quad (4.3)$$

[27] The matched sample of non-SRI funds identified are presented in Annexure A.

Where r_{bt} = the monthly rate of return of benchmark *b* in period *t*;

$Index\ value_{bt}$ = the index value of benchmark *b* in period *t*; and

$Index\ value_{bt-1}$ = the index value of benchmark *b* in period *t-1*.

The monthly rates of return as calculated using Equation 4.2 and Equation 4.3 functioned as inputs for the evaluation of the performance of the SRI funds based on the calculated unadjusted fund performance (Section 4.3); the risk-adjusted fund performance as calculated by the performance measures (the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio) (Section4.4); and the fund performance as calculated by the performance measurement models (the CAPM, Fama-French three-factor model and Carhart four-factor model) (Section 4.5).

4.3 UNADJUSTED SOCIALLY RESPONSIBLE INVESTMENT FUND PERFORMANCE

The unadjusted (or raw) annualised compound returns of the SRI and non-SRI funds were calculated for the research period, using Equation 4.4:

$$r_{unadj}^{it} = \left[\frac{NAV\ price_{it}}{NAV\ price_{it-f}}\right]^{\frac{1}{Number\ of\ observations/12}} - 1 \qquad (4.4)$$

Where r_{unadj}^{it} = the monthly rate of unadjusted return of fund *i* in period *t*;

$NAV\ price_{it}$ = the NAV price of fund *i* in period *t* (the most recent/current observation); and

$NAV\ price_{it-f}$ = the NAV price of fund *i* in period *t-f* (the first observation).

Table 4.1 and Table 4.2 provide the unadjusted annualised compound returns of the SRI funds and the non-SRI funds respectively for each respective sub-period[28] of:

- Sub-period 1: 1 May 2004 until 30 September 2009; and

[28] As discussed in Section 1.3.1 and Section 3.2, the research period was divided into two parts, of which the first sub-division formed the fundamental sub-periods over which the analysis was conducted. The annual unadjusted fund returns of the SRI and non-SRI funds for the second sub-division of the research period are presented in Annexure B.

- Sub-period 2: 1 October 2009 until 31 December 2014.

Table 4.1: Unadjusted socially responsible investment fund returns (annualised compound returns)

SRI Fund Name	Annualised Return (%)	
	Sub-period 1	Sub-period 2
Community Growth Equity Fund	17.20	10.13
Community Growth Gilt Fund	1.77	1.62
Element Earth Equity Fund	18.86	3.71
Element Flexible Fund	11.58	4.89
Element Real Income Fund	4.75	4.45
Oasis Crescent Equity Fund	17.34	11.88
Oasis Crescent International Feeder Fund	5.61	17.44
Old Mutual Albaraka Equity Fund	13.20	13.61
Average	**11.29**	**8.47**

Note: Funds are listed in alphabetical order according to SRI fund names

Source: Compiled by the author

Table 4.2: Unadjusted non-socially responsible investment fund returns (annualised compound returns)

SRI Fund Name	Annualised Return (%)	
	Sub-period 1	Sub-period 2
MET General Equity Fund	15.97	13.91
Coronation Bond Fund	1.24	1.98
Old Mutual Symmetry Equity Fund of Funds	17.18	11.33
Momentum Flexible Fund	15.27	5.38
ABSA Inflation Beater Fund	4.84	3.32
Old Mutual High Yield Opportunity Fund	13.99	10.10
Stanlib Multi-Manager Global Equity Feeder Fund	2.03	16.81
Old Mutual Growth Fund	19.70	11.89
Average	**12.00**	**9.87**

Note: Non-SRI funds are listed as matched to the alphabetically arranged SRI funds in Table 4.1

Source: Compiled by the author

As indicated in Table 4.1 and Table 4.2, the average annual unadjusted fund returns of both the SRI and non-SRI funds declined from sub-period 1 to sub-period 2. The average annual unadjusted returns of the SRI funds decreased by 2.82 percent while that of the non-SRI funds decreased by 2.13 percent over the research period. The comparative declines in average annual unadjusted returns were reasonably marginal, with the SRI funds only at a slightly higher decline.

The higher average annual unadjusted SRI and non-SRI fund returns in sub-period 1 may be ascribed to, as identified by Viviers (2007:185), the inclusion of a period under which South Africa has experienced enhanced economic conditions. This identified period of enhanced economic conditions, which extended to March 2006 as shown by Viviers (2007), was included in sub-period 1 of this study. Viviers (2007:185) concluded that the period of enhanced economic conditions led to strong growth in both the local general equity market and the local SRI market. On the other hand, the lower average annual unadjusted fund returns of sub-period 2 may be ascribed to the perception that this period included a recovery period (from the global financial crisis) in which the growth of both the local general equity market and the local SRI market may not have been as strong as in the beginning of sub-period 1. However, empirical evidence and verification is required to support this statement.

Table 4.1 further indicates that only three SRI funds, namely the Old Mutual Albaraka equity fund, the Community Growth gilt fund and the Oasis Crescent international feeder fund, have increased annual unadjusted returns from sub-period 1 to sub-period 2; while approximately 50 percent of the SRI funds displayed a decline in annual unadjusted returns of more than five percent. The most noteworthy decline of 15.15 percent from sub-period 1 to sub-period 2 was experienced by the Element Earth equity fund.

As Table 4.2 reports on the annual unadjusted fund returns of the matched sample of non-SRI funds, it can be seen that the non-SRI funds for both the Community Growth equity fund and the Oasis Crescent international feeder fund similarly experienced increased annual unadjusted returns from sub-period 1 to sub-period 2. Corresponding to the annual unadjusted SRI fund returns, the majority of non-SRI funds also experienced declines of more than three percent.

4.4 RISK-ADJUSTED SOCIALLY RESPONSIBLE INVESTMENT FUND PERFORMANCE

In this section of the chapter, the risk-adjusted performances of the SRI funds were calculated using five risk-adjusted performance measures. These performance measures, as indicated in Section 3.3, include the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio.

This section further provides comparisons regarding the risk-adjusted performance of the SRI funds. Firstly, the performance of the SRI funds in sub-period 1 was compared to the performance as in sub-period 2, with the primary purpose of identifying if the inclusion of a

hazardous market event (such as the 2007/08 global financial crisis) in sub-period 1, did have a probable effect on the subsequent results. Secondly, as discussed in Section 1.3.1 and Section 3.2, the research period is divided further into seven sub-periods. These sub-periods were related to one another in an attempt to identify if certain market events (both hazardous and non-hazardous), which were isolated in these sub-periods, affected the performance of the SRI funds.[29]

Thirdly, the performance of the SRI funds as indicated by the five risk-adjusted performance measures were compared in order to establish if the results of these measures were in accordance with one another. Lastly, the performance of the SRI funds was related to the performance of the three selected benchmark categories, which include the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index. Relating the SRI funds to the three selected benchmark categories entailed performing certain statistical tests[30] in order to establish if the SRI funds' risk-adjusted performance was statistically different from that of each selected benchmark category.

For the purpose of this study, an SRI fund had to be active (or surviving) during the period of 1 May 2004 until 31 December 2014. Thus, an SRI fund had to be launched prior to or on 1 May 2004 until 31 December 2014 or onwards (an active period of 128 months). This classification was undertaken in order to calculate and compare (on a continual basis) the risk-adjusted performance of the SRI funds.

4.4.1 Overview of risk-adjusted performance measures

The following sections provide an overview of each risk-adjusted performance measure. In the tables that follow, in each sub-period a fund was identified as either the best performing fund (*B*) or the worst performing fund (*W*), in accordance with the ranking delivered from each risk-adjusted performance measure. All tables were constructed alphabetically according to the SRI fund names.

[29] The seven sub-periods as categorised and identified in Section 1.3.1, Section 3.2 and Annexure B was used solely for this purpose. All other calculations and tests were conducted over the fundamental sub-periods (that is, the first sub-division of the research period) of this study.
[30] The selected statistical tests include the Spearman rank correlation test and the Wilcoxon signed ranks test, which is discussed in Section 4.4.2 and Section 4.4.3 respectively.

4.4.1.1 Treynor ratio

The Treynor ratio, which is expressed mathematically by Equation 4.5 and is discussed in Section 3.3.2, indicates a funds' excess return above the risk-free rate of return (the risk premium) per unit of risk. The Treynor ratio explicitly assumes that a funds' inherent risk (market or systematic risk) can be measured by beta (β_i) and, therefore, the Treynor ratio assumes that a fund is fully diversified.

$$TR = \frac{R_i - R_f}{\beta_i} \tag{4.5}$$

Where TR = Treynor ratio;

R_i = the expected return of fund *i;*

R_f = the risk-free rate of return; and

β_i = the funds' beta.

The Treynor ratio presents the risk premium return per unit of systematic risk according to which investors desire a higher value, indicating superior performance (Marx *et al*., 2010:284; Reilly & Brown, 2012:937). Table 4.3 provides an overview of the risk-adjusted performances of the SRI funds according to the Treynor ratio, during each respective sub-period.

Table 4.3: Overview of the Treynor ratio of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Treynor Ratio	Rank	Treynor Ratio	Rank
Community Growth Equity Fund	0.119	3	0.059	4
Community Growth Gilt Fund	-5.725 **(W)**	8	-1.776 **(W)**	8
Element Earth Equity Fund	0.177 **(B)**	1	-0.033	5
Element Flexible Fund	0.092	4	-0.038	6
Element Real Income Fund	-0.165	7	-0.237	7
Oasis Crescent Equity Fund	0.139	2	0.105	3
Oasis Crescent International Feeder Fund	-0.077	6	0.451 **(B)**	1
Old Mutual Albaraka Equity Fund	0.068	5	0.132	2
Average	**-0.672**		**-0.167**	

Note: ***(B)*** *= Best performing fund;* ***(W)*** *= Worst performing fund*

Source: Compiled by the author

As indicated in Table 4.3, three SRI funds had negative Treynor ratios and four SRI funds had negative Treynor ratios in sub-period 1 and 2, respectively. The reported negative Treynor ratios in each respective sub-period indicated that the average annual compound returns on

these SRI funds were lower than the average annual compound return on a local risk-free instrument (with reference to this study as the short-term (91 day) Treasury bill).

Further indicated in Table 4.3, the average Treynor ratios for both sub-periods were negative, implying that the average risk premiums on the SRI funds were negative. Thus, the SRI funds, on average, did not produce excess returns above the risk-free rate of return. The average Treynor ratio in sub-period 1 (-0.672), however, was reported to be lower relative to the average Treynor ratio in sub-period 2 (-0.167). The increase in the average Treynor ratios from sub-period 1 to sub-period 2 could well be attributed to the following:

- A considerable decrease in the systematic risk (volatility) of the SRI funds during the research period (the average beta (systematic risk) of the SRI funds in sub-period 1 decreased from 0.454 to 0.386 in sub-period 2); and
- The effect of the global financial crisis during which various investments funds experienced high uncertainty (sub-period 1 included the period of the global financial crisis whereas sub-period 2 was noted to be the period excluding the global financial crisis).

Although the period including the global financial crisis (sub-period 1) did not induce the average annual compound returns of the SRI funds to decrease compared to the period after the crisis, the decrease in market uncertainty (or risk) revealed a substantial improvement in the risk-adjusted performances of the SRI funds according to the Treynor ratio.

Viviers (2007:266) reported that the Treynor ratio may not be a suitable performance measure for SRI funds. Viviers (2007:266) argued that due to the discerning nature of SRI fund screens, SRI funds are generally not well diversified which may cause the Treynor ratio to deliver misleading results as it would be subject to the Treynor ratios' assumption of diversification. However, the results of this study were in contrast to Viviers' study. The results of this study indicated that the SRI funds under review may have been diversified efficiently, as the results obtained from the Treynor ratio of this study were approximately equal to the results obtained from the Sharpe ratio of this study.[31]

[31] The correlation between the ranking results of the Treynor ratio and Sharpe ratio is presented in Section 4.4.2.

4.4.1.2 Sharpe ratio

The Sharpe ratio, which is expressed mathematically by Equation 4.6 and is discussed in Section 3.3.3, indicates a funds' excess return above the risk-free rate of return (the risk premium) per unit of risk. The Sharpe ratio, similar to the Treynor ratio, however, uses standard deviation (σ_i) as a measure of the total risk inherent in a fund.

$$S = \frac{R_i - R_f}{\sigma_i} \tag{4.6}$$

Where S = Sharpe ratio;

R_i = the expected return of fund *i*;

R_f = the risk-free rate of return; and

σ_i = the standard deviation of the fund.

Similar to the Treynor ratio, a higher Sharpe ratio is indicative of superior performance, however, in relation to the total risk of a fund. A higher value of the Sharpe ratio indicates that a higher return for a given level of risk has been achieved (Marx *et al*., 2010:285). Table 4.4 provides an overview of the results of the risk-adjusted performances of the SRI funds according to the Sharpe ratio, during each of the respective sub-periods.

Table 4.4: Overview of the Sharpe ratio of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Sharpe Ratio	Rank	Sharpe Ratio	Rank
Community Growth Equity Fund	0.523	3	0.425	4
Community Growth Gilt Fund	-0.769 **(W)**	8	-0.562 **(W)**	8
Element Earth Equity Fund	0.732 **(B)**	1	-0.204	6
Element Flexible Fund	0.347	4	-0.141	5
Element Real Income Fund	-0.570	7	-0.313	7
Oasis Crescent Equity Fund	0.595	2	0.685	3
Oasis Crescent International Feeder Fund	-0.181	6	0.900 **(B)**	1
Old Mutual Albaraka Equity Fund	0.287	5	0.890	2
Average	**0.120**		**0.210**	

*Note: **(B)** = Best performing fund; **(W)** = Worst performing fund*

Source: Compiled by the author

The results of the Sharpe ratios of the SRI funds as reported in Table 4.4 indicate that the same three SRI funds that had negative Treynor ratios in sub-period 1 also produced negative Sharpe ratios in the same period. The four negative Sharpe ratios of the SRI funds in sub-period 2 was

also in concurrence with the four SRI funds that produced negative Treynor ratios in the same period. The negative Sharpe ratios can be ascribed, similar to the Treynor ratios, to lower average annual compound returns on the SRI funds as compared to the average annual compound return on the local risk-free instrument.

Table 4.4 further indicates that the average Sharpe ratio increased from sub-period 1 to sub-period 2. The increase in the average Sharpe ratios from sub-period 1 to 2, respectively, indicates that the average risk-adjusted performance of the SRI funds has improved over the research period.

Similar to the Treynor ratio, the factors that may have caused an increase in the average Treynor ratio can also be linked to the increase in the average Sharpe ratio. The most noteworthy attribution, however, was noted in the large decrease of the average annual total volatility (or risk) of the SRI funds. The average annual total risk of the SRI funds in sub-period 1 decreased from 12.826 percent to 8.523 percent in sub-period 2, a substantial decrease of 4.303 percent. As mentioned in the results discussion of the Treynor ratio, the decline in volatility of the SRI funds from sub-period 1 to sub-period 2 could be attributable to the reduced uncertainty originally noted in the period after the global financial crisis.

4.4.1.3 Jensen's alpha

As shown by Equation 4.7 and discussed in Section 3.3.4, the Jensen's alpha of a fund indicates the excess actual return that the fund produced over the required return indicated by the CAPM. Thus, the Jensen's alpha value indicates if a fund has produced above-average returns adjusted for risk as measured by beta (β_i) (Reilly & Brown, 2012:942).

$$\alpha = R_i - \left[R_f + \beta_i \left(R_m - R_f\right)\right] \tag{4.7}$$

Where α = Jensen's alpha;

R_i = the expected return of fund *i*;

R_f = the risk-free rate of return;

R_m = the expected return of the market index/benchmark; and

β_i = the funds' beta.

As discussed in Section 3.3.4, superior fund performance is indicated by a positive alpha value ($\alpha > 0$) whereas inferior fund performance is indicated by a negative alpha value ($\alpha < 0$).

Superior performance indicated by the Jensen's alpha can be attributable to large excess returns produced by the fund (Marx *et al*., 2010:285). Table 4.5 provides an overview of the Jensen's alphas of the SRI funds, during each respective sub-period.

Table 4.5: Overview of the Jensen's alpha of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Jensen's Alpha	Rank	Jensen's Alpha	Rank
Community Growth Equity Fund	0.022	3	0.008	4
Community Growth Gilt Fund	-0.067 (W)	8	-0.042	7
Element Earth Equity Fund	0.052 (B)	1	-0.049 (W)	8
Element Flexible Fund	0.001	4	-0.018	6
Element Real Income Fund	-0.055	6	-0.015	5
Oasis Crescent Equity Fund	0.032	2	0.034	3
Oasis Crescent International Feeder Fund	-0.059	7	0.105 (B)	1
Old Mutual Albaraka Equity Fund	-0.015	5	0.050	2
Average	**-0.011**		**0.009**	

Note: ***(B)*** *= Best performing fund;* ***(W)*** *= Worst performing fund*
The R^2 values of the Jensen's alpha (as calculated under the CAPM) are reported in Table 4.18, Section 4.5

Source: Compiled by the author

In association with the results of the Treynor ratio and Sharpe ratio in section 4.4.1.1 and 4.4.1.2 respectively, Table 4.5 indicates that the same three SRI funds in sub-period 1, and the same four SRI funds in sub-period 2 produced negative Jensen's alphas. However, one additional SRI fund, the Old Mutual Albaraka equity fund, also produced a negative Jensen's alpha in sub-period 1. Furthermore, the average Jensen's alpha in sub-period 1 followed the negative trend of the four aforementioned SRI funds.

Table 4.5 pointed out that the average Jensen's alpha reported in sub-period 1 as negative, changed substantially to sub-period 2 with an increase of 0.02. The reported increase in the average Jensen's alpha implies that the average SRI fund performance has improved during the research period. The average SRI fund in sub-period 1, according to the Jensen's alpha, produced inferior performance relative to the average SRI fund in sub-period 2, which produced superior performance indicated by the positive alpha.

It is noticeable that the Element Earth equity fund produced superior performance in sub-period 1 and ranked as the best performer according to the Jensen's alpha, while in sub-period 2 the SRI fund produced a substantial inferior performance, ranked as the worst performer. This noteworthy change in ranking can be attributable to the large decrease in annual compound return from 18.858 percent in sub-period 1 to 3.76 percent in sub-period 2, with approximately

no change in market risk faced by the fund (the beta was reported as 0.595 in sub-period 1 and 0.604 in sub-period 2).

As noted by Marx *et al*. (2010:285) the Jensen's alpha will have a value of zero if the fund has performed according to the CAPM expectations[32] as the alpha indicates the excess actual return that the fund has produced over and above the return required by the CAPM. Thus, Table 4.5 illustrates how close the Element flexible fund (in sub-period 1) and the Community Growth equity fund (in sub-period 2) produced returns as expected by the CAPM with alpha values of 0.001 and 0.008, respectively.

4.4.1.4 Sortino ratio

As indicated in Section 3.3.5 and through Equation 4.8, the Sortino ratio is considered an alternative to the Sharpe ratio by its use of downside deviation (or risk) (DR) or semi-variance as representation of risk, rather than the standard deviation (σ_i) as used by the Sharpe ratio. Therefore, the Sortino ratio indicates the average excess return above the minimum acceptance return threshold (as specified by the investor), adjusted for downside risk.

$$S = \frac{\bar{R}_i - \tau}{DR} \tag{4.8}$$

Where S = Sortino ratio;

$\bar{R}_i$ = the average return of fund *i*;

τ = the minimum acceptable return threshold specified (tau); and

DR = the downside risk of the fund.

The downside risk of a fund is expressed in Equation 4.9 in which a minimum acceptance return threshold (tau (τ)) is specified. The minimum acceptance return threshold set by the investor is the level below which he/she would not want to see the fund returns fall. The return threshold level can be set as zero, the risk-free rate of return or the average rate of return of the fund. However, for the purpose of this study and given that rational investors desire positive returns and regard negative returns as unacceptable, the minimum acceptance return threshold value was specified as zero.

[32] The CAPM expects that a fund will deliver returns equal to the risk-free rate of return plus a market risk premium as the fund is only exposed to systematic (market) risk as measured by beta (β) (Marx *et al*., 2010:38).

$$DR = \sqrt{\frac{1}{n}\sum(R_i - \tau)^2} \quad (4.9)$$

Where DR = the downside risk of the fund;

n = the number of fund returns that fall below the minimum acceptance return threshold;

R_i = the expected return of fund *i*; and

τ = the minimum acceptable return threshold specified (tau).

As noted by Reilly and Brown (2012:954) superior fund performance is indicated by a higher Sortino ratio. The Sortino ratios of the SRI funds during each respective sub-period are provided in Table 4.6.

Table 4.6: Overview of the Sortino ratio of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Sortino Ratio	**Rank**	**Sortino Ratio**	**Rank**
Community Growth Equity Fund	16.000	5	51.100	5
Community Growth Gilt Fund	10.401	7	10.135 **(W)**	8
Element Earth Equity Fund	30.816	2	10.655	7
Element Flexible Fund	35.077 **(B)**	1	28.734	6
Element Real Income Fund	22.397	3	51.652	4
Oasis Crescent Equity Fund	22.394	4	65.472	3
Oasis Crescent International Feeder Fund	7.445 **(W)**	8	72.753	2
Old Mutual Albaraka Equity Fund	10.480	6	82.508 **(B)**	1
Average	**19.376**		**46.626**	

Note: ***(B)*** *= Best performing fund;* ***(W)*** *= Worst performing fund*

Source: Compiled by the author

The high Sortino ratios produced by the SRI funds in sub-period 2 as compared to the lower Sortino ratios produced in sub-period 1, implies that the SRI funds were faced by lower levels of downside risk in sub-period 2. The Old Mutual Albaraka equity fund exhibited a downside risk value of 0.165 percent in sub-period 2 resulting in a high Sortino value of 82.508, whereas in sub-period 1 the downside risk value reported as 1.259 percent resulted in a substantially lower Sortino value of 10.480.

The average Sortino ratio in sub-period 1 and sub-period 2, as indicated in Table 4.6, has improved considerably over the research period. The average Sortino ratio of 19.376 in sub-period 1 increased to 46.626 in sub-period 2, indicating that the downside risk exhibited by the

SRI funds has decreased largely. The decrease in harmful volatility exhibited by the SRI funds may be ascribed to the reduction in uncertainty, which was evident in the midst of the global financial crisis as included in sub-period 1.

Lien (2002:483) argued that the ranking results recorded by the Sortino ratio will be identical to those recorded by the Sharpe ratio if the return distributions exhibit characteristics of normal distributions. However, the rankings reported by the Sharpe ratio and Sortino ratio in this study,[33] indicated that the return distributions of the SRI funds rather exhibited characteristics of asymmetrical (or non-normal) distributions in which higher order moments of skewness and kurtosis were evident.

4.4.1.5 Omega ratio

As indicated in Section 3.3.6 and through Equation 4.10, the Omega ratio expresses the upside deviation of a fund (the expected gains) as a ratio of the downside deviation of a fund (the expected losses), each with a shared return threshold. Thus, the Omega ratio differs from the traditional performance measures by expressing the performance of a fund as a gains-losses trade-off, rather than a return-risk trade-off (Van Dyk *et al*., 2012:164).

$$\Omega(r) = \frac{\int_r^b \big(1 - F(x)\big)dx}{\int_a^r F(x)dx} \tag{4.10}$$

Where $\Omega(r)$ = the Omega ratio with respect to the return threshold;

$F(x)$ = the cumulative distribution function of the return distribution;

r = the return threshold;

b = the highest observed return in the return distribution (upper bound); and

a = the lowest observed return in the return distribution (lower bound).

For the purpose of this study and considering that the Omega ratio incorporates the entire return distribution, the risk-free rate of return in each respective sub-period was chosen as the return threshold to which the returns on the SRI funds were related under the Omega ratio. As the

[33] The correlation between the ranking results of the Sharpe ratios and that of the Sortino ratios are calculated in Section 4.4.2.

Omega ratio considers the expected gains of a fund against the expected losses of a fund, two return thresholds were selected for ranking purposes. In order to report on the positive returns (upside risk) of the SRI funds, the positive of the risk-free rate of return was selected as the return threshold (in sub-period 1 and 2 $r = +0.670\%$ and $r = +0.463\%$, respectively); whereas the negative of the risk-free rate of return was selected in order to report on the negative returns (downside risk) of the SRI funds (in sub-period 1 and 2 $r = -0.670\%$ and $r = -0.463\%$, respectively).

Van Dyk *et al*. (2012:164) explained that a higher Omega ratio is more desirable than a lower ratio as this is indicative of greater return concentration in the area to the right of the set return threshold (r), when considering the CDF for the Omega ratio (as discussed in Section 3.3.6). The tables to follow provide the results of the Omega ratios of the SRI funds, during each respective sub-period. Table 4.7 indicates the Omega ratios with a set return threshold of the positive risk-free rate (+ risk-free rate), whereas Table 4.8 indicates the Omega ratios with a set return threshold of the negative risk-free rate (- risk-free rate).

Table 4.7: Overview of the Omega ratio (+ risk-free rate) of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Omega Ratio	Rank	Omega Ratio	Rank
Community Growth Equity Fund	1.500	3	1.382	4
Community Growth Gilt Fund	0.550 **(W)**	8	0.692 **(W)**	8
Element Earth Equity Fund	1.678 **(B)**	1	0.899	6
Element Flexible Fund	1.258	5	0.923	5
Element Real Income Fund	0.597	7	0.822	7
Oasis Crescent Equity Fund	1.531	2	1.679	3
Oasis Crescent International Feeder Fund	0.910	6	1.960	2
Old Mutual Albaraka Equity Fund	1.285	4	1.981 **(B)**	1
Average	**1.164**		**1.292**	

Note: ***(B)*** *= Best performing fund;* ***(W)*** *= Worst performing fund*

Source: Compiled by the author

Table 4.7 indicates the Omega ratios of the SRI funds in sub-period 1 and 2 with respect to the return threshold selected as +0.670 percent and +0.463 percent, respectively. The performance rankings produced by the Omega ratio when considering the positive returns of the SRI funds show similar rankings as produced by the previous performance measures (such as the Treynor ratio, Sharpe ratio, Jensen's alpha and Sortino ratio) in each respective sub-period.

However, the rankings produced by the Omega ratio differ from the rankings produced by the Sortino ratio in sub-period 1, which can be attributable to the fact that the Sortino ratios' rankings is based on the downside risk faced by the SRI funds. Therefore, it is assumed that the rankings produced by the Sortino ratio were rather more similar to the Omega ratio rankings when the return threshold is set to focus on the downside risk of the SRI funds.[34]

The average Omega ratio in sub-period 1 has increased from 1.164 to 1.292 in sub-period 2. Again, as indicated by the previous risk-adjusted performance measures, the risk-adjusted performance of the SRI funds has improved over the research period. In each instance of improvement, the volatility caused by the global financial crisis may be identified as one of the probable sources of poor performance recorded in sub-period 1.

Table 4.8: Overview of the Omega ratio (- risk-free rate) of local socially responsible investment funds

SRI Fund Name	Sub-period 1		Sub-period 2	
	Omega Ratio	Rank	Omega Ratio	Rank
Community Growth Equity Fund	2.890	5	2.988	6
Community Growth Gilt Fund	2.337	7	2.052 **(W)**	8
Element Earth Equity Fund	3.747	3	2.056	7
Element Flexible Fund	4.575 **(B)**	1	3.778	5
Element Real Income Fund	4.102	2	6.595 **(B)**	1
Oasis Crescent Equity Fund	3.223	4	4.185	3
Oasis Crescent International Feeder Fund	2.122 **(W)**	8	3.944	4
Old Mutual Albaraka Equity Fund	2.520	6	5.263	2
Average	**3.189**		**3.858**	

Note: ***(B)*** *= Best performing fund;* ***(W)*** *= Worst performing fund*

Source: Compiled by the author

Table 4.8 indicates the Omega ratios of the SRI funds in sub-period 1 and 2 with respect to the return threshold selected as -0.670 percent and -0.463 percent, respectively. As mentioned previously, the assumption made that the rankings produced by the Omega ratio with the return threshold set to consider the downside risk of the SRI funds were similar to that produced by the Sortino ratio in sub-period 1, was evident.[35]

[34] These results are reported in Table 4.8.

[35] The correlation between the ranking results of the Sortino ratios and that of Omega ratios (with a set return threshold of the negative of the risk-free rate) are presented in Section 4.4.2.

Table 4.8 further indicates that the average Omega ratio, focussing on the expected losses of the SRI funds, has increased during the research period. The increase in the average Omega ratio from 3.189 in sub-period 1 to 3.858 in sub-period 2 can be attributable to (similar to the Sortino ratio) the considerable decrease in downside risk faced by the SRI funds.

Comparing Table 4.7 and Table 4.8 shows how differently the SRI funds reacted to the selected return thresholds when considering upside and downside risk. In each instance, during each respective sub-period, the risk-adjusted performances of the SRI funds, as recorded by the Omega ratio, have improved vastly during the research period.

4.4.2 The Spearman rank correlation coefficient

In order to test if there was a difference in the performance of the SRI funds in the first and second sub-divisions of the research period and if there was a difference in the performance rankings between the different risk-adjusted performance measures (as calculated in the first sub-division of the research period), the Spearman rank correlation coefficient was calculated. As noted by Eling (2008:15), the Spearman rank correlation coefficient is a non-parametric measure of correlation and, therefore, tests the difference (or association) in the rankings between two variable values, such as that produced by different risk-adjusted performance measures.

Thus, the Spearman rank correlation coefficient tested both the strength and direction of the correlation between the rankings of the two respective sub-divisions produced by the same performance measure, and the correlation between the different performance measures in each respective sub-period. Equation 4.11 expresses the Spearman rank correlation coefficient (Zar, 1972:578):

$$r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \tag{4.11}$$

Where r_s = the Spearman rank correlation coefficient;

$\sum d_i$ = the sum of the difference in rankings given to the two variable values; and

n = the sample size.

The Spearman rank correlation coefficient produces a value between -1 and +1, with a value of zero indicating that there is no existing correlation (Eling, 2008:15). In order to test the

significance of the Spearman rank correlation coefficient, three sets of null and alternative hypotheses were stated which were tested at the five percent significance level as a two-tailed test[36].

For the Spearman rank correlation coefficient of the different rankings produced by the different risk-adjusted performance measures in the first sub-division, the null and alternative hypotheses were set as:

- $H_{1,0}$: There is no correlation (ρ) (or association) between the rankings produced by the risk-adjusted performance measure[37] in sub-period 1 and that produced by the same risk-adjusted measure in sub-period 2 ($\rho = 0$); and
- $H_{1,A}$: There is a correlation (ρ) (or association) between the rankings produced by the risk-adjusted performance measure in sub-period 1 and that produced by the same risk-adjusted measure in sub-period 2 ($\rho \neq 0$).

The null and alternative hypotheses for the Spearman rank correlation coefficient of the different rankings produced by the different risk-adjusted performance measures in the second sub-division were set as:

- $H_{2,0}$: There is no correlation (ρ) (or association) between the rankings produced by the risk-adjusted performance measure[38] in one sub-period to the next, as produced by the same risk-adjusted measure in sub-period 2 ($\rho = 0$); and
- $H_{2,A}$: There is a correlation (ρ) (or association) between the rankings produced by the risk-adjusted performance measure in one sub-period to the next, as produced by the same risk-adjusted measure in sub-period 2 ($\rho \neq 0$).

For the Spearman rank correlation coefficient of different rankings produced by the different risk-adjusted performance measures, the null and alternative hypotheses were set as:

- $H_{3,0}$: There is no correlation (ρ) (or association) between the rankings produced by the different risk-adjusted performance measures in each relative sub-period ($\rho = 0$); and

[36] A two-tailed test (or hypothesis) divides the critical value (α) into two equal values which are tested in each tail, thus, in the positive tail (right tail) and negative tail (left tail).
[37] The null ($H_{1,0}$) and alternative ($H_{1,A}$) hypotheses were tested for all five risk-adjusted performance measures (the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio).
[38] The null ($H_{2,0}$) and alternative ($H_{2,A}$) hypotheses were tested for all five risk-adjusted performance measures (the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio).

- $H_{3,A}$: There is a correlation (ρ) (or association) between the rankings produced by the risk-adjusted performance measures in each relative sub-period ($\rho \neq 0$).

Table 4.9 indicates the Spearman rank correlation coefficients of the rankings produced by the different risk-adjusted measures between sub-period 1 and sub-period 2, as calculated in the first sub-division. The rankings produced by the different risk-adjusted performance measures in sub-period 1 in relation to sub-period 2 were fairly different as indicated in Table 4.9. The correlation coefficients of each risk-adjusted performance measure recorded either a very low positive value or a very low negative value. The low positive or negative values imply that the rank correlations between sub-period 1 and sub-period 2 were close to zero, indicating that the rankings produced in sub-period 1 were different from that produced in sub-period 2.

The null and alternative hypotheses ($H_{1,0}$ and $H_{1,A}$) for Table 4.9 (as stated previously) were tested against the statistical test value of -0.700 and +0.700 (a two-tailed test with a significance level of $\alpha = 0.025$). The null hypothesis ($H_{1,0}$) is rejected (and the alternative hypothesis ($H_{1,A}$) is accepted) if the Spearman rank correlation coefficient is either smaller than -0.700 or greater than +0.700.

For each correlation coefficient recorded in Table 4.9, the null hypothesis ($H_{1,0}$) was accepted. Thus, in accepting the null hypothesis, it is clear that there was no correlation between the rankings produced by each risk-adjusted performance measures in the first sub-division (that is, between sub-period 1 and sub-period 2). Thus, it is evident that there was a difference between the ranking results produced by each risk-adjusted measure, from sub-period 1 to sub-period 2. The difference in the rankings produced by the performance measure in sub-period 1 and in sub-period 2 may be ascribed to certain hazardous market events (or economic shocks) such as the global financial crisis, which may have affected the risk-adjusted performance of the SRI funds.

Table 4.9: Ranking results of each risk-adjusted performance measure, of sub-period 1 in relation to sub-period 2

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	Ranking																	
	Sub-period		Difference	Sub-period		Difference	Sub-period		Difference	Sub-period		Difference	Sub-period		Difference	Sub-period		Difference
	1	2		1	2		1	2		1	2		1	2		1	2	
Community Growth Equity Fund	3	4	-1	3	4	-1	3	4	-1	5	5	0	3	4	-1	5	6	-1
Community Growth Gilt Fund	8	8	0	8	8	0	8	7	1	7	8	-1	8	8	0	7	8	-1
Element Earth Equity Fund	1	5	-4	1	6	-5	1	8	-7	2	7	-5	1	6	-5	3	7	-4
Element Flexible Fund	4	6	-2	4	5	-1	4	6	-2	1	6	-5	5	5	0	1	5	-4
Element Real Income Fund	7	7	0	7	7	0	6	5	1	3	4	-1	7	7	0	2	1	1
Oasis Crescent Equity Fund	2	3	-1	2	3	-1	2	3	-1	4	3	1	2	3	-1	4	3	1
Oasis Crescent International Feeder Fund	6	1	5	6	1	5	7	1	6	8	2	6	6	2	4	8	4	4
Old Mutual Albaraka Equity Fund	5	2	3	5	2	3	5	2	3	6	1	5	4	1	3	6	2	4
Spearman's Rank Correlation Coefficient	**0.267**			**0.233**			**-0.150**			**-0.333**			**0.333**			**0.2000**		

Source: Compiled by the author

The second sub-division of the research period (which included seven sub-periods) was created in an attempt to isolate certain hazardous or non-hazardous market events, such as those identified in Section 1.3.1, Section 3.2 and Annexure B.

Table 4.10 presents the Spearman rank correlation coefficients of the rankings produced by the different risk-adjusted measures between one sub-period to the next (that is, sub-period 1 and sub-period 2, sub-period 2 and sub-period 3, sub-period 3 and sub-period 4, sub-period 4 and sub-period 5, sub-period 5 and sub-period 6, sub-period 6 and sub-period 7), as calculated in the second sub-division.

Table 4.10: Overview of the Spearman rank correlation coefficient of each risk-adjusted performance measure, from sub-period 1 to sub-period 7[39]

Performance Measure	Sub-period 1 (05/2004 – 01/2006) vs. Sub-period 2 (01/2006 - 07/2007)	Sub-period 2 (01/2006 - 07/2007) vs. Sub-period 3 (07/2007 - 01/2009)	Sub-period 3 (07/2007 - 01/2009) vs. Sub-period 4 (01/2009 - 07/2010)	Sub-period 4 (01/2009 - 07/2010) vs. Sub-period 5 (07/2010 - 01/2012)	Sub-period 5 (07/2010 - 01/2012) vs. Sub-period 6 (01/2012 - 07/2013)	Sub-period 6 (01/2012 - 07/2013) vs. Sub-period 7 (07/2013 - 12/2014)
Treynor Ratio	0.214	1.000*	0.238	-0.833*	0.929*	-0.452
Sharpe Ratio	0.262	0.071	0.429	0.500	0.548	0.738*
Jensen's Alpha	0.143	0.190	0.786*	-0.024	0.643	0.976*
Sortino Ratio	0.262	-0.595	-0.595	0.833*	-0.071	0.762*
Omega Ratio (+ risk-free rate)	0.167	-0.048	0.357	0.500	0.548	0.619
Omega Ratio (- risk-free rate)	0.405	0.024	0.333	0.786*	0.357	0.643
Average	**0.242**	**0.107**	**0.258**	**0.294**	**0.492**	**0.548**

*Note: * reject null hypothesis ($H_{2,0}$) at the 5% level of significance*

Source: Compiled by the author

As indicated by Table 4.10, the average Spearman rank correlation coefficients of each sub-period relevant to the next, were relatively low indicating that there may have been no (or low) association between each sub-period. The low average values recorded in relating one sub-

[39] An overview of the results of the second sub-division of the research period (sub-period 1 to sub-period 7) as calculated by the five risk-adjusted performance measures are presented in Annexure C.

period to the next indicated that there was a difference (or no association) in the rankings produced between each sub-period, from sub-period 1 to sub-period 7.

The null and alternative hypotheses ($H_{2,0}$ and $H_{2,A}$) for Table 4.10 (as stated previously) were tested against the statistical test value of -0.700 and +0.700 (as with the first set of hypotheses). The null hypothesis ($H_{2,0}$) is rejected (and the alternative hypothesis ($H_{2,A}$) is accepted) if the Spearman rank correlation coefficient is either smaller than -0.700 or greater than +0.700.

According to the Spearman rank correlation coefficient of the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio, and Omega ratio (- risk-free rate), there was a correlation found between the relevant sub-periods (indicated by the asterisks (*)) as the null hypothesis ($H_{2,0}$) was rejected. In rejecting $H_{2,0}$ (or accepting $H_{2,A}$) it was evident that there was no difference between the rankings produced by the relevant risk-adjusted performance measures between the indicated sub-periods.

However, as the average correlation coefficient between each sub-period was relatively low and falls between the tested statistical values of -7.00 and +7.00, $H_{2,0}$ can be accepted. As $H_{2,0}$ was accepted (or $H_{2,A}$ was rejected) it was apparent that there was a difference between the rankings produced by the relevant risk-adjusted performance measures between each sub-period. The evident differences as indicated by the average correlation coefficients may be ascribed to the identified market events included in each sub-period[40]. Although a hazardous or non-hazardous market event was identified and isolated in each sub-period, the effects of these market events on the risk-adjusted performance of the SRI funds require empirical support.

The most noteworthy correlation coefficient was found between sub-period 2 and sub-period 3 in which the hazardous market event of the global financial crisis was isolated in sub-period 3. The correlation coefficient of sub-period 2 in relation to sub-period 3 of 0.107 indicate that the global financial crisis may have affect the risk-adjusted performance of the SRI funds as the rankings produced between sub-period 2 and sub-period 3 were different (or not correlated). The Spearman rank correlation coefficients between the different risk-adjusted performance measures in each respective sub-period are reported in Table 4.11.

[40] The categorised and identified market events (either hazardous or non-hazardous) are presented in Section 1.3.1, Section 3.2 and Annexure B.

Table 4.11: Spearman's rank correlation coefficient of the different risk-adjusted performance measures

Sub-period	1	2	1	2	1	2	1	2	1	2	1	2
Performance Measure	**Treynor Ratio**		**Sharpe Ratio**		**Jensen's Alpha**		**Sortino Ratio**		**Omega Ratio (+ risk-free rate)**		**Omega Ratio (- risk-free rate)**	
Treynor Ratio												
Sharpe Ratio	1.00	0.98[41]										
Jensen's Alpha	0.98	0.83	0.98	0.88								
Sortino Ratio	0.44	0.73	0.44	0.75[42]	0.58	0.89						
Omega Ratio (+ risk-free rate)	0.98	0.95	0.98	0.98	0.95	0.86	0.30	0.77				
Omega Ratio (- risk-free rate)	0.38	0.36	0.38	0.40	0.52	0.62	0.94	0.75	0.26	0.45		
Average	**0.75**	**0.77**	**0.75**	**0.80**	**0.80**	**0.82**	**0.54**	**0.78**	**0.69**	**0.80**	**0.50**	**0.52**

Note: The 'Omega ratio (+risk-free rate)' refers to the Omega ratio with the return threshold set as the positive of the risk-free rate and the 'Omega ratio (-risk-free rate)' refers to the Omega ratio with the return threshold set as the negative of the risk-free rate

Source: Compiled by the author

It is evident that the average correlation coefficients produced in sub-period 1 differ slightly from the average correlation coefficients produced in sub-period 2, between the different performance measures. In sub-period 1, a very high rank correlation was displayed between the Treynor ratio, Sharpe ratio, Jensen's alpha and Omega ratio (+ risk-free rate), in relation to one another; whereas a very high rank correlation between the Sortino ratio and Omega ratio (- risk-free rate), was displayed. The low correlation found relating the Sortino ratio and Omega ratio (- risk-free rate) to the Treynor ratio, Sharpe ratio, Jensen's alpha and Omega ratio (+ risk-free rate) implied that the rankings produced by these performance measures had no correlation with one another.

Sub-period 2 produced slightly different correlation coefficients with the average correlation coefficient increasing with each performance measure, from sub-period 1. A very high rank

[41] The high rank correlation found between the Treynor ratio and Sharpe ratio implied that the two performance measures rank the SRI funds equally which indicated that the SRI funds exhibited a large degree of diversification (as explained in Section 3.3.2).

[42] The relatively low rank correlation found between the Sharpe ratio and Sortino ratio indicated that the SRI funds under review exhibited characteristics of asymmetrical (or non-normal) distributions in which higher order moments of the return distributions, such as skewness and excess kurtosis, were apparent.

correlation between all the performance measures was illustrated, except with the Omega ratio (- risk-free rate). All performance measures, except that of the Sortino ratio, displayed no (or low) correlations to the Omega ratio (- risk-free rate).

The most noteworthy finding of the rank correlations indicated in Table 4.11, was that the correlation between the Omega ratio (- risk-free rate) and Sortino ratio was very high in each respective sub-period (0.94 in sub-period 1 and 0.75 in sub-period 2), however, very low in relation to the rest of the tested performance measures. This finding may be ascribed to the fact that both the Omega ratio (- risk-free rate) and Sortino ratio measures a funds' performance relative to its inherent downside risk (or expected losses), while the rest of the tested performance measures did not explicitly focus on the downside risk of a fund (hence the high correlation found between those performance measures focussing on either the upside potential or the downside risk of a fund).

The null and alternative hypotheses ($H_{3,0}$ and $H_{3,A}$) (as stated previously) were tested against a statistical test value of -0.700 and +0.700 (as with the first and second set of hypotheses). The null hypothesis ($H_{3,0}$) is rejected (and the alternative hypothesis ($H_{3,A}$) is accepted) if the correlation coefficient is either smaller than -0.700 or greater than +0.700.

In sub-period 1, based on the average rank correlations of the different performance measures, the Treynor ratio, Sharpe ratio and Jensen's alpha indicated associations relative to the other performance measures (the Sortino ratio and Omega ratio). However, in the same period, the average rank correlations of the Sortino ratio and Omega ratio indicated poor associations that were not in relation to the other performance measures. However, sub-period 2, indicated that on average, all performance measures were correlated with one another, except with the Omega ratio (- risk-free rate).

4.4.3 The risk-adjusted performance of socially responsible investment funds in relation to the three selected benchmark categories

The performance of the SRI funds was compared to the three respective benchmark categories, which include the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index.

In order to establish if there was a statistically significant difference between the performance of the SRI funds and the performance of each respective benchmark category, the Wilcoxon

signed ranks test was calculated. The Wilcoxon signed ranks test is a non-parametric test, which includes using the ranks (or order) of the values rather than using the actual values (Von Ossietzky, 2013:2).

The following steps were used to calculate the Wilcoxon signed ranks test:

- Step 1: Computing the difference (D_i) between the two paired values, for each item in the sample, calculated using Equation 4.12:

$$D_n = X_{1.n} - X_{2.n} \tag{4.12}$$

Where D_n = the difference scores between the two paired values;
$X_{1.n}$ = the n observations from the first sample; and
$X_{2.n}$ = the n observations from the second sample.

- Step 2: Obtaining the absolute differences ($|D_i|$) for each item in the sample;
- Step 3: Assigning ranks (R_i) to each of the absolute difference values ($|D_i|$);
- Step 4: Reassigning a plus or a minus to each of the ranks (R_i), depending on whether the differences (D_i) was originally positive (plus) or negative (minus);
- Step 5: Adding the signed ranks together. However, if the sample differences are predominantly positive (negative), the addition will be based on the positive (negative) ranks; and
- Step 6: Computing the Wilcoxon test statistic (W).

The Wilcoxon test statistic (W) is expressed mathematically as:

$$W = \sum_{i=1}^{n'} R_i^{(+/-)} \tag{4.13}$$

Where W = the Wilcoxon signed ranks test statistic; and
$\sum_{i=1}^{n'} R_i^{(+/-)}$ = the sum of the positive (negative) ranks.

The Wilcoxon signed ranks test does not require the data to be normally distributed, however, rather assumes that the differences (between the two paired values) are approximately symmetric about the mean (Von Ossietzky, 2013:4). The Wilcoxon test further assumes that the data are measured either on an ordinal, interval or ratio scale.

The null and alternative hypotheses for the Wilcoxon test, related to each benchmark category, are stated in Section 4.4.3.1, Section 4.4.3.2 and Section 4.4.3.3 respectively. The tables to follow with respect to each section indicate the comparisons of the SRI funds to each selected benchmark category in each respective sub-period. Each column in the tables are labelled with the corresponding number representing either the performance measure calculated for the SRI funds, the performance measure calculated for the benchmark category or the difference between the two calculated values.

Column (1) represents the names of the SRI funds, in alphabetical order. Column (2) provides the Treynor ratios of the SRI funds with the Treynor ratios of the benchmark category shown in column (3). In column (4) the difference between the Treynor ratios of the SRI funds and that of the benchmark category, is shown. In column (5) and (6) respectively, the Sharpe ratios of the SRI funds and the benchmark category are given with the difference between the two values calculated in column (7). In column (8) and (9) respectively, the Jensen's alphas of the SRI funds and the benchmark category are presented. Column (10) is the difference between column (7) and (8). The Sortino ratios of the SRI funds and the benchmark category are given in column (11) and (12) respectively, with their difference given in column (13). The Omega ratio (both with respect to the positive and negative selected thresholds) of the SRI funds and the benchmark category are shown in column (14), (15), (17) and (18) respectively, with the difference between the Omega ratios of the SRI funds and the benchmark category shown in column (16) and (19) respectively.

4.4.3.1 The risk-adjusted performance of socially responsible investment funds in relation to the first benchmark category

The first benchmark category is selected as the FTSE/JSE SRI Index, which served as a point of reference to which the SRI funds could be related. The risk-adjusted performance of the SRI funds were evaluated against the risk-adjusted performance of the FTSE/JSE SRI Index in each respective sub-period, namely 1 May 2004 until 30 September 2009 (sub-period 1) and 1 October 2009 until 31 December 2014 (sub-period 2). As discussed in Section 2.2.1.2, the FTSE/JSE SRI Index is a South African index created to raise ESG concerns to all companies listed on the JSE (JSE, 2015b:2).

The following null and alternative hypotheses were stated in order to test the difference between the risk-adjusted performance of the SRI funds and that of the first benchmark category:

- $H_{1,0}$: There is no statistical significant difference between the risk-adjusted performance of SRI funds and their selected benchmark index, the FTSE/JSE SRI Index, during each respective sub-period; and
- $H_{1,A}$: There is a statistical significant difference between the risk-adjusted performance of SRI funds and their selected benchmark index, the FTSE/JSE SRI Index, during each respective sub-period.

Table 4.12 and Table 4.13 provide the risk-adjusted performances[43] of the SRI funds in relation to the risk-adjusted performances of the FTSE/JSE SRI Index, during sub-period 1 and sub-period 2 respectively.

According to the average of the difference scores ($\overline{D}$) of the Sortino ratio and Omega ratio (- risk-free rate) in sub-period 1, the SRI funds slightly outperformed the first benchmark category (the FTSE/JSE SRI Index) with average difference scores of 7.226 and 0.650, respectively. This trend continued into sub-period 2, as indicated by Table 4.13, with an additional risk-adjusted performance measure, the Jensen's alpha, indicating that SRI funds slightly outperformed the FTSE/JSE SRI Index (with $\overline{D}$ equal to 13.304, 1.643 and 0.008 respectively).

The outperformance of the SRI funds as indicated by the Sortino ratio and Omega ratio (- risk-free rate) in sub-period 1 and by the Jensen's alpha and Sortino ratio in sub-period 2, however, was not statistically significant as the respective p-values (or probability values) of the Wilcoxon signed ranks test were all greater than 0.05 (the selected significance level). However, the Omega ratio (- risk-free rate) in sub-period 2 indicated a statistically significant difference between the SRI funds and the FTSE/JSE SRI Index, in which the SRI funds outperformed the relevant benchmark ($p = 0.036 < 0.05$).

In accordance with the above stated, the null hypothesis ($H_{1,0}$) could not be rejected for either of the tested risk-adjusted performance measures, in both sub-period 1 and sub-period 2, except

[43] The risk-adjusted performances of the SRI funds and the relevant benchmark category reported in Table 4.12 and Table 4.13 were according to the calculated performance measures, which included the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio.

for the outperformance as indicated by the Omega ratio (- risk-free rate) in sub-period 2. Accepting $H_{1,0}$ (for the majority of tested risk-adjusted measures in both sub-period 1 and 2) indicated that there was no statistically significant difference between the risk-adjusted performance of the SRI funds and the risk-adjusted performance of the FTSE/JSE SRI Index, over the period of 1 May 2004 until 30 September 2009 (sub-period 1) and 1 October 2009 until 31 December 2014 (sub-period 2).

Table 4.12: Performance of local socially responsible investment funds in relation to the performance of the FTSE/JSE SRI Index in sub-period 1 (1 May 2004 – 30 September 2009)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.12	0.09	0.03	0.52	0.44	0.09	0.02	0.00	0.02	16.00	12.15	3.85	1.50	1.44	0.06	2.89	2.54	0.35
Community Growth Gilt Fund	-5.72	0.09	-5.82	-0.77	0.44	-1.21	-0.07	0.00	-0.07	10.40	12.15	-1.75	0.55	1.44	-0.89	2.34	2.54	-0.20
Element Earth Equity Fund	0.18	0.09	0.09	0.73	0.44	0.30	0.05	0.00	0.05	30.82	12.15	18.67	1.68	1.44	0.24	3.75	2.54	1.21
Element Flexible Fund	0.09	0.09	0.00	0.35	0.44	-0.09	0.00	0.00	0.00	35.08	12.15	22.93	1.26	1.44	-0.18	4.57	2.54	2.04
Element Real Income Fund	-0.17	0.09	-0.26	-0.57	0.44	-1.01	-0.06	0.00	-0.06	22.40	12.15	10.25	0.60	1.44	-0.84	4.10	2.54	1.56
Oasis Crescent Equity Fund	0.14	0.09	0.05	0.59	0.44	0.16	0.03	0.00	0.03	22.39	12.15	10.24	1.53	1.44	0.09	3.22	2.54	0.68
Oasis Crescent International Feeder Fund	-0.08	0.09	-0.17	-0.18	0.44	-0.62	-0.06	0.00	-0.06	7.45	12.15	-4.71	0.91	1.44	-0.53	2.12	2.54	-0.42
Old Mutual Albaraka Equity Fund	0.07	0.09	-0.02	0.29	0.44	-0.15	-0.01	0.00	-0.02	10.48	12.15	-1.67	1.28	1.44	-0.16	2.52	2.54	-0.02
Average of Difference Scores ($\bar{D}$)	**-0.763**			**-0.316**			**-0.014**			**7.226**			**-0.267**			**0.650**		
Standard Deviation of Difference Scores	**2.047**			**0.564**			**0.046**			**10.067**			**0.430**			**0.885**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.700**			**-1.120**			**-0.845**			**-1.540**			**-1.400**			**-1.540**		
Probability Value	**0.484**			**0.263**			**0.398**			**0.123**			**0.161**			**0.123**		

Source: Compiled by the author

Table 4.13: Performance of local socially responsible investment funds in relation to the performance of the FTSE/JSE SRI Index in sub-period 2 (1 October 2009 – 31 December 2014)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference	SRI Fund	SRI Index	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.06	0.05	0.01	0.43	0.38	0.05	0.01	0.00	0.01	51.10	33.32	17.78	1.38	1.34	0.04	2.99	2.51	0.47
Community Growth Gilt Fund	-1.78	0.05	-1.82	-0.56	0.38	-0.94	-0.04	0.00	-0.04	10.14	33.32	-23.19	0.69	1.34	-0.65	2.05	2.51	-0.46
Element Earth Equity Fund	-0.03	0.05	-0.08	-0.20	0.38	-0.58	-0.05	0.00	-0.05	10.65	33.32	-22.67	0.90	1.34	-0.44	2.06	2.51	-0.46
Element Flexible Fund	-0.04	0.05	-0.09	-0.14	0.38	-0.52	-0.02	0.00	-0.02	28.73	33.32	-4.59	0.92	1.34	-0.42	3.78	2.51	1.26
Element Real Income Fund	-0.24	0.05	-0.29	-0.31	0.38	-0.69	-0.01	0.00	-0.02	51.65	33.32	18.33	0.82	1.34	-0.52	6.59	2.51	4.08
Oasis Crescent Equity Fund	0.10	0.05	0.06	0.69	0.38	0.31	0.03	0.00	0.03	65.47	33.32	32.15	1.68	1.34	0.34	4.18	2.51	1.67
Oasis Crescent International Feeder Fund	0.45	0.05	0.40	0.90	0.38	0.52	0.10	0.00	0.10	72.75	33.32	39.43	1.96	1.34	0.62	3.94	2.51	1.43
Old Mutual Albaraka Equity Fund	0.13	0.05	0.08	0.89	0.38	0.51	0.05	0.00	0.05	82.51	33.32	49.19	1.98	1.34	0.64	5.26	2.51	2.75
Average of Difference Scores ($\bar{D}$)	**-0.216**			**-0.168**			**0.008**			**13.304**			**-0.049**			**1.343**		
Standard Deviation of Difference Scores	**0.677**			**0.582**			**0.051**			**27.560**			**0.528**			**1.552**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.560**			**-0.980**			**-0.140**			**-1.120**			**-0.280**			**-2.100**		
Probability Value	**0.575**			**0.327**			**0.889**			**0.263**			**0.779**			**0.036**		

Source: Compiled by the author

4.4.3.2 The risk-adjusted performance of socially responsible investment funds in relation to the second benchmark category

The second benchmark category was selected as the matched sample of local non-SRI unit trust funds, which served as a point of reference to which the SRI funds were compared. The risk-adjusted performance of the SRI funds were evaluated against the risk-adjusted performance of the matched sample of non-SRI funds in each respective sub-period, namely 1 May 2004 until 30 September 2009 (sub-period 1) and 1 October 2009 until 31 December 2014 (sub-period 2). As discussed in Section 3.2, non-SRI funds are classified as any collective investment scheme, which does not employ any of the distinguished SRI strategies (screening, shareholder-activism or cause-based investing (Viviers, 2007:15). Furthermore, as discussed in Section 3.2.1, the matched sample of non-SRI funds were selected based on each funds' sector category, date of inception and fund size.

The following null and alternative hypotheses were stated in order to test the difference between the risk-adjusted performance of the SRI funds and that of the second benchmark category:

- $H_{2,0}$: There is no statistical significant difference between the risk-adjusted performance of SRI funds and the matched sample of non-SRI fund, during each respective sub-period; and
- $H_{2,A}$: There is a statistical significant difference between the risk-adjusted performance of SRI funds and the matched sample of non-SRI funds, during each respective sub-period.

Table 4.14 and Table 4.15 provide the risk-adjusted performances[44] of the SRI funds in relation to the risk-adjusted performances of the matched sample of non-SRI funds, during sub-period 1 and sub-period 2, respectively.

[44] The risk-adjusted performances of the SRI funds and the relevant benchmark category reported in Table 4.14 and Table 4.15 were according to the calculated performance measures, which include the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio.

Table 4.14: Performance of local socially responsible investment funds in relation to the performance of local non-socially responsible investment funds in sub-period 1 (1 May 2004 – 30 September 2009)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.12	0.09	0.03	0.52	0.43	0.09	0.02	0.00	0.03	16.00	15.19	0.82	1.50	1.39	0.11	2.89	2.63	0.26
Community Growth Gilt Fund	-5.72	-1.49	-4.23	-0.77	-0.87	0.1	-0.07	-0.08	0.01	10.40	7.56	2.84	0.55	0.50	0.05	2.34	2.29	0.04
Element Earth Equity Fund	0.18	0.12	0.06	0.73	0.55	0.18	0.05	0.02	0.03	30.82	18.29	12.52	1.68	1.50	0.17	3.75	3.02	0.73
Element Flexible Fund	0.09	0.11	-0.02	0.35	0.48	-0.13	0.00	0.01	-0.01	35.08	25.90	9.18	1.26	1.44	-0.18	4.57	3.19	1.39
Element Real Income Fund	-0.17	-0.92	0.75	-0.57	-1.06	0.49	-0.06	-0.04	-0.02	22.40	195.68	-173.28	0.60	0.22	0.38	4.10	17.59	-13.49
Oasis Crescent Equity Fund	0.14	0.08	0.06	0.59	0.30	0.29	0.03	-0.01	0.04	22.39	10.68	11.71	1.53	1.29	0.24	3.22	2.36	0.86
Oasis Crescent International Feeder Fund	-0.08	-0.13	0.05	-0.18	-0.41	0.23	-0.06	-0.11	0.05	7.45	2.32	5.13	0.91	0.76	0.15	2.12	1.77	0.35
Old Mutual Albaraka Equity Fund	0.07	0.14	-0.07	0.29	0.62	-0.34	-0.01	0.04	-0.05	10.48	17.28	-6.80	1.28	1.59	-0.31	2.52	2.92	-0.40
Average of Difference Scores ($\bar{D}$)	**-0.421**			**0.114**			**0.010**			**-17.235**			**0.076**			**-1.283**		
Standard Deviation of Difference Scores	**1.561**			**0.255**			**0.034**			**63.369**			**0.224**			**4.962**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.420**			**-1.120**			**-0.700**			**-0.840**			**-0.840**			**-0.840**		
Probability Value	**0.674**			**0.263**			**0.484**			**0.401**			**0.401**			**0.401**		

Source: Compiled by the author

Table 4.15: Performance of local socially responsible investment funds in relation to the performance of local non-socially responsible investment funds in sub-period 2 (1 October 2009 – 31 December 2014)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference	SRI Fund	Non-SRI Fund	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.06	0.10	-0.05	0.43	0.75	-0.32	0.01	0.02	-0.01	51.10	69.67	-18.57	1.38	1.72	-0.34	2.99	3.56	-0.57
Community Growth Gilt Fund	-1.78	-1.52	-0.26	-0.56	-0.53	-0.04	-0.04	-0.04	0.00	10.14	13.56	-3.42	0.69	0.71	-0.02	2.05	2.16	-0.11
Element Earth Equity Fund	-0.03	0.08	-0.11	-0.20	0.59	-0.79	-0.05	-0.01	-0.04	10.65	67.23	-56.57	0.90	1.53	-0.64	2.06	3.43	-1.37
Element Flexible Fund	-0.04	-0.01	-0.03	-0.14	-0.04	-0.10	-0.02	-0.04	0.03	28.73	29.94	-1.21	0.92	1.00	-0.08	3.78	3.19	0.59
Element Real Income Fund	-0.24	-0.41	0.18	-0.31	-0.72	0.41	-0.01	-0.03	0.01	51.65	56.73	-5.08	0.82	0.58	0.24	6.59	6.23	0.36
Oasis Crescent Equity Fund	0.10	0.07	0.04	0.69	0.47	0.22	0.03	-0.01	0.04	65.47	71.15	-5.68	1.68	1.42	0.26	4.18	3.33	0.85
Oasis Crescent International Feeder Fund	0.45	0.29	0.16	0.90	0.90	0.00	0.10	0.08	0.03	72.75	79.88	-7.13	1.96	2.00	-0.04	3.94	4.03	-0.09
Old Mutual Albaraka Equity Fund	0.13	0.08	0.05	0.89	0.60	0.29	0.05	0.00	0.05	82.51	67.22	15.29	1.98	1.55	0.43	5.26	3.45	1.81
Average of Difference Scores ($\bar{D}$)	**-0.002**			**-0.041**			**0.014**			**-10.296**			**-0.024**			**0.184**		
Standard Deviation of Difference Scores	**0.144**			**0.383**			**0.030**			**20.883**			**0.346**			**0.958**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.140**			**-0.280**			**-1.193**			**-1.680**			**-0.280**			**-0.560**		
Probability Value	**0.889**			**0.779**			**0.233**			**0.093**			**0.779**			**0.575**		

Source: Compiled by the author

In sub-period 1, based on the Sharpe ratio, Jensen's alpha and Omega ratio (+ risk-free rate), SRI funds slightly outperformed the matched sample of non-SRI funds with indicated average difference scores ($\overline{D}$) of 0.114, 0.010 and 0.076 respectively. Sub-period 2, presented in Table 4.14, indicated that the SRI funds slightly outperformed the matched sample of non-SRI funds, according to Jensen's alpha and Omega ratio (- risk-free rate) ($\overline{D}$ equal to 0.014 and 0.184 respectively). However, the outperformances indicated by these risk-adjusted performance measures, were not statistically significant.

Although slight outperformance was indicated by the previously stated risk-adjusted performance measures, the p-values of these measures were, however, all greater than 0.05 (the selected significance level). The null hypothesis ($H_{2,0}$) could accordingly not be rejected. Therefore, it is indicated by the Wilcoxon signed ranks test and its respective p-values, that in each respective sub-period, based on all the tested risk-adjusted performance measures, there was no statistically significant difference between the performance of the SRI funds and the performance of the matched sample of non-SRI funds. Thus, SRI funds do not earn inferior returns to non-SRI funds and SRI fund investors are not exposed to a specific risk.

4.4.3.3 The risk-adjusted performance of socially responsible investment funds in relation to the third benchmark category

The third benchmark category was selected as the FTSE/JSE All Share Index, which served as a benchmark to which the SRI funds were compared. The risk-adjusted performance of the SRI funds were evaluated against the risk-adjusted performance of the FTSE/JSE All Share Index in each respective sub-period, namely 1 May 2004 until 30 September 2009 (sub-period 1) and 1 October 2009 until 31 December 2014 (sub-period 2). As mentioned in Section 3.2, the FTSE/JSE All Share Index was identified and selected as the representation of the general equity market in South Africa.

The following null and alternative hypotheses were stated in order to test the difference between the risk-adjusted performance of the SRI funds and that of the third benchmark category:

- $H_{3,0}$: There is no statistically significant difference between the risk-adjusted performance of SRI funds and the FTSE/JSE All Share Index, during each respective sub-period; and
- $H_{3,A}$: There is a statistically significant difference between the risk-adjusted performance of SRI funds and the FTSE/JSE All Share Index, during each respective sub-period.

Table 4.16 and Table 4.17 provide the risk-adjusted performances[45] of the SRI funds in relation to the risk-adjusted performances of the FTSE/JSE All Share Index, during sub-period 1 and sub-period 2 respectively.

Based on the average of difference scores ($\overline{D}$) of the Sortino ratio and Omega ratio (- risk-free rate) in sub-period 1 ($\overline{D}$ equal to 4.116 and 0.015 respectively), and according to the Jensen's alpha and Omega ratio (- risk-free rate) in sub-period 2 (with $\overline{D}$ equal to 0.008 and 0.600 respectively), the SRI funds slightly outperformed the third benchmark category (the general equity market as represented by the FTSE/JSE All Share Index). However, the outperformance as indicated by these risk-adjusted performance measures in sub-period 1 and sub-period 2, were not statistically significant (p-values > 0.05).

Thus, according to the Wilcoxon signed ranks test and its respective p-values for all risk-adjusted performance measures in both sub-period 1 and 2, the null hypothesis ($H_{3,0}$) was accepted. This indicated that there was no statistical significant difference between the performance of the SRI funds and the performance of the FTSE/JSE All Share Index in either sub-period 1 or sub-period 2.

Consequently, according to the risk-adjusted performance of the SRI funds tested against the three selected benchmark categories, namely the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index, no significant difference was reported in either sub-period. Therefore, the risk-adjusted performance of the SRI funds was no different from the risk-adjusted performance of either benchmark category.

[45] The risk-adjusted performances of the SRI funds and the relevant benchmark category reported in Table 4.16 and Table 4.17 were according to the calculated performance measures, which include the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio.

Table 4.16: Performance of local socially responsible investment funds in relation to the performance of the FTSE/JSE All Share Index in sub-period 1 (1 May 2004 – 30 September 2009)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ risk-free rate)			Omega Ratio (- risk-free rate)		
	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.12	0.10	0.02	0.52	0.50	0.03	0.02	0.00	0.02	16.00	15.26	0.74	1.50	1.48	0.02	2.89	2.68	0.21
Community Growth Gilt Fund	-5.72	0.10	-5.82	-0.77	0.50	-1.27	-0.07	0.00	-0.07	10.40	15.26	-4.86	0.55	1.48	-0.93	2.34	2.68	-0.34
Element Earth Equity Fund	0.18	0.10	0.08	0.73	0.50	0.23	0.05	0.00	0.05	30.82	15.26	15.56	1.68	1.48	0.20	3.75	2.68	1.07
Element Flexible Fund	0.09	0.10	0.00	0.35	0.50	-0.15	0.00	0.00	0.00	35.08	15.26	19.82	1.26	1.48	-0.22	4.57	2.68	1.90
Element Real Income Fund	-0.17	0.10	-0.26	-0.57	0.50	-1.07	-0.06	0.00	-0.06	22.40	15.26	7.14	0.60	1.48	-0.88	4.10	2.68	1.42
Oasis Crescent Equity Fund	0.14	0.10	0.04	0.59	0.50	0.10	0.03	0.00	0.03	22.39	15.26	7.13	1.53	1.48	0.05	3.22	2.68	0.54
Oasis Crescent International Feeder Fund	-0.08	0.10	-0.17	-0.18	0.50	-0.68	-0.06	0.00	-0.06	7.45	15.26	-7.81	0.91	1.48	-0.57	2.12	2.68	-0.56
Old Mutual Albaraka Equity Fund	0.07	0.10	-0.03	0.29	0.50	-0.21	-0.01	0.00	-0.02	10.48	15.26	-4.78	1.28	1.48	-0.19	2.52	2.68	-0.16
Average of Difference Scores ($\bar{D}$)	**-0.768**			**-0.377**			**-0.012**			**4.116**			**-0.314**			**0.510**		
Standard Deviation of Difference Scores	**2.045**			**0.561**			**0.045**			**10.064**			**0.431**			**0.884**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.980**			**-1.400**			**-0.700**			**-0.980**			**-1.540**			**-1.260**		
Probability Value	**0.327**			**0.161**			**0.484**			**0.327**			**0.123**			**0.208**		

Source: Compiled by the author

Table 4.17: Performance of local socially responsible investment funds in relation to the performance of the FTSE/JSE All Share Index in sub-period 2 (1 October 2009 – 31 December 2014)

SRI Fund Name	Treynor Ratio			Sharpe Ratio			Jensen's Alpha			Sortino Ratio			Omega Ratio (+ Risk-free Rate)			Omega Ratio (- Risk-free Rate)		
	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference	SRI Fund	All Share Index	Difference
(1)	(2)	(3)	(4) = (2) - (3)	(5)	(6)	(7) = (5) - (6)	(8)	(9)	(10) = (8) - (9)	(11)	(12)	(13) = (11) - (12)	(14)	(15)	(16) = (14) - (15)	(17)	(18)	(19) = (17) - (18)
Community Growth Equity Fund	0.06	0.09	-0.03	0.43	0.70	-0.27	0.01	0.00	0.01	51.10	61.89	-10.79	1.38	1.66	-0.27	2.99	3.26	-0.27
Community Growth Gilt Fund	-1.78	0.09	-1.86	-0.56	0.70	-1.26	-0.04	0.00	-0.04	10.14	61.89	-51.76	0.69	1.66	-0.97	2.05	3.26	-1.21
Element Earth Equity Fund	-0.03	0.09	-0.12	-0.20	0.70	-0.90	-0.05	0.00	-0.05	10.65	61.89	-51.24	0.90	1.66	-0.76	2.06	3.26	-1.20
Element Flexible Fund	-0.04	0.09	-0.12	-0.14	0.70	-0.84	-0.02	0.00	-0.02	28.73	61.89	-33.16	0.92	1.66	-0.73	3.78	3.26	0.52
Element Real Income Fund	-0.24	0.09	-0.32	-0.31	0.70	-1.01	-0.01	0.00	-0.02	51.65	61.89	-10.24	0.82	1.66	-0.84	6.59	3.26	3.34
Oasis Crescent Equity Fund	0.10	0.09	0.02	0.69	0.70	-0.01	0.03	0.00	0.03	65.47	61.89	3.58	1.68	1.66	0.02	4.18	3.26	0.93
Oasis Crescent International Feeder Fund	0.45	0.09	0.37	0.90	0.70	0.20	0.10	0.00	0.10	72.75	61.89	10.86	1.96	1.66	0.30	3.94	3.26	0.69
Old Mutual Albaraka Equity Fund	0.13	0.09	0.05	0.89	0.70	0.19	0.05	0.00	0.05	82.51	61.89	20.62	1.98	1.66	0.32	5.26	3.26	2.00
Average of Difference Scores ($\bar{D}$)	**-0.252**			**-0.488**			**0.008**			**-15.267**			**-0.365**			**0.600**		
Standard Deviation of Difference Scores	**0.679**			**0.582**			**0.052**			**27.558**			**0.528**			**1.551**		
Wilcoxon Signed Ranks Test (Z-value)	**-0.980**			**-1.820**			**-0.281**			**-1.120**			**-1.400**			**-0.840**		
Probability Value	**0.327**			**0.069**			**0.779**			**0.263**			**0.161**			**0.401**		

Source: Compiled by the author

4.5 PERFORMANCE MEASUREMENT MODELS

In this section of the chapter, the risk-adjusted performance of the SRI funds were calculated in accordance with the three performance measurement models. As indicated in Section 3.4, the performance measurement models include the CAPM (presented in Section 4.5.1), Fama-French three-factor model and Carhart four-factor model (presented in Section 4.5.2).

In line with the risk-adjusted performance measures calculated in Section 4.4, the inclusion of a hazardous market event (such as the 2007/08 global financial crisis) in sub-period 1 was tested likewise with the calculated performance measurement models. The Chow test was conducted in order to establish if the results, according to the performance measurement models, of sub-period 1 differ from sub-period 2. This test is presented and conducted in Section 4.5.3.

4.5.1 Capital asset pricing model

As discussed in Section 3.4.1 and presented by Equation 4.14, the CAPM utilises a single risk factor to describe the performance of a fund. The CAPM essentially expresses the expected return of a fund as the risk-free rate of return plus the expected market risk premium. The expected market risk premium (or the funds' market beta) indicates the sensitivity of a fund to market fluctuations as presented by systematic (or market) risk.

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \varepsilon_i \qquad (4.14)$$

Where $R_i - R_f$ = the excess return of fund *i* (above the risk-free rate);

α_i = the Jensen's alpha (the intercept of the regression);

$\beta_{iM}(R_M - R_f)$ = the funds' market beta relative to the excess return of the market index; and

ε_i = the error term.

The excess return of fund *i* is calculated by subtracting the return of the short-term risk-free instrument (the 91-day Treasury bill) from the monthly returns of the fund. In accordance with the excess return of the fund, the excess return of the market is calculated likewise by subtracting the risk-free rate of return from the monthly returns generated by the market index. The market index selected for the SRI funds was the FTSE/JSE SRI Index, which was identified subsequently with the assumption that this market index explained the return deviations of the SRI funds. On the

other hand, the FTSE/JSE All Share Index was selected as the market index according to which non-SRI fund return deviations could be explained.

Table 4.18 summarises the results of applying Equation 4.13 on the sample of SRI funds and the matched sample of non-SRI funds during each respective sub-period. As proposed by Bauer *et al*. (2005:1759), a sample of difference funds was created by subtracting the returns of the non-SRI funds from the returns of the SRI funds. The creation of the difference funds served to enhance the comparability between the SRI and non-SRI funds, in which the differences in each instance were attributed to the inclusion of ESG considerations or the inclusion of specific SRI strategies, namely screening, shareholder activism or cause-based investing (Bauer *et al*., 2005:1759).

Table 4.18: Results of the capital asset pricing model

Regression Statistic	Sub-period 1			Sub-period 2		
	SRI Funds	Non-SRI Funds	Difference Funds	SRI Funds	Non-SRI Funds	Difference Funds
α	-0.001	-0.002	-0.007***	0.001	0.000	-0.005***
t-Stat	-0.841	-1.205	-6.568	0.712	-.381	-7.205
Probability	0.401	0.229	0.000	0.477	0.704	0.000
$\beta(Market)$	0.467***	0.551***	-0.024	0.392***	0.495***	-0.077***
t-Stat	22.422	21.911	-1.315	14.679	18.693	-4.065
Probability	0.000	0.000	0.189	0.000	0.000	0.000
R^2	0.496	0.485	0.003	0.300	0.410	0.032
Adjusted R^2	0.495	0.484	0.001	0.299	0.409	0.030
F-Statistic	502.759	480.098	1.729	215.476	349.446	16.526
Probability	0.000	0.000	0.189	0.000	0.000	0.000

*Note: * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level*

Source: Compiled by the author

As indicated through the alpha as in Table 4.18, inferior performance of the SRI and non-SRI funds was recorded in sub-period 1 while comparatively neither inferior nor superior performance of these funds was recorded in sub-period 2. The difference in the performance of the SRI and non-SRI funds was statistically significant (at the 1% level of significance) in both sub-period 1 and sub-period 2, as indicated by the alphas (α). The statistically significant difference between the SRI and non-SRI funds in sub-period 1 and sub-period 2 of -0.007 and -0.005 respectively indicated that the SRI funds marginally underperformed against the non-SRI funds according to the CAPM.

Furthermore, and in line with the findings of Bauer *et al*. (2005:1760), the market risk premium presented by the CAPM indicated that the SRI funds were relatively less sensitive to market

fluctuations than the non-SRI funds. In sub-period 1, the market risk premium for the SRI funds was given as 0.467, which was slightly lower than that for the non-SRI funds of 0.551. Similarly, in sub-period 2, the market risk premium for the SRI funds was lower than that for the non-SRI funds (0.392 and 0.495 respectively) with the difference being statistically significant.

As the R^2, which indicates if the explanatory variable/(s) included in the regression model (in this case the excess market return) accurately explain(s) the variation in the dependent variable (in this case the excess fund return) (Gujarati & Porter, 2010:102), of the CAPM for both the SRI and non-SRI funds in both sub-periods was relatively small (all lower than 0.500). It can be concluded that the inclusion of additional risk factors in an attempt to explain expected returns were necessary. This conclusion is tested in the following section by including the risk factors of size, value and momentum.

4.5.2 Multi-factor models

As discussed in Section 3.4.2, multi-factor models attempt to provide a more accurate explanation of the deviations in expected fund returns, which is not captured explicitly by the CAPM. Equation 4.15 presents the Fama-French three-factor model, which incorporates two additional risk factors; the size risk premium and the value risk premium.

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \beta_{iS}(SMB) + \beta_{iH}(HML) + \varepsilon_i \qquad (4.15)$$

Where $R_i - R_f$ = the excess return of fund *i* (above the risk-free rate);

α_i = the Jensen's alpha (the intercept of the regression);

$\beta_{iM}(R_M - R_f)$ = the funds' market beta relative to the excess return of the market index;

$\beta_{iS}(SMB)$ = the funds' size beta relative to the return difference between a small capitalisation portfolio and a large capitalisation portfolio (small minus big);

$\beta_{iH}(HML)$ = the funds' value beta relative to the return difference between a portfolio consisting of value investments and a portfolio of growth investments (high minus low); and

ε_i = the error term.

The excess fund return and excess market return was calculated as stated in Section 4.5.1, and as indicated, the market index for the SRI funds was selected as the FTSE/JSE SRI Index, while the market index for the non-SRI funds was selected as the FTSE/JSE All Share Index. The additional two risk factors, namely the size risk premium and the value risk premium, as discussed in Section 3.4.2, were calculated by the use of local indices. As representation of a small capitalisation and large capitalisation portfolio, the FTSE/JSE Small Cap Index and the FTSE/JSE Top 40 Index was selected to calculate the size risk premium. In order to calculate the value risk premium, the FTSE/JSE Value Index and the FTSE/JSE Growth Index was selected as representations of a portfolio consisting of value and growth investments respectively. These indices were used for the application of Equation 4.14 (the Fama-French three-factor model) and Equation 4.15 (the Carhart four-factor model) of both the SRI and non-SRI funds.

The results of applying Equation 4.14 on the sample of SRI funds and the matched sample of non-SRI funds is summarised in Table 4.19.

Table 4.19: Results of the Fama-French three-factor model

Regression Statistic	Sub-period 1			Sub-period 2		
	SRI Funds	Non-SRI Funds	Difference Funds	SRI Funds	Non-SRI Funds	Difference Funds
α	-0.002**	-0.003**	-0.006***	0.000	-0.001	-0.004***
t-Stat	-2.024	-2.401	-6.374	0.177	-1.089	-6.298
Probability	0.044	0.017	0.000	0.860	0.277	0.000
$\beta(Market)$	0.564***	0.663***	-0.072***	0.422***	0.586***	-0.142***
t-Stat	24.052	25.549	-3.679	10.151	14.518	-4.944
Probability	0.000	0.000	0.000	0.000	0.000	0.000
$\beta(SMB)$	0.251***	0.257***	-0.071***	0.069	0.124***	-0.078**
t-Stat	7.197	7.095	-2.623	1.320	2.653	-2.362
Probability	0.000	0.000	0.009	0.188	0.008	0.019
$\beta(HML)$	-0.057	0.108**	-0.163***	-0.083*	0.022	-0.045
t-Stat	-1.323	2.306	-4.651	-1.686	0.473	-1.386
Probability	0.186	0.022	0.000	0.092	0.637	0.166
R^2	0.549	0.569	0.103	0.305	0.421	0.052
Adjusted R^2	0.546	0.567	0.098	0.301	0.417	0.047
F-Statistic	205.950	223.791	19.436	73.128	121.125	9.196
Probability	0.000	0.000	0.000	0.000	0.000	0.000

*Note: * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level*

Source: Compiled by the author

As presented in Table 4.19, the SRI and non-SRI funds rendered inferior performance as indicated by the negative or equal to zero alphas in each sub-period. Verifying the results of the CAPM in Table 4.18, the difference in the performances (alphas) of the SRI and non-SRI funds was

statistically significant in both respective sub-periods. The statistically significant differences found between the performances of the SRI and non-SRI funds indicated that the SRI funds underperformed against the non-SRI funds.

Consistent with the results of the CAPM, the Fama-French three-factor model articulated that the SRI funds were less sensitive to market fluctuations than the non-SRI funds. The differences between market sensitivity of the SRI and non-SRI funds were statistically significant in both sub-periods. Related to the findings of Bauer *et al*. (2005:1762), the SRI funds tended to be more exposed to small capitalisation portfolios as indicated by the size risk premium of 0.251 in sub-period 1 and 0.069 in sub-period 2. Furthermore, Table 4.18 indicates that the SRI funds were more growth-oriented (or less value-oriented) than the non-SRI funds in both sub-periods. This finding was in agreement with the findings of Bauer *et al*. (2005:1762).

As suggested by Gujarati and Porter (2010:113), the adjusted R^2 indicates the goodness of fit of a multiple regression model more accurately than the R^2, as the adjusted R^2 is adjusted essentially for the number of explanatory variables in the regression model. Thus, by including two additional explanatory variables (size and value) in the model, the adjusted R^2 values reported in Table 4.19 were higher than those reported in Table 4.18 (as calculated by the CAPM), indicating that the Fama-French three-factor models' accuracy of explaining expected fund returns was greater than that of the CAPM. However, the adjusted R^2 value for the SRI funds in sub-period 2 as calculated by the Fama-French three-factor model was relatively equal to the adjusted R^2 as calculated by the CAPM. The relatively equal adjusted R^2 value implied that the inclusion of the two additional risk factors (size and value) were not statistically significant in explaining expected SRI fund returns in sub-period 2.

By adding additional risk factors to the CAPM equation, it can be deduced that expected fund returns are more accurately explained. The momentum effect that has been presented by Carhart (1997) (creating the four-factor model) to more accurately explain expected fund returns was tested and presented in Table 4.19. As discussed in Section 3.4.2, the Carhart four-factor model is considered an attempt to address the shortcomings of the Fama-French three-factor model, presented by the inability to capture expected returns of funds that exhibit momentum. As noted by Gabriel and Wang (2004:5) the Carhart four-factor model incorporates and quantifies four risk factors by measuring a funds' exposure to each risk factor.

$$R_i - R_f = \alpha_i + \beta_{iM}\left(R_M - R_f\right) + \beta_{iS}(SMB) + \beta_{iH}(HML) + \beta_{iU}(UMD) + \varepsilon_i \qquad (4.16)$$

Where	$R_i - R_f$	=	the excess return of fund *i* (above the risk-free rate);
	α_i	=	the Jensen's alpha (the intercept of the regression);
	$\beta_{iM}(R_M - R_f)$	=	the funds' market beta relative to the excess return of the market index;
	$\beta_{iS}(SMB)$	=	the funds' size beta relative to the return difference between a small capitalisation portfolio and a large capitalisation portfolio (small minus big);
	$\beta_{iH}(HML)$	=	the funds' value beta relative to the return difference between a portfolio consisting of value investments and a portfolio of growth investments (high minus low);
	$\beta_{iU}(UMD)$	=	the funds' momentum beta relative to the difference between a portfolio of past winners and a portfolio of past losers (up minus down); and
	ε_i	=	the error term.

The excess return, market risk premium, size risk premium and value risk premium for the Carhart four-factor model was calculated similarly to that calculated under the Fama-French three-factor model. However, the fourth risk factor, the momentum risk premium, was calculated by using a three-month rolling period (lagged one month) of the average excess returns that each fund has produced over the risk-free rate. Thus, the momentum risk premium was calculated as the difference between the past three month's winners (good performers) and the past three month's losers (bad performers), as discussed in Section 3.4.2.

Table 4.20 summarises the results of applying Equation 4.15 on the sample of SRI funds and the matched sample of non-SRI funds during each respective sub-period. According to Table 4.20, in line with the results of the CAPM and Fama-French three-factor model, the SRI and non-SRI funds rendered inferior performances in both sub-periods with the differences of the performance between the SRI and non-SRI funds found to be statistically significant. Furthermore, in accordance with the results of the CAPM and Fama-French three-factor model, the SRI funds were less sensitive to market fluctuations than the non-SRI funds, during both sub-periods.

Table 4.20: Results of the Carhart four-factor model

Regression Statistic	Sub-period 1			Sub-period 2		
	SRI Funds	Non-SRI Funds	Difference Funds	SRI Funds	Non-SRI Funds	Difference Funds
α	-0.003**	-0.004**	-0.006***	0.000	-0.001	-0.004***
t-Stat	-2.057	-2.462	-5.073	0.179	-0.631	-4.932
Probability	0.040	0.014	0.000	0.858	0.529	0.000
$\beta(Market)$	0.559***	0.663***	-0.078***	0.433***	0.580***	-0.150***
t-Stat	23.511	24.483	-3.828	10.192	13.883	-5.058
Probability	0.000	0.000	0.000	0.000	0.000	0.000
$\beta(SMB)$	0.251***	0.256***	-0.070**	0.096*	0.109**	-0.086**
t-Stat	7.125	6.968	-2.506	1.722	2.257	-2.515
Probability	0.000	0.000	0.013	0.086	0.024	0.012
$\beta(HML)$	-0.058	0.109**	-0.165***	-0.103**	0.006	-0.060*
t-Stat	-1.327	2.290	-4.603	-2.074	0.130	-1.803
Probability	0.185	0.022	0.000	0.039	0.897	0.072
$\beta(UMD)$	0.000	0.000	0.000	0.000***	0.000	0.000
t-Stat	0.440	0.782	-1.526	2.730	-0.143	-1.293
Probability	0.660	0.435	0.128	0.007	0.886	0.197
R^2	0.548	0.571	0.110	0.340	0.433	0.059
Adjusted R^2	0.544	0.567	0.102	0.334	0.429	0.051
F-Statistic	146.287	160.422	14.867	61.187	90.830	7.469
Probability	0.000	0.000	0.000	0.000	0.000	0.000

*Note: * significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level*

Source: Compiled by the author

According to the size risk premium as calculated under the Carhart four-factor model, the SRI funds were exposed relatively more to small capitalisation portfolios than large capitalisation portfolios. The value risk premium reported in Table 4.20 further indicated that the SRI funds were more growth-oriented than the non-SRI funds that were more value-oriented. Both of the above findings were in line with the results of the CAPM, the Fama-French three-factor model and that presented by Bauer *et al*. (2005:1762).

However, the findings of the momentum risk factor as reported in Table 4.20 were in contrast to that presented by Bauer *et al*. (2005:1761). The Carhart four-factor models' inclusion of the momentum risk factor was rendered statistically insignificant throughout the research period on both the SRI and non-SRI funds. However, a statistically significant influence of the momentum risk factor was found on the expected SRI fund returns in sub-period 2. This finding may be attributable to the perception that in the period after the global financial crisis (that is, sub-period 2) the SRI funds exhibited momentum, while the non-SRI funds lacked momentum. As the SRI funds, according to Nakai *et al*. (2011), were more resilient than the non-SRI funds to a market

shock such as the global financial crisis, the SRI funds may have created and sustained a momentum trend as exhibited in sub-period 2.

The adjusted R^2 value for the Carhart four-factor model as reported in Table 4.20 of the SRI and non-SRI funds were slightly higher than the adjusted R^2 values for the Fama-French three-factor model of the SRI and non-SRI funds. The slight increase in the adjusted R^2 values indicated that the inclusion of the momentum risk factor may attribute to the explanation of the expected fund returns. However, as indicated by the statistically significant influence of the momentum risk factor on expected SRI fund returns in sub-period 2, the adjusted R^2 of this period was relatively higher than that of the Fama-French three-factor model (0.301 and 0.334 respectively). This implies that during sub-period 2, the momentum risk factor provided a more accurate explanation of expected SRI fund returns.

Most of the four risk factors, which include the excess market risk premium, the size risk premium, the value risk premium and the momentum risk premium, were deemed to have statistically significant influences on the expected returns of both the SRI and non-SRI funds. However, the adjusted R^2 values of both the Fama-French three-factor model and Carhart four-factor model were relatively low, ranging between 0.299 and 0.567. These relatively low adjusted R^2 values imply that the additional (or other) risk factors should be included in the models to explain the variation in excess fund returns more accurately, as suggested by Clarke and De Silva (2014) and Fama and French (2014).

4.5.3 Chow test

The Chow test was conducted in order to establish if the inclusion of a hazardous market event (such as the 2007/08 global financial crisis) in sub-period 1 rendered different results relative to sub-period 2. The Chow test is considered a test of parameter stability (Brooks, 2008:180). The Chow test is calculated by dividing the analysed period into two sub-periods, estimating regressions over the whole analysed period and each sub-period, and obtaining the residual sum of squares (RSS) of each regression. Equation 4.17 is used to calculate the Chow test statistic (Brooks, 2008:180):

$$Chow\ test\ statistic = \frac{RSS - (RSS_1 + RSS_2)}{RSS_1 + RSS_2}\ x\ \frac{T - 2k}{k} \qquad (4.17)$$

Where RSS = the residual sum of squares for the whole analysed period;

RSS_1 = the residual sum of squares for sub-period 1;

RSS_2 = the residual sum of squares for sub-period 2;

T = the number of observations; and

k = the number of regressors in each sub-period regression.

In evaluating if the RSSs of both sub-periods significantly differ from the RSS of the whole research period, the Chow test assumes that if the coefficients do not change between the sub-periods, the RSS will consequently not change upon imposing that the coefficients are equal throughout the two sub-periods (Brooks, 2008:181).

The null and alternative hypotheses for the Chow test were stated as the following:

- H_0: The coefficients from sub-period 1 are stable and equal to those from sub-period 2; and
- H_A: The coefficients from sub-period 1 are not stable or equal to those from sub-period 2.

Table 4.21 indicates the RSS of each regression estimated under the CAPM, Fama-French three-factor model and Carhart four-factor model, each with a corresponding Chow test statistic, for both the SRI and non-SRI funds.

Table 4.21: Residual sum of squares and Chow test statistic

Performance Measurement Models	SRI Funds				Non-SRI Funds			
	RSS	RSS_1	RSS_2	Test Statistic	RSS	RSS_1	RSS_2	Test Statistic
CAPM	0.636	0.395	0.237	0.311	0.709	0.497	0.210	0.139
Three-factor model	0.597	0.354	0.236	0.366	0.629	0.416	0.207	0.306
Four-factor model	0.576	0.340	0.217	0.747	0.615	0.401	0.195	0.723

Source: Compiled by the author

All the reported Chow test statistic values were relatively low and, thus, the null hypothesis (H_0) could not be rejected at the five percent level of significance. Accepting H_0 indicated that the parameters from sub-period 1 were stable or equal to those from sub-period 2, for both the SRI and non-SRI funds, as estimated by the CAPM, Fama-French three-factor model and Carhart four-factor model. Therefore, according to the calculated Chow test, the period of the global financial crisis (as included in sub-period 1) may not have affect the results of the three calculated models and, thus, may not have affect the performance of either the SRI or non-SRI funds.

4.6 SUMMARY

This chapter presented the results and findings pertaining to the empirical portion of this study. The risk-adjusted performance of the SRI funds was calculated according to five risk-adjusted performance measures including the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio, and according to three performance measurement models including the CAPM, Fama-French three-factor model and Carhart four-factor model. The research period extended from 1 May 2004 until 31 December 2014. The research period was divided into two sub-periods (which formed the fundamental sub-periods of this study) in order to identify if the inclusion of a hazardous market event (such as the 2007/08 global financial crisis) in sub-period 1, may have had probable effects on the performance of the SRI funds.

According to the risk-adjusted performance measures, over the research period, the risk-adjusted performance of the SRI funds have improved. Based on the Spearman rank correlation test, the global financial crisis may have had an effect on the performance of the SRI funds in sub-period 1 relative to sub-period 2. This claim was supported further by the second sub-division (which included seven sub-periods) of the research period in which the isolation of the global financial crisis period led to different ranking results of the SRI funds.

However, in comparing the performance of the SRI funds to the three selected benchmark categories, the performance of the SRI funds was no different from the performance of the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index over the research period. Thus, according to the risk-adjusted performance measures, the SRI funds neither outperformed nor underperformed the three selected benchmark categories.

Furthermore, according to the performance measurement models that were calculated over the first sub-division (the two sub-periods) of the research period, the SRI funds significantly underperformed against the matched sample of non-SRI funds; the SRI funds tended to be less sensitive to market fluctuations than the non-SRI funds; the SRI funds were more exposed to small capitalisation portfolios than the non-SRI funds which were more exposed to large capitalisation portfolios; the SRI funds were relatively more growth-oriented than the non-SRI funds that were relatively more value-oriented; and the expected SRI fund returns in sub-period 2 indicated significant momentum while the non-SRI funds lacked momentum. After controlling for excess market returns, size, value and momentum, the difference between expected the SRI fund returns and expected non-SRI fund returns was deemed statistically insignificant.

After conducting the Chow test on the two sub-periods' regressions, it was evident that the inclusion of a hazardous market event (such as the global financial crisis) in sub-period 1 did not render statistically significant different results relative to sub-period 2. Therefore, the risk-adjusted performance of the SRI funds was no different from the risk-adjusted performance of the non-SRI funds and the performance of the selected benchmark categories during these periods.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Over the past decade, from 2004 until 2014, the South African SRI market has experienced enhanced growth. Since its historic developments, social responsibility has gained profound interest, which led to the development of a new generation of socially responsible investors. As such, socially responsible investors give increased consideration to ESG factors and combine social investment objectives with financial investment objectives during the investment decision-making process. Given that the number of SRI funds has increased throughout 1992 until 2015 and that the South African SRI market has grown on an immense scale, this study aimed at analysing the performance of the selected sample of SRI funds over the period of 1 May 2004 until 31 December 2014.

Chapter 1 provided a background to this study and identified the gap in the research relating to the South African SRI market. SRI received increased consideration in South Africa, which rendered the assumption that the SRI funds that focus on social investment objectives as well as financial investment objectives may perform better than the non-SRI funds that focus solely on financial investment objectives. Measuring the risk-adjusted performance of the SRI funds, in order to establish how the performance of the SRI funds relate to the performance of three selected benchmark categories, namely the FTSE/JSE SRI Index, a matched sample of non-SRI funds and the FTSE/JSE All Share Index, formed the primary objective of this study.

Chapter 2 provided a theoretical analysis of SRI. Previous as well as current research highlighted that both international and local SRI sectors are growing at an implausible speed given that a greater number of individual investors, investment/fund managers, financial institutions and organisations as well as companies give higher considerations toward ESG factors and concerns. Interestingly and ironically, the South African SRI market grew at a much later stage than international SRI markets whose growth spurred primarily as a result of the apartheid era in South Africa.

As per the definition of SRI adopted for this study, screening, shareholder activism and cause-based investing are the three distinguished strategies through which socially responsible investors can achieve set social investment objectives. Local SRI funds predominantly employ the negative screening strategy whereby Islamic Shari'ah principles are incorporated into the investment objectives. Socially responsible investors, which are categorised as either value-based, value-

seeking or value-enhancing investors, employ different combinations of the distinguished SRI strategies. This chapter further focused on establishing the growth of the local SRI market. In 2006, the local SRI market was valued at approximately R18 billion while consisting of 35 active funds. In 2009, the market grew to a total of 38 funds, with an approximate value of R23.28 billion. In June 2015, the market grew substantially to a market value of R71.38 billion while consisting of 42 funds.

Furthermore, this chapter highlighted various benefits and drawback relating to SRI of which the major benefits included that SRI indirectly encourages companies to reflect ESG factors, effect positive social change or improved corporate governance, and that SRI conveys benefits to communities, investors and economies. Major drawbacks of SRI include lack of diversification abilities of negatively screened investments and the high costs associated with acquiring superior expertise and skills to actively manage SRI portfolios.

Chapter 2 lastly highlighted the probable effect of the 2007/08 global financial crisis on SRIs. Although the crisis threatened financial markets worldwide, simultaneous interest in and awareness of ESG factors and concerns were raised throughout and after the crisis period. In international and local SRI markets, SRI funds either remained stable or outperformed non-SRI funds during the crisis period. The resilience of SRI funds during the crisis period was remarkable and primarily attributable to the commitment of socially responsible investors toward ESG objectives.

Chapter 3 provided the research design, data and methodology pertaining to the empirical portion of this study. For the purpose of achieving the primary objective of this study, measuring the performance of SRI funds in South Africa, and based on a number of specifications listed in this chapter, the sample used for the empirical (or statistical) analysis consisted of eight local SRI unit trust funds. Three benchmark categories were selected which included the FTSE/JSE SRI Index, a matched sample of non-SRI unit trust funds and the FTSE/JSE All Share Index to which the risk-adjusted performance of the SRI funds were compared.

The research period, 1 May 2004 until 31 December 2014, was divided into two parts of which the first sub-division (1 May 2004 until 30 September 2009 (sub-period 1) and 1 October 2009 until 31 December 2014 (sub-period 2)) formed the fundamental sub-periods of the statistical (or empirical) analysis. The fundamental sub-periods of the analysis were formed primarily to analyse the probable effect of a hazardous market event, such as the 2007/08 global financial crisis, on the

performance of the SRI funds. The second sub-division included seven sub-periods[46] over which various market events (both hazardous and non-hazardous) were identified that may have affected the performance (either enhancing or diminishing) of the SRI funds.

Chapter 3 further focussed on presenting a discussion on the five risk-adjusted performance measures used to measure the risk-adjusted performance of the SRI funds against the three selected benchmark categories (presented in Chapter 4). The five risk-adjusted performance measures included the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio. The Treynor ratio, Sharpe ratio and Jensen's alpha provided a means to compare the return performance of the SRI funds, adjusted for and at varying levels of risk. While the Treynor ratio and Jensen's alpha uses beta (β) as a measure of risk, the Sharpe ratio measures risk through standard deviation (σ). The remaining two risk-adjusted performance measures provided a means to incorporate higher moments (skewness and kurtosis) of the return distributions. The Sortino ratio focuses on the downside deviation (or semi-variance) as representation of risk with no reliance on the symmetry (or normality) of the return distribution. On the other hand, the Omega ratio takes the entire return distribution and its features (mean, variance, skewness and kurtosis) into account and, therefore, provided a measure to relate the upside deviation (expected gains) against the downside deviation (expected losses) of a fund.

The last focus of Chapter 3 shifted to a discussion on the three performance measurement models which included the CAPM, Fama-French three-factor model and Carhart four-factor model through which the excess returns of the SRI funds were derived and compared to the excess returns of the non-SRI funds (presented in Chapter 4). Starting with only one risk factor incorporated through the CAPM, namely expected market return, the Fama-French three-factor model extended the CAPM with two additional risk factors, namely size and value, while the Carhart four-factor model further extended the Fama-French three-factor model with a momentum risk factor.

Chapter 4 presented the results and findings pertaining to the empirical portion of this study. The first focus of this chapter was placed on the unadjusted (or raw) fund returns through which it was noted that both the SRI and non-SRI fund unadjusted returns decreased during the research period. The risk-adjusted returns of the SRI funds were calculated through the use of the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio. According to the five risk-adjusted performance measures, the risk-adjusted performance of the SRI funds did improve over the

[46] A detailed list of the seven sub-periods and the identified market events are presented in Section 1.3.1, Section 3.2 and Annexure B.

research period. The ranking results of the five risk-adjusted performance measures in sub-period 1 were related to that in sub-period 2 with the primary purpose of identifying if the inclusion of a hazardous market event (such as the 2007/08 global financial crisis) in sub-period 1, did affect the subsequent results. The results indicated that the inclusion of the identified hazardous market event (the global financial crisis) may have affected the performance of the SRI funds negatively.

Furthermore, the results of the second sub-division of the research period, according to the five risk-adjusted performance measures, indicated that several market events (both hazardous and non-hazardous) may have affected the performance (either enhancing or diminishing) of the SRI funds. The ranking results of the Treynor ratio, Sharpe ratio and Jensen's alpha were very similar, while the ranking results of the Sortino ratio and Omega ratio (with a set negative threshold) proved to be similar. A comparison between the risk-adjusted performance of the SRI funds and the risk-adjusted performance of the three selected benchmark categories indicated that the SRI funds neither outperformed nor underperformed against the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index.

Lastly, Chapter 4 presented the results and findings of the three performance measurement models. The results presented by the CAPM indicated that the SRI funds were less sensitive to market fluctuations. The results presented by the Fama-French three-factor model further indicated that the SRI funds were relatively more exposed to small capitalisation portfolios than large capitalisation portfolios and that the SRI funds were relatively more growth-oriented. Lastly, the Carhart four-factor model indicated that the expected SRI fund returns in sub-period 2 indicated significant momentum. According to the three performance measurement models, the SRI funds significantly underperformed against the non-SRI funds while the global financial crisis did not render any significant change in the performance of the SRI funds during the research period.

5.2 CONCLUSIONS

Social responsibility in South Africa has received increased consideration given that the South African SRI market has grown on an immense scale since its inception in 1992. The primary objective of this study was to measure the risk-adjusted performance of South African SRI funds during the period of 1 May 2004 until 31 December 2014. Given the results and findings presented by the five risk-adjusted performance measures and the three performance measurement models, the following main conclusions can be drawn:

- The risk-adjusted performance of the analysed SRI funds have improved over the research period given the improved ranking results presented by the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and Omega ratio;
- Based on the risk-adjusted performance measures, the 2007/08 global financial crisis may have had a probable negative effect on the performance of the analysed SRI funds;
- The analysed SRI funds neither outperformed nor underperformed on a risk-adjusted basis against the FTSE/JSE SRI Index, the matched sample of non-SRI funds and the FTSE/JSE All Share Index, according to the risk-adjusted performance measures;
- Based on the three performance measurement models, the analysed SRI funds significantly underperformed against the non-SRI funds during the research period;
- The analysed SRI funds were less sensitive to market fluctuations than the non-SRI funds;
- The analysed SRI funds were relatively more exposed to small capitalisation portfolios than large capitalisation portfolios;
- While the non-SRI funds were more value-oriented, the analysed SRI funds were relatively more growth-oriented;
- After the period of the 2007/08 global financial crisis (included in sub-period 1), the analyse SRI funds exhibited significant momentum while the non-SRI funds lacked momentum;
- After controlling for excess market return, size, value and momentum, the difference between the excess SRI fund returns and that of the non-SRI funds was deemed statistically insignificant; and
- Based on the three performance models and the Chow test, the 2007/08 global financial crisis did not affect the performance of the analysed SRI funds during the research period.

5.3 LIMITATIONS OF THE STUDY

While high priority was given to ensure that this study is valid and reliable, a number of limitations, relating to the size of the sample of South African SRI funds, were identified.

As the size of the South African SRI market is relatively smaller compared to international SRI markets, and as the objective of this study was to measure the risk-adjusted performance of South African SRI funds on a continual basis from 1 May 2004 until 31 December 2014, the following limitations have been identified during the study:

- This study was limited to include a period of approximately 10 years as the FTSE/JSE SRI Index was only established in May 2004;

- A survivorship bias was created as only those SRI funds that were launched prior to or on 1 May 2004 and that were active or operational until 31 December 2014 or onwards, were included in the sample; and
- Due to data availability, NDAs and confidentiality clauses, only those SRI funds categorised as unit trust funds were included in this study.

5.4 RECOMMENDATIONS FOR FUTURE RESEARCH

A number of recommendations for future research regarding the South African SRI market were identified. Firstly, given the current and foreseeable increase in the demand for SRI funds and the recent (June 2015) partnered ESG approach by the JSE and the FTSE Russell (the global index provider), it is suggested that in ten years' time, the South African SRI market might have grown to a size, which may be comparable to international SRI markets. However, at the time of research (February 2015 until November 2015), the South African SRI market was much too small to be compared to more multifaceted, sophisticated and advanced international SRI markets such as the SRI market of the United States of America and the United Kingdom.

Secondly, it is suggested that an event study methodology be conducted in order to analyse the impact of specific market events (be it hazardous or non-hazardous) on the long-term risk-adjusted performance of South African SRI funds. It is suggested further that the results of the SRI event study methodology be compared to the FTSE/JSE SRI Index and South African non-SRI funds.

Thirdly, as a number of SRI products, including funds, composites and various other securities are available in South Africa, it is suggested that future research focus on the performance of all available South African SRI products in order to provide a holistic view of the level and stance of social responsibility in South Africa.

Fourthly, as a means to measure and analyse the expected (or forecasted) excess (or active) returns produced by South African SRI funds, it is suggested that the fundamental law of active management (proposed by Grinold (1989)) be applied to future South African SRI research. As the act of screening various investments (or companies) require active investment management skills and expertise, the fundamental law of active management, proposed by Grinold (1989), will indefinitely enable researchers to determine if SRI fund managers are able to earn returns (active returns) above a specified index, the extensiveness of the applied SRI strategy and the value added by the investment strategy. Grinold (1989) suggested that by estimating an information ratio for an investment strategy, one can estimate both the skill (or ability) of the investment manager to

earn active returns (or to estimate how accurately the manager has been to forecast returns) and the extensiveness of the investment style (which entails how the investment is constructed).

Lastly, as a number of fund classifications exist (such as value or growth, small or large capitalisation), the investment strategy applied by the fund manager may be different from the investment objectives. Thus, it is suggested that the study presented by Brown and Goetzmann (1997) can be followed in order to determine if the investment objectives of South African SRI funds are in line with the strategies (or styles) of the respective fund managers. In determining if the investment objectives and manager styles are in accordance with one another, the manner in which SRI fund managers outperform (or earn returns greater than) specified benchmarks, can be determined.

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ANNEXURES

ANNEXURE A: SOUTH AFRICAN SOCIALLY RESPONSIBLE INVESTMENT FUNDS AND MATCHED NON-SOCIALLY RESPONSIBLE INVESTMENT FUNDS

This annexure contains an overview of the sample of the SRI funds and matched non-SRI funds used in the empirical portion of this study.

Table A.1: South African socially responsible and non-socially responsible investment funds

SRI Fund	Inception[(a)]	Fund Size[(b)]	Matched Non-SRI Fund[(c)]	Inception[(a)]	Fund Size[(b)]	Sector Category[(d)]	Employed SRI Strategy[(e)]
Community Growth Equity Fund	01-Jun-1992	R 472 421 377	MET General Equity Fund	19-Aug-1991	R 551 706 096	Equity - General	Positive Screening (Ethical Inclusion) & Shareholder Activism
Community Growth Gilt Fund	14-Jul-1998	R 254 537 074	Coronation Bond Fund	01-Aug-1997	R 325 945 200	Interest Bearing – Variable Term	Positive Screening (Ethical Inclusion)
Element Earth Equity Fund	04-Oct-2001	R 269 084 941	Old Mutual Symmetry Equity Fund Of Funds	01-Jun-2001	R 301 605 356	Equity - General	Shareholder Activism
Element Flexible Fund	15-Oct-2001	R 262 514 811	Momentum Flexible Fund	01-Oct-1999	R 254 261 616	South African – Multi Asset – Flexible	Shareholder Activism
Element Real Income Fund	09-Oct-2002	R 231 444 882	ABSA Inflation Beater Fund	01-Oct-2002	R 695 500 619	South African – Multi Asset – Low Equity	Shareholder Activism
Oasis Crescent Equity Fund	31-Jul-1998	R 6 365 821 589	Old Mutual High Yield Opportunity Fund	04-Nov-1998	R 3 156 281 815	Equity - General	Negative Screening (Ethical Exclusion)
Oasis Crescent International Feeder Fund	28-Sep-2001	R 1 086 531 574	Stanlib Multi-Manager Global Equity Feeder Fund	08-Sep-2000	R 1 142 257 850	Global Equity - General	Negative Screening (Ethical Exclusion)
Old Mutual Albaraka Equity Fund	01-Jun-1992	R 1 830 337 803	Old Mutual Growth Fund	01-Apr-1993	R 1 692 761 770	Equity - General	Negative Screening (Ethical Exclusion)

Note: (a) For the purpose of this study all funds should have been launched prior to 1 May 2004 and should have been active or operational until 31 December 2014 or onwards;
(b) Fund sizes were sourced and collected from FundsData Online (2015);
(c) The matched sample of non-SRI funds were selected according to each funds' sector category, date of inception and fund size;
(d) Sector categories were provided by FundsData Online (2015);
(e) The employed SRI strategies were identified according to each funds' objectives outlined in their respective fund fact sheets

Source: Compiled by the author

ANNEXURE B: ANNUAL UNADJUSTED FUND RETURNS OF THE SECOND SUB-DIVISION OF THE RESEARCH PERIOD

This annexure contains an overview of the annual unadjusted fund returns of both the SRI and non-SRI funds as divided by the second sub-division of the research period. As discussed in Section 1.3.1 and in Section 3.2, the second sub-division of the research period was divided into the following seven sub-periods:

- Sub-period 1: 1 May 2004 until 31 January 2006, identified as the period of enhanced growth in the South African general equity market and the South African SRI market;
- Sub-period 2: 1 January 2006 until 31 July 2007, identified as the period prior to the global financial crisis;
- Sub-period 3: 1 July 2007 until 31 January 2009, identified as the period of the global financial crisis;
- Sub-period 4: 1 January 2009 until 31 July 2010, identified as the period including the aftermath of the global financial crisis;
- Sub-period 5: 1 July 2010 until 31 January 2012, identified as the period in which global and local financial markets were starting to recover and stabilise from the global financial crisis, and the period in which the European debt crisis emerged;
- Sub-period 6: 1 January 2012 until 31 July 2013, identified as the period including the aftermath of the European debt crisis; and
- Sub-period 7: 1 July 2013 until 31 December 2014, identified as the period in which global and local financial markets were starting to recover and stabilise from the European debt crisis.

Table B.1: Unadjusted socially responsible investment fund returns (annualised compound returns)

SRI Fund Name	Annual Unadjusted Fund Return (%)						
	Sub-period 1	Sub-period 2	Sub-period 3	Sub-period 4	Sub-period 5	Sub-period 6	Sub-period 7
Community Growth Equity Fund	44.63	25.76	-19.73	21.69	6.24	10.05	14.75
Community Growth Gilt Fund	9.04	-4.72	3.83	-0.32	1.93	0.72	1.06
Element Earth Equity Fund	47.01	21.04	-11.26	14.90	9.15	-0.67	2.37

SRI Fund Name	Annual Unadjusted Fund Return (%)						
	Sub-period 1	Sub-period 2	Sub-period 3	Sub-period 4	Sub-period 5	Sub-period 6	Sub-period 7
Element Flexible Fund	31.69	11.17	-6.67	6.00	6.23	7.20	2.73
Element Real Income Fund	15.47	5.36	-6.85	3.40	4.70	7.85	2.31
Oasis Crescent Equity Fund	40.49	30.99	-14.85	13.43	10.21	15.30	12.25
Oasis Crescent International Feeder Fund	9.13	28.65	-15.53	-0.97	8.56	34.72	24.41
Old Mutual Albaraka Equity Fund	43.11	24.62	-23.59	11.11	18.20	15.39	13.84
Average	**30.071**	**17.859**	**-11.831**	**8.655**	**8.150**	**11.321**	**9.217**

Note: Funds are listed in alphabetical order

Source: Compiled by the author

Table B.2: Unadjusted non-socially responsible investment fund returns (annualised compound returns)

Non-SRI Fund Name	Annual Unadjusted Fund Return (%)						
	Sub-period 1	Sub-period 2	Sub-period 3	Sub-period 4	Sub-period 5	Sub-period 6	Sub-period 7
MET General Equity Fund	45.75	22.09	-22.48	24.69	9.93	19.40	17.21
Coronation Bond Fund	5.78	-2.70	3.19	-0.32	2.62	1.05	5.39
Old Mutual Symmetry Equity Fund Of Funds	47.13	21.33	-18.63	21.40	11.99	8.08	16.19
Momentum Flexible Fund	42.51	17.41	-16.15	20.48	7.99	7.64	-2.74
ABSA Inflation Beater Fund	7.81	3.34	2.97	2.27	3.68	3.89	4.52
Old Mutual High Yield Opportunity Fund	48.02	18.47	-25.55	24.44	9.94	4.64	15.95
Stanlib Multi-Manager Global Equity Feeder Fund	11.03	21.02	-20.42	-0.02	9.42	32.47	16.64
Old Mutual Growth Fund	48.97	26.68	-20.12	28.27	10.42	7.50	18.35
Average	**32.13**	**15.96**	**-14.65**	**15.15**	**8.25**	**10.58**	**11.44**

Note: Non-SRI funds are listed as matched to the alphabetically arranged SRI funds in Table B.1

Source: Compiled by the author

ANNEXURE C: RISK-ADJUSTED PERFORMANCE MEASURES IN THE SECOND SUB-DIVISION OF THE RESEARCH PERIOD

This annexure contains an overview of the risk-adjusted performance of local SRI and non-SRI funds over the seven sub-periods as listed in Chapter 1, Chapter 3 and Annexure B.

Table C.1: Overview of the risk-adjusted performance of socially responsible investment funds in the second sub-division (from sub-period 1 to sub-period 7)

Treynor Ratio														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	0.56	5	0.33	3	-0.40	3	0.20 *(B)*	1	0.01 *(W)*	8	0.08	6	0.12	3
Community Growth Gilt Fund	0.10	7	0.86 *(B)*	1	0.72 *(B)*	1	-1.18 *(W)*	8	1.42 *(B)*	1	0.84 *(B)*	1	-0.21	7
Element Earth Equity Fund	0.63	2	0.26	4	-0.41	4	0.15	2	0.07	7	-0.08 *(W)*	8	-0.04	4
Element Flexible Fund	0.57	4	0.13	6	-0.59	6	-0.07	5	0.07	6	0.05	7	-0.07	5
Element Real Income Fund	0.33	6	-0.16	7	-0.74	7	-1.00	7	0.14	4	0.15	4	-0.10	6
Oasis Crescent Equity Fund	0.61	3	0.39	2	-0.39	2	0.11	3	0.09	5	0.14	5	0.21 *(B)*	1
Oasis Crescent International Feeder Fund	0.05 *(W)*	8	-19.61 *(W)*	8	-1.13 *(W)*	8	-0.18	6	0.78	2	0.53	2	-0.89 *(W)*	8
Old Mutual Albaraka Equity Fund	0.65 *(B)*	1	0.20	5	-0.43	5	0.08	4	0.20	3	0.17	3	0.20	2
Sharpe Ratio														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	2.58	5	2.11	2	-1.49	4	0.83 *(B)*	1	0.05	6	0.53	5	1.17	4
Community Growth Gilt Fund	0.27	7	-2.26 *(W)*	8	-0.53 *(B)*	1	-1.05	7	-0.57 *(W)*	8	-0.61 *(W)*	8	-0.60	7
Element Earth Equity Fund	3.02 *(B)*	1	1.86	4	-1.29	2	0.58	2	0.40	3	-0.56	7	-0.29	5

Element Flexible Fund	2.73	4	0.78	6	-1.56	6	-0.22	5	0.17	5	0.26	6	-0.41	6
Element Real Income Fund	1.43	6	-0.74	7	-2.07 (W)	8	-1.30 (W)	8	-0.33	7	0.62	4	-0.62 (W)	8
Oasis Crescent Equity Fund	2.86	3	2.66 (B)	1	-1.35	3	0.42	3	0.52	2	0.89	3	1.20	3
Oasis Crescent International Feeder Fund	0.13 (W)	8	1.90	3	-1.87	7	-0.55	6	0.18	4	1.99 (B)	1	2.59 (B)	1
Old Mutual Albaraka Equity Fund	2.92	2	1.68	5	-1.49	5	0.30	4	1.22 (B)	1	1.06	2	1.82	2
Jensen's Alpha														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	0.12	4	0.07	3	-0.07	3	0.03 (B)	1	-0.03	7	0.03	4	0.05	3
Community Growth Gilt Fund	-0.06	7	-0.10 (W)	8	-0.09	5	-0.09	7	-0.04 (W)	8	-0.04	7	-0.06	7
Element Earth Equity Fund	0.15 (B)	1	0.03	4	-0.05	2	0.00	2	0.01	4	-0.07 (W)	8	-0.07 (W)	8
Element Flexible Fund	0.08	5	-0.02	6	-0.08	4	-0.05	5	0.00	5	0.01	6	-0.05	6
Element Real Income Fund	-0.01	6	-0.06	7	-0.10	7	-0.05	6	-0.01	6	0.02	5	-0.05	5
Oasis Crescent Equity Fund	0.12	3	0.11	2	-0.05 (B)	1	-0.03	3	0.02	3	0.08	3	0.05	4
Oasis Crescent International Feeder Fund	-0.15 (W)	8	0.21 (B)	1	-0.19 (W)	8	-0.16 (W)	8	0.03	2	0.28 (B)	1	0.20 (B)	1
Old Mutual Albaraka Equity Fund	0.15	2	-0.01	5	-0.10	6	-0.04	4	0.09 (B)	1	0.09	2	0.06	2
Sortino Ratio														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	144.44	6	663.66	4	-11.06	3	30.68	4	33.96	7	47.50	5	204.90	3
Community Growth Gilt Fund	65.98	7	-32.68 (W)	8	15.97 (B)	1	-1.69 (W)	8	18.80 (W)	8	3.97	7	8.15 (W)	8
Element Earth Equity Fund	276.69	3	2977.93 (B)	1	-19.15 (W)	8	118.16	2	586.85 (B)	1	-3.47 (W)	8	9.47	7
Element Flexible Fund	327.37	2	1581.17	2	-11.35	4	47.57	3	399.24	3	37.23	6	10.89	6
Element Real Income Fund	264.55	4	395.12	6	-17.89	7	176.79 (B)	1	516.90	2	199.77	2	14.83	5
Oasis Crescent Equity Fund	188.61	5	1413.95	3	-12.12	5	21.45	6	117.76	5	60.16	4	144.89	4
Oasis Crescent International Feeder Fund	24.89 (W)	8	451.25	5	-16.57	6	-0.94	7	37.46	6	279.79 (B)	1	510.97	2

Old Mutual Albaraka Equity Fund	441.94 (B)	1	285.22	7	-10.89	2	27.10	5	272.06	4	123.15	3	1246.62 (B)	1
Omega Ratio (+ risk-free rate)														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	4.58	5	3.67	3	0.30	5	1.80 (B)	1	1.08	6	1.50	5	2.26	3
Community Growth Gilt Fund	1.21	7	0.13 (W)	8	0.67 (B)	1	0.43	7	0.69 (W)	8	0.64 (W)	8	1.06	5
Element Earth Equity Fund	5.91	2	3.11	4	0.39	2	1.53	2	1.36	3	0.67	7	0.84	7
Element Flexible Fund	5.10	4	1.23	6	0.27	6	0.82	5	1.19	5	1.27	6	0.84	6
Element Real Income Fund	2.67	6	0.47	7	0.15 (W)	8	0.33 (W)	8	0.85	7	1.61	4	0.70 (W)	8
Oasis Crescent Equity Fund	5.53	3	4.40 (B)	1	0.37	3	1.37	3	1.52	2	1.98	3	1.84	4
Oasis Crescent International Feeder Fund	1.18 (W)	8	3.73	2	0.21	7	0.67	6	1.20	4	4.43 (B)	1	3.65	2
Old Mutual Albaraka Equity Fund	6.81 (B)	1	2.72	5	0.32	4	1.26	4	2.47 (B)	1	2.23	2	4.32 (B)	1
Omega Ratio (- risk-free rate)														
SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
Community Growth Equity Fund	8.43	6	17.18	4	0.69	7	3.16	4	2.30	6	3.28	6	5.86	3
Community Growth Gilt Fund	3.86	7	1.37 (W)	8	2.38 (B)	1	1.97	7	2.21	7	1.94	7	2.49	7
Element Earth Equity Fund	13.48	3	17.95	3	0.95	4	3.38	3	4.04	5	1.43 (W)	8	1.78 (W)	8
Element Flexible Fund	14.16	2	57.53 (B)	1	1.24	3	4.20	2	12.26	2	3.36	5	2.56	6
Element Real Income Fund	11.41	5	15.38	5	1.24	2	9.13 (B)	1	24.76 (B)	1	9.95 (B)	1	3.14	5
Oasis Crescent Equity Fund	13.43	4	33.94	2	0.83	5	2.99	5	4.75	4	3.72	4	5.52	4
Oasis Crescent International Feeder Fund	2.49 (W)	8	13.01	6	0.72	6	1.50 (W)	8	2.17 (W)	8	8.18	2	10.86	2
Old Mutual Albaraka Equity Fund	20.55 (B)	1	7.72	7	0.63 (W)	8	2.71	6	7.20	3	4.80	3	40.25 (B)	1

Note: Funds are listed in alphabetical order

***(B)** = Best performing fund; **(W)** = Worst performing fund*

Source: Compiled by the author

Table C.2: Overview of the risk-adjusted performance of non- socially responsible investment funds in the second sub-division (from sub-period 1 to sub-period 7)

Treynor Ratio													
Non-SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
MET General Equity Fund	0.49	5	0.16	6	-0.40	3	0.23	3	0.05	7	0.27	3	0.09	4
Coronation Bond Fund	-0.06 (W)	8	1.72 (B)	1	1.34	2	-0.70	7	1.85 (B)	1	0.34 (B)	1	-0.14	6
Old Mutual Symmetry Equity Fund Of Funds	0.56	4	0.21	5	-0.42	5	0.21	4	0.10	3	0.04	5	0.12	2
Momentum Flexible Fund	0.73	2	0.21	4	-0.47	6	0.20	5	0.05	6	0.06	4	-0.23	7
ABSA Inflation Beater Fund	0.09	6	-0.80 (W)	8	20.30 (B)	1	-1.95 (W)	8	-0.67 (W)	8	-0.14 (W)	8	-0.05	5
Old Mutual High Yield Opportunity Fund	0.77 (B)	1	0.13	7	-0.64	7	0.28 (B)	1	0.06	5	-0.01	7	0.11	3
Stanlib Multi-Manager Global Equity Feeder Fund	0.08	7	1.59	2	-0.67 (W)	8	-0.15	6	0.38	2	0.32	2	-0.96 (W)	8
Old Mutual Growth Fund	0.62	3	0.25	3	-0.40	4	0.27	2	0.06	4	0.03	6	0.15 (B)	1
Sharpe Ratio														
Non-SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
MET General Equity Fund	2.78	4	1.29	3	-1.56	4	1.01	3	0.31	5	1.76 (B)	1	0.94	5
Coronation Bond Fund	-0.19 (W)	8	-1.95	7	-0.60 (B)	1	-1.09	7	-0.48	7	-0.56 (W)	8	-0.56	7
Old Mutual Symmetry Equity Fund Of Funds	3.04 (B)	1	1.55	2	-1.49	3	0.91	4	0.63 (B)	1	0.29	4	1.32	3
Momentum Flexible Fund	2.76	5	1.15	5	-1.79	6	0.89	5	0.31	4	0.42	3	-1.31 (W)	8
ABSA Inflation Beater Fund	0.20	7	-2.39 (W)	8	-1.70	5	-1.41 (W)	8	-0.86 (W)	8	-0.43	7	-0.33	6
Old Mutual High Yield Opportunity Fund	2.86	3	0.75	6	-1.80	7	1.07	2	0.37	3	-0.07	6	1.05	4
Stanlib Multi-Manager Global Equity Feeder Fund	0.27	6	1.15	4	-1.99 (W)	8	-0.49	6	0.29	6	1.73	2	1.81 (B)	1
Old Mutual Growth Fund	2.98	2	1.62 (B)	1	-1.48	2	1.15 (B)	1	0.40	2	0.20	5	1.65	2
Jensen's Alpha														

Non-SRI Fund Name	Sub-period 1		Sub-period 2		Sub-period 3		Sub-period 4		Sub-period 5		Sub-period 6		Sub-period 7	
MET General Equity Fund	0.08	5	-0.03	5	-0.08	3	0.05	3	-0.02	6	0.09	2	0.01	5
Coronation Bond Fund	-0.10	7	-0.09 (W)	8	-0.09	5	-0.10	7	-0.03 (W)	8	-0.03	5	-0.07	7
Old Mutual Symmetry Equity Fund Of Funds	0.12	4	0.00	3	-0.08	4	0.03	4	0.02	2	-0.04	6	0.03	3
Momentum Flexible Fund	0.16	2	0.00	4	-0.10	6	0.03	5	-0.01	5	-0.01	3	-0.11 (W)	8
ABSA Inflation Beater Fund	-0.02	6	-0.06	7	-0.08 (B)	1	-0.06	6	-0.02	7	-0.02	4	-0.03	6
Old Mutual High Yield Opportunity Fund	0.20 (B)	1	-0.05	6	-0.19 (W)	8	0.07	2	0.00	4	-0.06 (W)	8	0.02	4
Stanlib Multi-Manager Global Equity Feeder Fund	-0.14 (W)	8	0.12 (B)	1	-0.17	7	-0.16 (W)	8	0.03 (B)	1	0.20 (B)	1	0.15 (B)	1
Old Mutual Growth Fund	0.15	3	0.04	2	-0.08	2	0.08 (B)	1	0.00	3	-0.05	7	0.05	2
Sortino Ratio														
Non-SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
MET General Equity Fund	399.17	6	151.92	6	-12.95	6	40.69 (B)	1	46.14	7	153.78 (B)	1	72.17	5
Coronation Bond Fund	33.02 (W)	8	-22.25 (W)	8	15.81	2	-1.96 (W)	8	32.38 (W)	8	5.51 (W)	8	11.02	7
Old Mutual Symmetry Equity Fund Of Funds	567.70	3	301.51	2	-11.96	4	35.76	2	147.31	2	36.71	6	128.90	3
Momentum Flexible Fund	572.41	2	203.43	4	-20.77 (W)	8	28.10	3	112.32	3	68.29	4	-9.27 (W)	8
ABSA Inflation Beater Fund	1112.06 (B)	1	860.21 (B)	1	66.98 (B)	1	27.41	5	280.42 (B)	1	103.28	3	68.63	6
Old Mutual High Yield Opportunity Fund	474.50	4	51.93	7	-12.10	5	22.61	6	54.49	5	39.18	5	113.39	4
Stanlib Multi-Manager Global Equity Feeder Fund	41.69	7	248.61	3	-16.68	7	-0.02	7	46.18	6	137.19	2	154.74	2
Old Mutual Growth Fund	465.41	5	183.22	5	-11.32	3	28.04	4	64.36	4	31.62	7	234.02 (B)	1
Omega Ratio (+ risk-free rate)														
Non-SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
MET General Equity Fund	4.85	5	2.22	3	0.30	3	1.99	3	1.32	4	3.01	2	2.23	5
Coronation Bond Fund	0.87 (W)	8	0.15	7	0.64 (B)	1	0.43	7	0.74	7	0.66 (W)	8	1.02	6
Old Mutual Symmetry Equity Fund Of Funds	5.66 (B)	1	2.59	2	0.32	2	1.89	5	1.58 (B)	1	1.29	4	2.53	2

Momentum Flexible Fund	5.42	3	2.12	5	0.24	5	1.93	4	1.31	5	1.42	3	0.29 (W)	8
ABSA Inflation Beater Fund	1.00	7	-0.04 (W)	8	-0.05 (W)	8	0.21 (W)	8	0.55 (W)	8	0.78	7	0.84	7
Old Mutual High Yield Opportunity Fund	5.08	4	1.62	6	0.22	6	2.13	2	1.36	3	0.99	6	2.25	4
Stanlib Multi-Manager Global Equity Feeder Fund	1.31	6	2.21	4	0.15	7	0.71	6	1.30	6	3.87 (B)	1	2.42	3
Old Mutual Growth Fund	5.59	2	2.60 (B)	1	0.30	4	2.22 (B)	1	1.38	2	1.21	5	3.29 (B)	1
Omega Ratio (- risk-free rate)														
Non-SRI Fund Name	**Sub-period 1**		**Sub-period 2**		**Sub-period 3**		**Sub-period 4**		**Sub-period 5**		**Sub-period 6**		**Sub-period 7**	
MET General Equity Fund	11.01	5	6.24	6	0.63	6	3.61	5	2.56	7	6.47	3	5.00	6
Coronation Bond Fund	3.12	7	1.81 (W)	8	2.34	2	2.03	7	2.47 (W)	8	1.95 (W)	8	2.50	7
Old Mutual Symmetry Equity Fund Of Funds	13.85	2	9.35	2	0.71	3	3.55	6	3.93	3	2.63	5	5.87	4
Momentum Flexible Fund	13.67	3	8.03	3	0.71	4	3.65	4	4.78	2	4.41	4	1.48 (W)	8
ABSA Inflation Beater Fund	49.62 (B)	1	120.41 (B)	1	6.93 (B)	1	5.88 (B)	1	14.72 (B)	1	7.11 (B)	1	6.13	2
Old Mutual High Yield Opportunity Fund	10.82	6	3.36	7	0.50 (W)	8	3.94	2	2.83	5	2.46	7	5.13	5
Stanlib Multi-Manager Global Equity Feeder Fund	2.86 (W)	8	7.00	4	0.54	7	1.53 (W)	8	2.62	6	6.71	2	5.96	3
Old Mutual Growth Fund	12.76	4	6.52	5	0.68	5	3.74	3	2.95	4	2.50	6	10.03 (B)	1

Note: Non-SRI funds are listed as matched to the alphabetically arranged SRI funds in Table C.1
***(B)** = Best performing fund; **(W)** = Worst performing fund*

Source: Compiled by the author