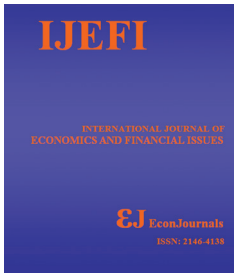

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A Comparative Risk-adjusted Performance Evaluation of South African SRI Funds and the FTSE/JSE over the Covid-19 Period

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ABSTRACT

Socially responsible investing is a growing investment philosophy that has gained profound interest in both the local and international context. Socially conscious investors are seeking alternative ways to make more responsible investment choices, especially since the Covid-19 pandemic. Although financial markets experienced a significant decrease owing to the pandemic, a more positive outcome was eminent by an increased demand in SRI products during this period. The aim of this study was to evaluate the performance of local SRI funds before, during and after the Covid-19 period. Comparatively evaluating the performance relative to the FTSE/JSE Responsible Investment Index and All Share Index, will assist investors (those with a heightened desire to invest responsibly) to establish if SRI funds were able to provide higher risk-adjusted returns than the comparable SRI and general equity markets. The results indicated that although larger returns were produced by SRI funds during the Covid-19 period and that significant differences were found relative to the two indices, SRI funds were not able to consistently outperform either index. Thus, socially conscious investors are likely to achieve higher risk-adjusted returns from the SRI index, although not receiving diversification benefits from investing in funds.

Keywords: South African SRI Funds, SRI Strategies, Risk-adjusted Performance, Covid-19
JEL Classifications: G11, G23

1. INTRODUCTION

The generation of socially responsible (or ethical) investors have evolved and progressed, both locally and internationally. These investors have created and promoted an evolving trend of investing in a wide range of investment products that promote a greener, more sustainable, and socially responsible future (Viviers, 2007:1; Woods Price, 2021; O'Shea and Benson, 2022). Although the Covid-19 pandemic led to financial markets experiencing downturns with a promised struggling recovery as the world learns how to deal with the consequences thereof, one positive outcome was eminent by an increased demand in socially responsible investment (SRI) products during this period (Madjarova, 2021). According to Woods Price (2021), the Covid-19 pandemic drew the attention of the world to the various existing social, economic and environmental issues and inequalities, highlighted by the United Nations Sustainable Developments Goals (SDGs) that were developed in 2012.

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 and Pretorius, 2012). However, Giamporcaro and Pretorius (2012:3) clarified that, fundamentally, SRI includes sustainable and responsible investments directed toward relating ethical, environmental, social and corporate governance (ESG) investment objectives and conventional financial investment objectives. Furthermore, during the investment decision-making process, investors select SRIs based on their perception toward ESG factors as well as financial investment objectives (Adam and 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.

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. The 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 (Du Plessis, 2015:26).

The study performed by Du Plessis (2015:27) found that the majority of SRI funds (33%) followed a negative (or exclusionary) screening strategy in 2014, which predominantly focused on Islamic Shari'ah principles. Furthermore, a positive (or inclusionary) strategy was employed by approximately 24% of the funds by placing focus on sectors or companies that promote ESG factors (such as renewable energy), while cause-based investing was employed by only 19%. South African SRI funds largely concentrate on the promotion of development, infrastructure (such as building roads, educational and medical centres) and Broad Based Black Economic Empowerment (BBBEE) (Du Plessis, 2015:29). 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 BBBEE (Viviers et al., 2009:11; Giamporcaro et al., 2010:11).

As reported by Du Plessis (2015:29) 12% of SRI funds reported to employ a combination of positive screening and cause-based investing, in 2014. 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 (Du Plessis, 2015:30). Giamporcaro et al. (2010:13) identified that this contrasts with the French SRI market in which the best-of-sector screening strategy is pervasive.

Viviers (2007) found that local SRI funds underperformed relative to the (then) FTSE/JSE SRI Index between 1992 and 2002, while delivering equal risk-adjusted performance to that of the FTSE/JSE All Share Index during the same period. Furthermore, during the period between 2002 and 2006, Viviers (2007) reported outperformance of SRI funds relative both comparable indices. The study performed by Du Plessis (2015) incorporated a similar methodological approach to compare the performance of local SRI funds against the aforementioned indices, as by Viviers (2007). Du Plessis (2015), however found that during the period of 2004 to 2014, local SRI funds did not out- nor underperform against the relative indices but did however indicate improved risk-adjusted performance since the start of the research period. Naidoo (2019) contrarily found that during 2009 to 2013, SRI funds indicated significant underperformance, while during 2014 to 2018 indicated improved performance.

This study will evaluate the performance of local SRI funds before, during and after the Covid-19 period to establish if the pandemic, a period in which financial markets experienced downturns, influenced SRI fund performance. The risk-adjusted performance will be evaluated by employing the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio, Calmar ratio and Omega ratio. Additionally, by evaluating SRI fund performance against that of the RI Top 30 index and ALSH, it is possible to establish if SRI funds outperformed the respective SRI and general equity markets in South Africa. Given that the majority of local SRI funds invest in equities (either locally or internationally), it is assumed that the analysis may indicate a relatively strong correlation to that of the two indices and may lead to certain traditional risk-adjusted performance measures to indicate biased results.

2. LITERATURE REVIEW

2.1. The History of Socially Responsible Investment

The history of SRI dates back hundreds of years where following religious and moral standards (or principles) were regarded as compulsory. The 18th century Quakers of the United States of America were the first group of investors to apply religious (or ethical) screening to traditional investments (Kinder and 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 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). In the aftermath of World War I, social awareness amplified through which the first SRI funds were created based on evading to invest in companies associated with alcohol, gambling, tobacco and weaponry production and transactions (Viviers, 2007:7).

Interestingly and ironically, as proposed by Heese (2005:730), the South African SRI market grew at a much later stage than international SRI markets. 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 and Schmiesing, 2003:67; Ethical Partnership, 2022). 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 divestment from South Africa brought about by the United States of America soon followed to the United Kingdom and Australia in the 1980s (Giamporcaro and Pretorius, 2012:1; Oh et al., 2013:705). Giamporcaro and Pretorius (2012:1) noted that in 2000, sustainable development formed the basis and prompted the progression of the Belgium, European, French, German and Switzerland SRI markets. Directing or withholding investment from companies that did or did not focus on ESG concerns was the ultimate manner in which socially responsible investing was practiced since 2000 (Giamporcaro and Pretorius, 2012:1).

The South African SRI market struggled to develop and grow as rapidly as the international SRI sector (Viviers, 2007:9). Although the first two South African SRI funds (the Community Growth

equity fund and the Futuregrowth Albaraka equity fund[1]) 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). However, since the establishment of the Financial Times Stock Exchange/Johannesburg Stock Exchange (FTSE/JSE) SRI Index in May 2004, the South African SRI market has received remarkable interest (Viviers et al., 2009:3). As identified by the Johannesburg Stock Exchange (JSE) (2022), 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 (ALSH) 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, 2022). While the new partnered ESG approach will replace the then 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 (London Stock Exchange Group [LSEG], 2022). The new FTSE/JSE Responsible Investment (RI) Index series, which comprises of the FTSE/JSE RI Index and the FTSE/JSE RI Top 30 index, replaces the FTSE/JSE SRI Index (Le Roux, 2015).

Granting that SRI received amplified interest since 2004 in South Africa, the South African SRI market remains comparatively smaller than international counterparts (Viviers and Fifer, 2013:218), although the largest in Africa (Viviers and Els, 2017:124). 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, institutions and retirement funds addressing ESG concerns (De Jongh et al., 2007:3; Woods Price, 2021).

2.2. Socially Responsible Investment Strategies

SRI is characterised by incorporating financial return with ESG concerns into the investment decision-making process (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).

The first SRI strategy, as noted by Viviers (2007:71) as well as Ballestero et al. (2012:488), comprises three types of screening, specifically negative, positive, and best-of-sector. Negative (or exclusionary) screening involves evading to invest in companies that are 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 to form a best-of-sector (or hybrid) screening approach.

The second SRI strategy, namely shareholder activism (or shareholder engagement), as stated by Viviers et al. (2009:7), entails 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 the environment, employees, socio-economic climate, and 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 improving the value of investments in accordance with shareholder activism (Kinder, 2005:30; Viviers, 2007:85).

3. RESEARCH DESIGN AND METHODOLOGY

3.1. Data Collection Method and Process

The research period for this study extended from 21 February 2018 to 05 October 2022 to include a period in which financial markets experienced significant volatility due to the global Covid-19

1 The Futuregrowth Albaraka equity fund has changed its name to the Old Mutual Albaraka equity fund.

pandemic. The research period was divided into three subsequent periods (Figure 1):

- Period 1: 21 February 2018 to 15 March 2020 – defined as the pre-Covid-19 period;
- Period 2: 16 March 2020 to 04 April 2022[2] – defined as the period during Covid-19; and
- Period 3: 05 April 2022 to 05 October 2022 – defined as the post-Covid-19 period.

The sample selected for the statistical analysis consisted of 14 local SRI unit trust funds. The sample was selected based on the specification that the SRI funds had to be active during the research period. Furthermore, due to data availability, non-disclosure agreements (NDAs) and confidentiality clauses, the sample was limited to the inclusion of unit trust funds only.

Secondary quantitative data were sourced and collected from the IRESS Expert INET BFA (2022) financial database. To compare the risk-adjusted performance of the SRI funds to that of two FTSE/JSE indices, namely the RI Top 30 index and ALSH, daily data were collected over the research period. Furthermore, data for the risk-free rate (selected as the short-term (91 day) Treasury bill rate of South Africa) were collected from the South African Reserve Bank (SARB, 2022).

3.2. Risk-adjusted Performance Measures

Performance measures are extensively employed to analyse the risk-adjusted performance of investments (including investment portfolios and funds) during the investment decision-making process. Various performance measures utilise similar representations of excess return, however, each with a different representation of risk. The Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio, Calmar ratio and Omega ratio were the risk-adjusted performance measures selected for the statistical analysis.

The Treynor ratio, as presented by Equation 1, 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, assumes that a fund is fully diversified. A high and positive Treynor ratio is preferred as it is indicative of superior risk-adjusted performance (Dzikevičius, 2005; Kanellakos, 2005:49).

$$Treynor\ ratio = \frac{R_i - R_f}{\beta_i} \quad (1)$$

where R_i is the expected return of fund i, R_f is the risk-free rate of return, and β_i is the funds' beta. As one of the most widely employed measures, the Sharpe ratio (Lien, 2002:484), on the other hand, measures the risk-adjusted return per unit of total risk and, therefore, estimates both diversification and performance (Marx et al., 2010:285; Reilly and Brown, 2012:939). The standard deviation, which is used by the Sharpe ratio as a gauge of total risk, is used to measure the volatility of a fund's returns as in Equation 2 (Sharpe, 2000:16):

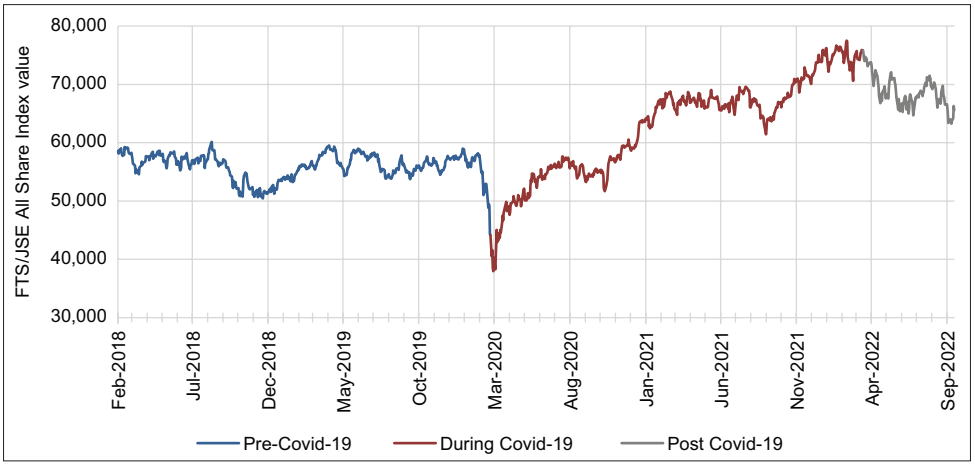
$$Sortino\ ratio = \frac{\overline{R_i} - \tau}{DR} \quad (2)$$

where σ_i represents the standard deviation of the fund as measure of total risk. As with the Treynor ratio, a high Sharpe ratio is indicative of greater risk-adjusted performance. As reported by van Heerden et al. (2014), the results of the Treynor ratio and the Sharpe ratio will not always be the same, which may be assumed given that these ratios are very comparable.

The Jensen's alpha, however, considers the correlation between the returns of a fund and the returns of a relative market benchmark or index (as denoted by R_m in Equation 3), which is calculated by the beta (β_i) factor (Eling and Schuhmacher, 2007:2633). Excess return is indicated by a statistically significant positive alpha (Jensen, 1968:394), based on the assumptions of the capital asset pricing model (CAPM) (Lintner, 1969; Sharpe, 1964; Black, 1972) that an investor is risk-averse, rational and that their investment decision relies on their risk-return utility function (Elbannan, 2015:216).

2 The start date of the Covid-19 period was selected as 16 March 2022, the date on which South Africa was declared to be in a National State of Disaster; while the end date was selected as the date on which the National State of Disaster was terminated.

Figure 1: Research period as shown by the FTSE/JSE all share index



$$Jensen's\ alpha = R_i - \left[R_f + \beta_i \left(R_m - R_f \right) \right] \quad (3)$$

It may be evident, in cases where the above performance ratios deliver the same results, that the portfolio or fund under investigation is classified as a well-diversified investment since its total risk (as measure by the Sharpe ratio) is reduced to its inherent market risk (as measured by the Treynor ratio and Jensen's alpha) (Verma and Hirpara, 2016:383). Contrarily, outperformance can be indicated by the Treynor ratio and Jensen's alpha, while underperformance is indicated by the Sharpe ratio, in cases where the unique risk (unsystematic risk) of the investment is very large and thus less diversified (Deb, 2012:7; Verma and Hirpara, 2016:383).

Developed as an alteration to the Sharpe ratio, the Sortino ratio evaluates the risk-adjusted performance of a fund by using the downside deviation (or semi-variance) as representation of risk (Rollinger and Hoffman, 2013:41). A minimum acceptance return (MAR) threshold is selected to capture exactly what investors regard as risky, which can be specified as zero, the risk-free rate or a relative benchmark or index.

$$Sortino\ ratio = \frac{\overline{R_i} - \tau}{DR} \quad (4)$$

where $\overline{R_i}$ denotes the average return of the fund, τ (tau) represents the MAR threshold, and DR denotes the downside risk of the fund. For this study the MAR threshold value was selected as the risk-free rate of return (per respective period analysed). Mathematically, downside risk is expressed as the following (adapted from Reilly and Brown, 2012):

$$Downside\ risk\ (DR) = \sqrt{\frac{1}{n}\sum (R_i - \tau)^2} \quad (5)$$

where n is the number of fund returns that fall below the MAR threshold. Similar to the excess return captured by the Treynor and Sharpe ratios, and the focus on downside risk by the Sortino ratio, the Calmar ratio measures the excess return over the risk-free rate per unit of maximum drawdown [represented by $E\ (MDD)$]. The maximum drawdown of a fund captures the distance between the fund's peak and trough, as the maximum cumulative decline that can be expected by the fund as in Equation 6 (Almahdi and Yang, 2019:147).

$$Calmar\ ratio = \frac{R_i - R_f}{E\left(MDD\right)} \quad (6)$$

While the traditional risk-adjusted performance measures do not take the entire return distribution into account, Keating and Shadwick (2002) introduced the Omega ratio which addresses this limitation. The Omega ratio expresses the upside deviation of a fund as a ratio of the downside deviation (each with a shared return threshold), while considering all moments of the return distribution (such as mean, variance, skewness and kurtosis) (Bergh and Van Rensburg, 2008:105).

$$\text{Omega ratio } (\Omega(r)) = \frac{\int_r^b \left(1 - F\left(x\right)\right) dx}{\int_a^r F\left(x\right) dx} \quad (7)$$

where $F\ (x)$ represents the cumulative distribution function of the return distribution, r is the return threshold (selected as the risk-free rate of return per respective period), b is the highest observed return in the return distribution (upper bound), and a is the lowest observed return in the return distribution (lower bound).

3.3. Wilcoxon Signed Rank Test

The Wilcoxon signed rank test was employed to establish if the SRI funds out- or underperformed against the three FTSE/JSE indices, pre-Covid-19, during Covid-19 and post-Covid-19; as well as to establish if the difference in performance was statistically significant at a 95% confidence level.

Rather than testing the difference of the actual values of the respective risk-adjusted performance measures, the Wilcoxon signed rank test includes using the ranks (or order) of the values as a non-parametric test (Du Plessis, 2015:88). The mathematical test statistic is expressed in Equation 8 (adapted from du Plessis, 2015:88).

$$Wilcoxon\ test\ statistic = \sum_{i=1}^{n'} R_i^{(+/-)} \quad (8)$$

where $\sum_{i=1}^{n'} R_i^{(+/-)}$ is the addition of the positive (or negative) ranked differences between two paired values. The addition will be positive (or negative) if the majority of the differences are positive (or negative) (Du Plessis, 2015:88).

To test the significance of the difference of the risk-adjusted performance, the following null and alternative hypotheses were defined, per comparative FTSE/JSE index and period:

- $H_{1,0}$: There was no statistically significant difference between the risk-adjusted performance of the SRI funds and the FTSE/JSE index; and
- $H_{1,A}$: There was a statistically significant difference between the risk-adjusted performance of the SRI funds and the FTSE/JSE index.

4. RESULTS AND FINDINGS

The statistical analysis included to firstly analyse the unadjusted annualised returns of SRI funds and the FTSE/JSE indices and to determine to extent of the correlation, before, during and after Covid-19. Secondly, the evaluation of various risk-adjusted performance measures of the SRI funds and FTSE/JSE indices, pre-Covid-19, during Covid-19 and post-Covid-19, was performed. Lastly, to establish if the difference in the risk-adjusted performance between the SRI funds and the FTSE/JSE indices were statistically significant, the Wilcoxon signed ranks test was performed.

The analysed period extended from 21 February 2018 to 05 October 2022 which included a period of the Covid-19

pandemic, a period in which financial markets around the world experienced significant downturns. As seen in Figure 1, relatively stable index values were recorded by the ALSH during the pre-Covid-19 period (21 February 2018 to 15 March 2020), with a distinguished decline that extended into the start of the Covid-19 period (16 March 2020). This decline can be ascribed to the impact of an anticipated National State of Disaster declaration.

During the Covid-19 period, the ALSH exhibited a bullish trend although reporting the lowest value of 37 963.01 (a decrease of 35.44% from the peak value recorded in the pre-Covid-19 period) during the period under investigation. The highest index value of 77 536.12 was similarly recorded towards the end of the Covid-19 period, which indicated the start of a bearish trend as reported during the post-Covid-19 period. Since the downturn was experienced at the onset of the pandemic, the index value was restored to pre-Covid-19 levels after approximately 283 days. Equities benefit from an expanding economy, evident by high economic activity, high inflation and thus high interest rates, which resulted from the contractionary pressures experienced due to the impact of the Covid-19 pandemic. It is thus expected and evident (as in Figure 1 in the post-Covid-19 period) that the economy, and likewise the equity market, will reach a period of decline as the higher interest rates have started to take effect.

The return distributions of the SRI funds and the two FTSE/JSE indices were analysed as presented in Table 1 by the descriptive statistics. The descriptive statistics focussed on the mean (average), variance (standard deviation around the mean), skewness (indication of extreme returns to the left or right of the mean) and kurtosis (indication of thin or fat tails) as the first four moments of distribution (Bacon, 2021). Given that most of the risk-adjusted performance measures employ these moments of distribution in their design, van Heerden et al. (2014:175) noted that it is essential to analyse the underlying return distributions to establish ability limitations of certain traditional risk-adjusted performance measures. Risk-adjusted performance measures such as the Sharpe ratio and Jensen's alpha rely on normally distributed returns and may limit the ability of these measures to effectively rank investment alternatives (Kat, 2003).

4.1. Descriptive Statistics

The descriptive statistics reported in Table 1 indicate that SRI funds are leptokurtic and negatively skewed throughout the research period. The SRI fund return distribution indicates similarities to the characteristics of SRI funds in France, the Eurozone and Europe as found by (Le Sourd, 2011) as well as of United States and European hedge funds as found by van Heerden et al. (2014:178). The RI Top 30 index exhibited inconsistent results between the three periods with a negatively skewed leptokurtic distribution in the pre-Covid-19 period, a positively skewed leptokurtic distribution during the Covid-19 period, and a negatively skewed platykurtic distribution during the post-Covid-19 period.

The general equity market indicated a negatively skewed leptokurtic distribution in the pre-Covid-19 period, a positively skewed leptokurtic distribution during the Covid-19 period as well as a positively skewed platykurtic distribution in the post-Covid-19 period. Given that the Jarque-Bera goodness-of-fit test indicated non-normality based on skewness and kurtosis for all return distributions, except for the two FTSE/JSE indices in the post-Covid-19 period, the results of the traditional risk-adjusted performance measures may be biased (van Heerden et al., 2014:177).

The average compound returns of SRI funds as well as the SRI and general equity market increased from negative pre-Covid-19 returns, to positive returns during the Covid-19 period. Accompanied with a higher average return, the standard deviation (risk/volatility) of SRI funds and the FTSE/JSE indices likewise increased into the period during Covid-19. However, in the post-Covid-19 period, average returns exhibited a moderate decrease, reaching the low and negative returns exhibited in the period before Covid-19, although combined with similar risk levels as during the Covid-19 period, especially noted for SRI funds and the ALSH.

Furthermore, the correlation between the SRI funds and the three FTSE/JSE indices was evaluated, as in Table 2. According to van Heerden et al. (2014:177), a biased risk-adjusted performance rank, by the Sharpe ratio, results from the existence of correlation. The results in Table 2 indicate similar results when comparing the SRI

Table 1: Descriptive statistics of the returns of SRI funds and FTSE/JSE indices

Average	Pre-Covid-19 period							
	Min.	Max.	Mean	Median	Std. dev.	Skewness	Kurtosis	Jarque-Bera
SRI funds	−3.576%	1.487%	−0.011%	0.025%	0.526%	−1.394	7.693	1957.129*
RI Top 30	−9.995%	2.786%	−0.030%	0.015%	1.111%	−2.008	14.697	4971.628*
ALSH	−9.721%	3.254%	−0.049%	0.027%	1.107%	−1.885	13.338	4114.155*
Average	**During Covid-19 period**							
	Min.	Max.	Mean	Median	Std. dev.	Skewness	Kurtosis	Jarque-Bera
SRI funds	−3.273%	2.786%	0.069%	0.075%	0.625%	−0.373	5.472	1929.678*
RI Top 30	−7.154%	8.613%	0.171%	0.175%	1.617%	0.189	4.495	435.834*
ALSH	−7.154%	7.532%	0.131%	0.131%	1.350%	0.174	4.596	455.010*
Average	**Post-Covid-19 period**							
	Min.	Max.	Mean	Median	Std. dev.	Skewness	Kurtosis	Jarque-Bera
SRI funds	−1.914%	1.770%	−0.029%	−0.016%	0.657%	−0.591	3.215	643.937*
RI Top 30	−3.565%	3.615%	−0.101%	−0.196%	1.397%	−0.005	−0.163	0.140
ALSH	−3.479%	3.274%	−0.100%	−0.156%	1.399%	0.173	−0.197	0.827

*Reject the null hypothesis of normality at the 5% level of significance

funds with firstly the RI Top 30 index, and secondly the ALSH, where a strong positive correlation is present for all three periods accompanied with an increase noted from period to period. Thus, a biased performance ranking by the Sharpe ratio may be expected based on the presence of correlation between the SRI funds and the two FTSE/JSE indices. For this reason, other (than traditional) risk-adjusted performance ratios were implemented (such as the Omega ratio) to evaluate these funds.

Given the increasing positive correlation between SRI funds and the SRI and general equity market, a clear dependence on equities was illustrated. Given that the ALSH indicated a bullish trend during the Covid-19 period, and that there is an increasing positive strong correlation with SRI funds, it may indicate the ability of SRI funds to outperform the general equity market, which will be discussed in the following section. The strong correlation may similarly lead to SRI funds experiencing a bearish trend in the post-Covid-19 period following the trend by the ALSH (Figure 1).

4.2. Risk-adjusted Performance Measures

The risk-adjusted performance of the SRI funds was compared to that of the two FTSE/JSE indices in the pre-, during, and post-Covid-19 periods. As presented in Table 3, the risk-adjusted performance measures calculated included the Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio, Calmar ratio and Omega ratio. For the evaluation against the performance of the SRI market, the RI Top 30 index was utilised as the market portfolio for the Treynor ratio and Jensen's alpha. Likewise, for the evaluation against the general equity market, the ALSH was employed as the market portfolio for both the Treynor ratio and Jensen's alpha.

Table 2: The average correlation between SRI funds and the FTSE/JSE indices

Average correlation	SRI funds	
	RI Top 30	ALSH
Pre-Covid-19 period	0.600	0.559
During Covid-19 period	0.703	0.742
Post-Covid-19 period	0.749	0.755

As seen in Table 3, across all risk-adjusted performance measures employed, on average, SRI funds performed poorly both before and after the Covid-19 period, indicated by negative ratio values; except for the Omega ratio, and the Treynor ratio with the RI Top 30 index as market portfolio specifically pre-Covid-19. This indicated that SRI funds were not able to produce excess returns above the risk-free rate per unit of either total risk, market risk, downside risk or maximum drawdown. However, the evaluation further indicated that these funds were able to produce higher returns than the SRI market and exhibited greater upside deviation opportunities.

However, contrary to the assumption based on the results found by Du Plessis (2015) that on average, SRI funds' performance can be influenced by hazardous market events (such as the global financial crises of 2007/08, and hence the Covid-19 pandemic), the risk-adjusted performance of the average SRI funds was higher (and positive) during the Covid-19 period. This indicated that during this period, SRI funds were able to provide investors with excess returns per unit of specific risk measured. Although the average market risk for both the SRI and general equity markets was significantly high in the pre-Covid-19 period and the period during Covid-19 (22.60% and 24.17% before, 28.47% and 22.50% during, respectively), the average compound annual returns of SRI funds produced were −2.92% before and 18.62% during Covid-19, leading to the significantly higher risk-adjusted performance ratios.

Furthermore, as presented in Table 4, SRI funds produced significant differences relative to the RI Top 30 index during the pre-Covid-19 period, with only the Treynor ratio indicative of outperformance. Although the average SRI funds' risk-adjusted performance measures were higher and positive during the Covid-19 period, underperformance was noted relative to the RI Top 30 index across most performance measures, except for the Treynor ratio (significantly) and Omega ratio indicating outperformance. This indicates that the average excess returns produced by these funds were higher than that produced by the index and that the returns were more concentrated on the positive

Table 3: The average risk-adjusted performance of the SRI funds and the FTSE/JSE indices

Pre-Covid-19 period								
Averages	Treynor ratio		Sharpe ratio	Jensen's alpha		Sortino ratio	Calmar ratio	Omega ratio
	SRI index	Equity index		SRI index	Equity index			
SRI funds	0.052	−0.042	−1.252	−0.062	−0.055	−1.091	−0.872	1.185
RI Top 30 index	−0.157		−0.892	0.000		−0.787	−0.568	0.994
ALSH	−0.199		−1.136	0.000		−0.98	−0.748	0.946
Covid-19 period								
Averages	Treynor ratio		Sharpe ratio	Jensen's alpha		Sortino ratio	Calmar ratio	Omega ratio
SRI funds	SRI index	Equity index		SRI index	Equity index			
	0.560	0.498	1.149	0.047	0.057	1.216	1.993	1.444
RI Top 30 index	0.446		1.745	0.000		1.824	2.957	1.400
ALSH	0.318		1.490	0.000		1.556	2.712	1.361
Post-Covid-19 period								
Averages	Treynor ratio		Sharpe ratio	Jensen's alpha		Sortino ratio	Calmar ratio	Omega ratio
SRI funds	SRI index	Equity index		SRI index	Equity index			
	−0.608	−1.217	−1.249	−0.036	−0.036	−1.160	−1.700	1.082
RI Top 30 index	−0.294		−1.330	0.000		−1.316	−1.538	0.866
ALSH	−0.292		−1.322	0.000		−1.315	−1.831	0.868

Table 4: The average difference in the risk-adjusted performance between SRI funds and the FTSE/JSE indices

Risk-adjusted performance of SRI funds relative to the FTSE/JSE RI Top 30 index						
Average difference	**Treynor ratio**	**Sharpe ratio**	**Jensen's alpha**	**Sortino ratio**	**Calmar ratio**	**Omega ratio**
Pre-Covid-19 period	0.208*	−0.360*	−0.062*	−0.303*	−0.304*	0.191
During Covid-19 period	0.114*	−0.596	0.047	−0.608	−0.964	0.044
Post-Covid-19 period	−0.314	0.081	−0.036	0.156	−0.163	0.215*
Risk-adjusted performance of SRI funds relative to the FTSE/JSE ALSH						
Average difference	**Treynor ratio**	**Sharpe ratio**	**Jensen's alpha**	**Sortino ratio**	**Calmar ratio**	**Omega ratio**
Pre-Covid-19 period	0.157	−0.116	−0.055	−0.111	−0.124	0.239*
During Covid-19 period	0.180	−0.341	0.057	−0.340	−0.719	0.083
Post-Covid-19 period	−0.925*	0.073	−0.036*	0.155	0.131*	0.214*

*Reject the null hypothesis at the 5% level of significance

side (upside) of the risk-free rate threshold selected. During the post-Covid-19 period, SRI funds underperformed the index as reported by the Treynor ratio, Jensen's alpha and Calmar ratio as a result of lower compound returns produced, greater maximum drawdowns experienced and exposure to greater market risk, compared to during Covid-19.

Relative to the ALSH, on average, the difference exhibited in performance was similar to that relative to the RI Top 30 index, except for the Calmar ratio during the post-Covid-19 period. Significant differences were found, however, in terms of fewer performance measures' comparisons. Pre-Covid-19 exhibited that only according to the Omega ratio, SRI funds significantly outperformed the ALSH. During the Covid-19 period, no significant difference was found between the SRI funds and the ALSH. In the post-Covid-19 period, significant underperformance against the ALSH was recorded by the Treynor ratio and Jensen's alpha, while significant outperformance was recorded by both the Calmar ratio and Omega ratio.

5. CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to analyse the risk-adjusted performance of local SRI funds before, during and after the Covid-19 period. The risk-adjusted performance was further evaluated relative to the FTSE/JSE RI Top 30 index and the FTSE/JSE ALSH. The research period extended from 21 February 2018 to 05 October 2022 and was divided into three periods. Period 1 served to represent a period before Covid-19, period 2 represented a period during the Covid-19 pandemic, and period 3 represented a post-Covid-19 period. Although financial markets experienced downturns as a result of the onset of the Covid-19 pandemic, the period brought about an increase in the demand for investments that are more socially responsible.

The results of this study indicated that SRI funds are strongly correlated to both the RI Top 30 index and the ALSH, indicative of great dependence on equities, evident by a larger asset allocation toward the equity market of all analysed funds. Furthermore, SRI funds performed, on average, poorly in the pre-Covid-19 and in the post-Covid-19 period, according to Treynor ratio, Sharpe ratio, Jensen's alpha, Sortino ratio and the Calmar ratio. However, during both these periods, the Omega ratio indicated greater upside potential exhibited by these funds. During the Covid-19 period, contrary to the assumption that SRI funds would similarly experience significant decreased performance due to the volatile period, these funds exhibited a higher risk-adjusted performance as measured across all performance measures employed in the study.

Relative to the RI Top 30 index, SRI funds underperformed significantly during the period before Covid-19. The Treynor ratio indicated significant outperformance in both the period before and during Covid-19. During the period after Covid-19, only the Omega ratio indicated significant outperformance. Therefore, during the analysed periods, on average, SRI funds were not able to consistently outperform the RI Top 30 index. The results relative to the ALSH were similar with only the Omega ratio indicating significant outperformance in the pre-Covid-19 period. No significant difference was found in the period during Covid-19 between Sri funds and the ALSH. However, in the period after Covid-19, both the Omega ratio and Calmar ratio indicated significant outromance, while the Treynor ratio and the Jensen's alpha indicated significant underperformance. Therefore, similar to the evaluation relative to the RI Top 30 index, SRI funds were not able to consistently outperform the general equity market during the period under investigation.

Although the local SRI market is still relatively small as compared to international counterparts, a number of recommendations for future research were identified. Firstly, given the current and foreseeable increase in the demand for SRI funds that spurred as a result of the Covid-19 pandemic, it is suggested that the local SRI market might grow to a size, which may be comparable 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 local SRI funds. It is suggested further that the results of the event study methodology be compared to the FTSE/JSE RI Index, the general equity market and local non-SRI funds.

Lastly, as a number of SRI products, including funds, composites, unlisted investments and various other securities are available locally, it is suggested that future research focus on not only the performance, but rather the social impact of all available local

SRI products in order to provide a holistic view of the level and stance of social responsibility in South Africa.

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