S Viviers*, JK Bosch, EvdM Smit and A Buijs

The risk-adjusted performance of responsible investment funds in South Africa

1. INTRODUCTION

1.1 RI strategies

Empirical evidence shows that the phenomenon of responsible investing (RI) is gradually moving from a fringe investment strategy to a mainstream consideration in the global investment arena (Knoll, 2002:681; Schueth, 2003:189). Responsible investing essentially refers to a set of approaches which include moral as well as environmental, social and corporate governance (ESG) considerations along with conventional financial criteria in decisions regarding the selection, retention and realisation of particular investments (Mansley, 2000:3).

A distinction can be drawn between three prominent RI strategies, namely screening, shareholder activism and cause-based (targeted) investing. In the case of ***negative or exclusionary screening***, investors refrain from investing in the securities of companies producing 'undesirable' products or services, as well as those operating in 'undesirable' industries and countries. According to this approach, responsible investors typically avoid investments in businesses which are associated with the production and/or sale of alcohol, tobacco, firearms and weapons as well as those involved with gambling, pornography and nuclear energy (Sparkes & Cowton, 2004:46). Negative or exclusionary screening is the main RI strategy employed by investors who wish to integrate their religious convictions with their investment decisions.

In contrast, investors who employ a ***positive or inclusionary screening*** approach to RI include securities of businesses in their portfolios which they perceive to be reputable as good corporate citizens. A positive screening strategy calls for the evaluation of businesses' products, policies and practices with regard to a wide range of ESG considerations (Cox, Brammer & Millington, 2004:27). As positive screens are shaped by a society's culture and needs hierarchy, they often differ from one country to the next. Criteria dealing with broad-based black economic empowerment (BBBEE) and social infrastructure development are, for example, widely employed positive screens in South Africa, whereas the focus in developed countries is rather on issues relating to climate change, resource utilisation and fair labour practices (Horsely, 2004:16).

A ***best-of-sector screening*** approach combines positive and negative screens. As such, responsible investors do not exclude entire sectors from their portfolios but include those businesses that are making the most effort to improve their non-financial (ESG) performance across the board (Solomon, Solomon & Norton, 2002:3).

Another major approach to RI is that of ***shareholder activism***. This approach implies that shareholders actively engage with management boards on a range of ESG considerations. They do so by engaging in dialogue, filing resolutions, using their voting rights at annual general meetings and divesting from companies that fail to transform to RI conventions (De Cleene & Sonnenberg, 2004:6).

Lastly, RI could take the form of ***cause-based (targeted) investing*** whereby investors support particular causes by investing therein. Such investments often deal with the promotion of BBBEE as well as the development of social infrastructure such as roads, schools and health-care facilities (Leeman, 2005:9; Petersen, 2005).

1.2 RI in South Africa

Establishing the exact size of the RI sector in South Africa is complicated given the diverse definitions of RI used by research agencies and practitioners. The best estimate therefore is that RI funds represent approximately R18 billion or 0.7 percent of the total investment capacity in South Africa (Alexander Forbes Asset Consultants Targeted Development Investment Vehicles Manager Watch Survey September 2006, 2006). It should however be noted that this figure excludes multi-managers and private equity funds (Personal communications Davids, 2006).

The relatively small size of the local RI sector, compared with international RI markets, can be primarily attributed to the perception among asset owners and managers that RI involves a financial sacrifice. This perception developed as a result of large scale losses associated with empowerment orientated special purpose vehicles (SPVs) in the late 1990s (De Cleene & Sonnenberg, 2004:6). No systematic research has however been conducted in South Africa to investigate the actual performance of RI funds over an extended period of time.

*Respectively Department of Business Management, Nelson Mandela Metropolitan University, PO Box 77000, Port Elizabeth 6031, Republic of South Africa, Nelson Mandela Metropolitan University, University of Stellenbosch Business School and University of Utrecht, The Netherlands.
Email: suzette.viviers@nmmu.ac.za

1.3 The performance of RI funds – international evidence

From a review of the literature it seems that international RI studies can be categorised into three groups namely:

(i) studies comparing the performance of artificially constructed RI funds *vis-à-vis* market and conventional indices (Rudd, 1979; Grossman & Sharpe, 1986; Diltz, 1995; Guerard, 1997a&b; Hutton, D'Antonio & Johnsen, 1998);

(ii) studies investigating the performance of ESG stock market indices against market and conventional indices (Kurtz & DiBartolomeo, 1996; Sauer, 1997; Statman, 2000); and

(iii) studies evaluating the performance of actual RI funds *vis-à-vis* market indices, other benchmark indices and conventional (non-RI) funds (Luther, Matatko & Corner, 1992; Hamilton, Jo & Statman, 1993; Luther & Matatko, 1994; Mallin, Saadouni & Briston, 1995; White, 1995; Gregory, Matatko & Luther, 1997; Reyes & Grieb, 1998; Goldreyer & Diltz, 1999; Statman, 2000; Cummings, 2000; Bauer, Koedijk & Otten, 2005; Mill, 2006; Bauer, Otten & Rad, 2006).

The most pertinent conclusions from these studies indicate that:

- RI funds, on average, tend to underperform relative to market indices, a finding which confirms the Efficient Market Hypothesis (EMH) notion that active managers cannot beat the market.
- RI funds generally perform on a par with conventional (non-RI) funds, implying that RI strategies do not adversely affect risk-adjusted performance.
- RI funds often exhibit small cap and growth biases which complicate researchers' attempts to distinguish a clear 'ethical effect'.
- Older RI funds tend to outperform younger funds, suggesting evidence of a learning effect in global RI markets. This finding is not surprising given the complexities involved in identifying viable RIs.
- With the exception of two studies (Bauer *et al*. 2005:1751 and Bauer *et al.* 2006:33) all prior studies on RI fund performance suffer from a survivorship bias. This is a serious shortcoming as the exclusion of discontinued funds has been shown to lead to a significant overestimation of average fund performance (Brown, Goetzmann, Ibbotson & Ross 1992:124; Carhart 1997:57).

2. PURPOSE OF THE RESEARCH, PROBLEM STATEMENT AND RESEARCH OBJECTIVES

Given the lack of RI research in South Africa, the purpose of this study was to evaluate the risk-adjusted performance of local RI funds over the period 1 June 1992 to 31 March 2006 using appropriate investment analytical and statistical analyses. More specifically, the question was whether the risk-adjusted performance of local RI funds is on par with two benchmark categories, namely the RI funds' respective benchmark indices and the general equity market in South Africa over the period 1 June 1992 to 31 March 2006.

To give effect to the purpose and problem statement of this research, the following research objectives were formulated, namely:

- to construct the first complete database of RI funds in South Africa;
- to source relevant quantitative primary data;
- to test the research hypotheses using appropriate statistical procedures;
- to report on the most pertinent findings of the empirical analysis; and
- to provide recommendations based on the empirical evidence.

3. RESEARCH HYPOTHESES

Based on an extensive analysis of secondary sources and interviews with local RI asset managers and industry experts, a hypothetical model, which consists of six pairs of null and alternative hypotheses were formulated (Figure 1).

By testing these hypotheses, the risk-adjusted performance of local RI funds will be assessed *vis-à-vis* two benchmark categories, namely the ***RI funds' respective benchmark indices*** and the ***general equity market in South Africa***. More details on the RI funds' benchmark indices is presented in Tables 1 and 2. The performance of the South African equity market was measured by evaluating the performance of the FTSE/JSE All Share Index. Also shown in the hypothetical model are three sub-periods during which local RI fund performance was evaluated. These sub-periods were identified based on an extensive overview of the prevailing macro-economic conditions in South Africa over the research period (1 June 1992 to 31 March 2006).

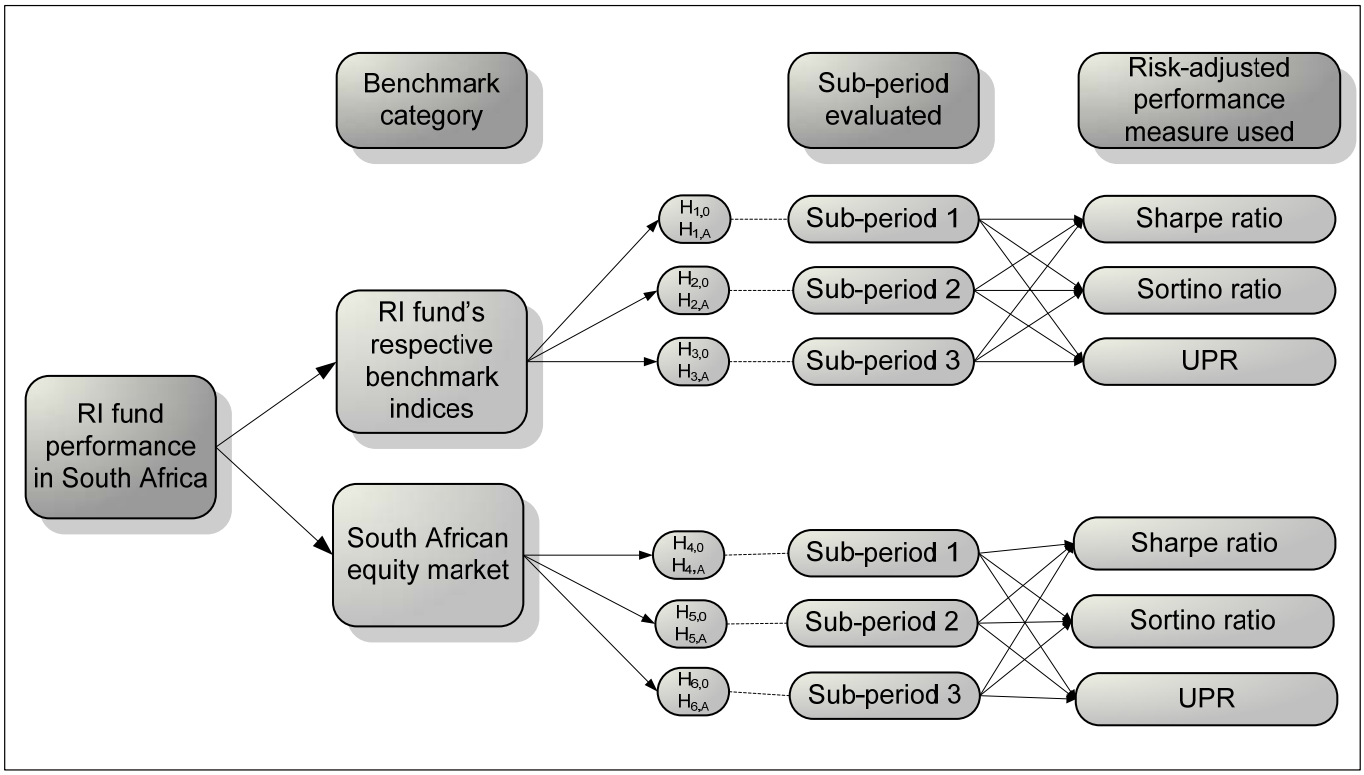

Figure 1: Hypothetical model underpinning the study
Source: Researchers' own construct

Sub-period one represents the period 1 June 1992 to 31 August 1998 and can be labelled the 'Establishment period of RI in South Africa'. The end date (31 August 1998) corresponds with a mini-crash on the JSE due to the Asian market crisis and the prime interest rate increasing to a record 25,5%. ***Sub-period two***, which started on 1 September 1998 up to 31 March 2002, can be described the 'Decline period of RI in South Africa'. During this period the adverse effects of high interest rates, unfavourable exchange and growth rates had negatively impacted on companies' financial results and hence also on portfolio performance. ***Sub-period three*** represents the period 1 April 2002 to 31 March 2006 and can be labelled the 'Resurgence period of RI in South Africa' as several new RI funds were established during this sub-period. During this period capital and property markets showed renewed, and consistent, growth.

The respective null hypotheses formally read as follows:

- $H_{1,0}$: There is no difference between the risk-adjusted performance of South African RI funds and their respective benchmark indices over the period 1 June 1992 – 31 August 1998 (the establishment period of RI in South Africa).
- $H_{2,0}$: There is no difference between the risk-adjusted performance of South African RI funds and their respective benchmark indices over the period 1 September 1998 – 31 March 2002 (the decline period of RI in South Africa).
- $H_{3,0}$: There is no difference between the risk-adjusted performance of South African RI funds and their respective benchmark indices over the period 1 April 2002 – 31 March 2006 (the resurgence period of RI in South Africa).
- $H_{4,0}$: There is no difference between the risk-adjusted performance of South African RI funds and the FTSE/JSE All Share Index over the period 1 June 1992 – 31 August 1998 (the establishment period of RI in South Africa).
- $H_{5,0}$: There is no difference between the risk-adjusted performance of South African RI funds and the FTSE/JSE All Share Index over the period 1 September 1998 – 31 March 2002 (the decline period of RI in South Africa).
- $H_{6,0}$: There is no difference between the risk-adjusted performance of South African RI funds and the FTSE/JSE All Share Index over the period 1 April 2002 – 31 March 2006 (the resurgence period of RI in South Africa).

As shown in Figure 1, three measures of risk-adjusted performance were calculated during each of the identified sub-periods. The Sharpe, Sortino and Upside-potential ratios were chosen to avoid the benchmark problem associated with market dependent performance measures such as the Jensen's alpha, the Treynor ratio and the Information ratio. The latter measures all evaluate performance relative to a market index. Correia and Uliana (2004:66) point out that using the FTSE/JSE All Share Index as proxy for the market in South Africa is seriously flawed as this index is heavily skewed towards resource and mining companies.

Bowie and Bradfield (1993:6) also suggested that the JSE Actuaries Financial and Industrial Index (predecessor of the present day FTSE/JSE Financial and Industrial Index) rather be used when empirically testing the CAPM in South Africa (and hence also evaluating fund performance using market dependent measures). They justified this argument by stating that many investors regard mining shares (and more particularly gold shares) as representing a different type of risk and hence a different market altogether.

Given these concerns, a decision was taken to focus on market independent measures, which will now be briefly explained.

3.1 Risk-adjusted performance measures

As indicated in Equation 1, the **Sharpe ratio** divides the average annualised differential return of fund *i* by its annualised standard deviation (Sharpe, 1966:120; Sharpe, 1994:49). For interpretative purposes a higher Sharpe ratio is seen to be better.

$$\text{Sharpe}_i = \frac{\bar{r}_i - \bar{r}_f}{\sigma_i} \quad \ldots (1)$$

where:

$\bar{r}_i$ = The mean annualised rate of return of fund *i* during a specified time period

$\bar{r}_f$ = The mean annualised rate of return of a risk-free asset during the same time period

σ_i = The annualised standard deviation of the rate of return of fund *i* during the specified time period

By using semi-variance or downside deviation (denoted by the Greek symbol *delta*, (δ) as denominator in Equation 2, the **Sortino ratio** differentiates between 'good' and 'bad' volatility (Sortino & Price, 1994:61).

$$\text{Sortino}_i = \frac{\bar{r}_i - \bar{r}_f}{\delta_i} \quad \ldots (2)$$

where:

$\bar{r}_i$ = The average annualised rate of return for fund *i* during a specified time period

$\bar{r}_f$ = The average annualised rate of return on a risk-free asset during the same time period

δ_i = The annualised downside deviation of the rate of return of fund *i* during the specified time period

In order to calculate a fund's downside deviation (or delta) a threshold or minimum acceptable return (MAR) value needs to be set. In Equation 3 tau (τ) represents the critical value below which investors would not like to see their investment returns fall.

$$\delta_i = \sqrt{\int_{-\infty}^{\tau} (\tau - r_i)^2 f(r_i) dr_i} \quad \ldots (3)$$

where:

τ = The investor's threshold or MAR value

r_i = The return of fund *i* with a cumulative probability density function f(.)

For the purpose of this research the threshold or MAR value was set at zero as rational investors are averse towards negative fund returns. As in the case of the Sharpe ratio, investors prefer a high Sortino ratio.

As shown in Equation 4, the **Upside-potential ratio** (UPR) divides a portfolio's upside potential (i.e. returns in excess of a specified threshold or MAR value) by its downside deviation (Sortino, Van der Meer & Plantinga, 1999:50).

$$\text{UPR}_i = \frac{\theta_i}{\delta_i} \quad \ldots (4)$$

where:

θ_i = Fund's *i*'s upside-potential

δ_i = Fund *i*'s downside deviation

Upside-potential (θ) can be calculated by using Equation 5. For the purpose of this research, the threshold or MAR value was set at zero. As in the case of the Sharpe and Sortino ratios, a higher ratio is preferred.

$$\theta = \int_{\tau}^{\infty} (r_i - \tau) f(r_i) dr_i \quad \ldots (5)$$

where:

τ = The investor's threshold or MAR value
r_i = The return of fund *i* with a cumulative probability density function f(.)

In practice the downside risk was calculated by constructing a spreadsheet indicating, for each fund, the negative returns in each month (returns lower than zero). The standard deviations of these negative returns for each fund were then calculated. Likewise for Upside potential a spreadsheet was constructed where the monthly return (above zero) were determined. The sum of squares was then calculated and finally the square root taken thereof for each fund.

4. SAMPLE CONSTRUCTION

Prior to the commencement of this research the population of RI funds in South Africa was unknown and thus had to be compiled. It was done by identifying funds, both active and discontinued, which fitted the RI definition adopted in this research. For the purpose of this research a RI fund was defined as "…*any local collective investment scheme that employs a screening, shareholder activism and/or cause-based (targeted) investment strategy".*

Active RI funds were defined as those local RI funds which were launched on or after the 1st of June 1992 and which were still operational on the 31st of March 2006. On the other hand, discontinued RI funds were defined as those local RI funds which were established on or after the 1st of June 1992, but which were either closed or merged with other funds at some point before the 31st of March 2006. In some cases the investment mandates of funds also changed substantially, so much so that they could no long be classified as RI funds and were thus seen as discontinued.

Discontinued funds were included in the sample as empirical evidence show that the exclusion of such funds leads to a significant survivorship bias and over-estimation of average fund performance (Brown *et al*., 1992:124; Bauer *et al*., 2005:1751).

The salient features of RI unit trusts are indicated in Table 1, whereas Table 2 provides more details on other pooled (non-unit trusts) and segregated RI funds.

Although 43 RI funds were established in South Africa since 1 June 1992 until 31 March 2006, not all funds were suitable for statistical analysis. The reasons being that:

- some RI funds' track records did not exceed twelve months;
- monthly valuations were not available for a number of RI funds;
- certain RI asset managers were not at liberty to disseminate performance data due to confidentiality clauses; and
- some RI funds were not classified as separate legal investment vehicles.

As a result only 24 RI funds could be included in the final sample.

5. PRIMARY DATA SOURCING

To test the stated research hypotheses, quantitative primary data were collected on the 24 RI funds contained in the sample as well as the 24 RI funds' respective benchmark indices, a risk-free asset; and the market index in South Africa.

5.1 Primary data sourcing with regard to the RI funds contained in the sample

Monthly data (total returns) for the sample of RI unit trusts, from their respective dates of inception until 31 March 2006, were sourced from the MoneyMate database (MoneyMate Version 32-bit User Manual, 2004). As this database contains only data on active unit trusts, data for the two discontinued RI unit trusts, namely the Nedbank Sustainability Investing Index Fund and the Sanlam Empowerment Equity Fund, had to be sourced from I-Net Bridge. Monthly data on the other pooled (non-unit trust) and segregated RI funds were sourced either from Alexander Forbes Asset Consultants or directly from the respective RI asset managers.

5.2 Primary data sourcing with regard to the RI funds' respective benchmark indices

Monthly data on the benchmark indices were sourced from data providers such as Bloomberg, I-Net Bridge, Cadiz Securities, Alexander Forbes Asset Consultants and directly from the respective RI asset managers. Total return indices were used to ensure comparability.

5.3 Primary data sourcing with regard to the risk-free asset

Although there is general consensus that government securities ought to be used as proxies for the risk-free rate, diverse views exists as to whether long or short-term rates ought to be used (Hirt & Block, 2004:607). Cornell, Hirshleifer and James (1997:13) note that academic studies commonly use a short-term Treasury bill rate, whereas practitioners favour a long-term rate. They argue that practitioners do so for two reasons: firstly, as a long-term rate is consistent with the goal of estimating a long-run cost of equity, and secondly, as it is less volatile than a short-term rate.

Table 1: Salient features of RI unit trusts

RI fund name	Status[a]	Classification[b]	Date of inception	Date of discontinuance	Fund size on 31 March 2006	Benchmark index
Community Growth Equity Fund	A	D-E-G	1-Jun-92	-	R 2 180 002 754	FTSE/JSE All Share Index[d]
Fraters Earth Equity Fund	A	D-E-G	4-Oct-01	-	R 635 682 778	FTSE/JSE All Share Index with a 50% weighting applied to the resources sector
Fraters Islamic Equity Fund	A	D-E-G	1-Feb-06	-	R 36 754 520	The company monitors the fund's performance against the FTSE/JSE All Share Index although this is not seen as its "true" benchmark since the investment universes differ considerably
Futuregrowth Albaraka Equity Fund	A	D-E-G	1-Jun-92	-	R 545 709 044	FTSE/JSE All Share Index
Nedbank Sustainability Investing Index Fund	D	D-E-G	6-Aug-02	31-Oct-03	-	Edward Nathan & Friedland Sustainability Index[d]
Oasis Crescent Equity Fund	A	D-E-G	31-Jul-98	-	R 1 657 300 000	FTSE/JSE All Share Index
Oasis Crescent International Fund of Funds[j]	A	F-E-G	28-Sep-01	-	R 300 200 000	Dow Jones Islamic Market Index[e]
Sanlam Empowerment Equity Fund	D	D-E-V	15-Sep-97	30-Apr-03	-	Barings ING Empowerment Index[d]
Sasfin Socially Responsible Fund	A	D-E-V	14-Oct-05	-	R 6 883 733	FTSE/JSE RI Index[f]
Sasfin TwentyTen Fund	A	D-E-G	1-Nov-05	-	R 14 735 531	Composite benchmark: 25% FTSE/JSE All Share Index & 75% FTSE/JSE Financials and Industrials Index
Fraters Flexible Fund	A	D-AA-F	15-Oct-01	-	R 782 188 779	Composite benchmark: SA Equities (45% FTSE/JSE All Share Index & 25% FTSE/JSE Financials and Industrials Index), SA Bonds (15% BEASSA All Bond Index[g]), Property (5% Property Unit Trust Index) & Cash (10% Stefi Index[h])
Fraters Real Income Fund	A	D-AA-TARR	9-Oct-02	-	R 731 781 343	CPIX[i] + 3%
Community Growth Gilt Fund	A	D-F-B	14-Jul-98	-	R 947 884 644	BEASSA All Bond Index

(a) A = Active; D = Discontinued
(b) D = Domestic; F = Foreign; E-G = Equity-General; E-V = Equity Varied Specialist; AA-F = Asset Allocation-Flexible; AA-TARR = Asset Allocation-Target Absolute and Real Return; F-B = Fixed Interest-Bond
(c) The FTSE/JSE All Share Index consists of the top 99 percent of eligible listed companies ranked by full market capitalisation (FTSE/JSE Africa Index Series, 2006). This index replaced the older JSE Actuarial All Share Index on 24 June 2002.
(d) As monthly data was not available for this benchmark index, the FTSE/JSE Socially Responsible Investment Index was used as proxy.
(e) This excludes the producers of alcohol and pork-related products, providers of conventional financial services (such as banking and insurance) and providers of entertainment services (hotels, casinos, cinemas and producers of pornography and music). Tobacco manufacturers as well as defence and weapons companies, although not strictly forbidden for investment under Islamic law, are also excluded. In addition to industry screens, companies are furthermore subjected to a series of financial ratio screens dealing with excessive levels of debt and interest income (Hussein & Omran, 2005:110).
(f) This index screens JSE-listed companies on the three pillars of the triple bottom line as well as corporate governance.
(g) This index consists of the top 20 listed bonds on the Bond Exchange of South Africa ranked according to market capitalisation and liquidity. These are mainly issued by the government (RSA loan stock), public utilities and public companies (Van Zyl, Botha & Skerritt, 2006:280).
(h) Stefi Index = Short TErm Fixed Interest index
(i) CPIX = Consumer price index excluding interest rates on mortgage bonds
(j) This fund sometimes called the Oasis Crescent International Feeder Fund
Source: Viviers (2007)

Table 2: Salient features of other pooled (non-unit trust) and segregated RI funds

RI fund name	Status[a]	Classification[b]	Date of inception	Date of discontinuance	Size on 31 March 2006	Benchmark index
AMB Empowerment Equity Fund	D	D-E[c]	1-Apr-97	31-Dec-02[d]	-	Could not be established
Futuregrowth Anchor Fund	D	P-D-E	1-Jul-97	31-May-04	-	Composite benchmark: 80% FTSE/JSE Financials and Industrials Index & 20% FTSE/JSE SA Resources Index
Futuregrowth RI Equity Fund	A	P-D-E	1-Jul-04	-	R 33 200 000	FTSE/JSE RI Index + 3%
Rocklands Social Responsible Private Equity Fund	A	D-Alt[c]	Sometime in 2004	-	Confidential	Could not be established
Community Growth Equity Fund of Funds	A	P-D-AA	1-Apr-05	-	R 25 000 000	Composite benchmark (no weights indicated): SA Equities (FTSE/JSE All Share Index), SA Bonds (BEASSA All Bond Index), Alternative investments (CPI[e] + 7%) & Cash (Stefi Index),
Futuregrowth Diversified Development Fund	D	P-D-AA	Sometime in 1997	31-Jul-01	-	CPI + 4%
Futuregrowth RI Balanced Fund	A	P-D-AA	30-Sep-04	-	R 3 200 000	Composite weighting of the underlying funds' benchmarks
Investec Mafisa Fund	D	D-ALT[c]	1-Oct-97	31-Aug-02[d]	-	Could not be established – CPI will however be used as a proxy as this fund invested heavily in infrastructural development
Investec Sechaba Fund	D	D-ALT[c]	1-Aug-00	31-Aug-02[d]	-	Could not be established – CPI will however be used as a proxy as this fund invested heavily in infrastructural development
Metropolitan Futurebuilder	A	P-D-AA	1-Oct-96	-	R 888 000 000	CPIX + 4%
Metropolitan RI Fund	A	P-D-AA	1-Dec-05	-	R 112 000 000	Composite benchmark: SA Equities (60% FTSE/JSE RI Index); SA Bonds (30% BEASSA All Bond Index); Property (5% CPI + 6%) & Cash (5% Alexander Forbes Money Market Index)
Momentum Supernation Fund	A	P-D-AA	1-Oct-02	-	R 78 900 000	Composite benchmark: SA Equities (60% FTSE/JSE All Share Index); SA Bonds (25% BEASSA All Bond Index); Property (10% CPI + 4%) & Cash (5% Stefi Index)
Sanlam Community Builder Fund	A	P-D-AA	1-Jan-96	-	n/a	No benchmark
STANLIB Corporate Wealth Development Fund	A	P-D-AA	1-Jan-97	-	R 504 000 000	CPI
TopGEAR Fund	D	P-D-AA	1-Feb-98	30-Sep-02[d]	-	7% real growth over rolling 3-year periods
African Harvest Infrastructure Bond Fund	A	S-D-F	1-Jan-01	-	R 517 100 000	Composite benchmark: 25% Govi Index[f] & 75% Othi Index[g]
Futuregrowth Infrastructure Bond Fund	A	P-D-F	1-Jan-94	-	R 3 664 900 000	BEASSA All Bond Index
AIIF African Infrastructure Investment Fund	A	P-D-ALT	Sometime in 2003	-	R 80 600 000	7% real growth over rolling 3-year periods
AIIF South African Infrastructure Fund	A	P-D-ALT	Sometime in 1996	-	R 1 320 000 000	7% real growth over rolling 3-year periods
Futuregrowth Structured Empowerment Fund	A	P-D-ALT	1-Oct-95	-	Not available	CPI + 8%
Investec RI Life Fund	A	S-D-ALT	17-Oct-05	-	R 567 898 129	Could not be established
Investment Solutions Sakhisizwe Fund	A	P-D-ALT	1-Nov-04	-	R 103 927 780	Composite benchmark: SA Equities (20% FTSE/JSE All Share Index), SA Bonds (70% BEASSA All Bond Index) & Cash (10% Stefi Index)
Investment Solutions Shari'ah Fund	A	P-D-ALT	1-Apr-05	-	R 8 184 304	High equity unit trust category average
OMAM IDEAS Fund	A	P-D-ALT	1-Jan-99	-	R 1 208 900 000	CPI + 7% over rolling 3-year periods
Prodigy Transformation Fund	A	D- ALT[c]	Sometime in 1998	-	Not available	Could not be established
Rocklands Growth and Development Fund	A	D- ALT[c]	Sometime in 2004	-	Confidential	CPI + 5%
Rocklands Social Responsible Balanced Fund	A	D-AA[c]	Sometime in 2004	-	Confidential	Could not be established
Sanlam Development Fund	A	P-D-ALT	1-Nov-96	-	Not available	No benchmark
Sanlam Development Fund of Funds	A	P-D-ALT	1-Jul-02	-	Not available	No benchmark
Futuregrowth Community Property Fund	A	P-D-Prop	1-Jul-96	-	R 488 100 000	CPI + 4%

(a) A = Active; D = Discontinued
(b) P = Pooled; S = Segregated; E = Equity; AA = Asset Allocation; F = Fixed interest; ALT = Alternative; Prop = Property
(c) It could not be established whether these funds were pooled or segregated funds
(d) As the exact date of discontinuance could not be established, the date on which the fund was excluded from the AFAC TDI Manager Watch Survey serves as proxy
(e) The Consumer Price Index (CPI) is an index of the prices of a representative 'basket' of consumer goods and services bought by a typical South African household and thus reflects the general price level in the economy (Mohr, Fourie & Associates 2004:13)
(f) This index consists of the most liquid government bonds listed on the Bond Exchange of South Africa (Van Zyl *et al*., 2006:280)
(g) This index consists of all other (non-government) bonds found in the BEASSA All Bond Index (Van Zyl *et al*., 2006:280)

Source: Viviers (2007)

Correia and Uliana (2004:71) propose another measure for the risk-free rate in the South African context, namely the negotiable certificate of deposit (NCD) rate. This rate is seen as being more applicable in the South African setting given the effect of historic government regulations on the liquidity and pricing of government loan stock. In recognition of this distortion, several studies on unit trust performance in South Africa use the NCD rate as a proxy for the risk-free rate (Meyer, 1998:102; Von Wielligh & Smit, 2000:121; Akinjolire & Smit, 2003:46). Akin to these studies, a similar approach was adopted in this research. Monthly data on the three-month NCD rate were sourced from the Bureau of Economic Research at the University of Stellenbosch.

5.4 Primary data sourcing with regard to the market index in South Africa

Monthly data on the *adjusted* FTSE/JSE All Share Index was sourced as proxy for the CAPM market index (J203T). An *adjusted* data set for the FTSE/JSE All Share Index was used to compare portfolio performance pre and post 1 June 2002 as the composition of the index changed on that date. More details on the rebasing of the JSE indices are provided on http://ftse.jse.co.za. Monthly data on the total returns of the adjusted index were sourced from I-Net Bridge.

6. DATA ANALYSIS

The data analysis consisted of two principle phases. Firstly, monthly returns were calculated for the 24 RI funds and the constituents of the two benchmark categories indicated in the hypothetical model (Figure 1). Secondly, the research hypotheses were tested by calculating appropriate measures of risk-adjusted performance and using suitable tests to establish normality and statistical significance.

6.1 Monthly returns

Equation 6 was used to calculate the monthly returns of the RI funds. It is important to note that the NAV prices sourced from the respective data providers included cash distributions (re-invested on ex-dividend date) but excluded any initial charges.

$$r_{it} = \frac{\text{NAVprice}_{it} - \text{NAVprice}_{it-1}}{\text{NAVprice}_{it-1}} \quad \ldots (6)$$

where

t = 1, 2, 3…T and:

r_{it} = The monthly rate of return of fund *i* in period *t*

NAVprice_{it} = The Net Asset Value (NAV) price of fund *i* in period *t*

NAVprice_{it-1} = The NAV price of fund *i* in period *t-1*

The monthly returns of the RI funds' respective benchmark indices as well as the monthly returns of the FTSE/JSE All Share Index were calculated by replacing NAV_{price} in Equation 6 with *Index value*.

The unadjusted (raw) returns of the local RI funds during the three sub-periods are presented in Table 3. Funds are ranked in alphabetical order. As indicated in Table 3 average unadjusted (raw) RI fund performance decreased from 15,874 percent in sub-period one to 12,214 in sub-period two. This decline in RI fund returns might be attributed to poor returns on small caps (Derby, 2003; Lea, 2006). This claim however requires empirical verification. Average unadjusted (raw) RI fund performance in sub-period three (21,279%) compares very favourably with the average return of the FTSE/JSE All Share Index in sub-period three (calculated as 20,33% using J203T).

6.2 Testing the null and alternative hypotheses associated with the first benchmark category (the RI funds' respective benchmark indices)

A matched pairs design was used to make inferences about the differences between sample means (Levine, Stephan, Krehbiel & Berenson, 2005:525). This process involved seven steps, namely:

- Calculating the risk-adjusted performance of the RI funds and the constituents of the two benchmark categories.
- Calculating the differences of the paired observations.
- Calculating the sample mean and standard deviation of the observed differences.
- Testing for normality using the Shapiro Wilk W-test. A significance level of 0,05 was used consistently throughout the data analysis.
- Deciding on the most appropriate measure of statistical significance to be used. In cases were the 'difference' distribution was normally distributed, a single-sample t-test was conducted, alternatively a Wilcoxon matched pairs test was used.
- Computing the relevant test statistic.
- Deciding whether or not to reject the null hypothesis. A null hypothesis was rejected when the p-values of all three risk-adjusted measures' test statistics were smaller than 0,05. Where

conflicting p-values were recorded, the final decision was based on the Upside-potential ratio's statistics. This ratio is seen as the most sophisticated of the three risk-adjusted measures as it considers both the upside-potential (*theta*) and downside risk (*delta*) of an investment.

Tables 4, 5 and 6, which deal with the first three sets of null hypotheses, are set out as follows: column (1) lists the RI funds' names, column (2) contains the calculated Sharpe ratios of the RI funds whereas column (3) contains the Sharpe ratios of the funds' respective benchmark indices (which were listed in Tables 1 and 2). Column (4), labelled "Difference Sharpe" was calculated by taking the difference between the Sharpe ratios of the RI funds and the Sharpe ratios of their respective benchmark indices. In columns (5) and (6) the calculated Sortino ratios of the RI funds and their respective benchmark indices are reflected. Column (7) was calculated by taking the difference between the Sortino ratios of the RI funds and the Sortino ratios of their respective benchmark indices. The Upside-potential ratios (UPR) of the RI funds are shown in column (8), that of their respective benchmark indices in column (9) and the differences in column (10). Also contained in the tables are the results of the Shapiro Wilk W-tests and the relevant significance tests.

All three performance measures in Table 4 indicated that local RI funds outperformed their benchmark indices during sub-period one ($\bar{D}$ equal to 0,382, 0,419 and 0,146 respectively). As only the Sharpe ratio's t-test yielded a statistically significant result, a final decision had to be made based on the Upside-potential ratio. As the Upside-potential ratio's t-test did not yield a statistically significantly p-value (p = 0,546 > 0,050), **$H_{1,0}$ could not be rejected**.

According to the Sharpe and Sortino ratios (from Table 5) RI funds marginally underperformed their benchmark indices during sub-period two ($\bar{D}$ equal to -0,183 and -0,099 respectively). In contrast, the Upside-potential ratio indicates that RI funds marginally outperformed their benchmark indices during the same period ($\bar{D}$ equal to 0,858). As none of the differences were however statistically significant (p-values equal to 0,286, 0,962 and 0,095 respectively), **$H_{2,0}$ could not be rejected**.

All three measures of risk-adjusted portfolio performance in Table 6 indicate that RI funds significantly outperformed their benchmark indices in sub-period three ($\bar{D}$ equal to 0,479, 8,110 and 0,049; p-values equal to 0,000, 0,001 and 0,001 respectively). As such, **$H_{3,0}$ could be rejected**.

6.3 Testing the hypotheses associated with the second benchmark category (the general equity market in South Africa)

As indicated in Figure 1, the second benchmark category deals with the evaluation of local RI fund performance *vis-à-vis* the local equity market. The FTSE/JSE All Share Index was used as proxy for the performance of the general equity market in South Africa. Tables 7, 8 and 9, which deal with the last three research hypotheses, are structured in the same manner as the preceding three tables.

Based on the Sharpe and Sortino ratios in Table 7 RI funds significantly outperformed the general equity market in South Africa during sub-period one ($\bar{D}$ equal to 0,492 and 1,859 respectively and p-values equal to 0,001 and 0,002 respectively) and marginally underperformed according to the Upside-potential ratio ($\bar{D}$ equal to -0,221 and p-value = 0,310 > 0,050). However, as the Upside-potential ratio's Wilcoxon matched pairs test was not statistically significant (p-value = 0,310 > 0,050), **$H_{4,0}$ could not be rejected**.

According to all three performance measures in Table 8 local RI funds underperformed the FTSE/JSE All Share Index during sub-period two ($\bar{D}$ equal to-0,273, -6,667 and -7,251 respectively). As the Upside-potential ratio's Wilcoxon matched pairs test was statistically significant (p-value = 0,005 < 0,050), **$H_{5,0}$ could be rejected.**

All three measures of risk-adjusted performance in Table 9 reveal that local RI funds outperformed the FTSE/JSE All Share Index during sub-period three ($\bar{D}$ equal to 0,615, 9,959 and 2,508 respectively). However, based on the insignificance of the Upside-potential ratio's Wilcoxon matched pairs test (p-value = 0,159 > 0,050), **$H_{6,0}$ could not be rejected**.

Table 3: Unadjusted (raw) RI fund returns

RI fund name	Status[a]	Annualised return sub-period 1 (%) [b,c]	Annualised return sub-period 2 (%) [b,c]	Annualised return sub-period 3 (%) [b,c]
African Harvest Infrastructure Bond Fund	A		5,683	16,582
Community Growth Gilt Fund	A		20,247	16,817
Community Growth Equity Fund	A	15,491	15,275	27,067
Fraters Earth Equity Fund	A			36,105
Fraters Flexible Fund	A			29,022
Fraters Real Income Fund	A			19,598
Futuregrowth Albaraka Equity Fund	A	12,147	25,769	30,790
Futuregrowth Anchor Fund	D	-1,847	0,043	13,685
Futuregrowth Community Property Fund	A	19,591	7,358	15,639
Futuregrowth Infrastructure Bond Fund	A	12,684	23,796	17,182
Futuregrowth SRI Balanced Fund	A			33,635
Futuregrowth SRI Equity Fund	A			50,978
Investec Mafisa Fund	D		10,245	
Investec Sechaba Fund	D		7,868	
Investment Solutions Sakhisizwe Fund	A			18,842
Metropolitan Futurebuilder Fund	A	13,418	10,768	25,098
Momentum Supernation Fund	A			31,168
Nedbank Sustainability Investing Index Fund	D			3,514
Oasis Crescent Equity	A		44,175	26,109
Oasis Crescent International FoF	A			-0,185
OMAM IDEAS Fund	A		15,624	17,355
Sanlam Empowerment Equity Fund	D	49,014	-13,082	-3,837
STANLIB Corporate Wealth Development Fund	A	6,490	11,988	21,691
TopGEAR Fund	D		-2,545	
Average		**15,874**	**12,214**	**21,279**

(a) A = Active; D = Discontinued
(b) Monthly returns were calculated using Equation 6
(c) The geometric return of a fund in a specified period was annualised by raising the fund's geometric return by its Yearly Annualisation Factor (n/12) minus one

Table 4: RI funds *vis-à-vis* benchmark indices in sub-period one (1 June 1992 – 31 August 1998)

RI fund name	Sharpe RI FUND	Sharpe BENCHMARK	Difference Sharpe	Sortino RI FUND	Sortino BENCHMARK	Difference Sortino	UPR RI FUND	UPR BENCHMARK	Difference UPR
(1)	**(2)**	**(3)**	**(4) = (2) – (3)**	**(5)**	**(6)**	**(7) = (5) – (6)**	**(8)**	**(9)**	**(10) = (8) – (9)**
Community Growth Equity Fund	0,343	0,011	0,333	1,764	1,732	0,032	3,418	4,142	-0,724
Futuregrowth Albaraka Equity Fund	0,241	0,011	0,230	2,206	1,732	0,474	4,653	4,142	0,511
Futuregrowth Anchor Fund	-0,254	-1,027	0,773	0,300	0,870	-0,570	2,061	1,248	0,813
Futuregrowth Community Property Fund	0,178	-0,134	0,312	1,418	1,243	0,175	0,983	0,669	0,314
Futuregrowth Infrastructure Bond Fund	-0,102	-0,138	0,036	2,245	2,097	0,148	2,203	2,024	0,180
Metropolitan Futurebuilder Fund	-0,145	-1,071	0,926	1,309	-1,006	2,316	1,112	1,768	-0,657
STANLIB Corporate Wealth Development Fund	-0,209	-0,276	0,067	1,022	0,662	0,360	0,982	0,395	0,587
Shapiro Wilk W-test			0,878			0,791			0,866
p-value Shapiro Wilk W-test			0,218			0,033			0,171
Reference mean			0,000			0,000			0,000
Mean of difference scores ($\bar{D}$)			0,382			0,419			0,146
Standard deviation of difference scores (S_D)			0,341			0,900			0,605
Single-sample t-test			2,967			-			0,639
p-value single-sample t-test			0,025			-			0,546
Wilcoxon matched pairs test (Z-value)			-			1,352			-
p-value Wilcoxon matched pairs test			-			0,176			-

Table 5: RI funds *vis-à-vis* benchmark indices in sub-period two (1 September 1998 – 31 March 2002)

RI fund name	Sharpe RI FUND	Sharpe BENCHMARK	Difference Sharpe	Sortino RI FUND	Sortino BENCHMARK	Difference Sortino	UPR RI FUND	UPR BENCHMARK	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) – (6)	(8)	(9)	(10) = (8) – (9)
African Harvest Infrastructure Bond Fund	0,179	0,181	-0,002	1,724	1,670	0,053	1,952	1,999	-0,048
Community Growth Gilt Fund	2,168	2,240	-0,072	5,091	5,981	-0,890	4,846	5,886	-1,040
Community Growth Equity Fund	1,694	1,884	-0,191	7,362	12,314	-4,952	14,261	17,261	-3,000
Futuregrowth Albaraka Equity Fund	2,039	1,884	0,154	10,699	12,314	-1,615	13,112	17,261	-4,149
Futuregrowth Anchor Fund	0,830	1,712	-0,881	0,932	9,465	-8,533	10,999	14,970	-3,971
Futuregrowth Community Property Fund	1,799	2,308	-0,509	2,843	5,315	-2,472	2,903	3,443	-0,540
Futuregrowth Infrastructure Bond Fund	2,367	2,240	0,127	6,302	5,981	0,321	5,874	5,886	-0,011
Investec Mafisa Fund	1,303	2,001	-0,697	6,230	3,160	3,069	19,231	2,543	16,688
Investec Sechaba Fund	0,509	0,478	0,031	2,778	3,145	-0,368	2,321	1,593	0,728
Metropolitan Futurebuilder Fund	1,585	0,889	0,696	3,962	-3,661	7,623	7,526	6,920	0,606
Oasis Crescent Equity Fund	2,969	1,884	1,084	32,864	12,314	20,550	27,314	17,261	10,053
OMAM IDEAS Fund	1,992	2,528	-0,536	3,801	6,456	-2,655	3,045	3,679	-0,634
Sanlam Empowerment Equity Fund	0,246	1,870	-1,624	-3,530	13,103	-16,633	8,065	18,387	-10,322
STANLIB Corporate Wealth Development Fund	1,792	2,001	-0,209	5,083	3,160	1,923	6,306	2,543	3,763
TopGEAR Fund	0,884	1,007	-0,123	-0,816	-3,894	3,078	5,187	7,105	-1,918
Shapiro Wilk W-test			0,961			0,901			0,861
p-value Shapiro Wilk W-test			0,717			0,098			0,025
Reference mean			0,000			0,000			0,000
Mean of difference scores ($\bar{D}$)			-0,183			-0,099			0,858
Standard deviation of difference scores (S_D)			0,640			7,989			6,939
Single-sample t-test			-1,109			-0,048			-
p-value Single-sample t-test			0,286			0,962			-
Wilcoxon matched pairs test (Z-value)			-			-			0,681
p-value Wilcoxon matched pairs test			-			-			0,095

Table 6: RI funds *vis-à-vis* benchmark indices in sub-period three (1 April 2002 – 31 March 2006)

RI fund name	Sharpe RI FUND	Sharpe BENCHMARK	Difference Sharpe	Sortino RI FUND	Sortino BENCHMARK	Difference Sortino	UPR RI FUND	UPR BENCHMARK	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) – (6)	(8)	(9)	(10) = (8) – (9)
African Harvest Infrastructure Bond Fund	1,785	1,753	0,032	17,419	17,140	0,280	0,090	0,092	-0,002
Community Growth Gilt Fund	1,760	1,764	-0,005	16,020	17,010	-0,990	0,087	0,094	-0,007
Community Growth Equity Fund	1,610	1,050	0,560	13,292	8,195	5,097	0,112	0,100	0,012
Fraters Earth Equity Fund	2,137	1,307	0,830	31,153	9,116	22,036	0,228	0,092	0,137
Fraters Flexible Fund	2,013	1,510	0,502	24,465	12,488	11,977	0,165	0,103	0,062
Fraters Real Income Fund	2,407	2,094	0,313	69,782	35,060	34,723	0,278	0,069	0,210
Futuregrowth Albaraka Equity Fund	1,858	1,050	0,808	23,240	8,195	15,045	0,189	0,100	0,089
Futuregrowth Anchor Fund	1,002	0,570	0,432	8,136	4,121	4,015	0,062	0,050	0,012
Futuregrowth Community Property Fund	1,818	1,490	0,328	18,120	14,115	4,005	0,084	0,051	0,034
Futuregrowth Infrastructure Bond Fund	1,829	1,764	0,064	17,914	17,010	0,904	0,093	0,094	-0,001
Futuregrowth RI Balanced Fund	2,812	2,560	0,252	31,433	39,435	-8,002	0,139	0,181	-0,043
Futuregrowth RI Equity Fund	2,478	2,388	0,091	36,022	27,997	8,025	0,178	0,143	0,035
Investment Solutions Sakhisizwe Fund	2,389	2,637	-0,248	26,286	17,372	8,914	0,104	0,066	0,038
Metropolitan Futurebuilder Fund	1,779	-0,497	2,277	19,495	-2,321	21,817	0,135	0,046	0,089

Table 6: RI funds *vis-à-vis* benchmark indices in sub-period three (1 April 2002 – 31 March 2006) (cont)

RI fund name	Sharpe RI FUND	Sharpe BENCHMARK	Difference Sharpe	Sortino RI FUND	Sortino BENCHMARK	Difference Sortino	UPR RI FUND	UPR BENCHMARK	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) – (6)	(8)	(9)	(10) = (8) – (9)
Momentum Supernation Fund	2,668	2,160	0,508	45,040	29,296	15,744	0,229	0,161	0,068
Nedbank Sustainability Investing Index Fund	1,135	1,076	0,059	13,937	17,659	-3,723	0,069	0,104	-0,035
Oasis Crescent Equity Fund	1,729	1,050	0,678	21,987	8,195	13,792	0,176	0,100	0,075
Oasis Crescent International FoF	0,455	0,075	0,380	3,234	0,440	2,794	0,086	0,065	0,021
OMAM IDEAS Fund	1,630	1,680	-0,050	13,296	17,403	-4,107	0,086	0,060	0,026
Sanlam Empowerment Equity Fund	-1,438	-3,261	1,824	-9,112	-14,186	5,074	0,057	0,015	0,042
STANLIB Corporate Wealth Development Fund	1,613	1,187	0,426	24,756	11,847	12,909	0,199	0,038	0,162
Shapiro Wilk W-test			0,804			0,956			0,930
p-value Shapiro Wilk W-test			0,000			0,451			0,142
Reference mean			0,000			0,000			0,000
Mean of difference scores ($\bar{D}$)			0,479			8,110			0,049
Standard deviation of difference scores (S_D)			0,599			10,228			0,063
Single-sample t-test			-			3,633			3,555
p-value Single-sample t-test			-			0,001			0,001
Wilcoxon matched pairs test (Z-value)			3,632			-			-
p-value Wilcoxon matched pairs test			0,000			-			-

Table 7: RI funds *vis-à-vis* the FTSE/JSE All Share Index in sub-period one (1 June 1992 – 31 August 1998)

RI fund name	Sharpe RI FUND	Sharpe FTSE/JSE ALL SHARE INDEX	Difference Sharpe	Sortino RI FUND	Sortino FTSE/JSE ALL SHARE INDEX	Difference Sortino	UPR RI FUND	UPR FTSE/JSE ALL SHARE INDEX	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) – (6)	(8)	(9)	(10) = (8) – (9)
Community Growth Equity Fund	0,343	0,011	0,333	1,081	0,038	1,043	3,418	4,142	-0,724
Futuregrowth Albaraka Equity Fund	0,241	0,011	0,230	0,874	0,038	0,836	4,653	4,142	0,511
Futuregrowth Anchor Fund	-0,254	-1,041	0,786	-1,013	-4,272	3,259	2,061	1,294	0,767
Futuregrowth Community Property Fund	0,178	-0,615	0,794	0,499	-2,316	2,815	0,983	1,756	-0,773
Futuregrowth Infrastructure Bond Fund	-0,102	-0,494	0,392	-0,330	-1,730	1,400	2,203	2,415	-0,211
Metropolitan Futurebuilder Fund	-0,145	-0,698	0,552	-0,458	-2,670	2,211	1,112	1,671	-0,559
STANLIB Corporate Wealth Development Fund	-0,209	-0,569	0,360	-0,687	-2,138	1,451	0,982	1,539	-0,557
Shapiro Wilk W-test			0,879			0,918			0,432
p-value Shapiro Wilk W-test			0,221			0,454			0,000
Reference mean			0,000			0,000			0,000
Mean of difference scores ($\bar{D}$)			0,492			1,859			-0,221
Standard deviation of difference scores (S_D)			0,225			0,921			0,619
Single-sample t-test			5,802			5,342			-
p-value single-sample t-test			0,001			0,002			-
Wilcoxon matched pairs test (Z-value)			-			-			1,014
p-value Wilcoxon matched pairs test			-			-			0,310

Table 8: RI funds *vis-à-vis* the FTSE/JSE All Share Index in sub-period two (1 September 1998 – 31 March 2002)

RI fund name	Sharpe RI FUND	Sharpe FTSE/JSE ALL SHARE INDEX	Difference Sharpe	Sortino RI FUND	Sortino FTSE/JSE ALL SHARE INDEX	Difference Sortino	UPR RI FUND	UPR FTSE/JSE ALL SHARE INDEX	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) – (6)	(8)	(9)	(10) = (8) – (9)
Community Growth Equity Fund	1,694	1,884	-0,191	15,727	20,375	-4,648	14,261	17,261	-3,000
Futuregrowth Albaraka Equity Fund	2,039	1,884	0,154	18,606	20,375	-1,769	13,112	17,261	-4,149
Oasis Crescent Equity Fund	2,969	1,884	1,084	48,567	20,375	28,193	27,314	17,261	10,053
Community Growth Gilt Fund	2,168	1,884	0,284	9,973	20,375	-10,402	4,846	17,261	-12,415
Sanlam Empowerment Equity Fund	0,246	1,884	-1,638	1,962	20,375	-18,413	8,065	17,261	-9,196
Futuregrowth Anchor Fund	0,830	1,884	-1,054	7,322	20,375	-13,053	10,999	17,261	-6,262
Investec Mafisa Fund	1,303	1,884	-0,581	15,799	20,375	-4,576	19,231	17,261	1,970
Metropolitan Futurebuilder Fund	1,585	1,884	-0,300	10,512	20,375	-9,863	7,526	17,261	-9,735
STANLIB Corporate Wealth Development Fund	1,792	1,884	-0,092	12,990	20,375	-7,385	6,306	17,261	-10,955
TopGEAR Fund	0,884	1,884	-1,001	6,725	20,375	-13,650	5,187	17,261	-12,074
Futuregrowth Infrastructure Bond Fund	2,367	1,884	0,483	11,514	20,375	-8,860	5,874	17,261	-11,387
Futuregrowth Community Property Fund	1,799	1,884	-0,086	9,737	20,375	-10,638	2,903	17,261	-14,358
OMAM IDEAS Fund	1,992	1,838	0,154	7,902	18,813	-10,910	3,045	15,845	-12,799
Investec Sechaba Fund	0,509	1,072	-0,564	2,071	8,897	-6,826	2,321	10,100	-7,779
African Harvest Infrastructure Bond Fund	0,179	0,919	-0,740	1,023	8,230	-7,206	1,952	8,622	-6,671
Shapiro Wilk W-test			0,990			0,671			0,860
p-value Shapiro Wilk W-test			0,999			0,000			0,024
Reference mean			0,000			0,000			0,000
Mean of difference scores ($\bar{D}$)			-0,273			-6,667			-7,251
Standard deviation of difference scores (S_D)			0,685			10,484			6,468
Single-sample t-test			-1,541			-			-
p-value single-sample t-test			0,146			-			-
Wilcoxon matched pairs test (Z-value)			-			2,556			2,840
p-value Wilcoxon matched pairs test			-			0,011			0,005

Table 9: RI funds *vis-à-vis* the FTSE/JSE All Share Index in sub-period three (1 April 2002 – 31 March 2006)

RI fund name	Sharpe RI FUND	Sharpe FTSE/JSE ALL SHARE INDEX	Difference Sharpe	Sortino RI FUND	Sortino FTSE/JSE ALL SHARE INDEX	Difference Sortino	UPR RI FUND	UPR FTSE/JSE ALL SHARE INDEX	Difference UPR
(1)	(2)	(3)	(4) = (2) – (3)	(5)	(6)	(7) = (5) –(6)	(8)	(9)	(10) = (8) – (9)
Community Growth Equity Fund	1,610	1,050	0,560	13,292	8,195	5,097	11,170	10,006	1,165
Fraters Earth Equity Fund	2,137	1,050	1,087	31,153	8,195	22,958	22,818	10,006	12,812
Futuregrowth Albaraka Equity Fund	1,858	1,050	0,808	23,240	8,195	15,045	18,897	10,006	8,891
Oasis Crescent Equity Fund	1,729	1,050	0,678	21,987	8,195	13,792	17,552	10,006	7,546
Oasis Crescent International FoF	0,455	1,050	-0,595	3,234	8,195	-4,960	8,566	10,006	-1,440
Fraters Flexible Fund	2,013	1,050	0,962	24,465	8,195	16,270	16,501	10,006	6,495
Community Growth Gilt Fund	1,760	1,050	0,710	16,020	8,195	7,826	8,720	10,006	-1,286
Metropolitan Futurebuilder Fund	1,779	1,050	0,729	19,495	8,195	11,301	13,532	10,006	3,526
STANLIB Corporate Wealth Development Fund	1,613	1,050	0,563	24,756	8,195	16,562	19,904	10,006	9,899
African Harvest Infrastructure Bond Fund	1,785	1,050	0,735	17,419	8,195	9,225	8,980	10,006	-1,025
Futuregrowth Infrastructure Bond Fund	1,829	1,050	0,779	17,914	8,195	9,719	9,318	10,006	-0,688
OMAM IDEAS Fund	1,630	1,050	0,580	13,296	8,195	5,101	8,624	10,006	-1,382
Futuregrowth Community Property Fund	1,818	1,050	0,768	18,120	8,195	9,926	8,416	10,006	-1,589
Momentum Supernation Fund	2,668	1,657	1,011	45,040	19,978	25,062	22,862	16,271	6,591
Fraters Real Income Fund	2,407	1,803	0,604	69,782	22,768	47,014	27,823	17,279	10,544
Futuregrowth Anchor Fund	1,002	0,376	0,626	8,136	2,983	5,153	6,236	5,758	0,478
Futuregrowth RI Equity Fund	2,478	2,491	-0,012	36,022	40,476	-4,453	17,811	19,970	-2,159
Futuregrowth RI Balanced Fund	2,812	2,392	0,419	31,433	31,099	0,334	13,869	15,899	-2,030
Investment Solutions Sakhisizwe Fund	2,389	2,392	-0,003	26,286	31,099	-4,813	10,446	15,899	-5,453
Nedbank Sustainability Investing Index Fund	1,135	1,086	0,048	13,937	16,625	-2,688	6,867	9,279	-2,412
Sanlam Empowerment Equity Fund	-1,438	-3,300	1,862	-9,112	-14,782	5,670	5,660	1,474	4,186
Shapiro Wilk W-test		0,239				0,889			0,428
p-value Shapiro Wilk W-test		0,000				0,021			0,000
Reference mean		0,000				0,000			0,000
Mean of difference scores ($\bar{D}$)		0,615				9,959			2,508
Standard deviation of difference scores (S_D)		0,489				12,023			5,236
Wilcoxon matched pairs test (Z-value)		3,632				3,528			1,408
p-value Wilcoxon matched pairs test		0,000				0,000			0,159

7. SUMMARY AND CONCLUSIONS

The empirical evidence, which is summarised as an empirical model (Figure 2), thus shows that:

- local RI funds underperformed relative to their respective benchmark indices during the first two sub-periods in RI history in South Africa, but significantly outperformed their benchmark indices during sub-period three (the resurgence period of RI in South Africa).

- local RI funds significantly underperformed relative to the general equity market in South Africa during sub-period two (the decline period of RI in South Africa) but performed on a par with the FTSE/JSE All Share Index during sub-periods one and three.

- RI fund performance consistently improved over time *vis-à-vis* the funds' respective benchmark indices and the general equity market in South Africa.

These findings firstly support the EMH which holds that active fund managers cannot consistently beat the market (Hirt, Block & Basu, 2006:91). RI researchers in the UK and USA also found that RI funds sometimes underperformed relative to broad market indices (Luther & Matatko, 1994:77; Mallin *et al*., 1995:483; Statman, 2000:30; Bauer *et al*., 2005:1755). These studies showed that RI funds performed on par with broad market indices, especially in more developed markets.

The empirical finding of this study further imply that the RI sector in South Africa might have undergone a learning effect i.e. RI asset managers might have familiarised themselves better with the various dimensions of RI within the South African context since the establishment of the first RI fund in 1992. Further research is however necessary to establish to what

extent they have actually improved their skills in terms of identifying and evaluating RI opportunities. Similar learning effects were noted in RI markets in Australia (Cummings, 2000:79; Bauer *et al*., 2005:1755), the UK (Mill, 2006:131), the USA and Germany (Bauer *et al*., 2006:33).

The empirical evidence therefore seems to suggest that investors should give more consideration to local RI funds as part of a well-diversified investment strategy. Cause-based (targeted) investments in particular can offer good diversification benefits as they typically display low levels of correlation with listed securities (Petersen, 2005). It is however recommended that investors give careful consideration to the specific RI strategy (or combination of strategies) employed by RI fund managers to ensure that it corresponds with their return requirements, level of risk tolerance and other investment criteria (such as liquidity and investment horizon). The fact that local RI fund performance improves over the longer term also implies that investors ought to adopt a long-term orientation.

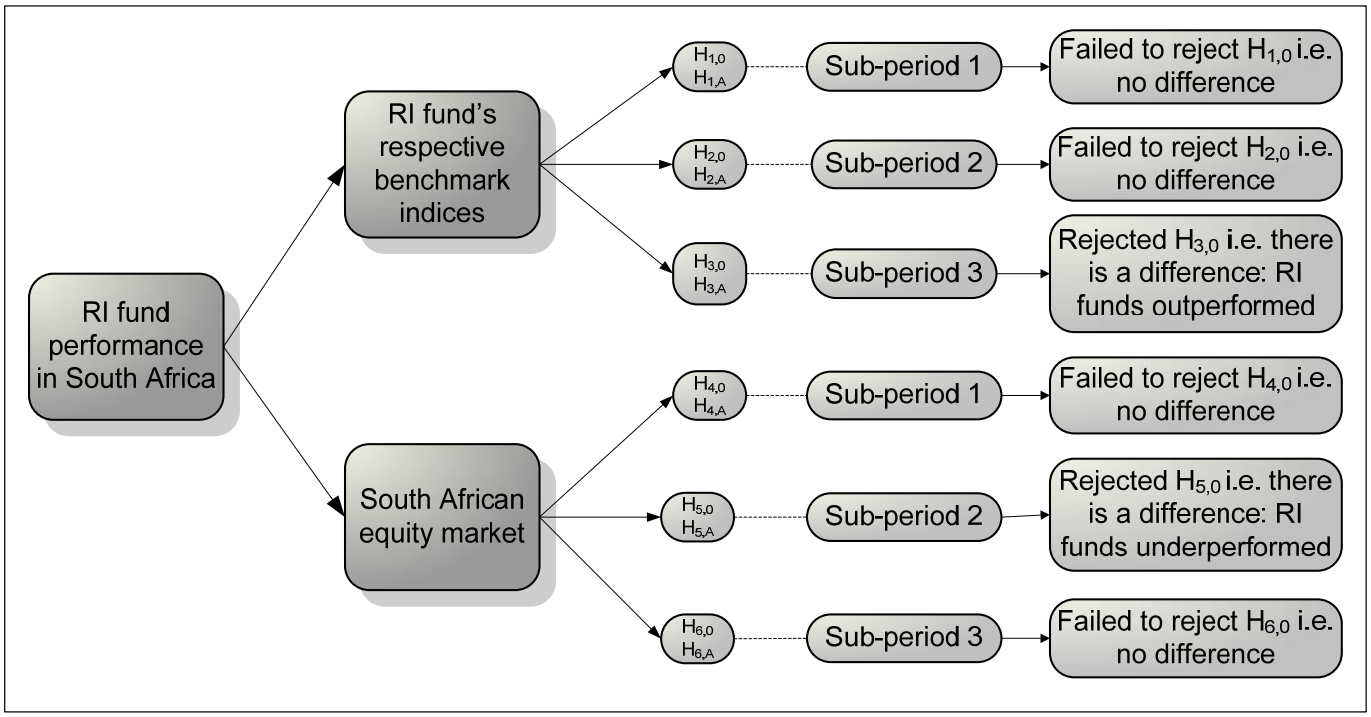

Figure 2: Empirical model of RI fund performance in South Africa

ACKNOWLEDGEMENTS

The authors would like to thank the following persons and institutions for their assistance in the completion of this research:

- Mr Mark Davids of Alexander Forbes Asset consultants and Ms Angelique Kalam of Futuregrowth Specialist Asset managers for the provision of fund data;
- Mr Danie Venter for his assistance with the statistical analysis; and
- the National Research Foundation (Thuthuka Programme) and the Nelson Mandela Metropolitan University for financial support of this research project.

REFERENCES

Alexander Forbes Asset Consultants Targeted Development Investment Vehicles Manager Watch Survey September 2006. 2006. Available: http://www.aforbes.co.za/AfricaFinancial/financial_assetcons.htm [Accessed 15 October 2006].

Akinjolire A & Smit E vdM. 2003. South Africa unit trust performance and strategy in a changing economic climate. *Investment Analysts Journal*, 58: 41-50.

Bauer R, Koedijk K & Otten R. 2005. International evidence on ethical mutual fund performance and investment style. *Journal of Banking & Finance*, 29(7): 1751-1767.

Bauer R, Otten R & Rad AT. 2006. Ethical investing in Australia: Is there a financial penalty? *Pacific-Basin Finance Journal*, 14(1): 33-48.

Bowie D & Bradfield D. 1993. A review of systematic risk estimation on the JSE. *De Ratione*, 7(1): 6-22.

Brown SJ, Goetzmann W, Ibbotson RG & Ross SA. 1992. Survivorship bias in performance studies. *The Review of Financial Studies*, 5(4): 553-580.

Carhart MM. 1997. On persistence in mutual fund performance. *The Journal of Finance*, 52(1): 57-82.

Cornell B, Hirshleifer J & James E. 1997. Estimating the cost of equity. *Contemporary Finance Digest*: 5-26.

Correia C & Uliana E. 2004. Market segmentation an the cost of equity on the Johannesburg Stock Exchange. *South African Journal of Accounting Review*, 18(1): 65-86.

Cox P, Brammer S & Millington A. 2004. An empirical examination of institutional investor preferences for corporate social performance. *Journal of Business Ethics*, 52(1): 27-43.

Cummings LS. 2000. The financial performance of ethical investment trusts: An Australian perspective. *Journal of Business Ethics*, 25(1): 79-92.

Derby R. 2003. Small caps out-gun JSE heavyweights. *Moneyweb*, 29 September, Available: http://www.moneyweb.co.za/investing/small_caps/376945.htm [Accessed 5 October 2006].

De Cleene S & Sonnenberg D. 2004. *Socially responsible investment in South Africa*. 2nd Edition. African Institute of corporate citizenship. Johannesburg: 1-49. Available: http://www.aiccafrica.org/ (Centre for Sustainable Investing)

Diltz JD. 1995. The private cost of socially responsible investing. *Applied Financial Economics,* 5: 69-77.

FTSE/JSE Africa Index Series. 2006. Available: http://www.ftse.jse.co.za

Goldreyer EF & Diltz JD. 1999. The performance of socially responsible mutual funds: Incorporating socio-political information in portfolio selection. *Managerial Finance*, 25(1): 23-36.

Gregory A, Matatko J & Luther R. 1997. Ethical unit trust financial performance: small company effects and fund size effects. *Journal of Business Finance and Accounting*, 24(5): 705-724.

Grossman BR & Sharpe WF. 1986. Financial implications of South African divestment. *Financial Analysts Journal*, (July-August): 15-29.

Guerard JB. 1997a. Is there a cost to being socially responsible in investing? *Journal of Investing*, 6(2): 11-19.

Guerard, JB. 1997b. Additional evidence of the cost of being socially responsible in investing. *Journal of Investing*, 6(4): 31-35.

Hamilton S, Jo H & Statman M. 1993. Doing well while doing good? The investment performance of socially responsible mutual funds. *Financial Analysts Journal*, 49(6): 62-66.

Hirt GA, Block SB & Basu S. 2006. *Investment Planning for Financial Professionals*. McGraw-Hill: New York.

Hirt GA & Block SB. 2004. *Fundamentals of Investment Management*. 8th Edition. McGraw-Hill: Boston.

Horsley S. 2004. *Socially-targeted investment: Strategy paper – National labour and economic development institute*. Available: http://www.naledi.org.za/docs/RI-sh04.pdf [Accessed 1 April 2005].

Hussein K & Omran M. 2005. Ethical investment revisited: evidence from Dow Jones Islamic Indexes. *The Journal of Investing*, 14(3): 105-124.

Hutton RB, D'Antonio L & Johnsen T. 1998. Socially responsible investing. *Business and Society Magazine*, 37(3): 281-306.

Knoll MS. 2002. Ethical screening in modern financial markets: The conflicting claims underlying socially responsible investment. *The Business Lawyer*, 57(2): 681-726.

Kurtz L & DiBartolomeo D. 1996. Socially screened portfolios: an attribution analysis of relative performance. *Journal of Investing*, 5(3): 35-41.

Lea A. 2006. Small-cap stocks appear relatively undervalued. *Business Report*, 2 August, Available: http://www.busrep.co.za/index.php?fSectionId=642&fArticleId=3370842 [Accessed 5 October 2006].

Leeman M. 2005. Sifting through socially responsible investment jargon. *Business Report*, 8 February: 9.

Levine DM, Stephan D, Krehbiel TC & Berenson ML. 2005. *Statistics for managers – using Microsoft Excel*. Pearson-Prentice Hall: Upper Saddle River, NJ.

Luther RG & Matatko J. 1994. The performance of ethical unit trusts: choosing an appropriate benchmark. *British Accounting Review*, 26: 77-89.

Luther RG, Matatko J & Corner DC. 1992. The investment performance of UK "Ethical" unit trusts. *Accounting, Auditing and Accountability*, 5(4): 57-70.

Mallin CA, Saadouni B & Briston RJ. 1995. The financial performance of ethical investment funds. *Journal of Business Finance and Accounting*, 22(4): 483-498.

Mansley M. 2000. *Socially responsible investment: a guide for pension fund managers*. Monitor Press: Suffolk, UK.

Meyer MC. 1998. The persistence of unit trust performance for the period July 1985 – June 1995. *South African Journal of Business Management*, 29(3): 100-108.

Mill GA. 2006. The financial performance of socially responsible investment over time and a possible link with corporate social responsibility. *Journal of Business Ethics*, 63(2): 131-148.

Mohr P, Fourie L & Associates. 2004. *Economics for South African Students*. 3rd Edition. Van Schaik: Pretoria.

MoneyMate Version 32-bit User Manual. 2004. Version 3. Available: http://www.moneymate.com [Accessed 3 August 2006].

Personal communication: Davids M. 2006. Asset Consultant. Alexander Forbes Asset Consultants, Johannesburg.

Petersen F. 2005. Targeted and profitable. *Financial Mail,* 10 June, Available: http://www.free.financialmail.co.za/report05/fmfmjun05/dfm.htm [Accessed 20 February 2006].

Reyes MG & Grieb T. 1998. The external performance of socially responsible mutual funds. *American Business Review*, 16(1): 1-7.

Rudd A. 1979. Divestment of South African equities: how risky? *The Journal of Portfolio Performance*, 5(3): 5-10.

Sauer DA. 1997. The impact of social responsibility screens on investment performance: evidence from the Domini 400 social index and Domini equity mutual fund. *Review of Financial Economics*, 6(2): 137-150.

Schueth S. 2003. Socially responsible investing in the United States. *Journal of Business Ethics*, 43(3): 189-194.

Sharpe WF. 1994. The Sharpe ratio. *The Journal of Portfolio Management*, (Fall): 49-58.

Sharpe WF. 1966. Mutual fund performance. *Journal of Business*, 39: 119-138.

Solomon J, Solomon A & Norton S. 2002. Socially responsible investment in the UK: drivers and current issues. *Journal of General Management*, 27(3): 1-13.

Sortino F & Price L. 1994. Performance measurement in a downside risk framework. *The Journal of Investing*, Fall: 59-65.

Sortino FA, Van der Meer R & Plantinga A. 1999. The Dutch triangle (portfolio performance measure). *Journal of Portfolio Management*, 26(1): 50-59.

Sparkes R & Cowton CJ. 2004. The maturing of socially responsible investments: a review of the developing link with corporate social responsibility. *Journal of Business Ethics*, 52(1): 45-57.

Statman M. 2000. Socially responsible mutual funds. *Financial Analyst Journal*, 56(3): 30-39.

Van Zyl C, Botha Z & Skerritt P. (Eds.) 2006. *Understanding South African Financial Markets*. 2nd Edition. Van Schaik: Pretoria.

Viviers S. 2007. *A Critical Assessment on Socially Responsible Investing in South Africa*. Unpublished doctoral thesis, Nelson Mandela Metropolitan University, Port Elizabeth.

Von Wielligh JFC & Smit E vdM. 2000. Persistence in the performance of South African unit trusts. *South African Journal of Business Management*, 31(3): 120-129.

White MA. 1995. The performance of environmental mutual funds in the United States and Germany: is there economic hope for "green" investors? *Research in Corporate Social Performance and Policy*, (supplement 1): 323-344.