Market reaction to the FTSE/JSE Responsible Investment Index series

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Abstract

Responsible investment has seen considerable growth since the turn of the millennium, and this has spurred the creation and continuous development of responsible investment indexes across the globe.

The purpose of this paper is to investigate whether the release of the RI index series contains price sensitive information content and therefore has value relevance for the market. Using event study methodology applied to the six releases of the FTSE/JSE Responsible Investment Index series from October 2015 to June 2018, this paper investigates the impact on the share prices of constituent, included and excluded firms from this index series.

The study finds that the release of the constituents of the RI index does not contain new information content while constituents of the RI top 30 experience positive and statistically significant abnormal returns as a result of their constituency. The inclusion of firms on the RI index is not a release of new price-sensitive information, while firms included on the RI top 30 experience a sustained increase in share price throughout the event window. Firms excluded from the RI index and RI top 30 experience negative and statistically significant share returns and the market applies a greater discount toward firms excluded from the RI top 30. Finally, there are statistically significant differences between firms that were included and firms that were excluded from the RI index and the RI top 30 post-announcement date, and this is caused by the market applying a value discount toward firms with deteriorating ESG performance and disclosure.

From an investors perspective, investors are able to generate significant arbitrage returns by shorting (longing) shares of firms expected to be to be excluded (included) from the RI index series. Consequently, firms should strive to be included or remain on the RI index series in order to signal the market that there has not been a deterioration in their ESG performance and disclosure, which would have a negative impact on their share price.

Declaration

I hereby declare that this research report is my own original work. It is submitted in partial fulfilment of the degree of Master of Commerce at the University of the Witwatersrand, Johannesburg. It has not been submitted elsewhere for the purpose of being awarded another degree or for the examination purposes at any other university.

Signature:

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Key words and abbreviations

AARs	Average abnormal returns
ARs	Abnormal returns
CAARs	Cumulative average abnormal returns
CARs	Cumulative abnormal returns
CFP	Corporate financial performance
CSP	Corporate social performance
CSR	Corporate social responsibility
ESG	Environmental, social and governance
JSE	Johannesburg Stock Exchange
PRI	United Nations-backed Principles of Responsible Investment
S&P 500	Standard & Poor's 500
RI	Responsible investment
RI index	FTSE/JSE Responsible Investment Index
RI indexes	General referral to a number of socially responsible investment indexes across the world
RI index series	FTSE/JSE Responsible Investment Index and the FTSE/JSE Responsible Investment Index Top 30
RI top 30	FTSE/JSE Responsible Investment Index Top 30
SRI index	JSE Socially Responsible Investment Index

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1. INTRODUCTION

Milton Friedman was the first person to introduce the idea of corporate social responsibility (CSR), stating that, “There is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud” (Friedman, 1970).

Since Friedman’s initial description of CSR, there has been a fundamental shift towards corporate governance and sustainable development as drivers in achieving corporate social performance (CSP) (IOD, 2016). McWilliams and Siegel (2001) contradict Friedman’s purely profit focused description of CSR, suggesting that CSR is achieved through active and meaningful engagement beyond the interest of the firm and that which is required by law.

CSR is crucial in addressing inclusive capitalism, sustainable use of the environmental and good corporate governance (IOD, 2016). The corporate sector is best positioned to effectively and efficiently achieve this. This has been a long standing and unresolved issue, as in Friedman’s 1970 paper he highlights that, “Problems are too urgent to wait on the slow course of political processes, that the exercise of social responsibility by businessmen is a quicker and surer way to solve pressing current problems” (Friedman, 1970).

This shift within business away from a purely profit focused approach towards incorporating environmental, social and governance factors when conducting business has caused changes in investor strategies. Globally, responsible investment (RI) and socially responsible investment (SRI) strategies have seen major growth (PRI, 2018a).

The United Nations Principles of Responsible Investment define RI as “an approach to investing that aims to incorporate environmental, social and governance (ESG) factors into investment decisions, to better manage risk and generate sustainable, long-term returns” (PRI, 2018c). They differentiate SRI from RI by the underlying

reasoning for including ESG factors in investment decisions for risk reduction purposes. The principle of RI is to incorporate ESG factors in investment decisions for risk management purpose, while SRI uses ESG factors to combine financial return with a moral or ethical return, and not for risk reduction. Section 2.1.1 provides a more detailed explanation of the differences between RI and SRI, however it is important to note that they both advocate for the need to include ESG factors in investment decisions and are therefore often used interchangeably despite their subtle differences (PRI, 2018c).

This saw the establishment of the United Nations-backed Principles for Responsible Investment (PRI) in 2006. The PRI established six principles for RI and signatories to these principles commit to integrating ESG issues into investment and ownership decisions. The principles seek to align institutional investors' duties towards the best long-term interests of their beneficiaries, and align investors' attitudes with the betterment of society. The PRI has 2139 signatories worldwide, of which 55 are from South Africa (PRI, 2018b).

Figure 1.1 illustrates the 12-year growth of asset owners (AOs), all signatories (asset owners, investment managers and service providers) and respective assets under management (AUM) committed to the PRI.

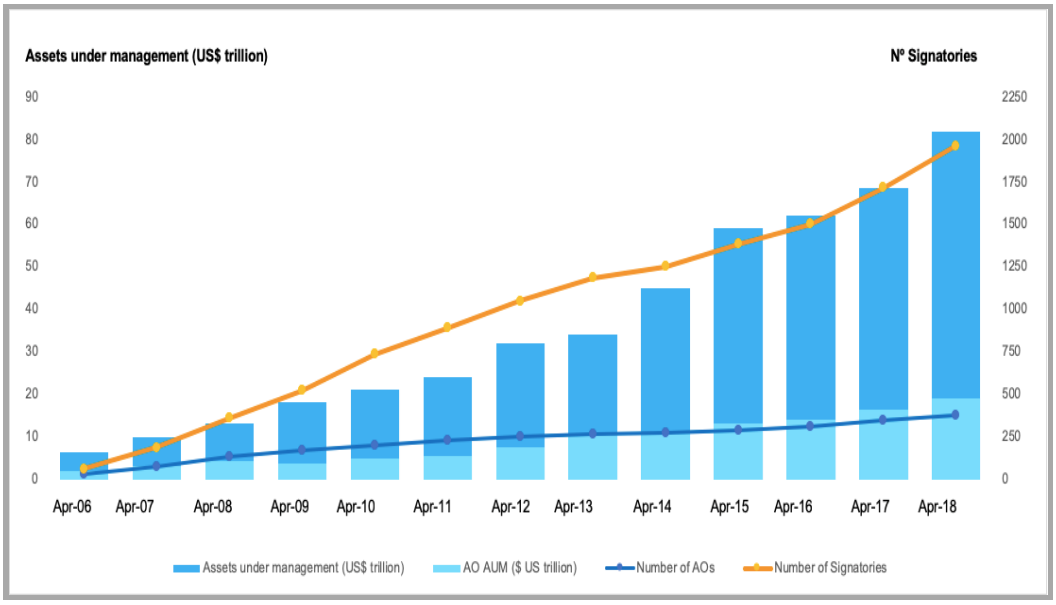


Figure 1.1 Assets under management (US$ trillion)

Source: (PRI, 2018a)

Following the PRI, South Africa established The Code for Responsible Investing in South Africa (CRISA) in 2011. CRISA's 5 principles, as reflected in Figure 1.2, correlate with the PRI and provide guidance to South African institutional investors to "better incorporate environmental, social and governance issues in decision-making and ownership practices"(IOD, 2018).

Figure 1.2 CRISA 5 Principles

Source: (CRISA & EY, 2013)

From a South African perspective, in 2004 the JSE introduced the annual Socially Responsible Investment Index (SRI index) (JSE ticker code – J100) and it was the first of its kind in an emerging market (JSE, 2014). The purpose of the SRI index was to "identify South African companies with leading environmental, social and governance practices" (JSE, 2014). Sonnenberg and Hamann (2006) suggest that the introduction of the SRI index was a catalyst in creating awareness of corporate citizenship and provided exposure to sustainability issues within firms. They further suggest that a key factor as a result of being announced as a constituent of the SRI index is the reputational value that firms gain.

In 2015 the JSE terminated the SRI index and announced its partnership with the global index brand provider, FTSE Russell, to provide the new FTSE/JSE Responsible Investment Index series. This series includes the Responsible Investment Index (RI index) (JSE ticker code – J113) and the top 30 constituents of the RI index (RI top 30)

(JSE ticker code – J110). To be included on the RI index, constituents must have a FTSE ESG Rating of 2.5 or above, and the RI top 30 comprises of the 30 best ranked constituents (FTSE, 2018d). Section 2.1.2 provides more detail regarding the ground rules and FTSE ESG rating methodology. The change in index provider allows for JSE companies to be assessed against more global and 'cutting edge' measures of ESG (JSE, 2015). The RI index is reviewed and announced every six months in June and December and applies a minimum threshold for entry.

Significantly, the RI top 30 Index selects and weights stocks to ensure the index is investable, and screens liquidity to ensure investability (FTSE, 2018c). This provides great potential to the RI top 30 to become a benchmark index or tracker fund that can be used by institutional investors. The number of constituents in the October 2015, June 2016, December 2016, June 2017, December 2017 and June 2018 RI index was 61, 69, 73, 77, 76 and 76, respectively.

The United Nation's 17 Sustainable Development Goals (SDGs), launched in 2015, aim to achieve a better and more sustainable future for all by tackling global challenges including poverty, inequality, climate, environmental degradation, prosperity, and peace and justice. The goal is to achieve the 17 SDGs by 2030. The SDGs are the succession of the UN's eight Millennium Development Goals (MDGs), aimed to reduce poverty, which was started in 2000 and ended in 2015 with the introduction of the SDGs (UN, 2018).

Crucially, the SDGs place greater focus on the private sector to achieve the 17 goals. This saw the collaboration with the PRI to create the SDG Investment Case that focuses on educating companies and institutional investors on how they can contribute to achieving the SDGs through their business activities, asset allocation and investment decisions (PRI, 2017). The SDGs are having a major impact on RI as the themes surrounding the SDGs can be used by institutional investors to develop their RI strategies (PRI, 2017).

The Johannesburg Stock Exchange's (JSE's) requirement for listed companies to comply with King IV, further highlights the increased pressure on firms to shift their focus towards CSR and ESG disclosure and performance (IOD, 2016). Specifically,

principle 17 of King IV states that, “The governing body of an institutional investor organization should ensure that responsible investment is practiced by the organization to promote the good governance and the creation of value by the companies in which it invests” (IOD, 2016).

The aforementioned illustrates that from a local (JSE) and global scale (UN) there has been intensified pressure towards institutional investors to adopt a more responsible investment ideology.

From the institutional investors’ perspective, an Ernst & Young (EY) survey found that most South African institutional investors consider ESG issues in their investment assessments. Significantly, they found that over 50% of the respondents said that they “actively value ESG issues”, and that this engagement with ESG can ultimately determine their investment decision. Similarly, they found that since the previous survey in 2007, there has been a noticeable shift in focus towards RI (van der Ahee & Schulschenk, 2013). This is supported by a survey conducted by Alexander Forbes whereby they found that 83% of asset managers say that ESG factors are considered in their investment processes. Asset managers use a variety of RI strategies to include ESG factors in their investment process. Table 2.2 in section 2.1.1 provides a detailed analysis of the most common RI strategies. They further suggest that client demand and regulation play a key role in the inclusion of ESG issues into investment decisions (AlexanderForbes, 2016).

Perhaps most importantly, in 2011 regulation 28 of the Pension Funds Act of 1956 was amended. This amendment imposed a duty upon institutional investors to include ESG factors when making investment decisions as these considerations were deemed to “materially affect the sustainable long-term performance of a fund’s assets” (National Treasury, 2011). In 2016 the Financial Services Board (FSB) reported that the total assets in retirement funds in South Africa was R4 035 billion. This amendment has led to a significant amount of funds requiring the inclusion of ESG factors into their investment decisions (FSB, 2016).

The above information indicates that there has undoubtedly been growth in RI driven by regulators and investors on a global and local scale. Greater emphasis is being

placed on ESG performance and disclosure. Of particular importance to this study is the introduction of FTSE/Russell, by the JSE, as the index provider of the RI index series. This change is an attempt to better define RI and gain the confidence in and reliance of investors on RI in South Africa (JSE, 2015).

Therefore, it is crucial to understand how the market reacts to the information content contained in the RI index Series, as they “are designed for use in the creation of index tracking funds, derivatives and as a performance benchmark” (FTSE, 2018c). Particularly, as the JSE’s continuous development and remodelling of the SRI/RI indexes is an attempt to provide these institutional investors with a more comprehensive tool to assess firms’ ESG disclosure and performance. This increased availability and comparability of ESG information and can be used by investors to guide their RI decisions. The independent FTSE ESG Advisory Committee is tasked with assigning ESG ratings to companies on the JSE. These ratings are solely comprised of ESG factors (non-financial information) and do not take into account any financial information such as profit margins and earnings per share (FTSE, 2018d). Therefore the announcement of the constituents, inclusions and exclusions on/from the RI Index series is a release of non-financial information.

The purpose of this paper is to investigate whether the release of the RI index series contains price-sensitive information content, and therefore has value relevance for the market. This paper uses the constituents of the RI index series as a proxy for quality ESG performance and disclosure. Furthermore, the inclusion in the RI index series serves as validation for improved ESG performance and disclosure, and consequently the exclusion as a deterioration of ESG performance and disclosure since the previous review.

1.1 Hypotheses

The following hypotheses will be tested:

i. **Null hypothesis:** constituents on the RI index Series do not experience significant abnormal share returns.
ii. **Hypothesis 1:** constituents of the RI index experience significant abnormal share returns.
iii. **Hypothesis 2:** constituents of the RI top 30 experience significant abnormal share returns.
iv. **Hypothesis 3:** firms included on the RI index experience significant abnormal share returns.
v. **Hypothesis 4:** firms included on the RI top 30 experience significant abnormal share returns.
vi. **Hypothesis 5:** firms excluded from the RI index experience significant abnormal share returns.
vii. **Hypothesis 6:** firms excluded on the RI top 30 experience significant abnormal share returns.

The remainder of the paper is organised as follows: Section 2 contains the literature review. Section 3 provides an overview of the event study methodology and the data design used. Section 4 displays the results of the event study and section 5 is a discussion of these results. Section 6 then concludes the paper and offers potential areas of future research.

2. LITERATURE REVIEW

In order to explore the impact that the release of ESG information, contained within the semi-annual RI index series announcement, has on a firm's share price, it is important to understand the prevalent theories, prior literature and empirical results. First, this section will deal with the definition of RI and the most prevalent RI strategies as per Eurosif (2018). Following this, the history of the RI index series, as well as FTSE Russel's ground rules and methodology, are presented to allow for greater understanding of the manner in which RI index series is constructed. It is essential to understand the economic relationship between firm value and ESG factors. So, it is necessary to study previous literature on this relationship, as this will impact how the market reacts to the release of the ESG information contained within the announcement of the RI index series. To better understand the theory supporting the market's reaction to the release of information, be it financial or non-financial, a discussion of Fama's (1970) efficient market hypothesis is presented.

This study focuses on the release of non-financial information into the South African market. Consequently, similar studies, within a South African context, dealing with the release of non-financial information and the market's reaction, are revealed to establish if the South African market values non-financial information. These similar studies in a South African context consist of the following studies: Esterhuysen and Ward (2011), Wolmarans and Sartorius (2009) and Ward and Muller (2010), Once the knowledge of this reaction is established, a more focused approach towards prior studies dealing with the release of RI indexes is undertaken. This section deals with the release of RI indexes from across the globe and the market's subsequent reaction. These studies are those most similar to this study as they use event study methodology to measure the market's reaction, and many also investigate the inclusion and exclusion of firms from the relevant RI indexes. The last section in the literature review deals with the challenges facing the SRI sector in South Africa, to determine what have been the major shortfalls of RI in South Africa.

2.1 Responsible investment

2.1.1 Definition of RI

The PRI defines RI as “an approach to investing that aims to incorporate environmental, social and governance (ESG) factors into investment decisions, to better manage risk and generate sustainable, long-term returns” (PRI, 2018c). Eurosif suggests that RI is an investment strategy that integrates ESG factors with long-term sustainable returns (Eurosif, 2018).

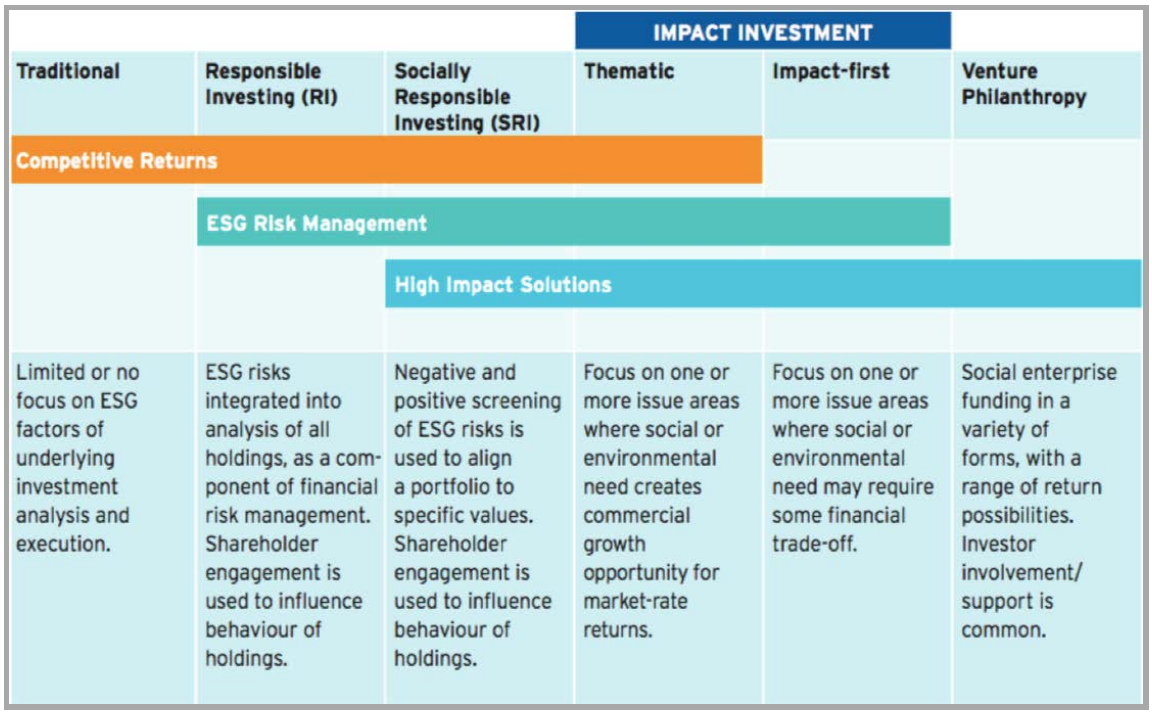
Notably, the PRI make a distinction between RI and other ESG investment approaches, such as SRI, impact investing, sustainable investment, ethical investment and green investment. The main differences between these investment styles is two-fold. The first difference is the priority placed on generating financial return, and secondly, their specific emphasis on certain factors within ESG (PRI, 2018c).

All of the aforementioned investment styles have a goal to generate financial return through integrating ESG factors within their investment decisions. RI’s motive for the inclusion of ESG factors in investment decisions is that if these factors are ignored the investor is ignoring key risks and opportunities that will have a tangible effect on the long-term returns. The other investment strategies include ESG factors, in order to make a difference in the world, and not for risk reduction purposes. According to the PRI, even investors, whose sole objective is to generate financial returns, should adopt an RI strategy for risk reduction purposes (PRI, 2018c).

The second difference is that RI takes a holistic view towards ESG factors, while the other investment strategies may target specific themes within ESG, such as focusing solely on environmental factors. RI’s main principle is to use ESG information for risk identification in order to consider all relevant factors with regard to investment decisions. Therefore, RI does not explicitly require exclusionary practices, but places importance on integrating financial and ESG data in order to generate sustainable long-term returns. Investors can use a variety of practices in order to meet the principles of RI (PRI, 2018c).

The table below provides further clarification of the differences between ESG investment styles.

Table 2.1 Different ESG investment styles



Source: (Cashman, 2015)

Table 2.2 displays the most common RI strategies as per Eurosif (2018). It is important to note that RI investment decisions are often subjected to more than one strategy.

Table 2.2 Responsible investment strategies

Strategy	Explanation
Best in class	This strategy involves selecting the best performing investments based on ESG factors from a specified class or category. The best-in-class approach identifies and selects leaders in ESG factors through ESG analysis within a defined investment universe. The RI top 30 is selected using a best-in-class method where the investment universe provides the constituents for the RI index.
Engagement and voting	First, this strategy requires the investor to have ownership of the firm's shares. Through ownership of the shares, the

Strategy	Explanation
	investor can then actively engage the company on ESG issues through voting or challenging the company on their ESG decisions. This is a long-term process. The ultimate goal is to influence the firm to engage in responsible behaviour in terms of ESG and increasing ESG disclosure through share ownership. It is important to note that voting alone on corporate governance issues is not enough to fall under this strategy.
ESG integration	• ESG integration combines explicit ESG risks and opportunities faced by each investment with financial factors in the mainstream analysis of investments. Asset managers research specific ESG issues, both positive and negative, that may affect the financial performance of each investment. This knowledge is then used by asset managers to guide their investment decisions. Specific areas of concern for Eurosif (2018) are: • Environmental: greenhouse gas emissions, renewable energy, energy efficiency, resource depletion, chemical pollution, waste management, water management, impact on biodiversity. • Social: labour standards (along the supply chain, child labour, forced labour), relations with local communities, talent management, controversial business practices (weapons, conflict zones), health standards, freedom of association. • Governance: corporate governance issues (executive remuneration, shareholder rights, board structure), bribery, corruption, stakeholder dialogue, lobbying activities.
Exclusions	A systematic screening of companies, sectors or countries is applied to specifically exclude investments. Certain

Strategy	Explanation
	criteria are used to identify specific activities that, if requirements are met, will be excluded from the asset owner or individual's permissible investment universe. Eurosif (2018) suggest common criteria include "weapons, pornography, tobacco and animal testing". This is also known as ethical or value-based investment and the exclusionary criteria are often shaped by religious beliefs.
Impact investing	These investments are made with a clear intention to cause a positive social and environmental impact while still generating a financial return. Impact investors have differing financial expectations with regard to their impact investing. The financial returns will be in a range from below market to a market-related return, depending on their intentions. Both individual and institutional investors use impact investing and can be investments into firms or specific projects (GIIN, 2018).
Norms-based screening	The screening process involves determining if investments comply with international ESG standards and norms. International norms are determined by international bodies, such as the United Nations.
Sustainability themed	Thematic funds are set up, which can either focus on specific or multiple ESG issues. Therefore, these funds are inherently linked to addressing sustainability issues. For funds to be included under this strategy they are required to apply an ESG analysis or screen before investments are added to the fund.

Source: Eurosif (2018) and (GIIN, 2018)

2.1.2 FTSE/JSE Responsible Investment Index Series

As mentioned in the introduction, the FTSE/JSE Responsible Investment Index Series replaced the JSE SRI index in 2015. The new index series comprises of the FTSE/JSE Responsible Investment Index (RI index) (JSE ticker code – J113) and the top 30

constituents of the RI index (RI top 30 Index) (JSE ticker code – J110) (FTSE, 2018c). The RI index is reviewed and announced every six months in June and December, and applies a minimum threshold for entry. These reviews use market data at the close of the Monday, four weeks prior to the effective date of the reviews (FTSE, 2018d).

FTSE Russel replaced EIRIS (Ethical Investment Research Services) as the index provider. The purpose of this change is to allow JSE companies to be assessed against the more global and 'cutting edge' measures of ESG (JSE, 2015). FTSE Russel, the global index provider, is also responsible for the FTSE4Good Index series. The series consists of "six benchmark indexes covering the Developed and European regions, the US, Japan and the UK" (FTSE, 2018b). An independent FTSE ESG Advisory Committee is tasked with assigning the ESG ratings. This committee consists of the leading "market practitioners and experts on global ESG principles and criteria" (FTSE, 2018d).

FTSE Russel seek to minimise subjectivity by having clearly-defined rating methodologies. The ESG ratings are based on publicly available data and includes an overall rating, which involves using underlying 'Pillar and Thematic Exposures and scores'. The overall ESG rating is determined by the three pillars, namely, ESG that are supported by fourteen themes. Each theme contains 10 to 35 indicators and the entire model consists of 300 indicators. On average, 125 indicators are applied per company. The breakdown in ESG pillars is shown in Figure 2.1 and the three Pillars and fourteen Themes in Figure 2.2 (FTSE, 2018a).

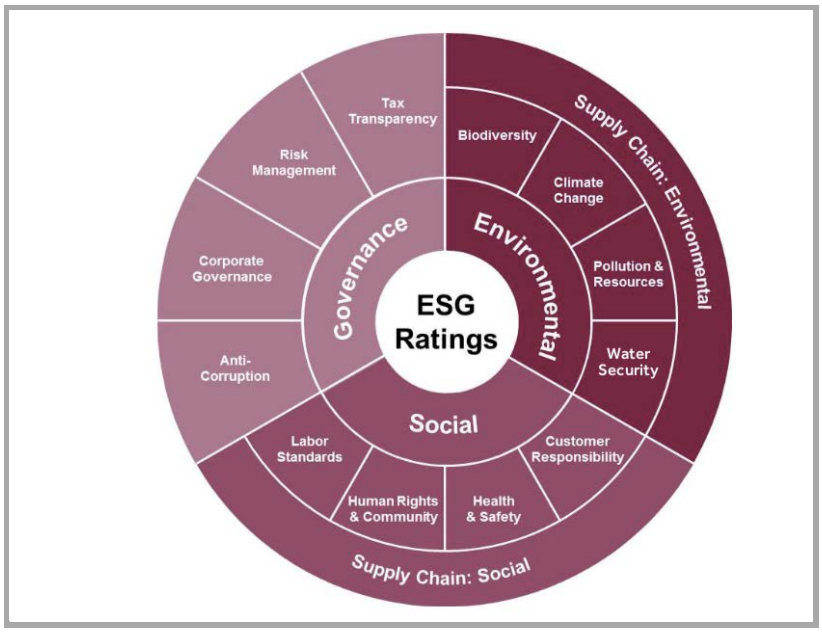


Figure 2.1 Transparent and objective ESG ratings

Source:(FTSE, 2018a)

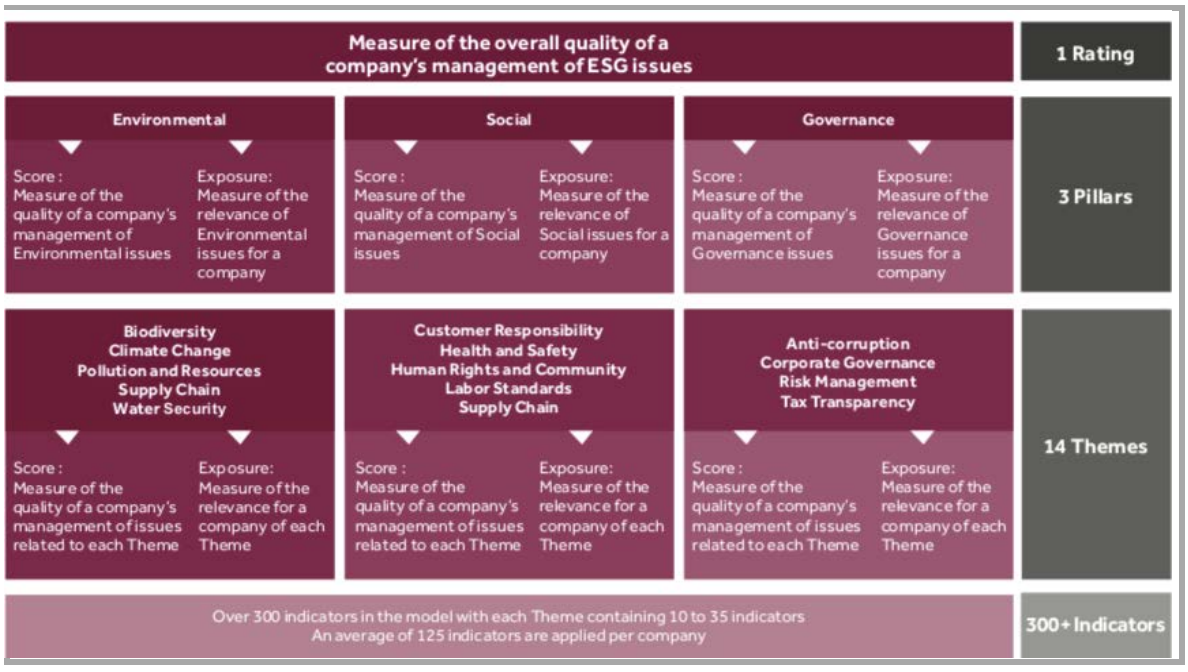


Figure 2.2 ESG ratings

Source: (FTSE, 2018a)

The above FTSE ESG Rating methodology is applied to all eligible companies. The eligible universe comprises constituents of the FTSE/JSE Shareholder Weighted All Share Index and investment trusts are specifically excluded. For a firm to be included on the RI index, it must have FTSE ESG Rating of 2.5 or above, and for a firm to be

excluded, the constituent must have an FTSE ESG Rating of 2.1 or below for a 12-month period (FTSE, 2018d).

The RI top 30 selects and weights stocks to ensure the index is investable, screening liquidity to ensure investability. This provides great potential to the RI top 30 to become a benchmark index or tracker fund that can be used by institutional investors (FTSE, 2018c). In order to achieve the aforementioned, the RI top 30 uses certain rules for the insertion and deletion of firms from this index.

The rules for insertion and deletion at each periodic review of the RI top 30 is as follows per the FTSE ground rules (FTSE, 2018d):

i. "A security will be inserted at the periodic review if it rises to 27th position or above when the eligible companies are ranked by FTSE ESG Ratings."
ii. "A security will be deleted at the periodic review if it falls to 34th position or below when the eligible companies are ranked by FTSE ESG Ratings."
iii. "A constant number of constituents will be maintained in the FTSE/JSE Responsible Investment top 30 Index. Where a greater number of companies qualify to be inserted in an index than those qualifying to be deleted, the lowest ranking constituents (ranked by FTSE ESG Ratings) presently included in the index will be deleted to ensure that an equal number of companies are inserted and deleted at the periodic review. Likewise, where a greater number of companies qualify to be deleted than those qualifying to be inserted, the securities of the highest-ranking companies (ranked by FTSE ESG Ratings, which are presently not included in the index, will be inserted to match the number of companies being deleted at the periodic review."
iv. "In the event two companies have the same FTSE ESG Ratings, the companies will be ranked based on investable market capitalisation."
v. "The market capitalisation of a constituent's multiple lines are aggregated for the purposes of ranking."

Reserve lists are created for the five highest ranking non-constituents of the RI top 30. The firms on the reserve list are included on a ranking basis in the RI top 30 if a constituent is deleted during the time period between each semi-annual review (FTSE, 2018d). These buffers are used to "provide stability and reduce turnover in the selection of constituents, while ensuring that the Index continues to be representative of environmental, social and governance factors" (FTSE, 2018d).

2.2 Economic relationship between firm value and environmental, corporate social responsibility and governance factors

2.2.1 Causality

The direction of this relationship has been explained by the slack resources' theory and the good management theory. While the majority of the literature indicates a positive relationship between CSR and corporate financial performance (CFP) (Griffin & Mahon, 1997), Tsoutsoura (2004) suggests that, "different explanations for this result depend on the direction of the causality between CSR and profitability".

Tsoutsoura (2004) provides an argument whereby firms that are financially strong have more resources available and can afford to invest in more CSR initiatives. Firms experiencing financial problems will invest less in CSR initiatives. This theory is known as 'slack resources theory' and indicates a positive relationship between CSP and prior financial performance (Waddock & Graves, 1997).

The other argument presented by Waddock and Graves (1997), is that CSP is positively associated with future financial performance, known as the good management theory. Through investment in corporate social initiatives, management is proactively meeting shareholders' expectations. This may cause future problems and issues being resolved before they result in litigation, which could negatively impact future profitability. Good management theory suggests that companies who invest in CSR attract more competent employees, receive reputational benefits, and are exposed to less risk of negative events occurring, all of which culminates in greater future financial performance (Waddock & Graves, 1997).

The direction of causality between CSP and CFP has been described by the above theories, however, empirical results do not indicate the direction of causality. This is supported by Brown and Caylor (2004) where they state, “our caveat regarding absence of causality is consistent with other studies (for example, Larcker *et al*., 2004) that recognise the impossibility of solving the endogeneity issue”. It can be seen that the direction of causality cannot be determined, nonetheless it is important for this study to understand the relationship between firm value and ESG factors.

2.2.2 Environmental

King and Lenox (2001) analysed 652 U.S. manufacturing firms, spanning the time period from 1987 to 1996. They found, “a real association between lower pollution and higher financial performance”. They provide further evidence that a firm’s environmental performance, when compared to the industry in which they operate, results in higher financial performance (King & Lenox, 2001).

Konar and Cohen (2001) performed a study on the market value of firms on the S&P 500 using objective environmental performance measures. Two of these environmental performance measures were the Toxic Chemical Release Inventory (TRI88) which measures the aggregate pounds of toxic chemicals emitted per dollar revenue, and the number of environmental lawsuits against the firm in 1989 known as LAW89. The dependent variable was defined as the intangible asset value, whereby the market value of a firm can be divided into tangible and intangible assets. The intangible asset value was determined as intangible assets that generate the return of a firm (patents, trademarks, etc.) over its tangible assets, reduced by intangible liabilities (consumer mistrust in a company as a result of fraudulent activities) (Konar & Cohen, 2001). A key finding was a significant and positive (negative) relationship between good (poor) environmental performance and the intangible asset value of publicly-traded firms on the S&P 500.

2.2.3 Corporate social responsibility

The widely cited work of Orlitzky, Schmidt, and Rynes (2003) provides rigorous methodology and review of the relationship between CSP and CFP. Conducting a

meta-analysis of 52 studies with a total sample size of 33,878 observations. Their results contributed a number of key findings:

i. CSP is positively correlated with CFP, and there is a higher correlation with accounting-based measures compared to market-based indicators in measuring financial performance.
ii. The relationship tends to be bi-directional and simultaneous.
iii. Reputation is an important mediator for the relationship.

A prior study conducted by Waddock and Graves (1997) supports these findings. They illustrate through an empirical study that both prior and future financial performance is positively associated with CSP.

A positive and statistically significant relationship exists between CSP and a series of bottom-line benefits. This relationship was empirically tested using a dataset, including most of the S&P 500 firms from 1996–2000. Tsoutsoura (2004) used the KLD rating to produce a rating scale of good and poor CSR, as well as using the Domini 400 Social Index (DSI 400) as a second measure of good CSR (Tsoutsoura, 2004). Financial performance was measured by accounting variables, namely return on assets (ROA), return on equity (ROE) and return on sales (ROS).

Pava and Krausz (1996) introduce the empirical irregularity called the ‘paradox of social cost’, which states that due to the inherent costs relating to achieving social performance one would expect a negative relationship between social and financial performance. They conducted 21 studies where 12 studies reported a positive relationship between CSR and CFP, one reported a negative association and eight reported no measurable association. They concluded that although there are conflicting results, there is a tendency toward a positive relationship (Pava & Krausz, 1996).

Griffin and Mahon (1997) evaluated 25 years of research conducted on the relationship between CSP and CFP. Although they describe the number of negative relationships as ‘impressive’, it is important to note that the majority of negative relationships were due to research investigating the impact on the stock market and

potential illegalities and product problems/recalls. The majority of researchers found a positive relationship between CSP and CFP, while the reasons for such contradicting results are attributed to conceptual, operationalisation and methodological differences in the definitions of social and financial performance.

2.2.4 Governance

Gompers, Ishii, and Metrick (2003) created the Governance Index (G-Index), which is used often as a measure of corporate governance. The G-index uses 24 different provisions of corporate governance for 1500 firms. Gompers et al. (2003) found a high correlation between the G-Index and firm value, as well as corporate governance being strongly correlated with stock returns during the 1990s.

Building on Gompers, Ishii and Metrick's G-Index, Brown and Caylor (2004) developed the Gov-Score. The Gov-Score is a composite measure of 51 factors encompassing eight corporate governance categories: audit, board of directors, charter/bylaws, director education, executive and director compensation, ownership, progressive practices and state of incorporation. "We document that Gov-Score is better linked to firm performance than is G-Index." Brown and Caylor (2004) findings, using a sample of 2327 firms, showed that better-governed firms are relatively more profitable, more valuable and pay out more cash to their shareholders. Within the governance categories, executive and director compensation is most highly associated with good financial performance (Brown & Caylor, 2004).

Further contribution to the literature was added by Bhagat and Bolton (2008). First, using the G-Index of (2003) as a measure of corporate governance they found that board member independence and CEO-Chair separation is significantly and positively correlated with better contemporary and subsequent operating performance. However, in contradiction to Gompers *et al*. (2003), they found that none of the governance measures are correlated to future stock market performance.

These indicate that despite varying measures of corporate governance there is a positive relationship between corporate governance and CFP, thereby providing evidence of a strong relationship regardless of the differing measures of corporate

governance. However, there remains doubt to whether governance measures correlate to future stock market performance.

2.3 Efficient market hypothesis

The historical background of the efficient market hypothesis is provided in Eugene Fama's (1970) paper, Efficient Capital Markets, Fama's efficient market hypothesis states that, "security prices, at any time, fully reflect all available information". Fama attributes the adjustment of security prices to three information subsets: (Fama, 1970)

i. Weak form tests: only historical information adjusts security prices.
ii. Semi-strong form tests: publicly available and historical information adjusts security prices.
iii. Strong form tests: all information is fully reflected in security prices.

Fama's (1970) paper concluded that evidence supporting market efficiency significantly outweighs contradictory evidence.

Smith, Jefferis, and Ryoo (2002) conducted a study on the efficiency of the JSE. Using the multiple variance ratio test, they found that stock prices on the JSE follow a random path. This is reiterated by Magnusson and Wydick (2002) who concluded that the JSE is weak form efficient. In a further study conducted by Jefferis and Smith (2005), they found that throughout the period from the early 1990s to June 2001, the JSE was weak form efficient. Finally, Simons and Laryea (2006) also found that the JSE is weak form efficient and their finding was supported by both parametric and non-parametric tests. The aforementioned suggests that the JSE follows a random path. Therefore, successive security returns are independent of one another and are adjusted by historical information, however, all information may not be fully reflected in security prices on the JSE.

Bénabou and Tirole (2010) state that there is doubt as to whether financial markets will react to CSR. The stock market may be undervaluing CSR and "they keep surprising the market positively, in contradiction to market efficiency". This may result in companies with greater CSP reflecting positive abnormal returns. "An intermediate

story is a slow repricing, whereby environmental and social factors are gradually becoming recognized as relevant price factors for valuing a company; virtuous firms experience high returns during this recognition period, but should experience lower ones once the repricing is completed" (Bénabou & Tirole, 2010).

The purpose of this study is to determine whether the market reacts to the release of the non-financial information regarding firms' ESG performance and disclosure contained within the RI index series. So, it is crucial to determine whether the South African market values the release of the RI index series as price sensitive information. The next section will look at how the JSE reacts to the release of various non-financial information.

2.4 Market reaction to non-financial information in South Africa

Esterhuysen and Ward (2011) suggest that investors do not solely focus on accounting and financial information in their investment decisions. Investors also incorporate factors relating to "morality, society, the environment and corporate governance". The aim of their research was to determine whether the release of Financial Mail's 'top companies' announcement had significant information content.

Financial Mail applies both financial and non-financial criteria to determine the 'top' companies. 40% of the total score is determined based on financial criteria that includes the return on equity, internal rate of return and compound growth in earnings per share. While the remaining 60% is based on non-financial criteria, which seeks to create a score on the 'investability' of the company and includes the following:

i. Manner in which the company is managed.
ii. Corporate governance procedures and culture.
iii. Black empowerment status.
iv. The quality of communication with shareholders and stakeholders.
v. Growth prospects of the applicable sector.
vi. Contextual issues, such as regulatory uncertainties and tax regimes.
vii. Liquidity of the share.

(Esterhuysen & Ward, 2011)

Esterhuysen and Ward (2011) found that companies included for the first time in Financial Mail's 'top companies' list, experienced significant and positive abnormal returns for the first ten trading days after the publication date. It is important to note that the key assumption in the study was that the announcement of the Financial Mail's 'top companies' was predominantly a release of non-financial information into the market. This was assumed on the premise that the financial information was already fully priced into the share prices. Therefore, the market reaction was caused by the release of new 'price-sensitive information' relating to factors in the aforementioned non-financial criteria.

In South Africa, Black Economic Empowerment (BEE) is a mechanism that can be employed by firms to enhance their CSR. Through the transfer of wealth to previously disadvantaged groups in South Africa, firms are engaging in socially responsible activities. Listed companies BEE transaction announcements release new non-financial information into the market regarding their commitment to wealth distribution in South Africa (Wolmarans & Sartorius, 2009).

Wolmarans and Sartorius's (2009) study sought to determine whether this release of non-financial information has an impact on firm value. They found a positive relationship between the announcement of BEE transactions and shareholder wealth. However, BEE transactions from 2002 to 2005 did not create significant shareholder wealth. In 2006, BEE transactions evidenced a significant and positive relationship with firm value for both the three- and five-day event windows. In addition, the results indicate that the type of BEE transaction does not create a significant difference in shareholder wealth. This study demonstrates that the market has reacted to the release of this non-financial information in the form of a BEE transaction announcement.

Ward and Muller (2010) followed an event study methodology to determine the long-term relationship between BEE deals and share price. Their definition of a BEE deal was one that impacted equity ownership. They conclude that firms with a market capitalisation of less than R3,5bn experience positive cumulative abnormal returns of around 10% for the first year after the announcement date. Whereas larger firms experience a marginally negative cumulative abnormal return (Ward & Muller, 2010).

The above studies, namely Esterhuysen and Ward (2011), Wolmarans and Sartorius (2009) and Ward and Muller (2010), provide evidence that the South African market reacts to the release of non-financial information content. This demonstrates that non-financial information regarding a firm's CSR initiative, such as firms' black empowerment status and governance practices, are relevant pricing factors in the South African market.

2.5 Performance of socially responsible indexes across different markets

This section is the most important as these studies are most comparable to the purpose of this study. The following studies use event study methodology to measure the market's reaction to the release of RI indexes from across the globe. Gladysek and Chipeta (2012) performed an event study in South Africa that measured the market's reaction to the release of SRI index and is the most similar to this study. The following studies also measure the market's reaction to the inclusion and exclusion of firms on the RI indexes: Consolandi, Jaiswal-Dale, Poggiani, and Vercelli (2009), Curran and Moran (2007), Robinson, Kleffner, and Bertels (2011) and Doh, Howton, Howton, and Siegel (2010). Statman (2006) and Schröder (2007) performed studies on whether the returns generated by RI indexes are superior or inferior to conventional benchmarks.

2.5.1 South African SRI index performance

Gladysek and Chipeta (2012) performed an event study on the constituents of the JSE SRI index in South Africa, covering the six annual releases of the index from May 2004 to November 2009. From 2004 to 2009 the number of firms examined was 38, 37, 45, 47, 55 and 63 respectively. They assumed that markets are efficient and used the SRI index as a proxy for CSR. The 41-day event window used includes 20 days prior to the announcement, the announcement date (T0) and 20 days after the announcement (Gladysek & Chipeta, 2012).

They found that, "with the exception of the year 2005, investors do not earn any significant abnormal returns when investing in the SRI index around the time when

constituents are announced" (Gladysek & Chipeta, 2012). They attributed the significant abnormal returns experienced in 2005 to the enthusiasm of the Index being established (Gladysek & Chipeta, 2012).

They concluded that short-term investors will not earn significant ARs when investing in the SRI index around the announcement date. However, they found that post-announcement date, the CAARs were positive for 2005 and 2007, but this was not enough to prove that the announcement of the SRI index contained new information.

Gladysek and Chipeta (2012) attributed the lack of reaction to a number of reasons:

i. The lack of trading volume on the SRI index;
ii. Investors are unaware of the SRI index;
iii. Investors are misguided that they would receive inferior returns if they choose to invest in the SRI index as opposed to a general equity index.

It could be further argued that the reason they found no significant ARs is that the market had already priced in a firm's CSR. Investors analyse the annual reports to inform their investment decisions. The annual reports precede the release of the SRI index and, as such, the SRI index could be confirmatory or a second tier provider of information; the first tier being the annual financial statements and continuous monitoring of firm-specific announcements/information releases with regard to their sustainable activities.

2.5.2 European SRI index performance

Consolandi, Jaiswal-Dale, Poggiani and Vercelli (2009) performed an event study to test the market's reaction to the inclusion (deletion) of a company entering (exiting) the Dow Jones Sustainability Stoxx Index. The underlying assumption of their study was that the inclusion (exclusion) from the index represents good (bad) news about that company's corporate responsibility practices. Their study was driven by their belief that investors are placing greater value on non-financial information. Therefore, portfolio managers are faced with trade-off decisions of holding the market while also

holding companies within their portfolios that may have unsustainable and poor CSR practices (Consolandi *et al*., 2009).
Their results suggest that companies entering (exiting) the Dow Jones Sustainability Stoxx Index subsequently experience positive (negative) abnormal returns. Concluding that their results suggest CSR performance is an important factor in asset allocation activities (Consolandi *et al*., 2009).

Curran and Morran (2007) performed a similar event study using the inclusion (exclusion) on the FTSE4Good UK Index as a proxy of good (poor) CSR. Their results indicate a trend toward positive abnormal returns for companies that were included in the FTSE4Good UK Index and conversely negative abnormal returns for their exclusion. However, unlike Consolandi *et al*. (2009), the trends indicated insignificant abnormal returns, providing evidence that firms do not experience significant financial gains/losses from their inclusion/exclusion from the FTSE4Good UK Index (Curran & Moran, 2007).

2.5.3 American SRI index performance

Robinson, Kleffner and Bertels (2011) explored whether membership on the Dow Jones Sustainability World Index (DJSI) signaled leadership in sustainability practices. They sought to determine whether membership on this index generated value for constituents. This membership can send signals to the market that the constituents are sustainability leaders, as the DJSI is based on a 'best-in-class' selection methodology (Robinson *et al*., 2011).

Robinson *et al*. (2011) focused on North American firms being included or excluded from the DJSI. They found that the addition of a firm to the DJSI resulted in a 'sustained' increase in a firm's share price. Conversely, the exclusion of a firm resulted in a 'temporary' decrease in firm value for ten days. They conclude that, if included in the DJSI, the benefits of inclusion outweigh the application costs. Significantly, they suggest that the reputational effect from being included on the DJSI is a major factor for the increase in share price as opposed to a listing effect. They emphasise the increased role that sustainability is playing on reputation (Robinson *et al*., 2011).

Another study was conducted by Doh *et al*. (2010) on the Calvert social index. They suggest that the inclusion of firms on this index could provide confirmatory signals to the market that the company has legitimate CSR practices. However, they found that the market reacted to firms excluded from the Calvert social index.

Doh *et al*. (2010) attribute this reaction to informational asymmetry, whereby firms that engage in socially responsible acts are more willing to distribute this information to their stakeholders, while firms that display socially irresponsible acts are more likely to try and supress this information. A firm's exclusion from the Calvert social index evidences a release of new negative information into the market. Doh *et al*. (2010) suggest that this imbalance of information is the reason for greater market reaction towards excluded firms. Although, even in the presence of information symmetry, it could be argued that the market is biased towards poor CSP and is likely to punish such firms more heavily than the reward attributed to socially responsible companies.

Statman (2006) compared the returns of four socially responsible indexes, namely the Domini 400 Social Index (DS 400 Index), the Calvert Social Index, the Citizens' Index, and the U.S. portion of the Dow Jones Sustainability Index to the conventional S&P 500 Index. Statman (2006) found that the returns of the DS 400 Index were higher than those of the S&P 500 Index during the overall May 1990 – April 2004 but not in every sub-period. Concluding that returns of socially responsible indexes were generally higher than those of the S&P 500 Index.

However, the higher returns were not found to be statistically significant and he therefore failed to reject the null hypothesis that risk adjusted returns of socially responsible companies are equal to the risk adjusted returns of conventional companies. This suggest that investors are not foregoing returns when investing in socially responsible indexes in the United States (Statman, 2006).

2.5.4 International SRI index peformance

Schröder (2007) studied the difference in returns of 29 SRI stock indices to their respective stock indexes. His findings were as follows: “The results show that SRI stock indices do not exhibit a different risk-adjusted return than conventional benchmarks. But many SRI indexes have a higher risk relative to the benchmarks.”

This is important as investors are not lessening their financial returns when investing in SRI indexes, however, neither has there been a risk reduction effect as a result of investing in SRI indexes.

2.5.5 Key challenges facing SRI in South Africa

Following the aforementioned study of Gladysek and Chipeta (2012), that found no significant reaction to the release of the SRI index, there has been a great deal of research surrounding the growth of SRI/RI and the specific challenges faced by SRI/RI in South Africa.

An EY and CRISA (2013) research paper revealed that leaders in RI have arisen since its emergence in South Africa in 1992. Nevertheless, the SRI/RI landscape has seen many challenges that have hindered its growth within South Africa, and these have been summarised in Table 2.3:

Table 2.3 Key challenges facing SRI in South Africa

	Key challenges facing SRI in South Africa
CRISA & EY (2013)	There is a lack of comparability of SRI/ESG data: this hinders the inclusion of RI into investment decisions. Service providers are unaware of what it means to properly integrate ESG information into their decision-making process. A further challenge is the lack of clarity with regard to what it means to balance short-term and long-term objectives for ESG.

	Key challenges facing SRI in South Africa
	Poor disclosure of the use of ESG information in the investment process, which makes it difficult to assign accountability to service providers.
Viviers (2014)	Limited adoption of a wide variety of RI strategies/practices: using content analysis, Viviers (2014) found that the majority of asset managers use impact investing strategies to address social issues, such as infrastructure development and economic empowerment, while screening methods have also seen an increased growth. Viviers (2014) suggests that a broader range of investment strategies need to be used if RI is going to reach its full potential in South Africa. Lack of focused RI research, training and education in South Africa: greater awareness and understanding of RI in the South African environment are needed for South Africa to fully embrace RI.
Herringer, Firer & Viviers (2009)	Definition of SRI/RI: the lack of an agreed upon and widely understood definition of SRI/RI is hindering RI growth. It is important to understand RI in the South African context and the material ESG factors affecting each sector. Risk adjusted performance of SRI funds: as seen in the SRI index performance in section 2.5, there is empirical evidence that investing in SRI funds does not compromise financial returns. This is also supported by Herringer *et al*. (2009) whereby they suggest there is "a growing body of evidence suggesting that the risk-adjusted performance of SRI funds is on par with conventional funds, especially over the long-term, negative perceptions among investors need to be challenged." It is crucial for the growth of RI in South Africa that investors are aware of the risk-reducing benefits of RI. This is one of the key selling points of RI (Herringer et al., 2009).

	Key challenges facing SRI in South Africa
	Human capital in South Africa: there is a financial skills shortage, particularly regarding the skill of integrating financial information with ESG data to make investment decisions that are aligned with the principles of RI. In addition, due to the long-term focus of RI, the transferal of asset managers over the duration of the investment further amplifies the RI human capital shortage. This can result in inexperienced asset managers, in terms of RI, being employed, which may hinder the long-term approach of RI. Availability of SRI information and research: increased pressure on companies to disclose ESG information, in forms such as sustainability/integrated reports, has improved the availability of ESG information. However, as Viviers (2014) suggests, the comparability of this information is a key challenge. Herringer *et al*. (2009) suggest that the SRI index has been "a catalyst in encouraging companies to comply with ESG reporting requirements" and has assisted in making ESG information more comparable. This is supported by an interviewee in Herringer *et al*. (2009)'s study who states that the SRI index has "made their job easier as the information is more readily available and packaged in such a way that most analysts can understand".
Heese (2015)	Affordability and flexibility of SRI for South African pension funds: with pension funds suffering from restructuring and member loss, it is difficult to include an SRI element when their priorities are focused on the liquidity of the investment. Linking to Herringer *et al*. (2009), the lack of consensus surrounding the definition of RI in South Africa. A key issue identified is the role of BEE in SRI. In addition, the criticism from the international sphere is that South Africa has failed to define how SRI is used to achieve transformation and those previously disadvantaged. The volatility of the Rand's value has impacted international investment in local SRI funds.

From Table 2.3 it can be seen that South Africa has its own unique SRI/RI landscape that faces numerous challenges. Overall the lack of an agreed upon definition of RI and the availability and comparability of RI information seem to be the major inhibitors of RI in South Africa. Therefore, it is important that this study analyses whether the market reacts to the release of the RI index series, and if so, the introduction of FTSE Russel as the index provider may have overcome some of these aforementioned challenges.

3. METHODOLOGY

3.1 Event study overview

An event study as prescribed by Benninga (2008) was followed to determine the event and estimations windows, as well as to calculate the abnormal returns (ARs). The ARs measure the impact an event has on the firm's share price during the event window. An irregular movement in a company's share price as a result of the release of the RI index series would evidence an abnormal return. Subsequently, cumulative abnormal returns (CARs), average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) were calculated to provide further analysis of the market's reaction to the event during the event window.

The event study determined how the market reacts to the release of the RI index series. The release contains non-financial information regarding firms' ESG performance and disclosure. The RI top 30 Index contains non-financial information regarding the best performing firms, while the inclusion (exclusion) on the RI index and RI top 30 is a further release of non-financial information. Those included receive validation regarding their ESG performance and disclosure according to FTSE Russel's methodology. Consequently, an exclusion suggests a deterioration in ESG performance and disclosure since the previous review.

3.1.1 Event

The event date is the date that FTSE Russel releases the RI index series; this release contains the list of included and excluded firms. The event is defined as the announcement of the constituents of the RI index series.

Table 3.1 Event dates

Event	Event date	SRI/RI constituents
RI index series October 2015	12 October 2015	61
RI index series June 2016	6 June 2016	69
RI index series December 2016	6 December 2016	73
RI index June 2017	2 June 2017	77
RI index series December 2017	5 December 2017	76
RI index series June 2018	5 June 2018	76

3.1.2 Event window

The event window is the number of days before and after the event takes place. The length of the event window was centred on the event date, that is the release of the RI index series every six months. McWilliams and Siegel (1997) suggest that "it should be long enough to capture the significant effect of the event, but short enough to exclude confounding effects". In this study, an 11-day event window was chosen, that is five days prior to the event, the date of the event (release date) and five days after the event. The length of the event window allowed the researcher to capture the effect of the release of the RI index series, but was not too long so as to be impacted by confounding events. The 11-day event window is supported by Benninga (2008).

3.1.3 Estimation window

The estimation window is used to estimate a model of the share price's expected returns under normal trading conditions prior to the event window (Benninga, 2008). Benninga (2008) suggests that the length of the estimation window should be 252 trading days and at a minimum 126 trading days. In this study, the estimation window consisted of 252 trading days prior to the event window, this allowed the market model to predict true stock price movements (Benninga, 2008).

Benninga (2008) suggests two models for estimating expected share returns, namely the market model and the market-adjusted two-factor model, with the latter not

requiring an ordinary least squares (OLS) regression. The market model was used as MacKinlay (1997) states that “the market model represents a potential improvement over the constant mean return model. By removing the portion of the return that is related to variation in the market's return, the variance of the abnormal return is reduced”.

3.2 Population and sampling

The population for this study was the semi-annual release (June and December) of the FTSE/JSE RI index series. This includes the releases from October 2015 to June 2018 which can be viewed in table 3.1. No sampling was used. To ensure that there were no confounding events around the release date, Stock Exchange News Service (SENS) announcements and media releases were studied. Individual companies that experienced significant confounding events around the release date were removed from the study.

It is important to note that the following are not the only confounding events that occurred during the event window, but examples thereof:

i. The news of Steinhoff’s accounting irregularities broke in early December 2017 and on the 5th of December, Markus Jooste stepped down with immediate effect. This saw the share price plunge. In August 2017 the share price was trading at around R90 per share and by the announcement of Markus Jooste stepping down it was trading at around R5,50 per share. This was a significant confounding event that took place during the event window in December 2017. Due to the sustained volatility in Steinhoff’s shares it has been removed for both December 2017 and June 2018 RI index releases *(*Cronje, 2017*) and (*Cairns, 2018*).*

ii. In June 2016, MTN agreed to pay the $1.671 billion fine to the Nigerian government for failing to register 5.2 million subscribers, some of which the Nigerian government believe were being used by the terrorist group Boko Haram to plan terrorist attacks and trade oil for weapons. This was

a significant confounding event that occurred during the June 2016 event window and was subsequently removed from the study *(*eNCA, 2016*)*.

iii. The share price of EOH plunged by 45% during the week of the 4th to the 8th of December 2017. Investors were left confused as to the reasons for the drop. Many attributed the drop in share price to the news that Jehan Mackay, EOH director, had been aggressively selling off his shares over the past two weeks. This occurred during the December 2017 event window and was removed from the study (Moneyweb, 2017).

3.3 Procedure and time frame

The closing share price data and JSE All Share Index price data was collected from IRESS Expert. The release dates and constituents of the SRI/RI index was obtained from FTSE Russel's website. The calculations for the event study were performed using Excel, and significance tests were calculated using STATA. Judgement was used to remove companies that made significant announcements around the release of the RI index series.

The event study methodology was individually applied to each release of the RI index series and the results combined to determine the overall reaction to the release of the RI index series across the years, and this is referred to as the Total RI Index and Total RI top 30 in this study. Furthermore, to provide more comprehensive results, the event study was separately applied to included and excluded firms from the RI index and the RI top 30 from October 2015 to June 2018.

3.4 Data design

The market model is an OLS regression of the individual firms' share returns and the returns on the JSE All Share Index over the estimation window. It was used to estimate a share's expected returns under normal trading circumstances (Benninga, 2008).

The expected share returns for the event window, as estimated by the market model, was calculated as:

$$E(R_{it}) = \alpha_i + \beta_i * R_{Mt}$$

Equation 1

Where:

$E(R_{it})$= Expected share return of the market model on day t

R_{Mt}= Market return on day t

α_i and β_i = coefficients calculated by the OLS regression of the individual firm's share returns and the returns on the JSE All Share Index over the estimation window.

The daily returns of the market over the estimation window was calculated as:

$$R_{Mt} = \frac{P_{Mt}}{P_{Mt-1}} - 1$$

Equation 2

Where:

R_{Mt} = daily return of the JSE ALSI on trading day t

P_{Mt} = closing price of the JSE ALSI on trading day t

P_{Mt-1} = closing price of the JSE ALSI on trading day t-1

The daily returns on the closing share prices was calculated as:

$$R_{it} = \frac{P_{it}}{P_{it-1}} - 1$$

Equation 3

Where:

R_{it}= daily return of share i on trading day t

P_{it}= closing price of share i on trading day t

P_{it-1} = closing price of share i on trading day t-1

The ARs was calculated as the difference between the actual share return in the event window on day t less the $E(R_{it})$ that was predicted by the market model on day t.

$$AR_{it} = R_{it} - \underbrace{(\alpha_i + \beta_i * R_{Mt})}_{\text{Expected Return}}$$

Equation 4

Where:

R_{it}= Actual share return in the event window on day t

$(\alpha_i + \beta_i * R_{Mt})$= Expected share return = $E(R_{it})$

The ARs are "a measure of the impact the event had on the market value of the security" (Benninga, 2008). If the ARs indicate statistically significant differences between the actual share returns and the expected share returns during the event window, then the release of the RI index series contains price sensitive information.

Cumulative Abnormal Returns (CARs) were then calculated to measure the total impact the release of the RI index series had on the firm's share price during the event window.

$$CAR_{it} = AR_{it} + CAR_{it-1}$$

Equation 5

To provide further analysis the ARs and CARs will then be then averaged over each time period in the event window to calculate AARs and CAARs as follows:

$$AAR_t = \frac{1}{n}\sum_{t=1}^{n} AR_{it}$$

Equation 6

$$CAAR_t = \frac{1}{n}\sum_{t=1}^{n} CAR_{it}$$

Equation 7

Where: n = number of constituents on day t

3.4.1 Hypothesis testing

To test whether the AARs and CAARs were statistically significant, a one sample t-test was performed as follows:

$$t - test\ AAR_t = \sqrt{n}\ \frac{AAR_t}{\sigma_{(AARt)}}$$

Equation 8

Where:

$\sigma_{(AARt)}$= standard deviation across firms

n = number of firms in the study

$$\sigma^2{}_{AARt} = \frac{1}{n-1}\sum_{i=1}^{n}(AR_{it} - AAR_t)^2$$

Equation 9

A one sample t-test was also performed on the CAARs.

$$t - test\ \mathrm{CAAR} = \sqrt{n}\ \frac{\mathrm{CAAR}}{\sigma_{(\mathrm{CAAR})}}$$

Equation 10

Where:

$\sigma_{(\mathrm{CAAR})}$ = standard deviation of the CAARs of each firm in the study

n = number of firms in the study

$$\sigma^2{}_{CAAR} = \frac{1}{n-1}\sum_{i=1}^{n}(CAR_i - CAAR)^2$$

Equation 11

A requirement to carry out the one sample t-test is that the data must be approximately normally distributed. The analysis of normality was performed based on descriptive statistics (kurtosis and skewness) and using a histogram as a visual aid to determine whether the results were normally distributed. Furthermore, the skewness/kurtosis test for normality was run in STATA. From this analysis, it was concluded that the data was

approximately normally distributed. The analysis of normality can be found in section 7.1 in the appendix.

Non-parametric tests are not used alone, but rather together, to ensure the robustness of the conclusions of the parametric tests and to control for outliers (MacKinlay, 1997; McWilliams & Siegel, 1997). MacKinlay (1997) suggests that the most common non-parametric tests are the sign test and the rank test. The sign test accounts for skewness in the ARs, if any, while the Wilcoxon Signed Rank Test is perhaps more powerful as it considers both the sign and magnitude of the ARs. The Wilcoxon Signed Rank Test is supported by McWilliams and Siegel (1997). The study most similar to this, conducted by Gladysek and Chipeta (2012), also used the Wilcoxon Signed Rank Test and the Signed Rank Test to supports the results of their parametric t-tests.

Parametric tests assume that the AARs and CAARs are normally distributed, while non-parametric tests relax this assumption (Leedy & Ormrod, 2005). From the above, the test of normality indicates that the data is approximately normally distributed and therefore the non-parametric tests merely serve as confirmatory evidence of the parametric t-tests. Therefore, the Wilcoxon Signed Rank Test was performed on the AARs for each day in the event window and this can be found in section 7.2 in the appendix.

The final test of significance will be a two-sample t-test that was performed between the inclusion and exclusion of firms on/from the RI index and RI top 30 post-announcement date. This was performed to determine whether the differences between firms included/excluded on/from the RI index, as well as the RI top 30, were statistically significant.

3.5 Validity and reliability

The share price data was extracted from IRESS Expert and the RI index series release dates from FTSE Russel's website, were verified on the JSE's website to ensure the validity of the data and the event date. Individual companies that experienced confounding events around the release date were removed from the study to further ensure the validity of the results. Reliability of the results were maintained by following

the event methodology in a manner that when repeated would yield the same results. The use of both parametric (t-tests) and non-parametric (Wilcoxon signed-rank test) tests increases the robustness and validity of the significance tests. Event studies are a robust and frequently used methodology when studying CSR-related events and their impact on share price. It has been used by Gladysek and Chipeta (2012), Curran and Moran (2007), Consolandi *et al*. (2009), Robinson *et al*. (2011) and Doh *et al*. (2010) which are the most similar to this study.

3.6 Scope and limitations

The scope of this research applies to the release of the RI index series from October 2015 to June 2018. It does not include the terminated SRI index. It is assumed that the RI index series correctly captures a firm's ESG performance and disclosure. Therefore, an inclusion (exclusion) from the RI index series serves as a proxy for an improvement (deterioration) in a firm's ESG performance and disclosure. This paper does not seek to critically analyse the accuracy of the selection criteria for the RI index series. The returns were not adjusted for risk.

4. RESULTS

The Figures displaying the AARs show the AARs per day over the 11 day period and the Figures displaying the CAARs show the CAARs per day over the 11 day period for the respective tests in the study i.e. constituents, inclusions and exclusions on the respective indexes.

4.1 Total RI index

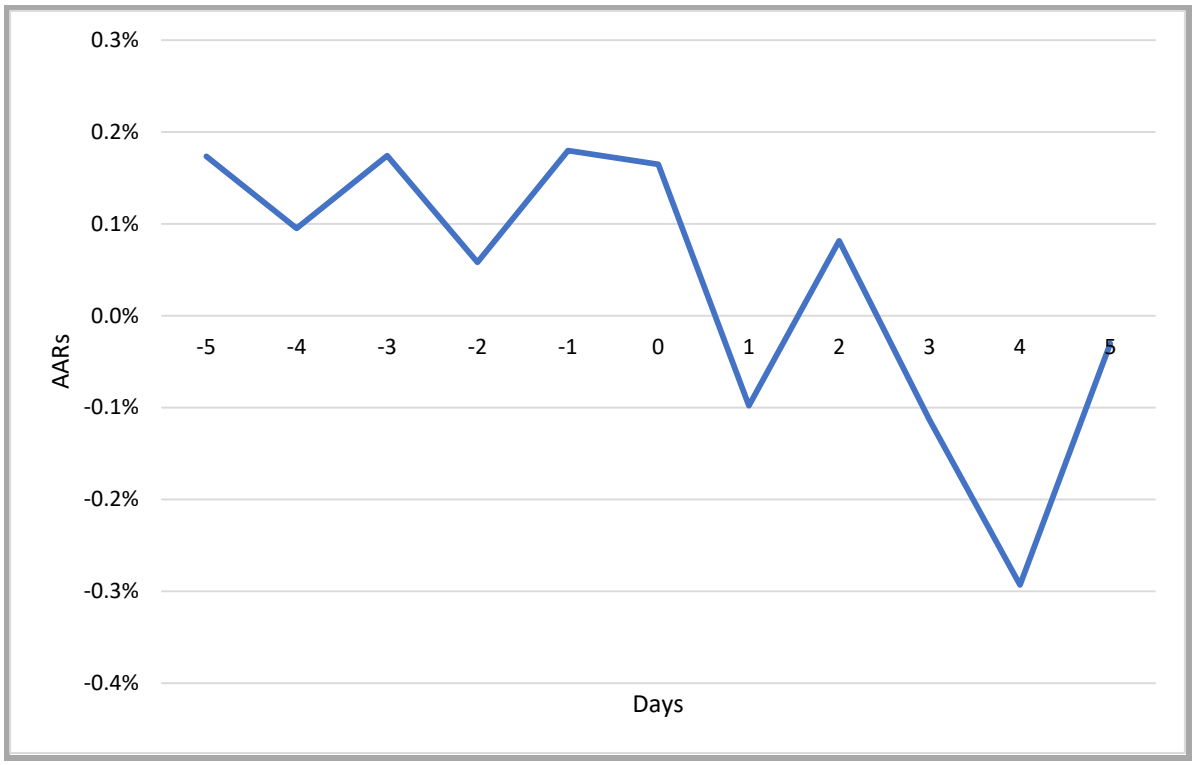


Figure 4.1 AAR – Total RI index

Figure 4.1 displays AARs for the Total RI index. The AARs are all positive before the announcement date. These positive AARs are of a similar magnitude and therefore there is not a great deal of volatility within the AARs prior to the event date. At T0, the announcement of the constituents of the RI index, the AAR is 0,165%. The first negative AAR of the event window occurs at T+1, equal to -0,098%. After announcement date, there is a great deal more volatility in the AARs compared to the pre-announcement AARs. There are two positive AARs at T0 and T+2 and four negative AARs that occur at T+1, T+3, T+4 and T+5. The minimum AAR equal to -0,0293% occurred at T+4 and the maximum AAR equal to 0,184% occurred the day before the announcement date at T-1.

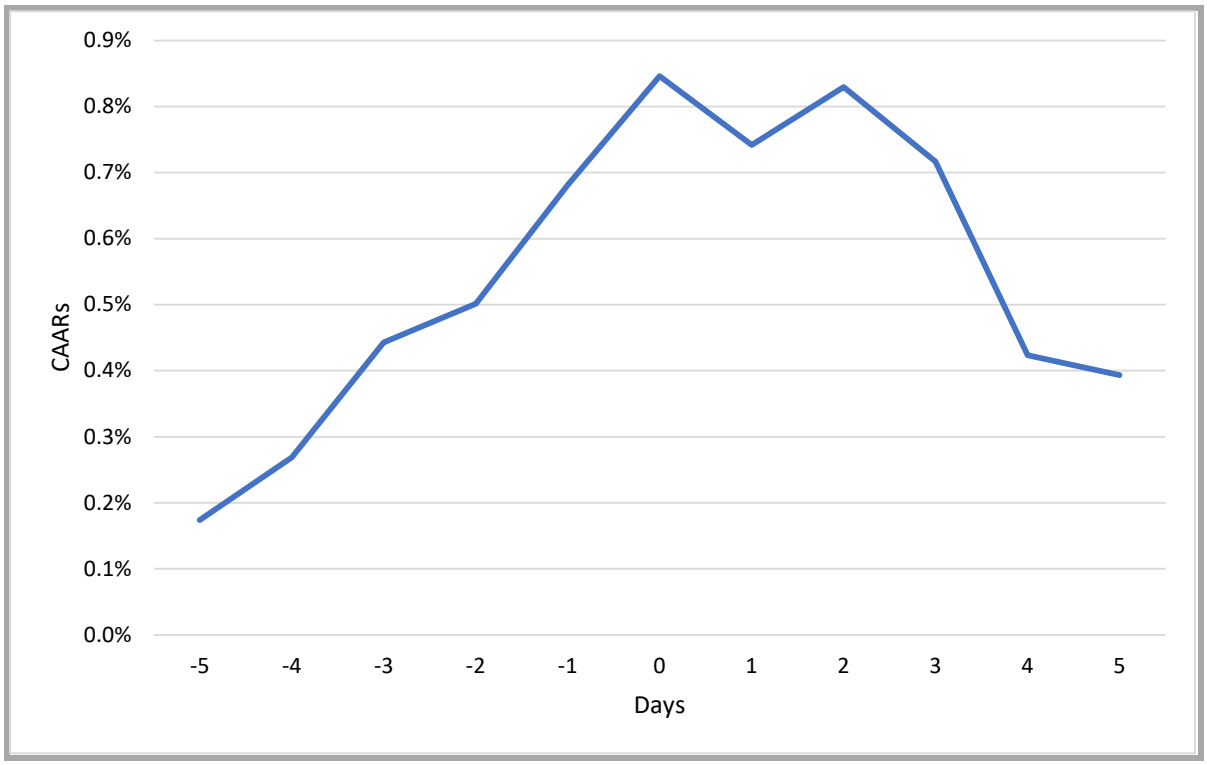


Figure 4.2 CAAR – Total RI index

From T-5 to T0, the CAARs display an increasing trend with the sharpest increase occurring from T-2 to T+2, as displayed in Figure 4.2. The peak of the CAARs equal to 0,846% occurs on the announcement date. The CAARs display a decreasing trend post-announcement date, excluding the slight increase at T+2. The CAARs for the event window is equal to 0,393% and over the entire event window the CAARs were never below 0%.

Overall it seems as though the market initially receives the inclusion of firms on the RI index as positive news. However, at T+3 it appears as if the market is correcting its overreaction, which demonstrates some level of market inefficiency. The correction of the market's overreaction is supported by the negative and statistically significant AAR at T+4 as reflected in Table 4.2.

Table 4.1 AAR descriptive statistics for the Total RI index

Time	Mean	Median	Standard deviation	Min	Max
-5	0,174%	0,038%	1,784%	-6,337%	6,856%
-4	0,095%	-0,070%	1,778%	-6,962%	7,146%
-3	0,174%	0,096%	2,001%	-6,642%	8,836%
-2	0,058%	0,001%	1,792%	-5,419%	7,292%
-1	0,180%	0,062%	1,817%	-7,735%	9,043%
0	0,165%	0,142%	2,124%	-6,797%	9,576%
+1	-0,098%	-0,167%	1,994%	-8,602%	9,306%
+2	0,082%	-0,057%	1,889%	-6,934%	8,099%
+3	-0,113%	-0,111%	1,595%	-6,307%	8,258%
+4	-0,293%	-0,303%	1,534%	-4,515%	6,861%
+5	-0,030%	0,031%	1,677%	-5,814%	7,030%

Table 4.1 displays the AARs descriptive statistics for the Total RI index across the event window. The largest AAR occurs at T-1 and the smallest AAR at T+4 of 0,180% and -0,293% respectively. The greatest volatility in the AARs occurs on the announcement date, with a standard deviation of 2,124%. Furthermore, the volatility seems to be the highest during the days closest to the announcement date. This further signifies greater market uncertainty towards pricing this new information content regarding RI index constituents.

Table 4.2 AAR and CAAR significance tests for Total RI index

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	**1,977****	**4,870%**
-4	1,086	27,812%
-3	**1,771***	**7,726%**
-2	0,662	50,843%
-1	**2,011****	**4,498%**
0	1,579	11,521%
+1	-0,998	31,904%
+2	0,877	38,080%
+3	-1,443	14,989%
+4	**-3,885*****	**0,012%**
+5	-0,366	71,476%

CAAR significance test	
CAAR test-statistic	**CAAR p-value**
1,400	16,221%

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.2 displays the statistical significance of the AARs and the CAARs for the Total RI index. Before the announcement date, at T-5, T-3 and T-1 the AARs are positive and statistically significant at the 95%, 90% and 95% level of significance respectively. Post-announcement date, the only statistically significant AAR is experienced at T+4. The AAR at T+4 is negative and statistically significant at the 99% level of significance. This displays contrasting market reactions pre and post-announcement date.

It seems as though the market is anticipating/expecting these firms to once again be constituents of the RI index. Upon the release of the information regarding their constituency on the RI index, the market confirms its prior knowledge of the firms' level of ESG performance and disclosure gained from the annual financial statements,

integrated reports and firm-specific announcements. Consequently, this confirmation is not a release of new information into the market and this is supported by the lack of market reaction shortly after the announcement date. At T+4, the pre-announcement over anticipation is subsequently corrected, which again displays a level of market inefficiency. The CAARs for constituents of the RI index are not statistically significant.

4.2 Total RI top 30

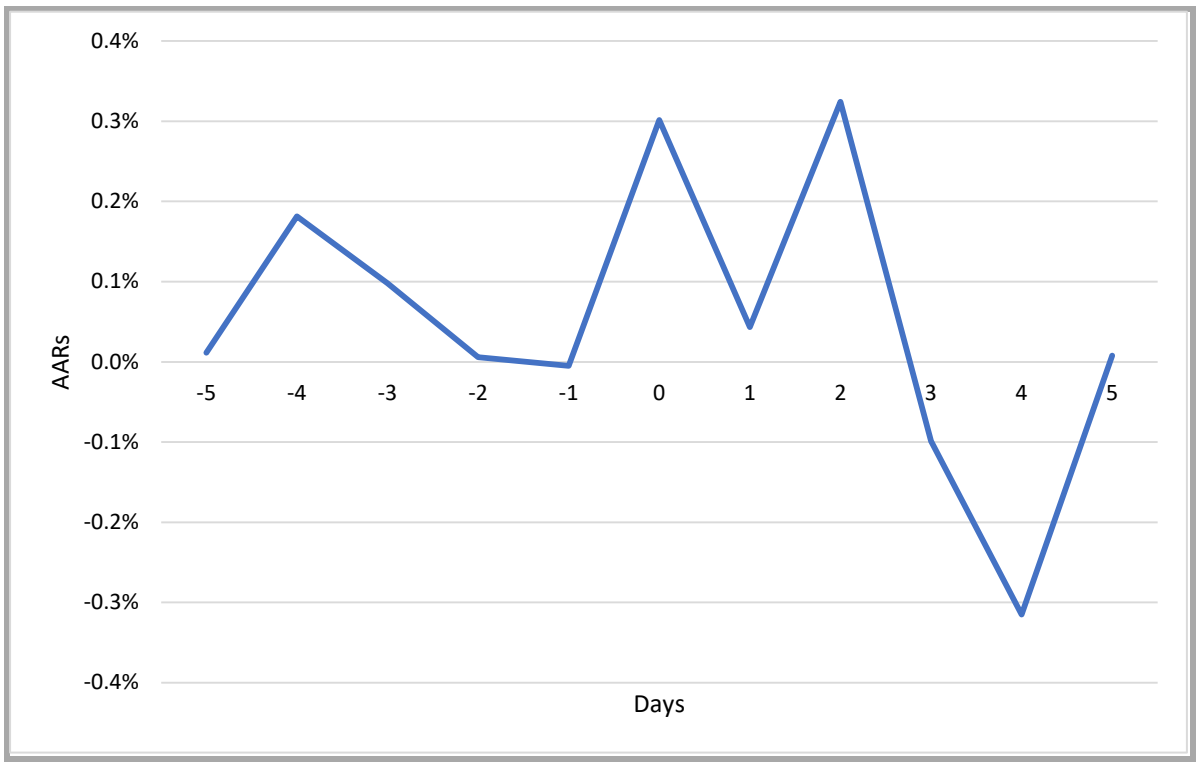


Figure 4.3 AAR – Total RI top 30

Figure 4.3 displays the AARs for the Total RI top 30. There are only positive AARs between the period T-5 to T+2, besides T-1 that is marginally negative with an AAR of -0,005%. On the announcement of the constituents of the RI top 30, the second largest AAR of 0,301% is experienced. This is marginally smaller than the largest AAR at T+2 equal to 0,324%. Therefore, two of the largest AARs occurred within the first two days from the announcement date. The first negative AAR arising on day T+3 is equal to -0,099% and is followed by another negative AAR of -0,315% on T+4. Looking at the AARs post event date, there is a great deal more volatility in the AARs when compared

to the AARs before the announcement. The AARs on T-5 and T+5, marking the start and the end of the event window, are extremely close to zero at 0,011% and 0,008%.

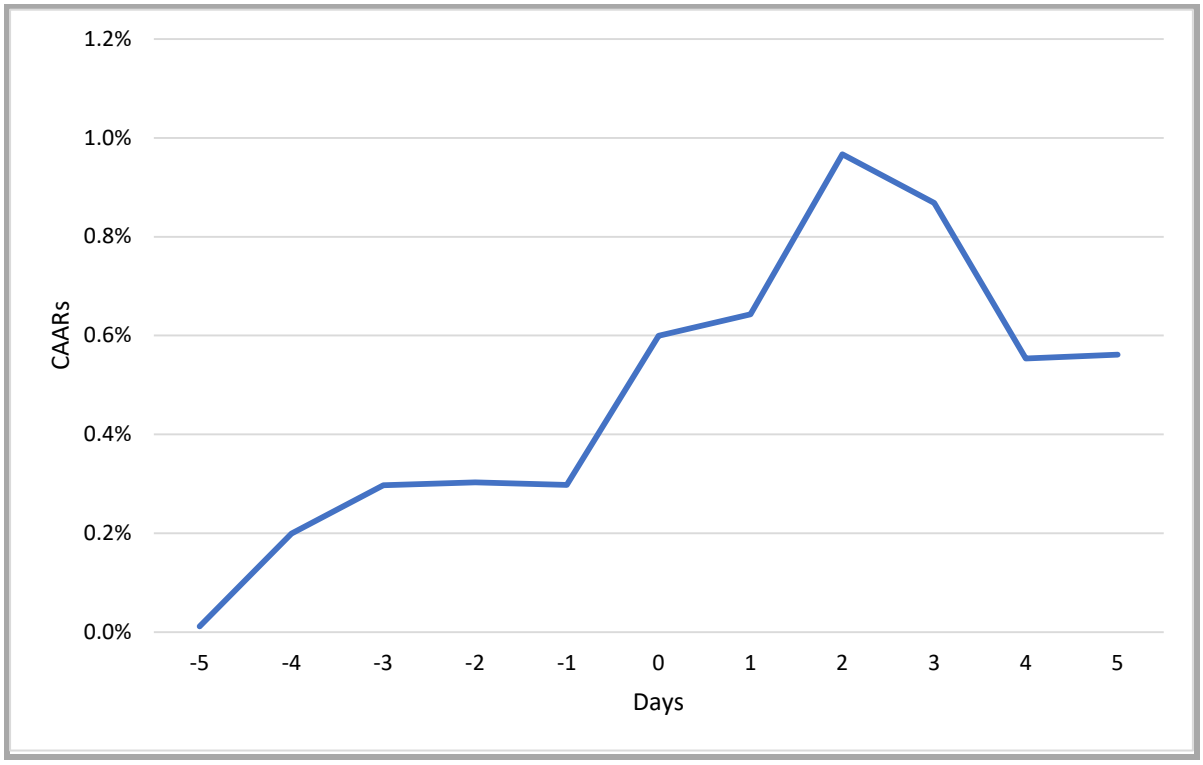


Figure 4.4 CAAR – Total RI top 30

Figure 4.4 displays the CAARs for the Total RI top 30. Between T-5 and T+2 the CAARs have an increasing trend. This increasing trend occurs as a result of only positive AARs from T-5 to T+2, excluding the marginally negative AAR at T-1. The peak of the CAARs at T+2 is equal to 0.967%. The most dramatic increase in the CAARs arises from T-1 to T+2. From the peak of 0,967% at T+2 there is a decreasing trend in the CAARs, however it is not as steep as the prior increasing trend. This decrease takes the CAARs to 0,561% at T+5. At no point in the event window were the CAARs negative.

Much like the reaction to the RI index, the market initially receives the constituents of the RI top 30 as positive news. However, at T+3 it appears as if the market is correcting its overreaction, which demonstrates some level of market inefficiency. The markets initial positive and subsequent negative reaction to constituents of the RI top 30 is

supported by the positive/negative statistically significant AARs experienced at T+2/T+4 respectively, as reflected in Table 4.4.

If Anglo American Platinum Limited and Impala Platinum Holdings Limited were removed from both the Total RI index and Total RI top 30 for this study, there may not have been such a substantial decrease at T+3 and T+4. However, the removal of these companies would not have resulted in a substantial increase in AARs at T+3 and T+4 due to the larger number of constituents on the Total RI index and the Total RI top 30 across the years is larger than those included and excluded from these respective indexes.

Table 4.3 AAR descriptive statistics for the Total RI top 30

Time	Mean	Median	Standard deviation	Min	Max
-5	0,011%	-0,144%	1,821%	-5,480%	5,187%
-4	0,182%	-0,105%	1,840%	-6,962%	7,146%
-3	0,098%	0,014%	1,898%	-5,886%	5,113%
-2	0,006%	-0,038%	1,687%	-5,251%	5,891%
-1	-0,005%	-0,171%	1,979%	-4,802%	9,043%
0	0,301%	0,223%	2,378%	-10,125%	9,576%
+1	0,043%	-0,114%	1,976%	-6,955%	9,306%
+2	0,324%	0,321%	2,144%	-4,430%	7,526%
+3	-0,099%	-0,105%	1,532%	-6,066%	7,251%
+4	-0,315%	-0,440%	1,633%	-4,052%	5,059%
+5	0,008%	0,038%	1,724%	-5,614%	6,488%

Table 4.3 displays the AARs descriptive statistics for the Total RI top 30 across the event window. The largest AAR occurs at T+2 and the smallest AAR at T+4 of 0,324% and -0,315% respectively. The greatest volatility in the AARs occurs on the announcement date with a standard deviation of 2,378%.

Table 4.4 AAR and CAAR significance tests for the Total RI top 30

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	0,085	93,267%
-4	1,331	18,492%
-3	0,697	48,687%
-2	0,047	96,227%
-1	-0,034	97,253%
0	**1,710***	**8,892%**
+1	0,295	76,862%
+2	**2,041****	**4,266%**
+3	-0,869	38,596%
+4	**-2,603*****	**1,000%**
+5	0,061	95,142%
CAAR significance test		
CAAR test-statistic		**CAAR p-value**
1,315		19,018%

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.4 displays the results of the significance tests for the AARs and CAARs of the Total RI top 30. On the announcement date, the first positive and statistically significant AAR occurs at the 90% level of significance. At T+2 a further positive and statistically significant AAR (at the 95% level of significance) is experienced for constituents of the RI top 30. However, two days later at T+4, a negative and statistically significant AAR at the 99% level of significance occurs. The CAARs are not statistically significant.

4.3 Inclusions

4.3.1 RI index

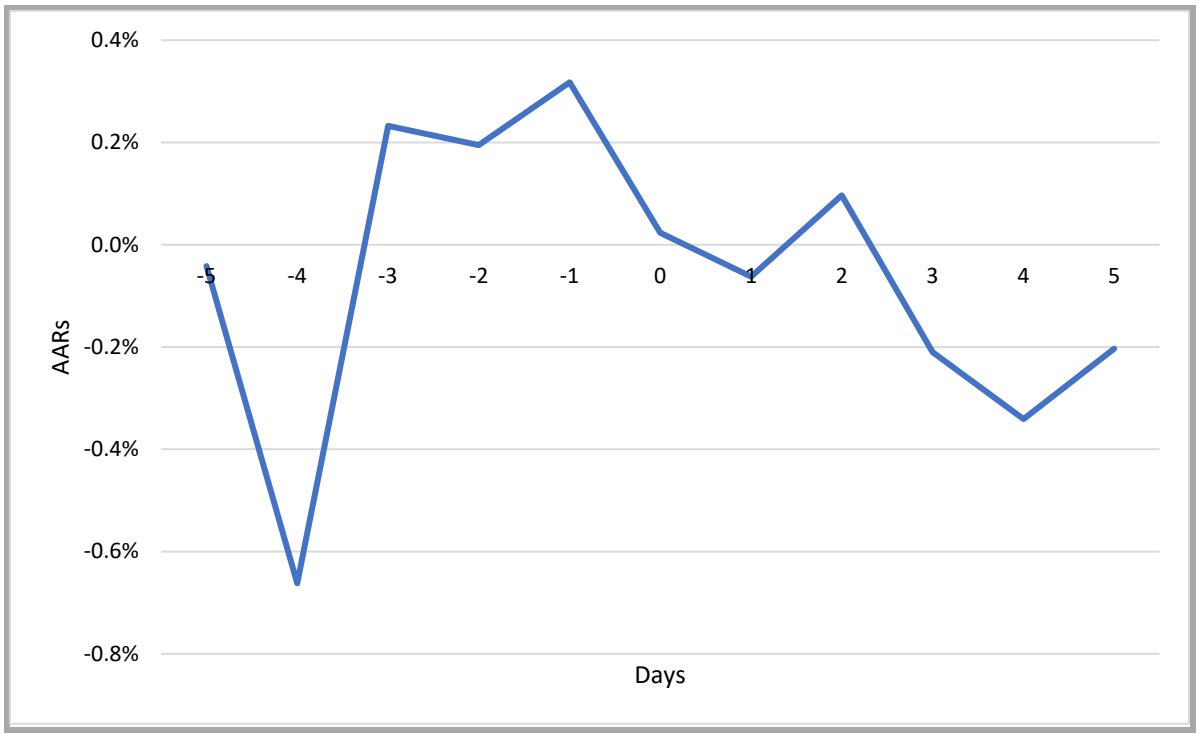


Figure 4.5 AAR RI index inclusions

Figure 4.5 displays the AARs of the RI index Inclusions. Between T-5 to T-3 in Figure 4.5 there is a great deal of volatility in the AARs, where T-4's AAR equal to -0,662% is the minimum AAR in the event window. The maximum AAR occurs at T-1 equal to 0,318%. The period T-3 to T+2, the AARs are all positive with the exception of T+1, which is slightly negative at -0,062%. The AARs on the announcement date are marginally positive at 0,023%. The announcement date of the RI index Inclusions (T0) and the day after the announcement (T+1), experiences the least market reaction excluding the AAR of -0,051% on T-5. From the period T+3 to T+5 there are only negative AARs.

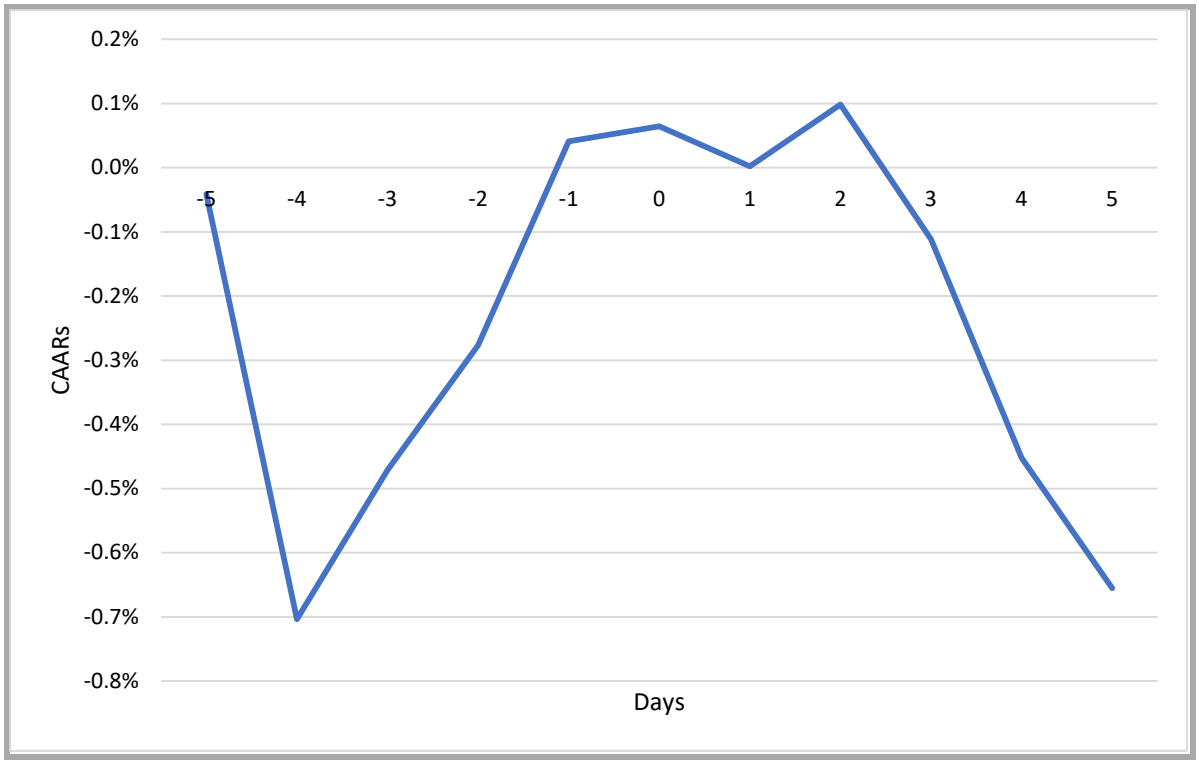


Figure 4.6 CAAR RI index inclusions

Figure 4.6 displays the CAARs for the RI index Inclusions. At T-4 the CAARs of -0,704% are at their lowest point; this is due to the largest AAR of -0,662% in the event window occurring at T-4. However, as reflected in Figure 4.6, from T-3 until T+2 there is an increasing trend in the CAARs. The CAARs become positive at T-1 and remain positive for the next three days in the event window. Therefore, one day prior to the announcement of the RI index Inclusions, the announcement date and two days post the announcement date, the CAARs are positive. From T+3 to T+5 the CAARs drop steeply. The CAARs for the event window is negative equal to -0,656%.

Despite marginally positive AARs at T0 and T+2, overall the market appears to react negatively to firms included on the RI index. The minimum AAR at T-4 of -0,662% is largely caused by the negative ARs of Liberty Holdings Limited and Adcock Ingram Holdings Limited at T-4. If these companies were to be removed, the CAARs would not have started out as negative, as reflected in Figure 4.6, yet their removal would not have changed the negative market reaction post-announcement date.

Table 4.5 AAR descriptive statistics for RI index inclusions

Time	Mean	Median	Standard deviation	Min	Max
-5	-0,041%	-0,018%	1,280%	-2,489%	2,225%
-4	-0,662%	-0,810%	1,558%	-3,906%	2,720%
-3	0,232%	-0,186%	2,423%	-5,342%	5,005%
-2	0,195%	0,021%	1,422%	-1,992%	3,683%
-1	0,318%	0,384%	1,744%	-3,153%	3,519%
0	0,023%	0,060%	1,804%	-3,652%	5,472%
+1	-0,062%	-0,344%	1,588%	-3,972%	4,204%
+2	0,096%	0,394%	2,043%	-3,435%	6,751%
+3	-0,210%	-0,022%	1,242%	-2,744%	1,714%
+4	-0,341%	-0,260%	1,568%	-3,383%	2,704%
+5	-0,203%	-0,228%	1,416%	-2,951%	2,824%

Table 4.5 reflects the descriptive statistics for the AARs for RI index Inclusions; the largest AAR occurs at T-1 and the smallest AAR at T-4 equal to 0,318% and -0,662% respectively. The greatest volatility in the AARs is at T-3 with a standard deviation of 2,423%.

Table 4.6 AAR and CAAR significance tests for RI index inclusions

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	-0,165	87,016%
-4	**-2,167****	**3,993%**
-3	0,489	62,904%
-2	0,698	49,171%
-1	0,929	36,197%
0	0,066	94,797%
+1	-0,200	84,316%
+2	0,241	81,167%
+3	-0,862	39,702%
+4	-1,109	27,813%
+5	-0,732	47,110%
CAAR significance test		
CAAR test-statistic	**CAAR p-value**	
-0,782	44,182%	

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

The only statistically significant AAR for RI index Inclusions is experienced at T-4 and the CAARs are not statistically significant as reflected in Table 4.6. However, as previously discussed, Liberty Holdings Limited and Adcock Ingram Holdings Limited largely contributed to the substantially negative AAR at T-4 and therefore the statistical significance cannot be wholly attributed to the release of the inclusions on RI index as this is also prior to its announcement date.

4.3.2 RI top 30

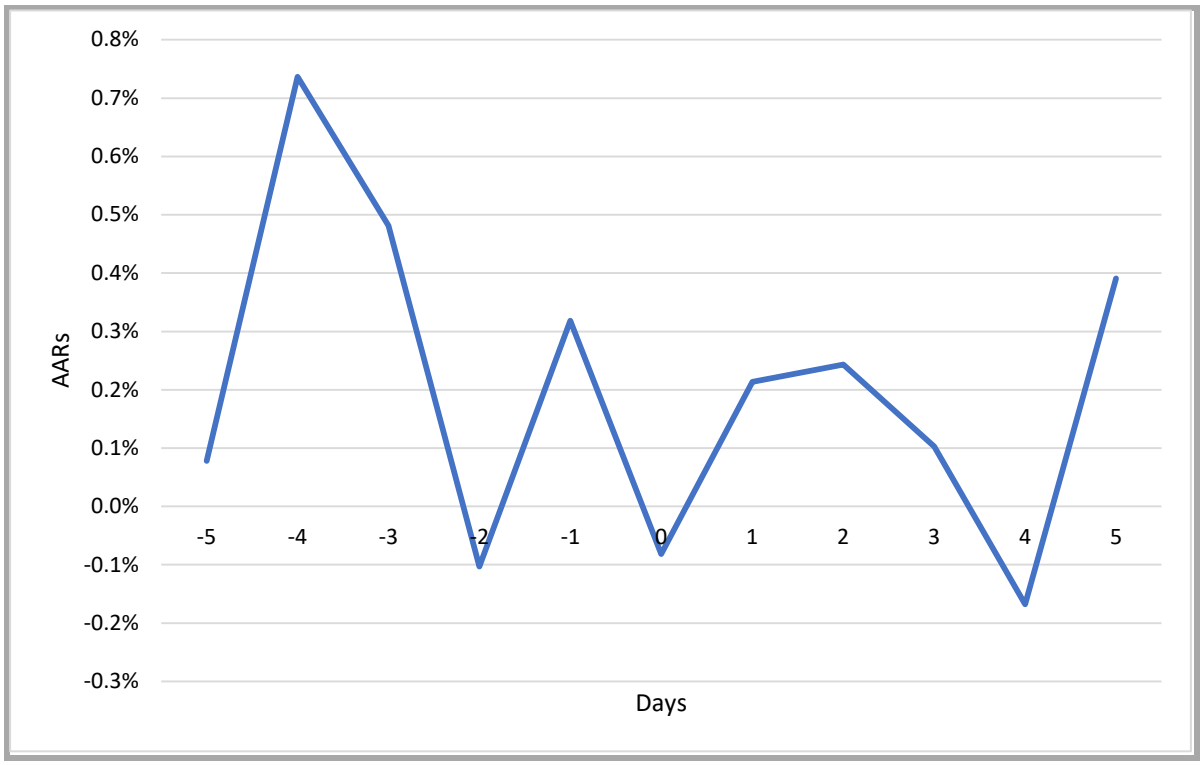


Figure 4.7 AAR – RI top 30 inclusions

Figure 4.7 reflects the AARs for the RI top 30 Inclusions; there are only three days of negative AARs over the event window that occur at T-2, T0 and T+4 and they have relatively small AARS of -0,103%, -0,082% and -0,168%, respectively. These are all marginally negative compared to the positive AARS for the other eight days in the event window. The maximum AAR is at T-4, which is equal to 0,737%. There is a slightly negative AAR on the announcement date of -0,082%. However, for the next three days post-announcement date, firms included on the RI top 30 experience positive AARs.

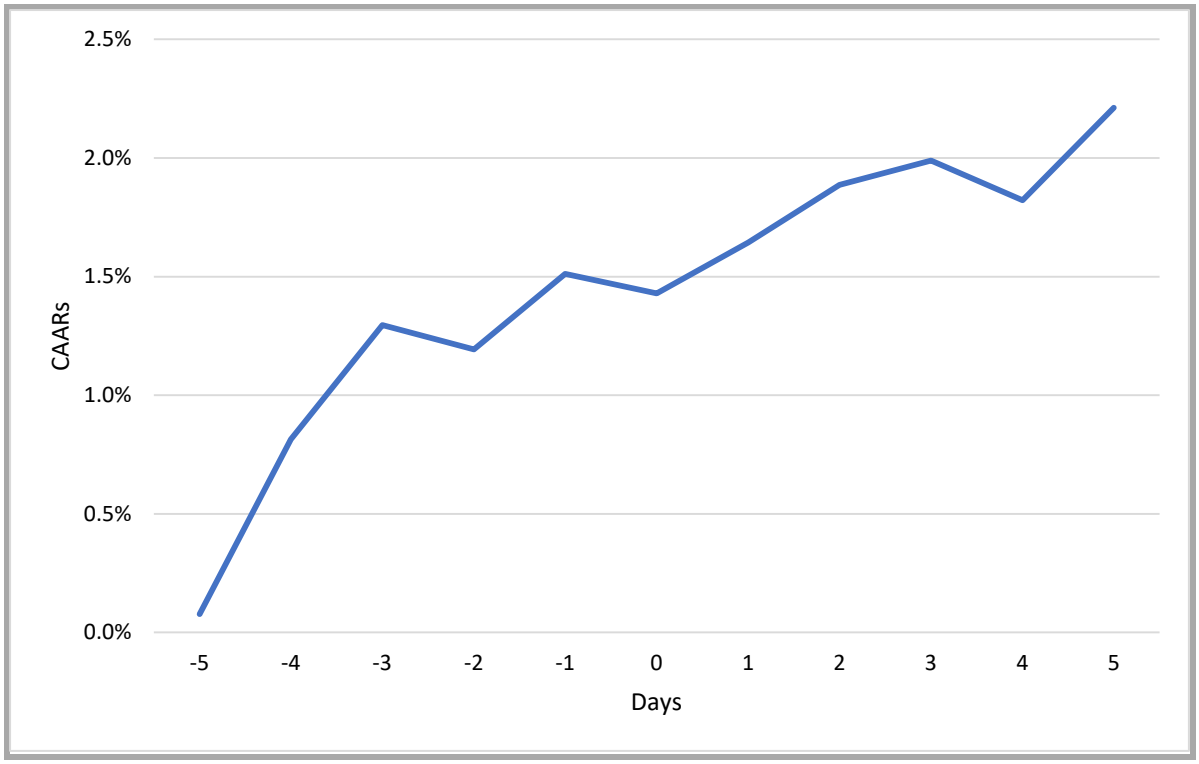


Figure 4.8 CAAR – RI top 30 inclusions

Figure 4.8 displays an increasing trend within the CAARs for firms included on the RI top 30 across the event window. The CAAR at the announcement date is equal to 1,429% exhibiting a build-up in CAARs to the announcement that is caused by a majority of positive AARs before the announcement. From T0 to T+5, following the announcement of firms included on the RI top 30, there is a further increase in the CAARs. The CAARs for the event window equal 2,212%; this illustrates a sizeable and positive relationship between the announcement of the RI top 30 Inclusions and the included firms' CAARs.

On the whole, the market appears to react positively to the release of the inclusions on the RI top 30 and this reaction is sustained throughout the event window.

Table 4.7 AAR descriptive statistics for RI top 30 inclusions

Time	Mean	Median	Standard deviation	Min	Max
-5	0,078%	-0,096%	1,023%	-1,279%	3,230%
-4	0,737%	0,556%	1,721%	-3,677%	3,880%
-3	0,481%	0,240%	1,327%	-2,035%	3,174%
-2	-0,103%	-0,284%	1,309%	-2,571%	3,683%
-1	0,319%	0,125%	1,375%	-1,880%	2,632%
0	-0,082%	-0,288%	1,902%	-2,385%	5,910%
+1	0,214%	0,099%	1,692%	-1,904%	5,616%
+2	0,243%	0,599%	1,285%	-2,682%	2,775%
+3	0,103%	-0,104%	1,079%	-1,283%	2,523%
+4	-0,168%	-0,577%	1,596%	-1,939%	5,059%
+5	0,391%	0,064%	1,484%	-2,176%	3,722%

The largest AAR occurs at T-4 and the smallest AAR occurs at T+4 equal to 0,737% and -0,168% respectively. The greatest volatility in the AARs is experienced on the announcement date with a standard deviation of 1,902%. When comparing the above standard deviations for RI top 30 Inclusions to the standard deviations in Tables 4.1, 4.3 and 4.5, the volatilities of the RI top 30 Inclusions seem to be lower than the volatilities experienced by the Total RI index, the Total RI top 30 and RI index Inclusions. This indicates that markets are confident in interpreting the RI performance of firms included on the RI top 30 and that the market is happy to reward newcomers. This support of newcomers on the RI top 30 is reinforced by the sustained increase in CAARs across the event window as reflected in Figure 4.8.

Table 4.8 AAR and CAAR significance tests for RI top 30 inclusions

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	0,349	73,040%
-4	**1,962***	**6,389%**
-3	1,662	11,205%
-2	-0,361	72,157%
-1	1,062	30,095%
0	-0,197	84,581%
+1	0,579	56,912%
+2	0,867	39,600%
+3	0,436	66,729%
+4	-0,482	63,508%
+5	1,208	24,126%

CAAR significance test	
CAAR test-statistic	**CAAR p-value**
1,722	10,052%

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.8 displays the results of the significance tests performed on the AARs and the CAARs of firms included in the RI top 30. One statistically significant AAR is experienced before the announcement date at T-4 and is only statistically significant at the 90% level of significance. The low statistical significance, when combined with its occurrence four days prior to the announcement, suggests that this substantial AAR was not solely as a result of the release of the inclusions on the RI top 30. However, the CAARs for firms included on the RI top 30 is extremely close to being statistically significant at the 90% level of significance and this is as a result of the increasing trend seen in the CAARs for RI top 30 Inclusions across the event window as reflected in Figure 4.8.

4.4 Exclusions

4.4.1 RI index exclusions

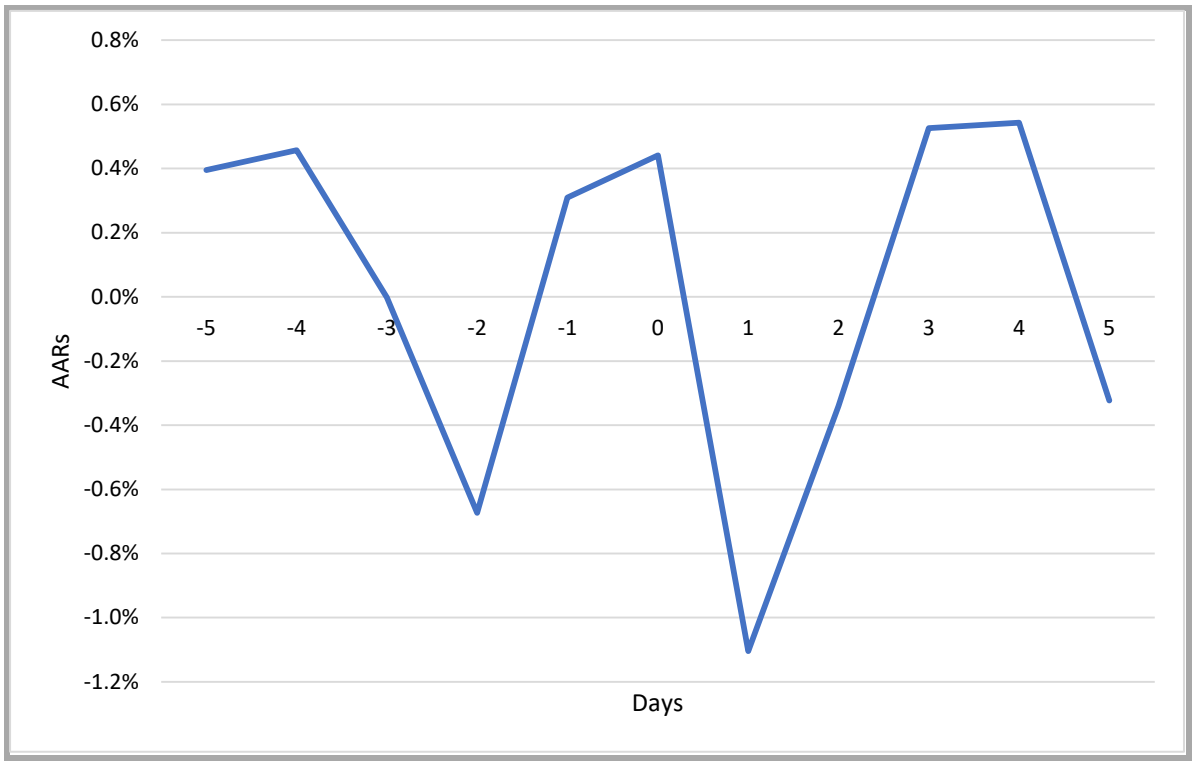


Figure 4.9 AAR – RI index exclusions

In Figure 4.9, before the announcement date there are three positive AARs and two negative AARs, with T-3 being marginally negative at - 0,002%, and at post-announcement date there are three negative AARs and two positive AARs. A positive AAR is experienced on the announcement date (T0) equal to 0,441%. The day after the announcement (T+1), the minimum AAR equal to -1,104% occurs for firms excluded from the RI index. This is followed by an additional negative AAR at T+2 equalling -0,34%. Subsequently, positive AARs are experienced by firms excluded from the RI index at T+3 and T+4 of 0,526% and 0,543% respectively.

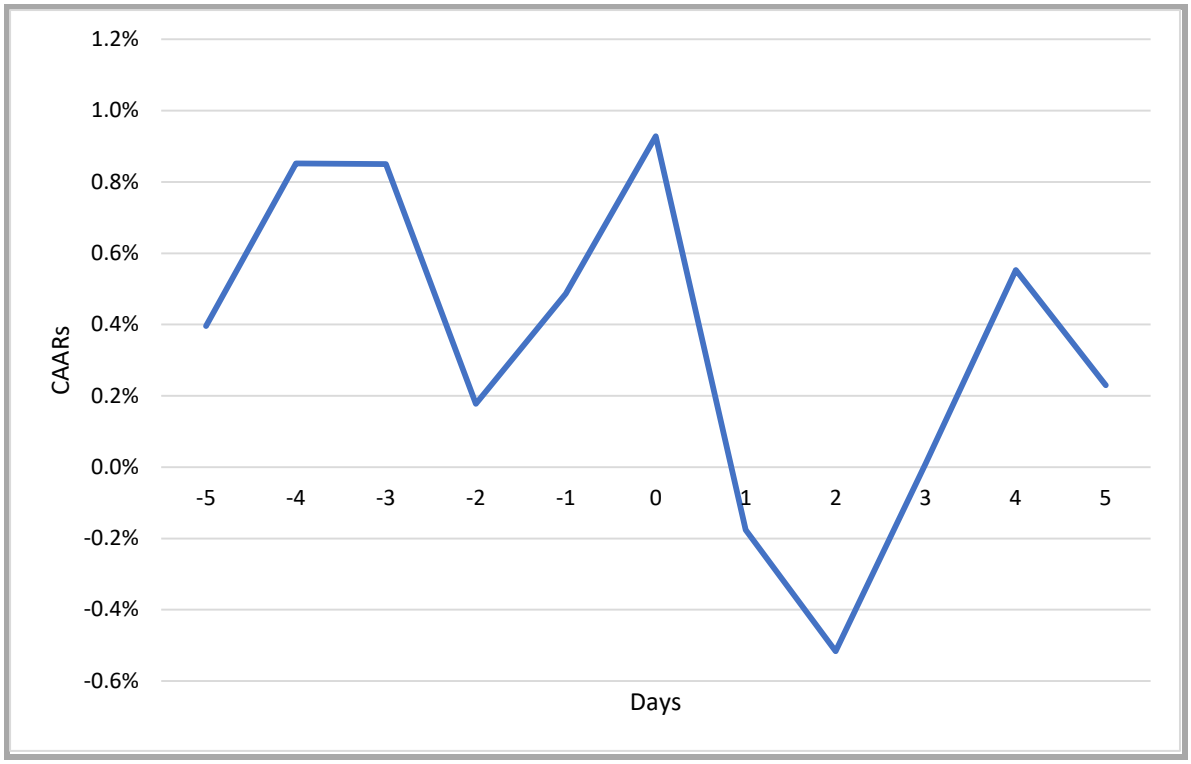


Figure 4.10 CAAR – RI index exclusions

Figure 4.10 displays the CAARs for exclusions on the RI index. The CAARs show some volatility before the announcement date, however at T-2 until the announcement date there is an increasing trend. Unlike the Total RI index, at T+1 there is a drastic decrease in CAARs from 0,928% at T0 to -0,176% at T+1. This is followed by a further drop in CAARs to -0,516% at T+2. The decrease in CAARs from T0 to T+2 is equal to 1,444%. In the first two days following the announcement date, there is a substantial downward trend of firms excluded from the RI index as seen by the 1,444% decrease in CAARs. However, the CAARs then increase from T+3 to T+4 before slightly decreasing on the last day of the event window. This increase in CAARs is the market's correction of the overreaction seen at T+1 and T+2. The CAARs at T+5 is equal to 0,230%.

Although the CAARs over the event window is positive, this is attributable to the CAARs prior to the announcement date, whereas post-announcement date, the CAARs show a more negative trend for firms excluded from the RI index. This is supported by the negative mean of the AARs post-announcement date of -0,043% as reflected in Table 4.13.

Overall there is a great deal of volatility in the CAARs before the announcement date, however the most noticeable decrease comes one day after the announcement date. Therefore, for the first two days after the announcement of firms excluded from the RI index, the market seems to react negatively to this news. This is supported by the negative and statistically significant AAR at T+1 as reflected in Table 4.10. Yet at T+3, the market appears to correct its overreaction as seen by the increasing trend from T+3 to T+4 in Figure 4.10. This demonstrates a degree of market inefficiency.

African Oxygen Limited experiences a substantially positive AR on T+4. This could distort the AAR at T+4 and if removed the AAR at T+4 would not be as positive. Therefore, the removal of African Oxygen Limited could reduce the extent of the market's overreaction at T+4.

Table 4.9 AAR descriptive statistics for RI index exclusions

Time	Mean	Median	Standard deviation	Min	Max
-5	0,396%	0,826%	1,938%	-4,744%	4,132%
-4	0,457%	0,684%	1,476%	-2,902%	3,550%
-3	-0,002%	0,047%	2,443%	-4,434%	4,665%
-2	-0,673%	-0,739%	2,484%	-5,291%	4,435%
-1	0,310%	-0,481%	2,615%	-4,367%	6,738%
0	0,441%	0,233%	1,788%	-2,628%	4,526%
+1	-1,104%	-0,940%	1,745%	-6,060%	1,978%
+2	-0,340%	0,238%	1,846%	-7,056%	1,711%
+3	0,526%	0,349%	1,497%	-2,479%	3,183%
+4	0,543%	0,457%	2,389%	-3,422%	6,586%
+5	-0,323%	0,259%	2,293%	-6,001%	3,473%

Table 4.9 displays the descriptive statistics for the AARs for firms excluded on the RI index. The largest AAR is experienced four days after the announcement date and the smallest AAR is experienced a day after the announcement date equal to 0,543% and -1,104% respectively. From the aforementioned, it can be seen that the negative AAR experienced by firms excluded from the RI index at T+1 creates the most substantial market reaction throughout the event window. The AAR at T-1 has the greatest volatility with a standard deviation of 2,615%. When comparing the post-announcement date standard deviations of the RI index Exclusions in Table 4.9 to the standard deviations of the RI index Inclusions in Table 4.5, the market displays greater volatility towards exclusions from the RI index. This indicates that the market displays a greater ability to efficiently price inclusions on the RI index than exclusions from the RI index.

Table 4.10 AAR and CAAR significance tests for RI index exclusions

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	0,958	34,919%
-4	1,452	16,133%
-3	-0,004	99,676%
-2	-1,271	21,769%
-1	0,555	58,467%
0	1,158	26,004%
+1	**-2,969*** **	**0,732%**
+2	-0,864	39,739%
+3	1,649	11,409%
+4	1,067	29,827%
+5	-0,661	51,592%
CAAR significance test		
CAAR test-statistic	**CAAR p-value**	
0,155	87,799%	

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.10 displays the results of the significance tests for the AARs and CAARs for firms excluded on the RI index. At T+1, a negative and statistically significant (at the 99% level of significance) AAR occurs for firms excluded from the RI index. The CAARs for firms excluded on the RI index are not statistically significant.

4.4.2 RI top 30 exclusions

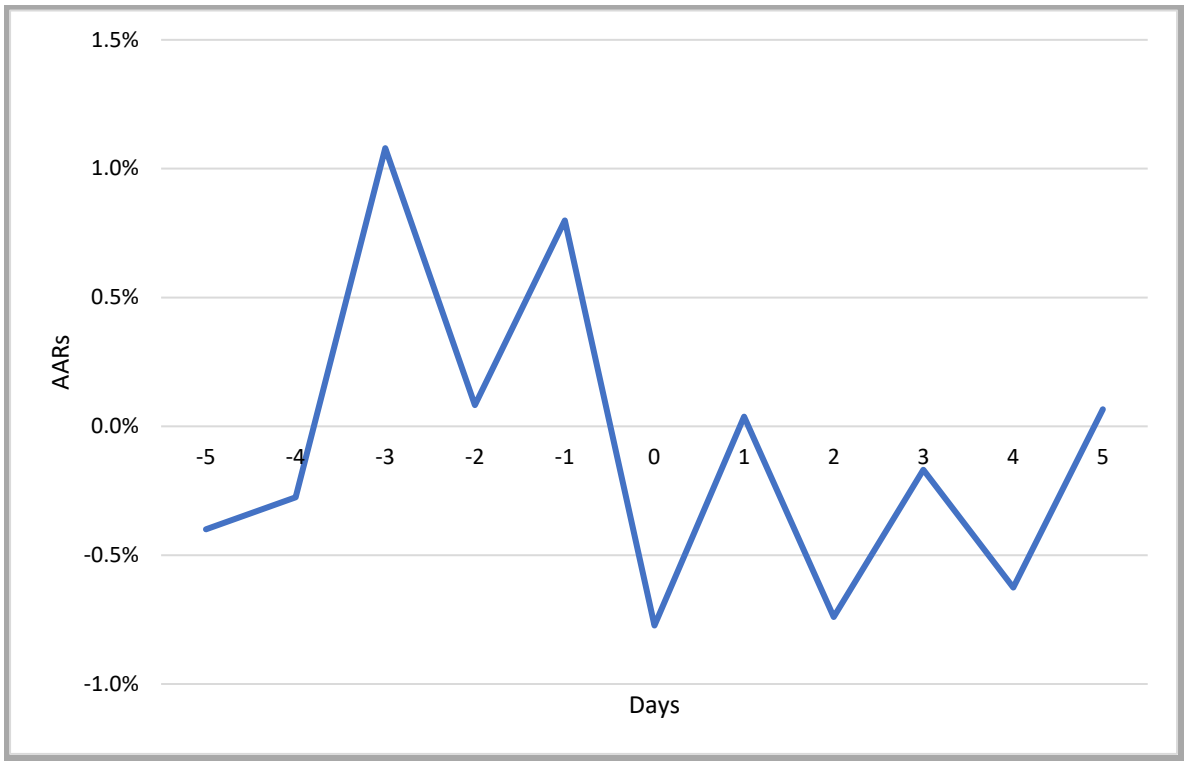


Figure 4.11 AAR – RI top 30 exclusions

In Figure 4.11 which displays the AARs for the RI top 30 exclusions, the first two days in the event window T-5 and T-4 display negative AARs, although the magnitude of these negative AARs in relation to the AARs in the event window is relatively small at -0,400% and -0,276% respectively. This is followed by three positive AARs of which T+3 is the maximum AAR in the event window at 1,080%. Upon the announcement of exclusions from the RI top 30 at T0, excluded firms experience a negative AAR equal to -0,773%. This AAR at T0 is also the minimum AAR in the event window. Post-announcement date, three of the five days display negative AARs and the two positive AARs on day T+1 and T+5 are marginally positive at 0,037% and 0,066% respectively.

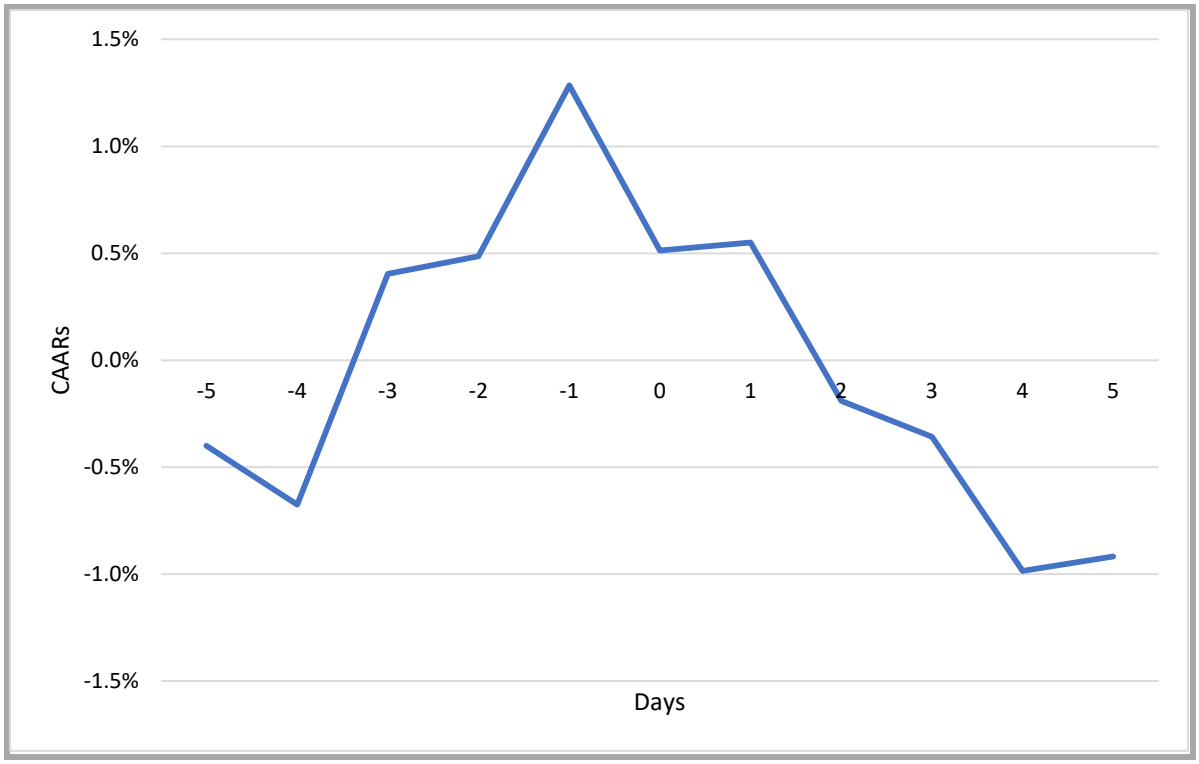


Figure 4.12 CAAR – RI top 30 exclusions

In Figure 4.12, despite the slight dip from T-5 to T-4, the CAARs for RI top 30 Exclusions show an increasing trend before the announcement date. This build up in CAARs is similar to that of the Total RI top 30 as reflected in Figure 4.4. Post-announcement date, the CAARs display a negative trend. This negative trend starts at T-1, with the CAAR of 1,286% to the CAAR of -0,918% at T+5. This is a substantial decrease of 2,204%. This decreasing trend in the CAARs is substantial, as the maximum CAAR is at T-1 of 1,286% and the minimum CAAR is at T+4 of -0,985%.

Overall the market seems to anticipate that these firms will once again be included on the RI top 30. However upon the announcement of their exclusion from the RI top 30, overall the CAARs evidence a negative reaction toward RI top 30 Exclusions for the remainder of the event window. This shows a clear negative reaction to the news of the firms' exclusion from the RI top 30 and this relationship is supported by negative and statistically significant AARs that occur at T+2 and T+4 as reflected in Table 4.12.

Table 4.11 AAR descriptive statistics for RI top 30 exclusions

Time	Mean	Median	Standard deviation	Min	Max
-5	-0,400%	-0,298%	1,730%	-5,183%	2,059%
-4	-0,276%	-0,896%	1,778%	-2,811%	4,566%
-3	1,080%	0,875%	2,616%	-3,601%	8,836%
-2	0,083%	-0,059%	2,400%	-5,123%	4,952%
-1	0,800%	0,546%	1,928%	-3,219%	4,269%
0	-0,773%	-0,943%	2,134%	-5,080%	3,285%
+1	0,037%	0,329%	2,374%	-6,955%	3,414%
+2	-0,740%	-0,699%	1,432%	-4,430%	1,599%
+3	-0,168%	-0,275%	1,265%	-2,174%	1,780%
+4	-0,626%	-0,740%	0,831%	-2,282%	0,898%
+5	0,066%	0,109%	1,850%	-3,739%	5,177%

Table 4.11 shows the descriptive statistics for the AARs for firms excluded from the RI top 30. The largest AAR occurs at T-3 equal to 1,080% and the smallest AAR occurs on the announcement date of firms excluded from the RI top 30 equal to -0,773%. The aforementioned largest AAR at T-3 also has the greatest volatility with a standard deviation of 2,616%. Comparing the standard deviations of RI top 30 Exclusions in Table 4.11 against RI top 30 Inclusions in Table 4.7, it is clear that across the event window the market displays greater volatility towards exclusions from the RI top 30 than inclusions on the RI top 30. This indicates that the market displays a greater ability to efficiently price inclusions on the RI top 30 than exclusions from the RI top 30.

Table 4.12 AAR and CAAR significance tests for RI top 30 exclusions

AAR significance test		
Time	**AAR test-statistic**	**AAR p-value**
-5	-1,034	31,395%
-4	-0,694	49,601%
-3	**1,846***	**8,057%**
-2	0,154	87,931%
-1	**1,854***	**7,929%**
0	-1,620	12,169%
+1	0,070	94,506%
+2	**-2,313****	**3,211%**
+3	-0,594	55,946%
+4	**-3,368*****	**0,323%**
+5	0,160	87,472%
CAAR significance test		
CAAR test-statistic	**CAAR p-value**	
-0,639	53,058%	

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.12 displays the results of the test of significance for firms excluded from the RI top 30. Before the announcement date, both the AAR at T-3 and T-1 are positive and statistically significant at the 90% level of significance. Most importantly, after the announcement of firms excluded from the RI top 30, there are two negative and statistically significant AARs at T+2 and T+4 at the 95% and 99% level of significance respectively. This provides evidence that there is a negative and statistically significant market reaction to firms excluded from the RI top 30 post-announcement date. Across the entire event window, the CAARs are not statistically significant.

4.5 AARs post-announcement date

4.5.1 Direction of AARs post-announcement date

Table 4.13 Directions of AARs post-announcement date

Index	Mean of the AARs post-announcement date	Positive/Negative	Significance post-announcement date e.g. Time - Direction (level of significance)
Total RI index	-0,048%	Negative	T+4 – Negative (99%)
Total RI top 30	0,044%	Positive	T+2 – Positive (95%) T+4 – Negative (99%)
RI index inclusions	-0,116%	Negative	None
RI top 30 inclusions	0,117%	Positive	None
RI index exclusions	-0,043%	Negative	T+1 – Negative (99%)
RI top 30 exclusions	-0,367%	Negative	T+2 – Negative (95%) T+4 – Negative (99%)

From Table 4.13, it can be seen that the mean of the AARs post-announcement date for constituents of the Total RI index is negative and is positive for the constituents of the Total RI top 30. However, these means are very close to zero.

Firms included on the RI index (RI top 30) experience a negative (positive) mean of AARs post-announcement date. It is also noteworthy that when comparing the means of the Total RI index against the Total RI top 30 and the inclusion on the RI index against the inclusion on the RI top 30, the magnitude of the AARs post-announcement date are very similar in magnitude yet have opposite directions.

Exclusions from both the RI index and the RI top 30, result in negative mean AARs post-announcement date. It is important to note that the mean of the AARs of excluded firms on the RI top 30 results in the most substantial and negative mean of the AARs post-announcement date equal to -0,367% as reflected in Table 4.13. The negative mean of the AARs for exclusions on both the RI index and RI top 30 is supported by negative and statistically significant AARs post-announcement date.

4.5.2 Two-sample t-test between inclusions and exclusions on/from the RI index and RI top 30

Tables 4.14 and 4.15 display the results of the two-sample t-test between the inclusion and exclusion of firms on/from the RI index and the RI top 30. The two-sample t-test was performed to determine whether the differences between firms included/excluded from the RI index and the RI top 30 post-announcement date were statistically significant.

Table 4.14 Two-sample t-test between the inclusion and exclusion of firms on/from the RI index

Time	AAR test-statistic	AAR p-value
0	-0,804	42,590%
+1	**2,148****	**3,740%**
+2	0,777	44,104%
+3	**-1,833***	**7,401%**
+4	-1,486	14,622%
+5	0,213	83,250%

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

From Table 4.14, at T+1 it can be seen that the AAR of firms included on the RI index are significantly greater than the AAR of firms excluded on the RI index, while at T+3 the opposite occurs but this is only statistically significant at the 90% level of significance. This is important as at T+1, as reflected in Table 4.13, the only negative and statistically significant AAR occurs for firms excluded from the RI index, while no statistically significant AAR occurs for RI index Inclusions post-announcement date. Therefore, one day after the announcement of the RI index, firms excluded from the RI index experience a significantly lower AAR than firms included on the RI index.

From the above it can be seen that this significant difference in the AARs at T+1 is caused by the market applying a greater discount toward firms excluded from the RI index, rather than the markets rewarding of firms included on the RI index. This conclusion is drawn as a result of the lack of statistical significance for firms included post-announcement date, while at T+1 there is a negative and statistically significant AAR for firms excluded from the RI index.

Therefore, there is a three-day window post-announcement date for investors to generate significant arbitrage returns by shorting shares of companies expected to be excluded from the RI index and longing shares of those expected to be included on the RI index.

Table 4.15 Two-sample t-test between the inclusion and exclusion of firms on/from the RI top 30

Time	AAR test-statistic	AAR p-value
0	1,093	28,129%
+1	0,273	78,631%
+2	**2,311****	**2,635%**
+3	0,736	46,653%
+4	1,160	25,531%
+5	0,619	54,013%

*Statistically significant at the 90% level of significance.

** Statistically significant at the 95% level of significance.

*** Statistically significant at the 99% level of significance.

Table 4.15 presents evidence that at T+2 firms excluded from the RI top 30 experience a significantly lower AAR than firms that were included on the RI top 30. This indicates that two days after the announcement date, firms excluded from the RI top 30 significantly underperform compared to firms included. This is further reinforced by RI top 30 Inclusions (Exclusions) evidencing a positive (negative) mean of AARs post-announcement date, as well as firms that were excluded from the RI top 30 experiencing two negative and statistically significant AARs post-announcement date, as reflected in Table 4.13.

This reflects that firms excluded from the RI top 30 significantly underperform compared to those that were included on the RI top 30 for one day post announcement date. This is caused by the negative market reaction towards firms excluded from the RI top 30 rather than the rewarding of firms for their inclusion on the RI top 30, as there is a lack of statistical significance for firms included on the RI top 30, while there are negative and statistically significant AARs at T+2 and T+4 for firms excluded from the RI top 30.

Therefore, two days after the announcement of the RI, top 30 investors are able to generate significant arbitrage returns by shorting shares of companies expected to be excluded from the RI top 30 and longing shares of firms that are expected to be included.

5. DISCUSSION

5.1 RI index and RI top 30

Looking at the AARs for the Total RI index in Figure 4.1, it appears as if the market anticipates the release of the RI index, as before the announcement date there are only positive AARs for constituents of the RI index. This is further emphasised in Figure 4.2, whereby CAARs peak on the announcement date. Post announcement date, the CAARs evidence a decreasing trend as a result of constituents on the RI index experiencing a majority of negative AARs. This negative post-announcement reaction is supported by the mean of the AARs equal to -0,048% as reflected in Table 4.13.

An explanation for the pre-announcement build up in CAARs and its subsequent decrease post-announcement date may be due to the infrequent change in the number of constituents on the RI index. The market seems to predict that there will be little to no movement in the constituents and therefore constituents of the RI index experience positive AARs leading up to and including the announcement date. The positive and statistically significant AARs at T-5, T-3 and T-1, as reflected in Table 4.2, provide further supporting evidence of the market's prediction of firms, once again retaining their constituency on the RI index. However, post-announcement date the market corrects this preannouncement overreaction/prediction of low constituency turnover. The aforementioned post-announcement correction is supported by the mean of the AARs being negative, as well as a negative and statistically significant AAR occurring at T+4.

Figures 4.3 and 4.4 display the AARs and CAARs for the Total RI top 30 respectively. These AARs and CAARs exhibit a similar pattern to the AARs and CAARs of the Total RI index. Constituents on the RI top 30 experience a positive AAR on the announcement date, however, unlike the total RI index, the constituents experience positive AARs for a further two days post-announcement date. Consequently, the peak of the CAARs occurs at T+2 equal to 0,967%. Post-announcement date, the constituents of the RI top 30 experience more positive abnormal returns than the

constituents of the RI index and this is supported by the positive mean of the AARs post-announcement date of 0,044%, as reflected in Table 4.13.

There are similarities between the build-up in CAARs for the RI index and RI top 30 before the announcement date, and a similar explanation of the lack of turnover on the RI index series can be given to explain this relationship. As mentioned in section 2.1.2, there are strict rules applied to the insertion and deletion of firms on the RI top 30 to reduce high turnover rates of constituents to keep the RI top 30 investable. Therefore, for a firm to be inserted (deleted) from the RI top 30 it must rise (fall) to the 27^{th} (34^{th}) position when ranked by the FTSE ESG rating (FTSE, 2018d). These buffers are a reason for the low turnover in constituents of the RI top 30. Therefore, the market may be anticipating little movement in constituents of the RI top 30 and this could be a contributing factor for the aforementioned build up in CAARs before the announcement date, as reflected in Figure 4.4.

The pre-announcement build up in CAARs cannot be solely attributed to the low constituency turnover on the RI index and RI top 30. A further contributing factor for this pre-announcement build-up in CAARs is that markets are unable to determine which companies will remain/be included/be excluded from the RI index series, and how well they will perform. Prior to the announcement, portfolio managers may try to replicate the index or use enhancements by overweighting companies they expect to perform well and underweighting companies they expect to underperform. Therefore, this replication prior to the announcement could be a further contributing factor for the aforementioned build up in CAARs pre-announcement date for constituents of the RI index series.

Subsequently, failure to meet their investment strategies will see portfolio managers tactically rebalancing their portfolios in order to re-align to the RI index series. A substantial misestimation will result in a more significant tactical rebalancing being employed by portfolio managers, and ultimately is the cause of the higher volatilities seen around the announcement date.

Suppose a portfolio manager increases the weighting they have in a certain company because they expect it to perform well on the Index, but subsequently they are

excluded from the index, their strategy would not have paid off. To realign with the RI index series, the portfolio would have to reduce their position in that company, the sell-off therefore reverses gains made prior to the announcement. This post-announcement date relationship will be further investigated in section 5.2 and 5.3, which deals with the inclusion and exclusion of firms on the RI index series.

As reflected in Figures 4.2 and 4.4, the CAARs experienced by constituents of the RI index and the RI top 30 is equal to 0,393% and 0,561% respectively. This illustrates that over the event window the constituents of the RI index and the RI top 30 are rewarded for their constituency by higher returns than would have been expected. Yet, the constituents of the RI top 30 evidence greater abnormal returns than the RI index constituents over the event window, and this is a result of the more positive market reaction post-announcement date for the RI top 30 constituents.

Overall, for both the Total RI index and the Total RI top 30, it appears as if the market initially receives the inclusion of firms on the RI index series as positive news. However, three days after the announcement date, it appears as if the market is correcting its overreaction to the constituents of both these indexes. This demonstrates some level of market inefficiency.

In Table 4.13, the mean of the AARs post-announcement date for the Total RI index (Total RI top 30) is negative (positive). Constituents of the Total RI top 30 appear to receive greater recognition for their constituency on the RI top 30 than those constituents on the RI index within the first two days after the announcement. This is supported by the positive and statistically significant AAR for constituents on the RI top 30 at T+2 as reflected in Table 4.13. The market's correction of its prior overreaction to constituents of both the RI index and RI top 30 is supported by statistically significant and negative AARs at T+4 for both indexes.

There seems to be a lack of reaction towards the constituents of the RI index as a result of the negative reaction post-announcement date. So, short-term traders investing in RI index constituents around its release date will not be able to earn significant abnormal returns. Consequently, the release of the RI index constituents does not contain price sensitive information. These results are most similar to

Gladysek and Chipeta (2012) as they concluded that the release of the SRI index does not contain new information content. Investors appear to see the constituents of the RI index as a form of confirmation of their ESG performance and disclosure, rather than as new information content on the pricing/value of these firms. Investors therefore confirm their knowledge of a firm's ESG disclosure and performance attained from the preceding annual financial statements and firm-specific announcements. The release of the constituents of the RI index series is a second tier/confirmatory source of information.

Compared to the RI index, the constituents of the RI top 30 display greater and more positive market reaction post-announcement date. Investors investing in RI top 30 constituents can earn significant and positive abnormal returns two days after the announcement date. Therefore, the release of the constituents of the RI top 30 is a release of new information content that is valued by the market. This reaction is similar to Robinson *et al*. (2011) as they state that RI index methodology, based on a best-in-class selection methodology, signals the market that the constituents are leaders in sustainability. Therefore, the release of the RI top 30 constituents create a positive market reaction, post-announcement date, with a positive and significant abnormal return generated two days after the announcement date. After these two days post the announcement date, the market then begins to correct its overreaction.

5.2 Inclusions

5.2.1 RI index inclusions

In Figure 4.5, the minimum AAR at T-4 equal to 0,662% causes a great deal of volatility before the announcement date as following this substantially negative AAR there are only positive AARs prior to the announcement date. Firms included on the RI index experience marginally positive AARs on the announcement date of 0,0023%. Following the announcement, negative AARs are experienced for four out of the five days.

Consequently, the shape of the CAARs, as reflected in Figure 4.6, is one that starts out negative and then increases as the announcement date draws closer. For the day

before the announcement date and two days after the announcement date, the CAARs are slightly positive, however there is a drastic decrease from T+3 to the end of the event window with the CAARs ending on -0,656% throughout the event window.

There is a great deal of volatility in the AARs prior to the announcement date that cannot be attributed to a single factor or explanation. However, looking at the reaction after the announcement date, it is clear that there is a negative reaction, and this is supported by the negative mean of the AARs post-announcement date of -0,116% as reflected in table 4.13.

The AARs and CAARs of firms included on the RI index do not show signs of statistical significance as reflected in Table 4.6 post-announcement date. So, the market does not place value on those firms included on the RI index and it can be concluded that the release of included firms on the RI index does not release new information content into the market. This lack of reaction is most similar to the study conducted by Doh *et al*. (2010) whereby they suggest that an inclusion on an index may confirm to the market that the company has legitimate CSR practices rather than providing new information content. However, they suggest that firms have it in their own interest to communicate their greater commitment to CSR and are willing to communicate this information to their stakeholders.

Consequently, a firm's effort to be included on the RI index would have been communicated through the annual financial statements or firm-specific announcement, as they would have to increase their ESG performance and disclosure to be included in the FTSE ESG Ratings. Therefore, there is no information asymmetry between the firm and the market as this information has already been processed by the market before the announcement date. The inclusion on the RI index only serves as a confirmatory signal that they have met the FTSE ESG Rating of 2,5 or above. Further, linking to the study of Gladysek and Chipeta (2012), the lack of statistical significance would lead to a similar conclusion that the release of the inclusions on the RI index does not contain new information content.

5.2.2 RI top 30 Inclusions

As reflected in Figure 4.7, four of the five AARs pre-announcement date for RI top 30 Inclusions are positive, while only one of the days post-announcement evidence a negative AAR. The AAR on the announcement date is slightly negative at -0,082% and the magnitude of the other two negative AARs are minor in relation to the eight positive AARs over the event window.

The accumulation of these AARs over the event window can be seen through the CAARs in Figure 4.8. The CAARs pre-announcement date for the RI top 30 Inclusions and the CAARs of the Total RI top 30, as reflected in Figure 4.4, are very similar. Both Figure 4.4 and 4.8 show an increasing trend to the announcement date, however the CAARs of the RI top 30 Inclusions are much larger at 1,429%. Conversely, the CAARs of the RI top 30 Inclusions continues the increasing trend after the announcement date to the end of the event window, while the CAARs of the Total RI top 30 decreases three days after the announcement date. The CAARs for the event window for firms included on the RI top 30 is 2,212%. This positive reaction post-announcement date, when compared to the RI index Inclusions negative reaction post-announcement date, is further supported by the mean of the AARs post-announcement date of 0,117% in Table 4.13.

The CAARs in Figure 4.8 illustrate that firms included on the RI top 30 are rewarded with substantial positive abnormal returns over the event window. Therefore, firms gaining membership in the RI top 30 experience higher returns than what would have been expected had there not been the announcement of their inclusion.

However, there is no statistical significance in the AARs and CAARs for RI top 30 Inclusions as reflected in Table 4.8. It is important to note that the CAARs are very close to being statistically significant at the 90% level of significance with a p-value of 10,052%.

The study by Robinson *et al*. (2011) is most similar to the RI top 30 Inclusion results, as they found that firms included on the DJSI achieved a sustained increase in share

price. They attribute the sustained increase as a reputational effect of being included with the leaders in sustainability practices.

Much like the DJSI, the RI top 30 applies a best-in-class selection methodology and only the top 30 constituents of the RI index form part of the RI top 30. According to FTSE's ground rules, as mentioned in section 2.1.2, for a firm to be included in the RI top 30, it must rise to the 27th position or above when ranked by the FTSE ESG Ratings. This is done to provide stability and reduce turnover in constituents to ensure its investability (FTSE, 2018d). Therefore, a firm's inclusion on the RI top 30 signals to the market that according to the FTSE ESG Ratings, the firm is ranked 27th or above in terms of ESG performance and disclosure.

Consequently, the inclusion on the RI top 30 results in sustained increase in included firms' share prices and signals to the market that the firm has drastically improved its ESG performance and disclosure, overcoming the 27th position buffer and being selected based on a best-in-class selection methodology.
Robinson *et al*. (2011) concluded that the reputational effect from being included on the DJSI is a major factor for the increase in share price. Therefore the sustained increase in CAARs as reflected in Figure 4.8 shows the link to Robinson *et al*. (2011)'s conclusion as firms receive reputational benefits from being included on the RI top 30 as they are now classed as leaders in ESG performance and disclosure. Although there is a positive relationship between share price and firms included on the RI top 30, there is a lack of statistical significance, but it is worth noting that the CAARs are extremely close to being statistically significant at the 90% level of significance as reflected in Table 4.8.

5.3 Exclusions

5.3.1 RI index exclusions

Before the announcement date of firms excluded from the RI index, there is a build-up in CAARs, as reflected in Figure 4.10, that is similar to the CAARs of the Total RI index reflected in Figure 4.2. This is caused by three large positive AARs in relation to the two negative AARs pre-announcement date. A positive AAR is experienced on

announcement date, however, at T+1 and T+2 firms excluded from the RI index experience a substantially negative AAR equal to -1,1% and -0,34%. The aforementioned AARs can be reflected in Figure 4.9. This reaction on T+1 and T+2 suggests that the market reacted negatively to firms excluded from the RI index a day after the announcement.

Looking at Figure 4.10's CAARs after the announcement, there is a sizeable decrease that occurs from 0,928% at T0 to -0,516% at T+2. Therefore, this two-day decrease in CAARs following the news of firms' exclusion from the RI index is equal to 1,444%. The negative reaction post-announcement date, as reflected in Figure 4.10, is supported by the negative mean of the AARs post-announcement date of RI index Exclusions equal to -0,043% in Table 4.13. The negative reaction as a result of an exclusion on the RI index is supported by Curran and Moran (2007), Consolandi *et al*. (2009) and Robinson *et al*. (2011).

Due to the pre-announcement similarities between the RI index Exclusions CAARs and the Total RI index CAARs, this gives the impression that the market predicts that these firms will once again be included on the RI index. The negative reaction only occurs the day after the announcement and this suggests that the market is a day late to react to the news that these firms have been excluded from the RI index. Nonetheless, particularly on day T+1, but also T+2, the market shows a substantially negative reaction towards excluded firms. Interestingly there is roughly an equally opposite reaction that occurs on T+3 and T+4. This demonstrates a level of market inefficiency because the market seems to be correcting its overreaction to the negative news of firms excluded from the RI index at T+1 and T+2.

Although there is an overall negative reaction within the market post-announcement date, it is important to note that at T+1 there is a negative and statistically significant AAR for firms excluded from the RI index as reflected in Table 4.10. As a result, it can be concluded that the release of the exclusion of firms from the RI index contains new price sensitive information content. Therefore, firms excluded from the RI index experience significantly negative abnormal returns a day after the announcement date.

5.3.2 RI top 30 exclusions

The pre-announcement pattern of the CAARs of the Total RI top 30 in Figure 4.4 resembles a similar pattern to the CAARs of the RI top 30 Exclusions as reflected in Figure 4.12. They both show an increasing trend before the announcement date. While post announcement date, the constituents of the RI top 30 in Figure 4.3 experience a majority of positive AARS, from Figure 4.11 excluded firms from the RI top 30 experience a majority of negative AARs. This suggests the market was anticipating that these firms would once again be constituents of the RI top 30 and then reacted negatively upon their exclusion.

At T0, the announcement date, excluded firms experience a negative AAR of -0,773%. Unlike the firms excluded on the RI index, the market seems to efficiently react to this negative information on the day of the announcement regarding these firms' deterioration in ESG performance and disclosure. Figure 4.12 shows a substantial drop in CAARs from 0,513% at T0 to -0,918% at T+5. This emphasises the market's sustained negative reaction to excluded firms from the RI top 30 in a cumulative drop of 1,431% in CAARs from the announcement date to the end of the event window. A further support of this negative reaction is the mean of the AARs experienced by RI top 30 Exclusions post-announcement date equal to -0,367%, while the mean of the AARs experienced by RI index Exclusions post-announcement date equal to - 0,043%, as reflected in Table 4.13. This suggests that the market has a greater reaction to excluded firms on the RI top 30 than firms excluded on the RI index and consequently applies a value discount towards these firms.

Table 4.12's test statistics indicate that firms excluded from the RI top 30 experience two negative and statistically significant AARs at T+2 and T+4. This shows that the announcement of excluded firms on the RI top 30 contains price sensitive information. For a firm to be excluded from the RI top 30 it must have fallen to 34th position or below. This may be a major contributing factor to the market demonstrating a significant negative reaction post-announcement as the information contained by the exclusion of firms on the RI top 30 indicates a severe deterioration in a firm's ESG disclosure and performance.

The most substantial market reaction occurs for RI top 30 exclusions as reflected by the mean of the AARs post-announcement date equal to 0,367%, which is the minimum mean of the AARs post-announcement date across the RI index series and their respective inclusions and exclusions in this study, as reflected in Table 4.13. Parallels between these results and Doh *et al*. (2010)'s results can be drawn as they suggest that the market shows a greater reaction to excluded firms, and that a firm's exclusion is a release of new negative information. Therefore, when comparing the means of the AARs post-announcement date in Table 4.13 it is clear that the market has a lower appreciations for firms that are excluded from the RI top 30.

Contributing factors to this greater market reaction are the aforementioned RI top 30 exclusion criteria buffers (fall below 34th position) and informational asymmetry. Doh *et al*. (2010) suggest that informational asymmetry plays a major role in this greater reaction towards excluded firms, as firms are far more reluctant to distribute news regarding a reduction in CSR practices than an improvement. This greater informational asymmetry regarding companies with deteriorating ESG performance explains the higher volatilities experienced by firms excluded from the RI index and RI top 30, as reflected in Tables 4.9 and 4.11, when compared to firms included on the RI index and RI top 30, as reflected in Tables 4.5 and 4.7.

The lower volatility for inclusions is as a result of these firms willing to provide information regarding improvements in their ESG performance throughout the year in order to yield greater reputational value. This increased disclosure lowers the information asymmetry and therefore included firms have better pricing and trading liquidity as evidenced by the observed lower volatility of firms included on the RI index series.

Consequently, a reduction in a firm's ESG performance and disclosure cannot be obtained through the annual financial statements or firm-specific announcements due to their reluctance to distribute this negative news. Therefore, the negative and statistically significant market reaction towards firms excluded from the RI top 30 is a release of new price-sensitive information into the market.

Even without informational asymmetry it could be argued that the market reacts more severely to a reduction in ESG performance and disclosure when it is based on a best-in-class selection methodology, as this signals a severe deterioration from a former leader in ESG performance and disclosure. The negative reaction as a result of an exclusion from an RI index is further supported by the findings of Curran and Moran (2007), Consolandi *et al*. (2009) and Robinson *et al*. (2011).

6. CONCLUSION

This paper investigated whether the release of the RI index series contains price sensitive information content and therefore has value relevance for the market. The study employed event study methodology and used the constituents of the RI index series as a proxy for quality ESG performance and disclosure. The study further examined whether the inclusion (exclusion) on (from) the RI index and the RI top 30 was a release of new information content regarding a firm's improvement (deterioration) in ESG performance and disclosure and the subsequent impact on the firm's share price.

Pre-announcement date, the constituents of the RI index and RI top 30 display a build-up in CAARs and this is attributed to two factors. First, due to the strict rules applied by FTSE regarding a firm's inclusion or exclusion on/from the RI index series (as seen in section 2.1.2) there is a low turnover rate in constituents of both the RI index and RI top 30. As a result of the low turnover rate the market anticipates/predicts little movement in constituency, and this is a contributing factor towards the pre-announcement build-up in CAARs. Second, markets may be unable to determine if firms will remain/be included/be excluded or how well they will perform. Therefore, portfolio managers may seek to replicate the RI index series or use enhancements by overweighting companies they expect to perform well and short-selling companies they expect to underperform. This replication of the RI index series is a further contributing factor to the pre-announcement build-up in CAARs. In spite of this post-announcement date, the constituents of the RI index and RI top 30 cause different reactions within the market.

There is a lack of market reaction to constituents of the RI index post-announcement date, as constituents display a marginally negative relationship between the release of the RI index and their share price. Consequently, the release of the RI index constituents does not contain price sensitive information, but rather serves as a second tier/confirmatory source of information.

Post-announcement date, the constituents of the RI top 30 exhibit a positive market reaction. Investors investing in RI top 30 constituents can earn significant and positive abnormal returns two days after the announcement date. Therefore, the release of the RI top 30 contains new and price-sensitive information content and is consequently valued by the market. Two days after the announcement date, the market begins to correct its overreaction, and this displays a level of market inefficiency. This positive market reaction, compared to the negative market reaction towards constituents of the RI index, is attributed to the best-in-class selection methodology employed by FTSE for the RI top 30. This best-in-class selection methodology signals to the market that constituents of the RI top 30 are leaders in ESG performance and disclosure, and is a major contributing factor for the significant and positive market reaction two days after the announcement date.

There is a lack of market reaction towards firms that are included on the RI index and the RI top 30. For both inclusions on the RI index and the RI top 30 there are no signs of statistical significance throughout the event window. This lack of market reaction is as a result of firms finding it in their own interests to distribute news regarding improved ESG performance and consequently the informational asymmetry is reduced between these firms and the market. Therefore, the release of firms that have been included on the RI index and RI top 30 confirms that there has been an improvement in ESG performance and disclosure. Significantly, it is not a release of new information content into the market as this information has already been communicated through the annual financial statements or firm-specific announcement because these firms would have had to increase their ESG performance and disclosure throughout the review period to be included on the RI index or the RI top 30.

Although there is no statistical significance for inclusions on the RI index and RI top 30, the inclusion on the RI index causes a negative market reaction post-announcement date, while being included on the RI top 30 results in a positive market reaction post-announcement date. It is noteworthy that the CAARs for RI top 30 Inclusions are extremely close to being statistically significant at the 90% level of significance as reflected in Table 4.8. Consequently, the inclusion on the RI top 30 results in a sustained increase in included firms' share prices throughout the event

window (as reflected in Figure 4.8) and signals to the market that the firm has drastically improved its ESG performance and disclosure.

The main finding of this study is that companies excluded from the RI index and RI top 30 experience significant negative share returns. Informational asymmetry plays a role in this significant and negative market reaction, as firms are far more reluctant to distribute news regarding a reduction in ESG performance and disclosure than an improvement. Therefore, the release of the information of firms that have been excluded from the RI index and RI top 30 is a release of new information content that negatively impacts the share prices of excluded firms. Consequently, the market applies a value discount on firms with deteriorating ESG performance and disclosure.

It is important to note that the market applies greater discounts towards firms that have been excluded from the RI top 30, as opposed to firms excluded from the RI index. A major contributing factor to this more severe market reaction is that for a firm to be excluded from the RI top 30 it must fall to 34th position or below according to the FTSE ESG Ratings methodology. Therefore, an exclusion from the RI top 30 signals to the market that a leader in ESG performance and disclosure has severely deteriorated.

Finally, there are statistically significant differences between firms that were included and firms that were excluded from the RI index and the RI top 30 post-announcement date as discussed in section 4.5.2. These significant differences are a result of the market applying a greater discount on firms excluded from the RI index and RI top 30, rather than the markets rewarding of firms being included on the aforementioned indexes. Post announcement date, investors can generate significant arbitrage returns by shorting shares of firms expected to be excluded from and longing shares of firms expected to be included on the RI index and RI top 30.

6.1 Areas for future research

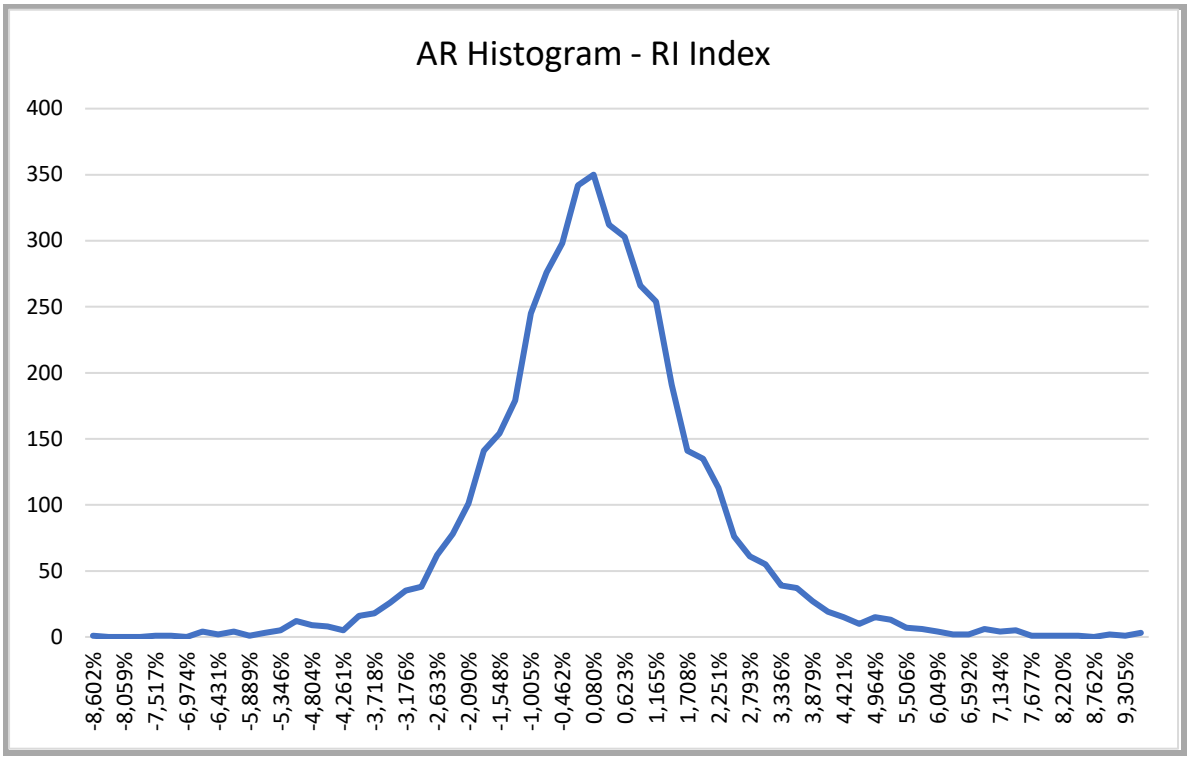
A cross-sector analysis could be performed to determine whether the constituency, inclusion and exclusion on/from the RI index series impacts each sector differently. The cross-sector analysis could provide valuable insight into which sectors place greater emphasis on ESG performance and disclosure in share price determination.

This could be important in sectors such as the mining industry because if ESG information has a major impact on share prices, investors will apply discounts to poor ESG performance. This could in turn align managements' objective of increasing shareholder value with the use of enhanced ESG performance and disclosure. Therefore, ultimately improving the industry's use of environmental and human capital, while also creating value for shareholders. The control portfolio model could also be used in the event study to estimate the abnormal returns. This study focused on the short-term impact on a firm's share price upon the announcement of the RI index series, a long-term focus could be performed using a longer event window. Further, the returns in this study were not risk adjusted and this is an area of potential improvement and future research. Qualitative research could be performed by conducting interviews with asset managers to ascertain the value they place upon the RI index series and the extent to which it is used to guide investment decisions.

7. APPENDIX

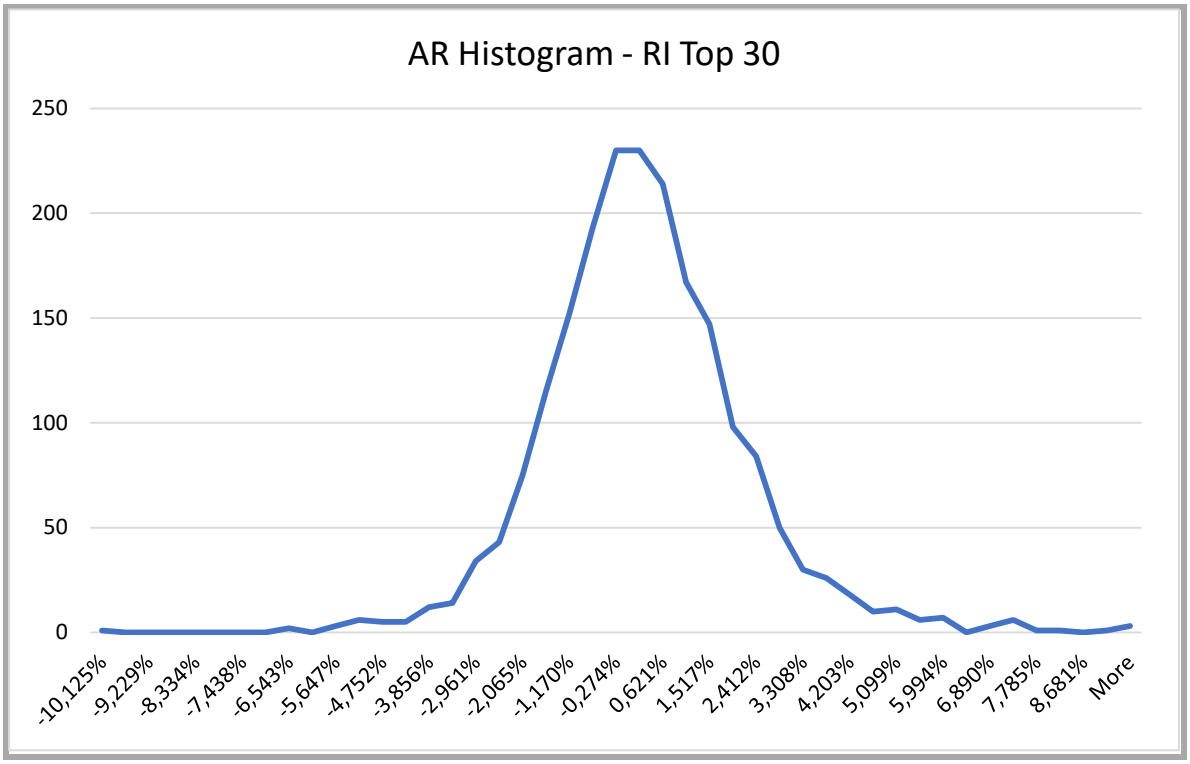
7.1 Normality analysis

7.1.1 Total RI index



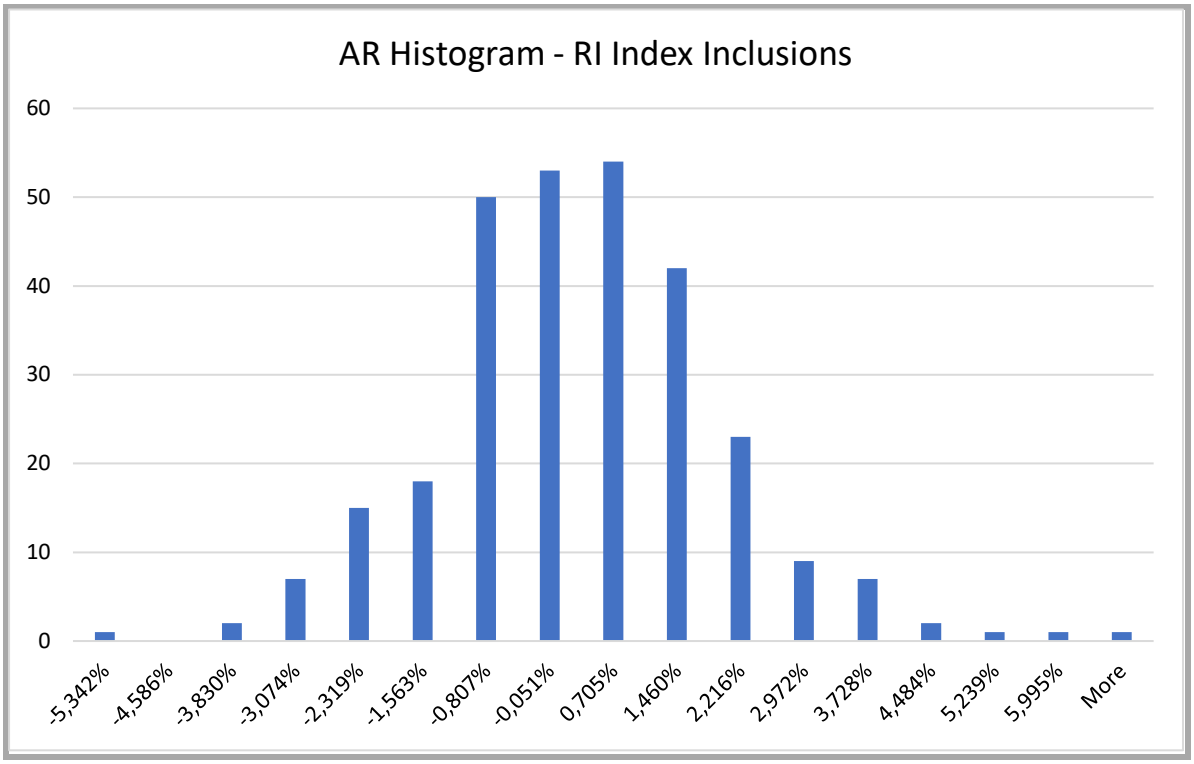
Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
0,036%	-0,034%	2,392	0,353
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.053			

7.1.2 Total RI top 30



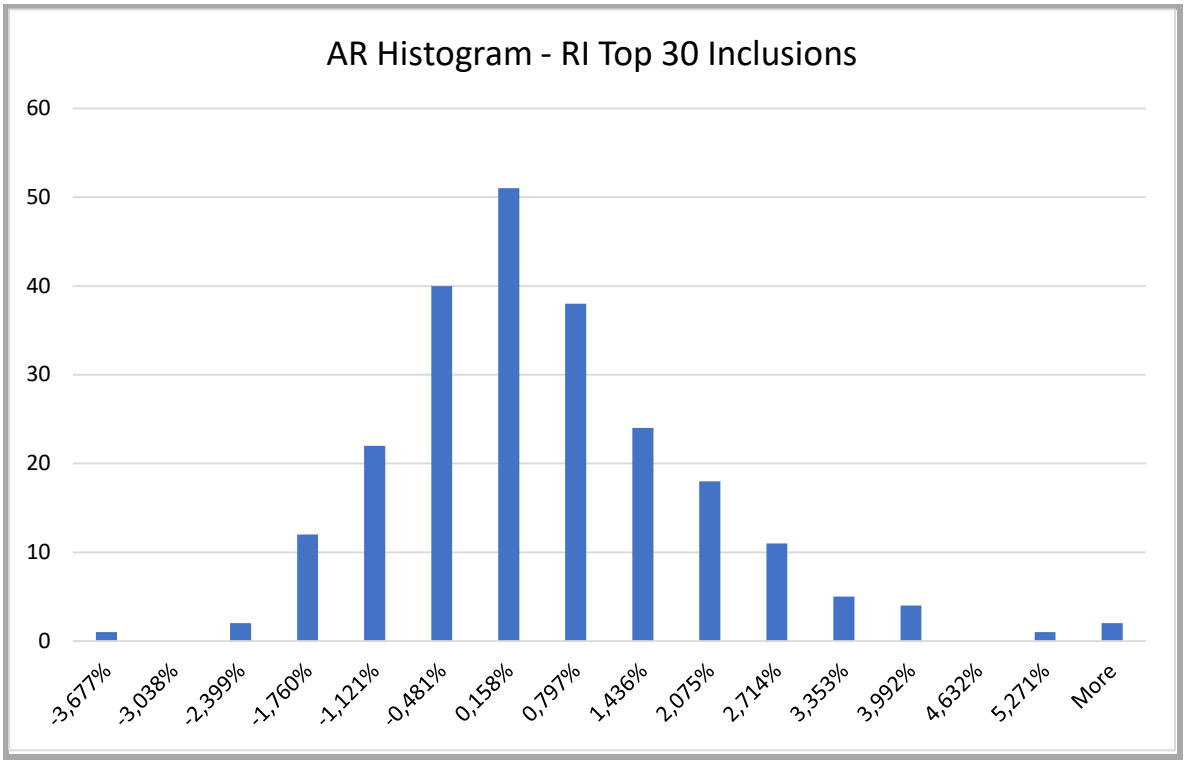
Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
0,050%	-0,074%	2,572	0,483
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.639			

7.1.3 RI index inclusions



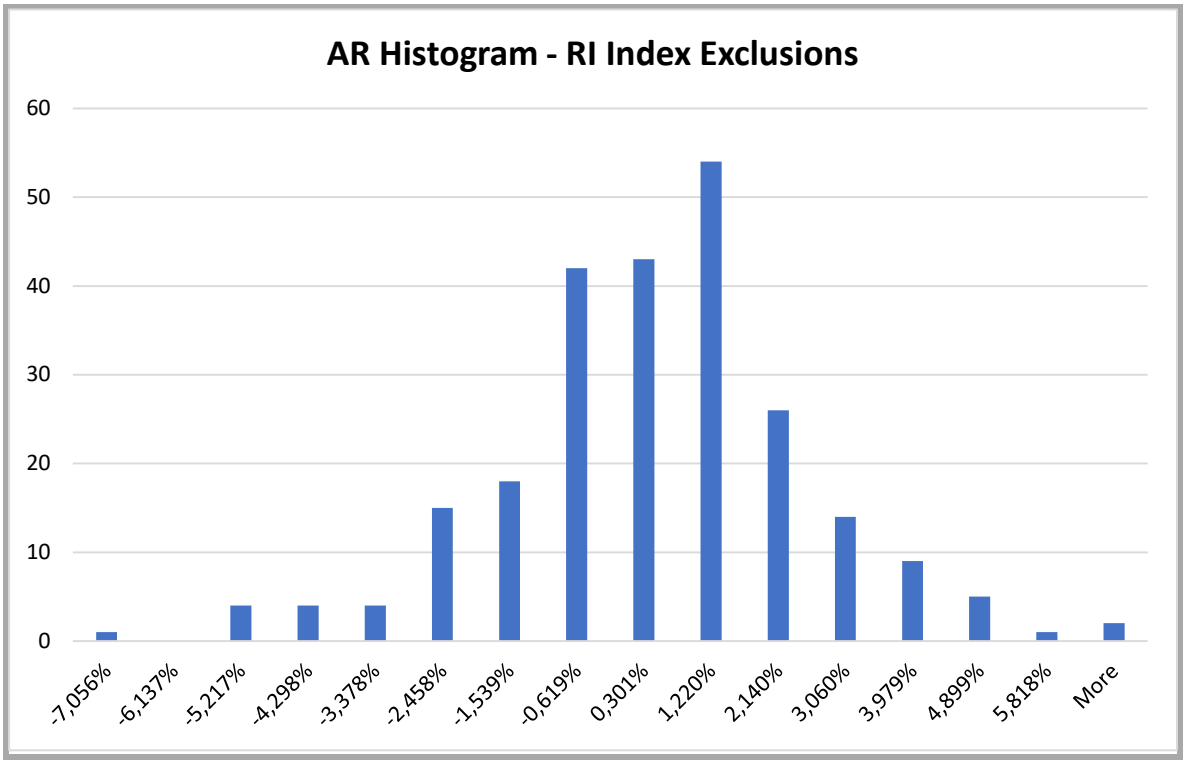
Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
-0,060%	-0,078%	1,282	0,322
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.531			

7.1.4 RI top 30 inclusions



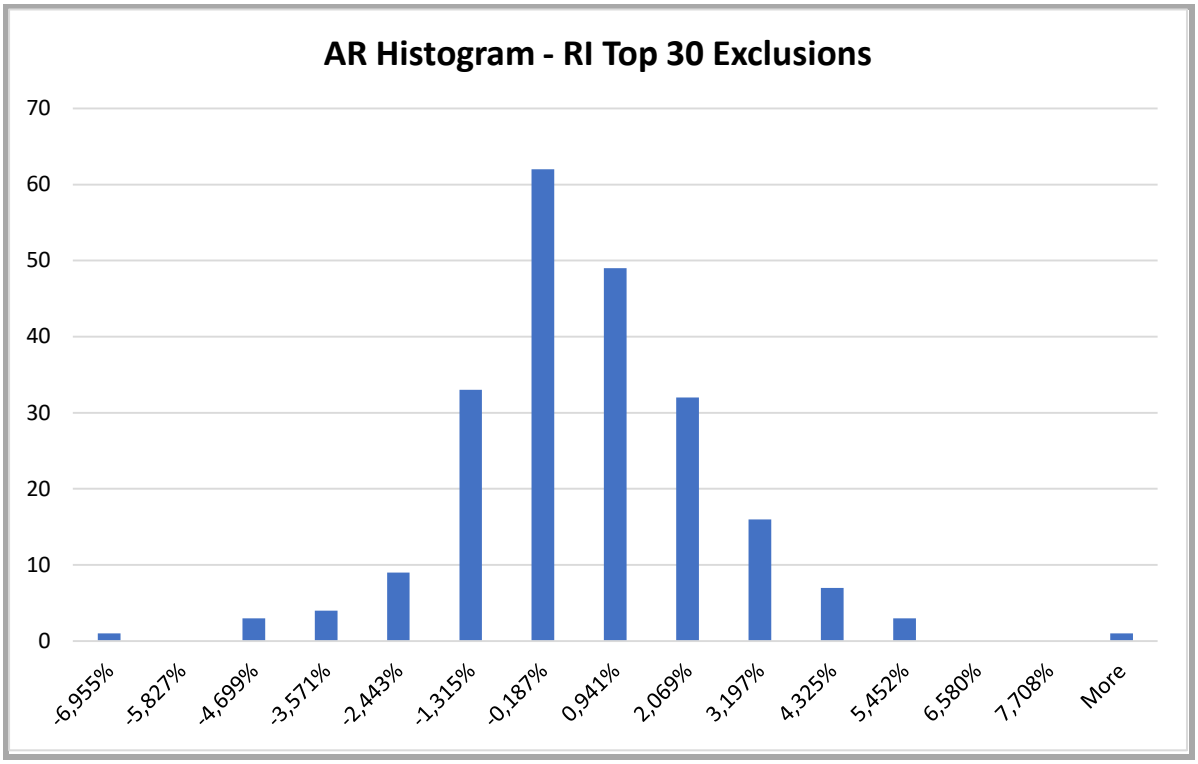
Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
0,201%	0,072%	1,630	0,825
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.887			

7.1.5 RI index exclusions



Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
0,021%	0,104%	1,190	-0,112
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.442			

7.1.6 RI top 30 exclusions



Descriptive statistics			
Mean	**Median**	**Kurtosis**	**Skewness**
-0,083%	-0,214%	2,335	0,366
STATA Skewness/Kurtosis tests for Normality			
p-value: 0.438			

7.1.7 Normality conclusion

An acceptable range of kurtosis to approximate normal distribution is between -3 and +3, while the skewness should be close to 0, with an acceptable range between -1 and +1. From the above, all the kurtosis and skewness values fall within this range.

The Skewness/Kurtosis test was run in STATA to test whether the data is normally distributed. The Skewness/Kurtosis "presents a test for normality based on skewness and another based on kurtosis and then combines the two tests into an overall test statistic" (STATA, 2018). The null hypothesis is that the data are normally distributed. In all the above Skewness/Kurtosis tests for Normality, the p-values generated fail to reject the null hypothesis. Therefore, it is concluded that the data are normally distributed. Skewness/Kurtosis tests for Normality in STATA is "similar in spirit to the Jarque–Bera (1987) test of normality. The Jarque–Bera test statistic is also calculated from the sample skewness and kurtosis, though it is based on asymptotic standard errors with no corrections for sample size. In effect, the skewness/kurtosis test for normality offers two adjustments for sample size, that of Royston (1991c) and that of D'Agostino, Belanger, and D'Agostino (1990)" (STATA, 2018).

Therefore, when combining the visual of the histograms, the skewness and kurtosis values, as well as STATA's Skewness/Kurtosis tests for Normality, there is no evidence that there have been substantial deviations from normality.

7.2 Wilcoxon signed-rank test results

The tables below show the results of the parametric (t-test) and non-parametric (Wilcoxon signed-rank test) tests. It is important to note that as the data is approximately normally distributed and therefore the results of the Wilcoxon signed-rank test merely serve as confirmatory evidence that the majority of the Wilcoxon signed-rank test are consistent with the parametric t-tests. This was performed to add extra validation and to ensure the robustness of the conclusions of the parametric t-tests.

7.2.1 Total RI index

AAR significance tests for the Total RI index				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	1,977**	0,049	2,480**	0,013
-4	1,086	0,278	0,140	0,889
-3	1,771*	0,073	1,823*	0,068
-2	0,662	0,501	-0,202	0,840
-1	2,011**	0,050	1,810*	0,070
0	1,579	0,115	0,936	0,349
+1	-0,998	0,319	-0,999	0,318
+2	0,877	0,381	-0,020	0,984
+3	-1,443	0,150	-1,481	0,139
+4	-3,885***	< 0,0001	-4,322***	< 0,0001
+5	-0,366	0,715	0,069	0,945

7.2.2 Total RI top 30

AAR significance tests for the Total RI top 30				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	0,085	0,933	-0,691	0,489
-4	1,331	0,185	0,481	0,631
-3	0,697	0,487	0,859	0,391
-2	0,047	0,962	-0,323	0,747
-1	-0,034	0,973	1,236	0,216
0	1,710*	0,089	1,109	0,268
+1	0,295	0,769	-0,065	0,948
+2	2,041**	0,043	1,430	0,153
+3	-0,869	0,389	-0,889	0,374
+4	-2,603***	0,010	-2,838***	0,005
+5	0,061	0,951	0,706	0,480

7.2.3 RI index inclusions

AAR significance tests for RI index Inclusions				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	-0,165	0,870	-0,025	0,980
-4	-2,167**	0,040	-2,032**	0,042
-3	0,489	0,629	0,305	0,761
-2	0,698	0,492	0,457	0,648
-1	0,929	0,362	0,940	0,347
0	0,066	0,945	0,241	0,809
+1	-0,200	0,843	-0,813	0,416
+2	0,241	0,812	0,254	0,800
+3	-0,862	0,397	-0,686	0,493
+4	-1,109	0,278	-1,016	0,310
+5	-0,732	0,471	-0,686	0,493

7.2.4 RI top 30 inclusions

AAR significance tests for RI top 30 Inclusions				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	0,349	0,730	-0,174	0,862
-4	1,962*	0,064	2,016**	0,044
-3	1,662	0,112	1,738*	0,082
-2	-0,361	0,722	-0,695	0,487
-1	1,062	0,301	0,956	0,339
0	-0,197	0,846	-0,730	0,465
+1	0,579	0,569	0,000	1,000
+2	0,867	0,396	0,938	0,348
+3	0,436	0,667	0,035	0,972
+4	-0,482	0,635	-1,217	0,224
+5	1,208	0,241	0,487	0,627

7.2.5 RI index exclusions

AAR significance tests for RI index Exclusions				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	0,958	0,349	1,461	0,144
-4	1,452	0,161	1,623	0,105
-3	-0,004	0,997	-0,032	0,974
-2	-1,271	0,218	-1,039	0,299
-1	0,555	0,585	-0,162	0,871
0	1,158	0,260	0,812	0,417
+1	-2,969***	0,007	-2,857***	0,004
+2	-0,864	0,397	0,097	0,922
+3	1,649	0,114	1,526	0,127
+4	1,067	0,298	0,909	0,363
+5	-0,661	0,516	0,097	0,922

7.2.6 RI top 30

AAR significance tests for RI top 30 Exclusions				
Time	**AAR test-statistic**	**AAR p-value**	**AAR Wilcoxon signed-rank test-statistic**	**AAR Wilcoxon signed-rank p-value**
-5	-1,034	0,314	-0,560	0,575
-4	-0,694	0,496	-1,027	0,305
-3	1,846*	0,081	1,923*	0,055
-2	0,154	0,879	-0,168	0,867
-1	1,854*	0,079	1,549	0,121
0	-1,620	0,122	-1,475	0,140
+1	0,070	0,945	0,429	0,668
+2	-2,313**	0,032	-1,960**	0,050
+3	-0,594	0,560	-0,616	0,538
+4	-3,368***	0,003	-2,707***	0,007
+5	0,160	0,875	-0,168	0,867

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