The Evaluation of Domestic Socially Responsible Investment Equity Funds Performance in Australia

Auckland University of Technology

Faculty of Business, Economics and Law

A dissertation submitted to Auckland University of Technology in partial fulfilment of the requirements for the degree of Master of Business

Huiqiong Tang

(2018)

Abstract

In this paper, I analyse the performance of Australian domestic equity Socially Responsible Investment Funds (SRIFs). I construct a sustainability index based on negative screens, and use this index to evaluate the performance of SRIFs by employing the Jensen (1968) CAPM, Fama–French (1993) 3-factor and the Carhart (1997) 4-factor models. The results show that SRIFs outperform the SRI index between November 2002 and February 2018. I also find evidence that SRIFs have a preference for value stocks and past winners. No significant size bias is found over the entire period, although there is evidence of a bias towards small-firms during the 2007 Global Financial Crisis. Results of sub-period analysis show that SRIFs outperform the sustainability index both in the crisis and non-crisis periods, although the abnormal return during the crisis period is slightly higher than the non-crisis period. By employing the Henriksson and Merton (1981), and the Bollen and Busse (2001) models, I find that SRIF managers have positive stock-picking skills but no market timing abilities. I also compare the SRFIs' performance with the Australia's five most popular conventional indices (the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices). The results document that the SRIFs also outperform the conventional benchmarks, while the magnitude of abnormal return is slightly lower than that from the sustainability index.

Table of Contents

List of Tables

List of Figures

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signature: Huiqiong Tang Date: 24/07/2018

Acknowledgements

In writing this report, I have received a lot of help and support. I am using this opportunity to express my gratitude to everyone who supported me throughout the process of writing this dissertation. I would like to express the deepest appreciation to Associate Professor Aaron Gilbert, my primary supervisor, for his expert supervision and constant guidance. Second, I would like to express my gratitude to Dr. Ayesha Scott, my second supervisor, for her continuous encouragement and extraordinary support. I am thankful for their aspiring guidance, valuable suggestion and friendly encouragement during the learning process of this dissertation. Without their help, this dissertation would not have been possible. Lastly, I would like to thank my husband for his wonderful support and loving consideration throughout the entire process. Thank you.

1. Introduction

Socially Responsible Investment Funds (SRIFs) refer to funds that follow a philosophy of concerning themselves not only with competitive financial performance but also with benefits to the environment, society and governance (Leite & Cortez, 2015). In the last two decades, the assets under management and number of SRIFs has significantly increased worldwide. Rathner (2012) states that the total number of European retail ethical funds reached 886 in 2011, more than 200% growth within a decade. A similar significant increase has occurred in the U.S.. According to the Forum for Sustainable and Responsible Investment [USSIF] (2016), in the U.S., more than one-fifth of funds managed by professional fund managers are invested with ethical funds.

Empirical research into SRIFs has concentrated mainly on assessing the financial return of SRIFs, and in particular, evaluating whether the social focus of SRIFs influences the fund's performance. The majority of the literature compares the risk-adjusted return of SRIFs to a benchmark portfolio. However, the results are mixed, including studies that find outperformance (Galema, Plantinga & Scholtens, 2008; Briec & Kerstens, 2009; Lean, Ang & Smyth, 2015), underperformance (Chang & Witte, 2010; El Ghoul & Karoui, 2017; Ibikunle & Steffen, 2017) and no significant difference (Climent & Soriano, 2011; Thompson, Engle Sr & Spain, 2011; Leite & Cortez, 2014b). One of the possible reason for the conflicting results may relate to the selection of the benchmark portfolio. There are three main types of benchmarks used in the existing literature; conventional indices, characteristic-matched peers and sustainability indices (Chegut, Schenk & Scholtens, 2011). All three choices have pros and cons. The conventional indices and the characteristic-matched peers are comparing the SRIFs with the conventional funds, which may indicate whether there is a potential return penalties (or return premiums) for social responsibility investing, i.e. does excluding companies result in lower performance. Sustainability indices however, compare SRIF performance to a relatively similar investment universe (depending on the screens the index and the SRIFs applied). By employing the sustainability indices, it is possible to investigate whether the SRIFs can obtain consistent outperformance when comparing to other social responsibility equities. Chegut et al. (2011) suggest using multiple benchmarks to evaluate the SRIFs' performance. In this report, I apply negative screens to build a sustainability index, and use this index to evaluate the performance of SRIFs. I also employ several of the best-known conventional

indies(ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices) to consider the potential performance penalty, if any, for investing ethically.

Another potential reason for these different results in the literature may come from the different macro- and micro-economic conditions that exist in different regions. Renneboog, Ter Horst and Zhang (2008) examine worldwide SRIFs and find that in France, Ireland, Sweden, and Japan SRIFs underperform the benchmark, while in the U.S. and the U.K. no significant difference was found. In addition, Van and Nijhof (2015) show that most of the literature associated with SRIFs is concentrated on European and the U.S. markets. They suggest that further studies should be undertaken for markets outside of these two regions. Besides the benchmark and the market region, SRIFs performance may also be affected by fund type, market state, and managerial skills of the fund manager.

In this report, I evaluate the performance of Australian domestic equity SRIFs. There are two reasons for choosing Australia. First, SRIFs have relatively significant impacts on the local investment. Compared with the U.S. and some European countries, the Australian fund market is relatively small. However, within this relatively small fund market, the concepts of SRI have shown a significant impact. The total amount of SRI assets in the Australian market is approximately AU$622 billion in 2016, representing 44% of the total assets under professionally managed in the local market (The Responsible Investment Association Australasia [RIAA], 2017). In addition, the Australian SRI market has shown relatively rapid growth in the past few years. According to Global Sustainable Investment Alliance [GSIA] (2017), SRI assets in Australia and New Zealand had an overall growth of 247.5% from 2014 to 2016. However, the growth rate for Europe and the U.S. were 11.7% and 32.7%, respectively. Second, the market composition of the Australian financial market is different from many other regions. According to Humphrey and Lee (2011), more than 40% of listed companies in ASX 300 index are in the mining industry, which are excluded from SRIFs due to the damaging environmental impacts that mining has. Excluding the mining stocks will dramatically reduce the universe of investable companies, which may result in SRIF's underperformance compared to their conventional peers. Additionally, given the weight of the ASX exposure to the mining industry, it is likely that the conventional domestic indices in Australia will be heavily impacted by the performance of this industry. It is therefore important to evaluate the performance of SRIFs in Australia, controlling for the impact of the mining sector.

In this paper, I start by constructing a suitable benchmark for the Australian SRIFs to be evaluated against. I construct the sustainability index by applying negative, or exclusionary, screens which refers to exclude the firms involved in some unethical sectors from the investment universe (Eurosif, 2016). When I compare my index with the existing Australian sustainability index, the Dow Jones Sustainability Index Australian(DJSIA), my index includes more equities, especially small stocks. The DJSIA is also constructed using best-in-class screens which includes the best companies in each industry, including unethical industries, while my index includes all the Australian listed firms, except those in unethical industries. It is worth noting that most SRIFs run either positive or negative screens, making their investment universes more in line with my index than the DJSIA. After evaluating the performance and investment styles of Australian domestic equity SRIFs between 2002 and 2018, I find evidence that SRIFs are able to outperform the sustainable index, the DJSIA and even conventional indices. This outperformance also persists through both crisis and non-crisis periods, and in fact the outperformance is stronger during the crisis period. SRIFs have a preference for value stocks and past winner stocks when I consider the whole sample period, and I also employ the Henriksson and Merton (1981), and the Bollen and Busse (2001) models to examine whether SRIF managers are skilled. The results show that, during the sample period, SRIF managers have positive stock-picking skills but no market timing abilities. Lastly, I compare the SRIFs' performance with the five best-known conventional indices, which are the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices. I find that the SRIFs still outperform compared to conventional benchmarks, although the magnitude of abnormal return is slightly lower than that from sustainability index.

My study contributes to the literature in three ways. First, I build a sustainability index as the benchmark for the performance evaluation. This index is constructed using negative screens strategies, which results in the inclusion of more smaller and younger firms. The DJSIA, which applies the best-in-class strategy, contains larger sized firms. In consideration of the specific characteristics of the Australian market and the size bias of SRIFs in prior literature, the new sustainability index may provide better explanatory power than the DJSIA. Second, my work aims to extend the existing literature by employing a relatively large sample (83 SRIFs), is set in a non-US and Europe market, and employs a more recent sample period (2002-2018) which encompasses the Global Financial Crisis (GFC) period. To the best of my knowledge, few studies cover the recovery period post-GFC. I also split the entire sample into three sub-periods to test the performance of SRIFs in different market states(crisis and non-crisis). Last, this

article contributes to the existing literature by analysing the managerial skills of Australian SRIF managers, which to date has attracted only limited attention in the existing literature.

2. Literature review

The performance of SRIFs was first examined in 1972 (Moskowitz, 1972), since then the number of empirical studies of SRIF performance has grown significantly. Most of these works focus on one of two aspects: either performance comparison and/or performance attribution.

Performance comparison is the most heavily examined topic in SRIF analysis. Approximately 74% of SRIF studies investigate this topic over the period from 1990-2014 (Van & Nijhof, 2015). The reason for such high attention may relate to the performance puzzle. According to financial portfolio theory, the constriction of investment opportunities should result in greater idiosyncratic risks and less financial return due to reduced diversification (Chegut et al., 2011). SRIF typically exclude all companies within unethical industries, such as oil and gas production, alcohol and gambling industries (Barnett & Salomon, 2006; Leite & Cortez, 2015). An expected consequence of the smaller investment universe may be that SRIFs underperform the market or their conventional counterparts. However, the results generated from the various studies conducted on performance comparison between SRI and benchmark market and/or the non-SRI funds find both outperformance, underperformance, as well as no significant difference.

Studies that find investors of SRIFs may obtain a higher return than non-ethical funds include Lean et al. (2015) who examine ethical funds in North American and Europe from 2001 to 2011. They conclude that SRIFs obtain higher risk-adjusted returns than the market. In addition, Derwall and Koedijk (2009) find that even though the SRIFs may generate higher expenses, their financial return still outperforms a portfolio of matched conventional peers in the U.S. between 1987 and 2003. Gil-Bazo, Ruiz-Verdú and Santos (2010) find similar results when employing characteristics-matched comparison funds in America. They compare the before- and after-fees scenarios and find that SRIFs outperform the comparison group. The main reason for the outperformance may relate to the pre-selection process. According to Bollen (2007), the process of selecting companies with a social conscious may result in

incidental filtering of better management quality, which may relate to the observed higher financial return and the better risk bearing capability.

However, other research contends that SRIFs earn lower returns for their investors. Chang and Witte (2010) state that U.S. SRIFs have lower average annual returns when they are compared to their conventional counterparts over three-, five-, ten- and fifteen-year sample period. This result is in line with Cortez, Silva and Areal (2012) who compare the financial performance of SRIFs to their conventional counterparts and the sustainability benchmark and find that SRIFs underperform both benchmarks in the U.S. and Austria. Two reasons have been stated to support the underperformance of SRIFs. As stated above, underperformance may be a consequence of the restriction on investment universe. SRIFs may have less diversification opportunity, which generally associates with the higher risk and less profit (Chegut et al., 2011). Another possibility is that the monitoring cost of the socially conscious selection may consequently deduct from the funds' performance (Bauer, Derwall & Otten, 2007).

A third option is that funds investing based on ethical features neither under- or out-perform. Bauer et al., (2007) found that ethical mutual funds in Canada did not obtain significantly different returns than their conventional peers between 1994-2003. This result has been supported by other studies conducted in other regions. For instance, Thompson et al. (2011) find a similar result in the U.S. based on a sample between 2001 and 2006. Likewise, Leite and Cortez (2014b) also find no significant difference in their multi-country research of European markets.

Since most of the performance comparison literature employs the standard set of asset pricing models, for example, CAPM, Fama and French (1993) three-factor model and the Carhart (1997) four-factor model, benchmark selection could explain the variety of differing conclusions. According to Chegut et al. (2011), "conventional indices, matched pair analysis and sustainability indices" (p.83) are the three main types of benchmark employed in SRIFs performance comparisons. There is no constant conclusion about which type is more effective. The differences in the investment universes may make conventional market indices inappropriate to compare SRIFs against (Bauer et al., 2007). In essence, the SRI investment excludes some non-ethical but generally better profitability industries, it may not be fair to examine the performance of a fund against an index including those industries. Rather than evaluating performance, the comparison between SRIFs and the conventional indices is more

appropriate to explain the potential financial impact of SRI investment. The characteristics-matched pair approach matches some fundamental properties, such as age, size and capitalization between a SRIF and a conventional fund and then compares their returns. For one thing, it compares the performance of a set of funds that elect to remove certain segments of the market against those funds that can invest in these industries. For another, it may be difficult to find suitable counterparts for SRIFs, especially for the multi-country studies (Chegut et al., 2011). Recently, some SRI benchmarks have been developed to allow for an unbiased analysis at both the global and individual country level. Although some researchers have raised concerns regarding the explanatory power of the ethical index (Bauer et al., 2007), it is still a capable benchmark for studies in regions which have a suitable sustainability index. According to Chegut et al., (2011) utilizing multiple benchmarks is recommended for measuring performance. Some studies use different benchmarks to examine the performance of SRIFs. For example, Leite and Cortez (2015) employ a characteristics-matched portfolio of conventional peers and conventional indices (using both the French and the European market indices). In Australia, Humphrey and Lee (2011) employ two comparison groups, one is a portfolio with 27 characteristics-matched peers and the other one contains all 514 conventional funds. In order to test whether SRIFs have superior performance than the conventional funds or not, they also form difference portfolios by subtracting the return of comparison portfolios from the return on SRIFs.

In the last decade, researchers have analysed various aspects which may relate to SRIFs performance, including fund type, type of screens used, market state and managerial skills. First, SRIFs cover a range of different fund types, such as international funds, equity funds, bond funds and fixed income bonds. Their exposure to different asset classes in different concentrations may generate different performance. For instance, Chang and Witte (2010) state that SRIFs in balanced funds and fixed income categories have superior performance compared with non-ethical funds. Leite and Cortez (2014b) exhibit that international SRIFs in European markets have no significant difference in performance when compared to their matched-peers. Henke (2016) state that during 2001-2014, the U.S. and the Eurozone socially responsible bond funds outperform a matched sample of conventional funds. Therefore, it may be that SRIFs have better performance when investing in particular asset classes.

Secondly, different types of screens may have different impacts on fund performance. There are three well-known types of screens; negative, positive and best-in-class. The negative

(exclusionary) screens eliminate all non-ethical firms from the investment universe (Humphrey & Lee, 2011). Funds with a positive (inclusionary) screen only invest in ethical firms (Humphrey & Lee, 2011), and therefore represent an even more restrictive universe of assets than funds with a negative screen. Leite and Cortez (2015) state that the best-in-class strategy refers to only including the leading firms which have the highest environment, social and governance(ESG) scores within each industry, including unethical industries. Numerical studies have been created to test the relationship between screens and SRIFs performance (Kempf & Osthoff, 2007; Statman & Glushkov, 2009; Henke, 2016). For the Australian market, Humphrey and Lee (2011) analyse the influence of screening intensity on the SRIF in Australian and find some evidence to support that positive and negative screens have an effect on performance. They also state that SRIFs with more screens may provide a higher risk-adjusted return.

Third, SRIFs in different market states, for example, crisis vs non-crisis, may generate different performance comparison results. Henke (2016) separate their sample period into crisis and non-crisis periods and find that SRIFs are more likely to outperform during crisis periods. Leite and Cortez (2015) show that SRIFs in Europe underperform the comparison group during a non-crisis period but obtain similar financial return during recession periods. Similar results have been found in the U.S., for instance, Nofsinger and Varma (2014) find that U.S. SRIFs outperform conventional funds during crisis periods and underperform them during non-crisis periods. There are two possible reasons that SRIFs are more likely to outperform during crisis periods. For one thing, investors tends to examine the firm more frequent during the economic recession (Hirshleifer, 2008). Therefore, the mitigation of ESG risk should be more likely to occur (Henke, 2016). For another, firms with strong corporate social responsibility (CSR) activities can build a good reputation and trust among their investors, which may result in outperformance of these firms during the financial crisis (Lins, Servaes & Tamayo, 2015).

Last, some other research indicates that SRIF managers may exhibit different managerial skills than conventional funds (Ferruz, Muñoz & Vargas, 2010; Leite & Cortez, 2014a). There are two dimensions of managerial skills, stock-picking skills and market timing skills. These two skills assess the fund managers' forecasting abilities for individual stocks and the entire market, respectively. Leite and Cortez (2014a) state that the pre-selection process of SRIFs may generate additional valuable information resulting in selecting undervalued stocks and so demonstrating stock picking skills. They also state that the restriction of the SRI investment

universe may also allow SRIF managers to focus more on their market timing ability. Several studies have been done in this area, although the results are mixed. According to Ferruz et al. (2010), SRIFs managers in the UK exhibit neutral stocking-picking skills and negative market timing abilities. More recently, Leite and Cortez (2014a) find, based on their investigation of European countries between 2000 and 2008, SRI funds managers have weaker stock-selecting skills but neutral market timing ability than their conventional counterparts.

To the best of my knowledge, prior studies on SRIFs' performance evaluation in Australia are limited, and the results regarding their performance differ. Bauer, et al. (2006) employ two benchmarks and investigate 25 ethical equity funds (both international and domestic). They find that between 1992 and 2003, both the SRIFs and the conventional funds are not able to earn abnormal returns. Jones, Van, Frost and Loftus (2008) apply the CAPM and four-factor model to a portfolio of 89 Australian SRIFs between 1986 and 2005 and find that ethical funds underperform the market by 0.88% annually (1.55% during 2000-2005). They also check the robustness of their results at the individual fund level and document that 67.2% of individual SRIFs have a lower return than the market. Humphrey and Lee (2011) investigate a portfolio of 27 SRIFs and find that the risk-adjusted return of SRIFs neither out- nor underperform the non-ethical funds between 1996 and 2008.

There are four main limitations in the existing literature for Australia. First, the samples are not homogenous. For instance, Jones et al. (2008) include both the international and domestic SRIFs in the portfolio and assess their performance against a local benchmark. As a result, the observed performance differences may result from differences in asset allocation between the domestic and international assets, not as a result of their social screening criteria. Additionally, applying a conventional local equity benchmark may not be suitable when assessing the performance of international equity funds. Second, the studies contain relatively small sample sizes. For example, because of the relatively strict rules the authors apply in selecting ethical funds, Bauer et al. (2006) and Humphrey and Lee (2011) only include 25 and 27 SRIFs, respectively, in their sample portfolio. The small sample may make it difficult to generalise their comparison results to the whole SRIFs market. Third, the SRI fund management market has developed considerably over the last few decades. However, the three Australia studies consider older periods which may not fully incorporate the development of the funds and the ability of managers. Additionally, few Australian studies consider the GFC period, nor do they split their sample based on market conditions. In consideration of the relatively good

performance during the crisis period found by Henke (2016), it is important to include the GFC in evaluating the performance of SRIFs. Four, all of the prior literature are comparing ethical with non-ethical funds, which in essence questions whether there is a penalty for investing ethically, not whether ethical funds outperform when assessed against an appropriate benchmark that matches their investment universe.

3. Methodology

3.1 Benchmark Construction

In prior studies, there are three typical benchmarks; conventional market indices, characteristics-matched comparison pair and the sustainability indices (Chegut et al., 2011). Since the conventional market indices of Australia heavily rely on the mining and gas/oil industries, excluding these stocks will have an impact on the performance of the SRIFs. Therefore, an assessment based on the conventional market indices may be inappropriate in Australia, as the conventional indices will be heavily impacted by the performance of companies that the investor has chosen to exclude. The majority of characteristics-matched comparison pairs only take the part of the social conscious investment into account, which may have an influence on generalizing the results. Therefore, in this paper, I construct a new sustainability index for Australia based on the exclusion (negative) screening strategy. I start with all companies listed on the ASX (5403 companies at the time of writing) and remove those companies that are engaged in the following irresponsible industries: liquor, tobacco, gambling, weapons, pornography and animal testing, which are the most common screening in Australia (RIAA, 2017). In consideration of the increase in the screening of fossil fuels and the nuclear power (RIAA, 2017) during recent years, I also exclude these sectors. The mining industry has also been excluded, since most of the SRIFs in Australia screen for mining industry (Humphrey & Lee, 2011). I also exclude firms belonging to the financial industry. Then by eliminating the firms that lack the necessary data on returns, I narrow down the list to 1254 firms.

My index includes between 573 firms in 2002 and 729 firms in 2018. These firms belong to 9 industries and 28 sectors. Within these sectors, Software & Computer Services sector has the largest frequency (158 firms), followed by the Support Services sector (140 firms) and the

Health Care Equipment & Services sector (102 firms). Then I use these firms to construct a sustainability index, both equally- and value-weighted.

3.2 Performance Evaluation

Having constructed both equally-weighted and value-weighted SRIFs index portfolios for Australia, I apply the three most widely used approaches; the Jensen (1968) CAPM, Fama–French (1993) 3-factor and the Carhart (1997) 4-factor models, to evaluate the performance of Australian domestic equity.

3.2.1 Capital Asset Pricing Model (CAPM)

Following the prior studies (Bauer et al., 2006; Humphrey & Lee, 2011), the CAPM model can be expressed as below:

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}\left(R_{mt} - R_{ft}\right) + \varepsilon_{\mathrm{it}} \qquad (1)$$

Where R_{it} - R_{ft} = excess return of SRIFs in month *t*;

R_m - R_f = excess return of benchmark in month *t*;

β_{0i} = the systematic risk of the SRIFs;

ε_{it} = error term in month *t*.

The Jensen's alpha (α_i) measures the performance of SRIFs related to the benchmark indices. The β_{0i} illustrates the market risk exposure of SRIFs. In this paper, a statistically significant positive α represents SRIFs that outperform the benchmark, while a significant negative α indicates SRIFs that underperform the benchmark. A significantly positive β_{0i} indicates that the fund performance moves in the same direction as the benchmark, whereas a significantly negative β_{oi} indicates an opposite direction of movements.

3.2.2 Three- and four- factor model

I further evaluate the SRIFs performance by applying the Fama–French (1993) and the Carhart (1997) models, which are defined as follow (Climent & Soriano, 2011; Busse, Chordia, Jiang & Tang, 2014):

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}\left(R_{mt} - R_{ft}\right) + \beta_{1i}SMB_t + \beta_{2i}HML_t + \varepsilon_{it} \qquad (2)$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}\left(R_{m,t} - R_{f,t}\right) + \beta_{1i}SMB_t + \beta_{2i}HML_t + \beta_{3i}MOM_t + \varepsilon_{it} \qquad (3)$$

Where β_{1i}= the coefficient of the size factor;

β_{2i}= the coefficient of the book-to-market ratio factor;

β_{3i}= the coefficient of the momentum factor;

I form the small minus big(*SMB*), high minus low (*HML*) and momentum (*MOM*) factors based on the companies I include in the Australian SRI indices I construct. I followed the methodologies of Fama and French (1993) and Carhart (1997). As for the market excess return, I calculate the average return and the value-weighted return for the sustainability index. Then, I subtract the risk-free rate (Australian 90 days bank bill rate) from the index return. For the *SMB* factor, I rank all the stocks based on the previous year capitalization and assign the largest 30% of companies to the big portfolio and the smallest 30% of companies to the small portfolio. The *SMB* represents the return premium by longing small portfolio and shorting the big portfolio simultaneously. The *HML* factor is calculated by ranking the previous years book to market (BM) ratio. The 30% of companies with the highest BM ratio are assigned to high BM portfolio and the 30% of companies with the lowest BM ratio are assigned to the low BM portfolio. The return difference between the high portfolio and the low portfolio is the *HML* factor. The *MOM* factor is constructed in a similar method to the *HML*. Stocks are ranked from best to worst based on the cumulative monthly prior ($t_{-2} - t_{-12}$) returns. The top 30% of companies are assigned to the winner portfolio and the bottom 30% to the loser portfolio. The *MOM* factor can be obtained by buying the winner portfolio and selling the loser portfolio. Following the prior literature, these factors portfolios are rebalanced at the beginning of each year. The returns of *SMB* and *HML* are calculated using value-weighted returns, while the *MOM* uses equally weighted returns.

In this paper, the significant positive coefficients on the size (β_{1i}), value (β_{2i}) and momentum (β_{3i}) factors would provide evidence that SRIFs are inclined more toward small companies, value stocks and past winners, respectively. However, significantly negative coefficients on the size (β_{1i}), value (β_{2i}) and momentum (β_{3i}) factors indicate that the financial return of SRIFs are driven by investments in large firms, growth stocks and past losers, respectively.

3.3 Managerial skills assessment

In this part, I employ the model of Henriksson and Merton (1981), (henceforth "HM") and the Bollen and Busse (2001) (henceforth "BB") models to evaluate the stock picking skills and the market timing skills of Australia domestic equity SRIF managers.

3.3.1 Henriksson and Merton (1981) model

The HM model employs Jensen's Alpha, market excess return and an interaction term to explain fund performance. Alpha provides evidence of security picking skill. A significant and positive (negative) alpha indicates a positive (negative) stock selection skill. The HM model initially introduces an interaction term ($D^*(R_{mt} - R_{ft})$) to change the exposure on the market excess return. Based on their assumption, market-timing refers to the dynamic re-balancing of the investment capital between risk-free assets and stocks based on their forecasting of upcoming market movements. If market timing managers believe that stocks will increase, then they are likely to raise their exposure to the stock market, and consequently the coefficient of market excess return will increase. Therefore, the coefficient of the interaction term, gamma, is the indicator of market timing ability. A significant positive (negative) gamma indicates a positive (negative) market timing skills, while an insignificant gamma indicates the absence of market timing skills. Following the previous study of Hallahan and Faff (1999), I express the model as follow:

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}(R_{mt} - R_{ft}) + \gamma_i(D * (R_{mt} - R_{ft})) + \varepsilon_{i,t} \quad (4)$$

Where α_i = abnormal return, the indicator of stock selection ability;

β_{0i}= market exposure of the fund portfolio;

D = a dummy variable equals to 1 if $R_{mt} - R_{ft} > 0$; equals to 0 otherwise;

γ_i = the indicator for timing ability of fund managers.

3.3.2 Bollen and Busse (2001) Extension model

The HM model only addresses market risk. However, more recent asset pricing models include other risk factors, for instance, the size, value and momentum factors (Fama & French, 1993; Carhart, 1997). Therefore, Bollen and Busse (2001) extend the HM model by adding *SMB*, *HML* and *MOM* factors, and state that by adding these variables, the extended model provides better explanatory power than the single factor model does. More recently, Ferruz et al., (2010) and He, Cao and Baker (2015) also employ the extended model to evaluate managerial skill. Follow their work, the BB model can be expressed as:

$$R_{it} - R_{ft} = \alpha_i + \beta_{0i}(R_{m,t} - R_{f,t}) + \gamma_i \left(D * (R_{mt} - R_{ft})\right) + \beta_{1i} SMB_t + \beta_{2i} HML_t + \beta_{3i} MOM_t + \varepsilon_{it} \quad (5)$$

Where β_{1i}= the coefficient of the size factor;

β_{2i}= the coefficient of the book-to-market ratio factor;

β_{3i}= the coefficient of the momentum factor;

3.4 Benchmark comparison and the Spanning test

Following the prior research of Schröder (2007), I test the performance, risk differences between different benchmarks by using the Equation (6).

$$r_{i,t}^{SRI} = \alpha_i + \beta_{0i} r_{i,t}^{BM} + \varepsilon_{i,t} \qquad (6)$$

Where $r_{i,t}^{SRI}$ = excess return of the sustainability index,

$r_{i,t}^{BM}$= excess return of the benchmark indices

The Jensen's alpha (α_i) measures the performance of sustainability index related to the benchmark indices. The β_{0i} illustrates the relative risk of the sustainability index. The explanation of these two coefficients as similar to the Section 3.2.1.

In Equation (6), the test which sets the alpha equals zero and the beta equals one is known as the Spanning test (Huberman & Kandel, 1987). I employ this test to compare the difference between indices. If the Spanning test is rejected refers to that the sustainability index cannot be replicated by the other benchmarks, while if it is not, the sustainability index may have no difference in return or risk comparing to the benchmark indices (Schröder, 2007).

4.Data

4.1 SRIFs sample

I follow Jones et al. (2008) to construct the sample by using Morningstar to identify the Australian domestic equity SRIFs. I obtain 103 funds that both belong to the "socially conscious" and the "Australian domestic equity funds" categories. This list includes dead SRIFs to eliminate any survivorship bias (Chegut et al., 2011). The first Australian SRIF opened to investors in 1987, however, as I use a portfolio-based study, I select a more recent sample period with relatively more active SRIFs. Consequently, my sample period is between November 2002 and February 2018. By deleting duplicates and excluding the funds with less than 24-month data (Jiang, Yao & Yu, 2007 and Lean et al., 2015), I finally obtain an Australia domestic equity SRIFs list with 83 unique funds (as shown in Appendix A). The amount of

funds in every year varies between 24 in 2002 and 67 in 2018. I then obtain the after-fees monthly return of each Australian domestic equity SRIFs from Morningstar. The monthly risk-free rate (90-day bank bill rate) is obtained from Bloomberg.

I form the value- and equally-weighted portfolios for my sample of SRIFs. Table 1 illustrates the descriptive statistics of the monthly returns for two SRIFs portfolios. From the table, both portfolios have a positive mean return. The value-weighted portfolio has a smaller range (0.2090) than the equally-weighted portfolio (0.2143). The standard deviations are 0.0361 and 0.0359, respectively.

Table 1 Descriptive Statistic of SRIFs Portfolio

	Value-weighted portfolio	***Average-weighted portfolio***
Mean	0.0082	0.0082
Median	0.0129	0.0131
Standard Deviation	0.0361	0.0359
Minimum	-0.1277	-0.1177
Maximum	0.0813	0.0966
Count	184	184

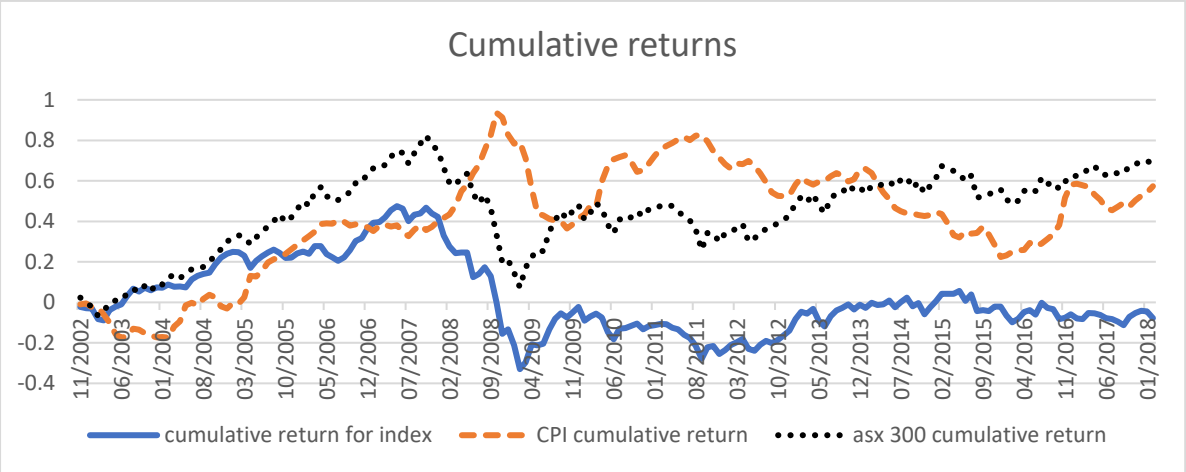
Note: This table reports the descriptive statistics of the monthly returns for SRIFs portfolios between November 2002 and February 2018. Both the value- and equally-weighted portfolios are reported.

4.2 Benchmarks

4.2.1 Constructed sustainability index

As discussed above, in the Australian market where the stock market is heavily based around excluded industries, the conventional index may not appropriate for evaluating SRIFs' performance. To demonstrate the difference between the conventional index and the SRI indices, I plot the cumulative returns of the ASX 300 and my sustainability index in Figure 1. As we can see, although the main trends of the two benchmarks are similar, with peaks and troughs occurring at similar points, there is a consistently growing difference between the two indices over the sample period. While the sustainable index has not really changed over the past 16 years, the ASX300 has had cumulative returns of over 60%. This could be driven by the predominance of excluded industries, particularly mining which went through a boom period in the early 2000's. Therefore, in consideration of the fact that Australia has a relatively large proportion of mining and energy or materials companies listing on the ASX, it is necessary to construct the sustainability index and use this index as the benchmark to measure SRIFs performance.

Figure 1 Plot of Cumulative Returns



Note: This figure summarises the cumulative return of the SRI index, CPI and ASX 300 index between November 2002 and February 2018.

Table 2 presents the descriptive statistics for the constructed benchmark portfolios. The average excess return of the market, both value-weighted and equally-weighted method, are negative, which indicates that the return of investing in the sustainable benchmark is lower than the return of investing in the 3-month bank bill rate on average. The standard deviations are relatively close, which are 0.0367 and 0.0465, respectively. The average *SMB* is -0.0137. That is to say, between 11/2002 and 02/2018, on average, large size firms obtained a higher return than small firms. The mean *HML* is 0.0006, which indicates that the value stocks earn a higher return than growth stocks during the sample period. The positive *MOM* (0.0089) shows that the past winners gain higher return than past losers。

Table 2 Descriptive Statistic of constructed sustainability index

	Excess return of Value-weighted Market index	***Excess return of equally-weighted Market index***	***SMB***	***HML***	***MOM***
Mean	-0.0040	-0.0126	-0.0137	0.0006	0.0089
Median	0.0016	-0.0055	-0.0157	0.0026	0.0129
Standard Deviation	0.0367	0.0465	0.0423	0.0407	0.0362
Minimum	-0.1594	-0.2218	-0.1131	-0.1052	-0.1103
Maximum	0.0859	0.1184	0.1303	0.1837	0.1235
Count	184	184	184	184	184

Note: This table reports the descriptive statistics of the monthly returns, *SMB*, *HML* and *MOM* for the constructed sustainability index between November 2002 and February 2018.

4.2.2 Dow Jones Sustainability Index Australian

I also compare the performance of SRIFs with the DJSIA for robustness. The monthly price index of DJSIA is obtained from the DataStream. The key difference between the DJSIA and my indices is the screening strategy. The DJSIA applies the best-in-class screens (S&P Dow Jones Indices LLC, 2018) while the indices I constructed employ negative-screens. As a result of the different investment universe, two sustainable indices may provide different assessment results. Kempf and Osthoff (2007) state that the benchmark applying the best-in-class screens strategies usually outperforms the benchmarks applying other strategies. They also point out that the reason for the outperformance may relate to the better diversification opportunities for the best-in-class strategy.

4.2.3 Conventional indices

In this paper, I also employ the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices to test whether SRIFs face a financial penalty compared to the conventional benchmark for investing based on ethical considerations. I consider all the Australian equities in the DataStream and construct the *SMB*, *HML* and *MOM* factors. Table 3 presents the descriptive statistics of the conventional indices and their factors. The mean values of all the conventional indices are positive, which means that the passive investment tracking the indices may averagely generate a higher return than the 90-day bank bill rate. From this figure, we may conclude that in terms of the benchmarks, socially conscious investors may suffer a financial penalty on average. The standard deviations of the conventional indices range from 0.0399-0.0407. The mean values of *SMB*, *HML* and *MOM* is -0.01, 0 and 0.083, respectively. This may indicate that for the conventional index with all the equities in Australia, on average, large size firms gain a higher return than small firms, and past winners obtain premium return than past losers. These values are also substantively similar to the factor means calculated for the sustainable indices.

Table 3 Descriptive Statistic of the conventional indices and the *SMB*, *HML* and *MOM* factors

	ASX 100 excess return	***ASX 200 excess return***	***ASX 300 excess return***	***MSCI excess return***	***ASX ALL ORDINARIES excess return***	***SMB***	***HML***	***MOM***
Mean	0.0002	0.0002	0.0002	0.0002	0.0004	-0.0100	0.0000	0.0083
Median	0.0098	0.0105	0.0103	0.0094	0.0101	-0.0064	-0.0011	0.0113
Standard Deviation	0.0399	0.0403	0.0404	0.0407	0.0405	0.0494	0.0410	0.0364
Minimum	-0.1395	-0.1417	-0.1421	-0.1429	-0.1489	-0.1731	-0.1265	-0.1214
Maximum	0.0942	0.0940	0.0943	0.1017	0.0952	0.1362	0.1688	0.1131
Count	184	184	184	184	184	184	184	184

Note: This table reports the descriptive statistics of the monthly returns for the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices between November 2002 and February 2018. The descriptive statistics *SMB, HML* and *MOM* factors for conventional stocks are shown in the last three columns.

5. Empirical results

5.1 Sustainability index analysis

5.1.1 CAPM

Table 4 Australian domestic equity SRIFs performance evaluation by using CAPM

Benchmark	α		β_0		Adj. R^2
Panel A: Value-weight benchmark					
Average weighted SRIFs	0.0080	***	0.8398	***	0.7191
Value weighted SRIFs	0.0080	***	0.8353	***	0.7187
Panel B: DJSIA					
Average weighted SRIFs	0.0059	***	0.3325	***	0.3077
Value weighted SRIFs	0.0059	***	0.3370	***	0.3195

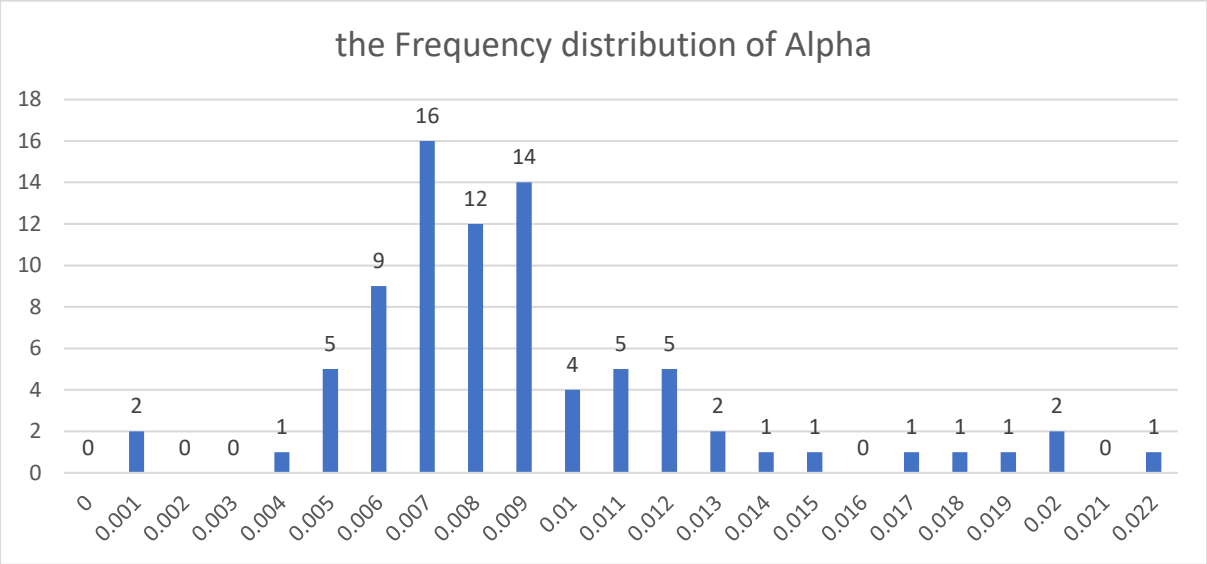
Note: This table reports the regression results for CAPM between November 2002 and February 2018. Panel A presents the results for the value-weighted sustainability index. Panel B presents the results for DJSIA.*,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

Table 4 provides a brief summary of the results when running Equation (1) for the period November 2002- February 2018. Panel A and panel B exhibit the results of SRIFs portfolio regress on the constructed value-weighted index and the DJSIA. For both panels, alphas are positive and significantly different from zero. The alpha for the DJSIA is lower than that from the sustainability index. I also construct the sustainability index by using the equally-weighted calculation (As shown in Appendix B). The outperformance result remains even when I use the equally-weighted index. Therefore, on average, between 2002 and 2018, SRIFs outperform the constructed index and the DJSIA, suggesting that SRIFs are outperforming compared to an appropriate risk-adjusted benchmark. This result contrasts with the prior research based on the Australian market. For instance, Jones et al. (2008) found statistically significant underperformance of around -0.6% annually. In contrast, I find outperformance of 9.6% per annum. There are three possible reasons for this relatively large magnitude. First, the SRI index had relatively poor performance over the study period. As mentioned in Section 4.2.1, the return of investing in the sustainable benchmark is lower than the return of investing in the 3-month risk free rate. This may be related to the use of a negative screen in constructing the index. According to Trinks & Scholtens (2017), negative screening generates opportunity costs, reducing the financial performance. Therefore, the SRIFs are being compared to a relatively poorly performing index. Another possibility is that SRIF managers may have positive stock-picking skills (as discussed in Section 5.2). The third possibility is that the SRI Index does not fairly measure the strategies being employed by SRIFs. I have built the index

based on published information about how SRIFs screen stocks, but if there is style drift then this may explain the large out-performance.

Another way to test the fund performance is to test it by individual fund. I calculate the Jensen's alpha for each individual SRIF based on the sustainability index. Within 83 individual SRIF, all the Jensen's alphas are positive, and only 4 funds have alpha which is insignificantly different from zero. This indicates that majority of Australian domestic equities SRIFs outperform the universe of sustainable equities. There are 65 SRIFs with positive alpha significant at 1% level, 11 SRIFs with positive alpha significant at 5% level, and 3 alphas are significantly positive at 10% level. Figure 2 presents the frequency of individual alphas, from the figure, more than half (61.45%) alphas are between 0.006 and 0.009. My result contrasts with Jones et al. (2008) who find that 67.2% of individual SRIFs have a negative Jensen's alpha. One of the reasons for the different findings could be the difference in benchmark selection. In Jones et al. (2008) paper, they employ the conventional index (ASX All Ordinary Shares) as the benchmark, while I use the newly constructed sustainability index. The negative screen applied in constructing the sustainability index rules out several industries, which, especially in Australia, generate relatively higher profits.

Figure 2 Frequency distribution of Alpha for Individual SRIF



Note: This figure summarises the frequency distribution of alphas for 83 individual SRIFs during the period from November 2002 to February 2018. The vertical axis is the value range of individual alphas. The horizontal axis is the frequency of alphas appear in each range, for example, there are two alphas between 0 and 0.001, five alphas between 0.004 and 0.005.

The beta obtained from the CAPM model represents the market exposure, which is usually used for describing the market volatility. All the betas are significantly different from 1 (tested

using a Wald test). In Panel A, the betas of the SRIFs are 0.8398 and 0.8353, which indicates that the SRIFs are positively related to the market albeit with a slightly lower volatility than the market. This result was also found by Bauer et al. (2006). They observe a significantly lower market exposure of SRIFs in Australia. As in Panel B, it is worth noting that the coefficients (β_o) of DJSIA are 0.3325 and 0.3370, which are considerably small. This phenomenon may be due to the fact that the DJSIA is constructed using the best-in-class screen, which results in the inclusion of larger companies. According to Bauer, Koedijk, and Otten (2005), ethical funds are more likely to invest in small companies. In order to test the preference of small companies, I further apply the multi-factor models to evaluate the performance of Australian domestic equity SRIFs.

5.1.2 Multi-factor model

Table 5 provides the regression results for equation (2) over the entire sample period. By comparing Panel A of Tables 4 and 5, four main conclusions can be drawn. First, after controlling for the size, and book-to-market factors, the alpha for the 3-factor model is slightly higher than the alpha obtained from the single-factor model in both panels. The positive and significant alphas (0.0086 and 0.0082, respectively) provide evidence that SRIFs outperform the market. Second, constant with the above discussion, the SRIFs are positively related to the market and have lower volatility (0.8186 and 0.8072, respectively) than the market. However, the value of market risk exposures decreases with the introduction of *SMB* and *HML* factors. The coefficients for constructed index decrease from 0.8398 to 0.8186 and from 0.8353 to 0.8072, respectively. The magnitude of the decline for the DJSIA is even larger. This may indicate that a small part of the exposure to the excess market return is captured by the Australian factors. Bauer et al. (2007) also observed this phenomenon in their study of Canadian ethical fund performance assessment. Third, the estimation results for $\beta(SMB)$ differ based on the method used to construct the index. Specifically the $\beta(SMB)$ of the value-weighted SRIF portfolio is not statistically significant, while it is positive and significant for the equally weighted portfolio at the 90% level. This indicates that that for the equally-weighted portfolio, the SRIFs prefer to invest in small companies during my sample period. However, the $\beta(SMB)$ for DJSIA is insignificant (Panel B in Table 4). The $\beta(SMB)$ for equally weighted index are significantly negative (as shown in Appendix B). Lastly, all of the coefficients of *HML* are significantly positive. Therefore, Australian domestic equity SRIFs are more value-oriented than growth-oriented. This is consistent with the value bias shown by Jones et al. (2008) for

Australia domestic ethical funds, and Lean et al. (2015), who examines North American SRI mutual funds.

Table 5 Australian domestic equity SRIFs performance evaluation by using 3-factor model

Benchmark	α	β_0	$\beta(SMB)$	$\beta(HML)$	Adj. R^2
Average weighted SRIFs	0.0086***	0.8186***	0.0569*	0.0979***	0.7351
Value weighted SRIFs	0.0082***	0.8072***	0.0280	0.1123***	0.7338
Panel B: DJSIA					
Average weighted SRIFs	0.0057**	0.3030***	-0.0114	0.1761***	0.3376
Value weighted SRIFs	0.0053**	0.3049***	0.0388	0.1868***	0.3531

Note: This table reports the regression results for Equation (2) between November 2002 and February 2018. Panel A presents the results for the value-weighted sustainability index. Panel B presents the results for DJSIA.*,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

Table 6 presents the regression results for the Carhart (1997) four-factor model. In terms of performance, after adding the momentum factor, the 4-factor model alpha remains significantly positive at the 1% level. Alphas (0.0083 and 0.0079) obtained from four-factor model are smaller than those from the 3-factor model, but still larger than the single factor model. Therefore, on average, SRIFs significantly outperform the market during 2002 and 2018. This result contrasts with Bauer et al. (2006), who found no significant difference between ethical funds and conventional funds' performance between 1992-2003 based on the Carhart (1997) 4-factor model. One of the possible reasons for the different conclusion may be due to the different sample period. More recently, Humphrey and Lee (2011) also find no significant return difference between SRIFs and conventional funds. Besides the sample size and the benchmark, another potential reason might be that I include the entire global financial crisis in my sample. According to Becchetti, Ciciretti, Dalò and Herzel (2015), SRIFs outperformed conventional funds during the 2007-2009 global financial crisis.

By applying the Carhart (1997) four-factor model, I find similar results regarding the market, size and value factors compared to the results presented in Table 5. During 2002 -2018, on average, SRIFs have significant positive market exposure, and they are inclined to invest in high BM ratio companies.

Both SRIFs portfolios have a positive and significant coefficient for the *MOM* factor, which indicates a preference for past winners. This result differ from some prior research (Bauer et

al., 2006; Jones et al., 2008; Humphrey & Lee, 2011) who find an insignificant coefficient on the *MOM* factor in the Australian market.

Table 6 Australian domestic equity SRIFs performance evaluation by using 4-factor model

Benchmark	α	β_0	$\beta(SMB)$	$\beta(HML)$	$\beta(MOM)$	$Adj.R^2$
Panel A: Value-weight benchmark						
Average-weighted SRIFs	0.0083***	0.8362***	0.1007***	0.1061***	0.1113**	0.743
Value-weighted SRIFs	0.0079***	0.8208***	0.0618	0.1186***	0.0859*	0.7379
Panel B: DJSIA						
Average-weighted SRIFs	0.0056**	0.3003***	-0.0169	0.1709***	-0.0158***	0.3307
Value-weighted SRIFs	0.0053**	0.3016***	-0.0526	-0.1793	-0.0381	0.3618

Note: This table reports the regression results for Equation (3) between November 2002 and February 2018. Panel A presents the results for the value-weighted sustainability index. Panel B presents the results for DJSIA. .*,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

5.1.3 Sub-period analysis

In addition to assessing the financial return of the Australian domestic equity SRIFs for the entire sample period from November 2002 to February 2018, I separate the sample into three sub-periods; November 2002-October 2007, November 2007-December 2009, and January 2010-February 2018. According to Figure 1, due to the impacts of 2007 GFC, the cumulative return of the SRI index had relatively large fluctuations between November 2007-December 2009. Therefore, on the basis of the return series, I defined this period as the GFC period.

Table 7 summarises the regression results of the value-weighted SRIFs portfolio on the value-weighted sustainable benchmark. I can draw five conclusions from Table 7. First, the alphas are all significantly positive except for the CAPM model during the GFC period. The outperformance of the SRIFs is consistent with the result generated from the entire period. Second, the coefficients of the market return are all significantly positive. Third, during the GFC period, the investment of SRIFs seems to become more small-firm-oriented which may provide explanation for the higher abnormal return during crisis. Fourth, for the period between 2010 and 2018, the SRIFs prefer to invest in value (high BM ratio) companies, this is not the case prior to the GFC. Fifth, the coefficient of *MOM* is significantly positive at 10% level after the GFC, but are not significant for other periods.

Based on my results, the outperformance of SRIFs does not change for the different market state. During the crisis period, the SRIFs can provide a higher abnormal return than non-crisis periods, while the significance is weaker. The significant level of alpha improves after controlling for the *SMB*, *HML* and *MOM* factors. The positive alphas may support the idea that the SRIFs can provide a hedge function during the down-ward market (Henke, 2016)

Table 7 Results for sub-period regressions (Value-weighted SRIFs portfolio on value-weighted benchmark)

	α	β_0	β(SMB)	β(HML)	β(MOM)	Adj. R^2
Panel A CAPM						
2002.11-2007.10	0.0093***	0.7178***				0.5266
2007.11-2009.12	0.0095	0.8049***				0.7560
2010.1-2018.2	0.0071***	0.9299***				0.7402
Panel B 3-factor model						
2002.11-2007.10	0.0081**	0.7315***	-0.0538	0.0906		0.5270
2007.11-2009.12	0.0106*	0.7255***	0.2596**	0.1757		0.8089
2010.1-2018.2	0.0076***	0.9039***	0.0229	0.0944**		0.7577
Panel C 4-factor model						
2002.11-2007.10	0.0081***	0.7309***	-0.0544	0.0908	-0.0015	0.5154
2007.11-2009.12	0.0143**	0.7547***	0.3128**	0.2092*	0.1930	0.8178
2010.1-2018.2	0.0068***	0.9184***	0.0643	0.1033**	0.0979*	0.7548

Note: This table reports the regression results for Equation(1)--(3) for three subperiods: November 2002-October 2007, November 2007-December 2009, and January 2010-February 2018. .*,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

5.2 Managerial skills analysis[1]

Table 8 presents the regression results for the HM model. The Jensen's alpha is positive and significant at 1% level. That is to say, between 2002 and 2018, SRIFs have demonstrated security picking skills when comparing to the constructed sustainable benchmark. This result contrasts with Benson, Brailsford and Humphrey (2006), who state that approximately 86% of SRIF managers have insignificant stock-picking skills. The gamma for both the average-weighted and value-weighted SRIFs is insignificant. This indicates that SRIF fund managers either do not try to or do not have any real skill in market timing. The lack of a significant negative however also means that they are not trying to market time and getting it wrong. My result is different from the prior work of Renneboog et al. (2008) who find that SRIF managers in the Asia-Pacific (Australia, Japan, Malaysia and Singapore) area have a negative market timing ability i.e. increasing stock market exposure just prior to a drop in the stock market.

The results of the BB model (As shown in Table 9) exhibit similar results to the HM model. The SRIF managers have positive stock picking skills (significantly positive Jensen's alpha) while no evidence of market timing skills (insignificant gamma). The $Adj.R^2$ of the extended model is slightly higher than the corresponding the $Adj.R^2$ of the HM model. This indicates that the goodness of fit improved after including additional *SMB*, *HML*, *MOM* factors. By applying this model, I find slightly more significant evidence to support the small-oriented investment style of SRIFs. The preference on the value stock and the past winner is constant with the prior results from the Carhart (1997) four-factor model contained in Table 6.

[1] This sector focus on discuss the results of HM and BB model based on the value-weighted benchmark. I also test for the equally-weighted benchmark. The results are shown in Appendix C.

Table 8 Results for Henriksson and Merton (1981) model

	α (H_0: α=0)	β_{0i} (H_0: β_{0i}=0)	γ_i (H_0: γ_i=0)	$Adj.R^2$	F-test
Value-weight benchmark					
Average weighted SRIFs	0.0081***	0.8433***	-0.0111	0.7175	233.44***
Value weighted SRIFs	0.0076***	0.8265***	0.0280	0.7172	233.10***

Note: This table reports the regression results for the Henriksson and Merton (1981) model, based on Equation (4). The sample period is between November 2002 and February 2018. *,**,*** Indicate significant at 10%, 5% and 1%, respectively.

Table 9 Results for Bollen and Busse (2001) model

	α (H_0: α=0)	β_{0i} (H_0: β_{0i}=0)	γ_i (H_0: γ_i=0)	β_{1i}	β_{2i}	β_{3i}	Adj.R^2	F-test
Value-weight benchmark								
Average weighted SRIFs	0.0081***	*0.8312****	0.0166	*0.1011****	*0.1058****	*0.1124***	0.7416	106.03***
Value weighted SRIFs	0.0074***	*0.8082****	0.0420	*0.0627**	*0.1179****	*0.0888***	0.7366	103.35***

Note: This table reports the regression results for the Bollen and Busse (2001) model, based on Equation (5). The sample period is between November 2002 and February 2018. *,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

5.3 Conventional index analysis

Contrary to the existing literature on this topic in Australia, I find significant outperformance by SRIFs. One of the reasons behind this result may relate to the benchmark selection. My analysis so far is based on the SRI indices I constructed and the DJSIA. The extant literature on Australia however typically uses a conventional benchmark. For instance: Humphrey and Lee (2011) employ two comparison groups, one contains 514 conventional funds, and the other one contains 27 characteristic-matched funds; Jones et al. (2008) employ a conventional benchmark (ASX All Ordinaries market return indices); and Bauer et al. (2006) use the Worldscope market equity indices. In consideration of the different results generated from different indices, there is a concern about whether the sustainable indices generate the similar performance and risk level as the conventional market indices?

Following the prior research of Schröder (2007), I test the performance, risk and conduct a spanning test for the SRI index and the conventional benchmarks (ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries).Table 10 represents the regression result of SRI index and the conventional indices based on equation (6). All the alphas are significantly negative at 1% level, which may indicate that my SRI indices performed significantly worse than the conventional benchmarks between November 2002 and February 2018. This significant underperformance may generate impacts when running the regression of SRIFs on SRI indices, which may explain why I get contrary results with the prior research who employ the conventional benchmark. The last column of Table 10 shows the result of a test which sets the alpha equals zero and the beta equals one. This test is known as the Spanning test. The null hypothesis(α_i=0 & β_i=1) has been rejected for all five conventional indices, and we may conclude that the SRI index cannot be replicated by the conventional indices. This may support the idea that, in Australia, constructing the sustainability index and using it to measure SRIFs performance is important. As a result of these tests, I also want to test whether the SRIFs can outperform when compared with conventional indices.

Table 10 Comparison results between SRI indices and the conventional indices

	Alpha (H_0: α=0)	**Beta** (H_0: β_0=1)	**Adj R^2**	**Spanning** (H_0: α=0 and β_0=1)
ASX 100	-0.0041***	0.8240***	0.8008	Rejected ***
ASX 200	-0.0041***	0.8234***	0.8148	Rejected ***
ASX 300	-0.0041***	0.8217***	0.8165	Rejected ***
MSCI Australia	-0.0041***	0.7944***	0.7737	Rejected ***
All Ordinaries	-0.0043***	0.8236***	0.8238	Rejected ***

Note: This table reports the regression results of SRI indices and five conventional indices(the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices) based on Equation(6). The last column summarises the results of Spanning test. The sample period is between November 2002 and February 2018. *,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

Table 11 represents the regression results for equation (1), (2) and (3) by comparing the performance of the SRIFs portfolio against the conventional indices. All the Jensen's alphas are significantly positive at the 1% level, indicating that for the period of November 2002-February 2018, on average, the SRIFs outperform the conventional market indices. The magnitude of the alpha compared to conventional indices is smaller than the alpha obtained when employing the sustainability index. This reduction reflects that potential finical penalty that appears to exist for social responsibility investment. The coefficients of the market risk premium (betas) across all five conventional indices are ranged from 0.8053 to 0.8322. All of them are smaller than 1, which indicates that SRIFs are positively related to the conventional benchmark with slightly lower volatility. The $\beta(SMB)$ are all significantly positive, which indicates that the SRIFs tend to invest in small firms. The $\beta(HML)$ are negative and the $\beta(MOM)$ are all positive across the indices, while all of them are not significantly different from zero.

In comprehensively considering the Table 3, 4, 5 and 11. I can conclude that the SRIFs outperform the sustainability index and the conventional indices, while the abnormal returns on conventional indices are slightly lower. I did not test the persistence of the positive abnormal return in this paper, which is a limitation of this work.

Table 11 Performance Comparison Between SRIFs and Conventional Indices

	α	*β0*	*β(SMB)*	*β(HML)*	*β(MOM)*	*Adj R2*
Panel A ASX 100						
CAPM	0.0045***	0.8239***				0.8265
3-factor model	0.0053***	0.8320***	0.0841***	-0.0179		0.8370
4-factor model	0.0051***	0.8322***	0.0913***	-0.0061	0.0331	0.8368
Panel B ASX200						
CAPM	0.0045***	0.8203***				0.8347
3-factor model	0.0052***	0.8262***	0.0712***	-0.0243		0.8416
4-factor model	0.0051***	0.8261***	0.0759***	-0.0165	0.0218	0.8411
Panel C ASX 300						
CAPM	0.0045***	0.8196***				0.8387
3-factor model	0.0052***	0.8242***	0.0631***	-0.0239		0.8438
4-factor model	0.0050***	0.8241***	0.0671***	-0.0173	0.0185	0.8432
Panel D MSCI Australian						
CAPM	0.0045***	0.8035***				0.8174
3-factor model	0.0054***	0.8130***	0.0900***	-0.0196		0.8296
4-factor model	0.0052***	0.8133***	0.0977***	-0.0070	0.0358	0.8295
Panel E All Ordinaries						
CAPM	0.0044***	0.8233***				0.8499
3-factor model	0.0047***	0.8255***	0.0378***	-0.0245		0.8509
4-factor model	0.0047***	0.8255***	0.0382***	-0.0238	0.0021	0.8500

Note: This table reports the regression results for SRIFs and five conventional indices(the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices) based on Equation(1)-(3). The sample period is between November 2002 and February 2018. *,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

6. Conclusion

In this article, I first investigate the performance of Australian domestic equity SRIFs. Contrasting with the prior research in Australia, the results of both single-factor and multi-factor models document that SRIFs outperform a constructed sustainable index and the DJSIA during the November 2002 to February 2018 period. By applying the Fama–French (1993) 3-factor and the Carhart (1997) 4-factor model, I conclude that SRIFs have a preference for value stocks and past winner stocks for the entire sample period, but show no significant size bias. The results have also been examined in three different sub-periods. The result from the subperiod analysis concurs with existing literature which shows that SRIFs generate positive and higher abnormal return than other periods. This may indicate that SRIFs can provide a hedge function during financial crises. Therefore, the SRIFs can be an alternative investment for investors who are concerned about not only the financial returns but also the benefits to society. Then, I employ the Henriksson and Merton (1981), and the Bollen & Busse (2001) models to assess the fund managers' stock picking and market timing abilities. The results exhibit that fund managers have positive stock-picking skills, but no market timing abilities when measuring the skills by employing the constructed sustainability index. Lastly, I employ the conventional indices, including the ASX 100, ASX 200, ASX 300, MSCI Australian and All Ordinaries market return indices, and find that investment in SRIFs results in a return premium (significantly positive alphas) comparing to the conventional market. However, the magnitude of the alphas obtained from conventional indices are slightly smaller than that from sustainability index. This may indicate that, as for the whole investment universe, socially conscious firms underperform. By analysing the performance, risk and the spanning test for the SRI indices and the conventional indices in Australia, I conclude that, in Australia, the SRI index cannot be replicated by conventional indices. This conclusion has two meanings, one, the construction of the SRI index plays a significant role in SRIFs performance evaluation; two, conventional indices may not be appropriate for measuring the performance of SRIFs. They may more suitable to use as the indicator of the potential return penalty (or premium) in socially responsible investment.

References

Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, *27*(11), 1101-1122.

Bauer, R., Derwall, J., & Otten, R. (2007). The ethical mutual fund performance debate: New evidence from Canada. *Journal of Business Ethics*, *70*(2), 111-124.

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

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

Becchetti, L., Ciciretti, R., Dalò, A., & Herzel, S. (2015). Socially responsible and conventional investment funds: performance comparison and the global financial crisis. *Applied Economics*, *47*(25), 2541-2562.

Benson, K. L., Brailsford, T. J., & Humphrey, J. E. (2006). Do socially responsible fund managers really invest differently?. *Journal of Business Ethics*, *65*(4), 337.

Bollen, N. P. (2007). Mutual fund attributes and investor behavior. *Journal of Financial and Quantitative Analysis*, *42*(03), 683-708.

Bollen, N. P., & Busse, J. A. (2001). On the timing ability of mutual fund managers. *The Journal of Finance*, *56*(3), 1075-1094.

Briec, W., & Kerstens, K. (2009). Multi-horizon Markowitz portfolio performance appraisals: A general approach. *Omega*, *37*(1), 50–62.

Busse, J. A., Chordia, T., Jiang, L., & Tang, Y. (2014). How does size affect mutual fund performance? Evidence from mutual fund trades. Working Paper.

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

Chang, C. E., & Witte, H. D. (2010). Performance evaluation of US socially responsible mutual funds: revisiting doing good and doing well. *American Journal of Business*, *25*(1), 9-24.

Chegut, A., Schenk, H., & Scholtens, B. (2011). Assessing SRI fund performance research: Best practices in empirical analysis. *Sustainable Development*, *19*(2), 77-94.

Climent, F., & Soriano, P. (2011). Green and good? The investment performance of US environmental mutual funds. *Journal of Business Ethics*, *103*(2), 275-287.

Cortez, M. C., Silva, F., & Areal, N. (2012). Socially responsible investing in the global market: The performance of US and European funds. *International Journal of Finance & Economics*, *17*(3), 254-271.

Derwall, J., & Koedijk, K. (2009). Socially responsible fixed-income funds. *Journal of Business Finance & Accounting*, *36*(1-2), 210-229.

El Ghoul, S., & Karoui, A. (2017). Does corporate social responsibility affect mutual fund performance and flows?. *Journal of Banking & Finance*, *77*, 53-63.

Eurosif. (2016). *SRI Study 2016.* Retrieved from http://www.eurosif.org/sri-study-2016/

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, *33*(1), 3-56.

Ferruz, L., Muñoz, F., & Vargas, M. (2010). Stock picking, market timing and style differences between socially responsible and conventional pension funds: evidence from the United Kingdom. *Business Ethics: A European Review*, *19*(4), 408-422.

Forum for Sustainable and Responsible Investment [USSIF] (2016) Retrieved from https://www.ussif.org

Galema, R., Plantinga, A., & Scholtens, B. (2008). The stocks at stake: Return and risk in socially responsible investment. *Journal of Banking & Finance*, *32*(12), 2646-2654.

Gil-Bazo, J., Ruiz-Verdú, P., & Santos, A. A. (2010). The performance of socially responsible mutual funds: the role of fees and management companies. *Journal of Business Ethics*, *94*(2), 243-263.

Global Sustainable Investment Alliance. (2017). Retrieved from http://www.gsi-alliance.org/

Hallahan, T. A., & Faff, R. W. (1999). An examination of Australian equity trusts for selectivity and market timing performance. *Journal of Multinational Financial Management*, *9*(3-4), 387

He, W., Cao, B., & Baker, H. K. (2015). The performance and market timing ability of Chinese mutual funds. *Financial Services Review*, *24*(3), 289.

Henke, H. M. (2016). The effect of social screening on bond mutual fund performance. *Journal of Banking & Finance*, *67*, 69-84.

Henriksson, R. D., & Merton, R. C. (1981). On market timing and investment performance e. II. Statistical procedures for evaluating forecasting skills. *Journal of business*, 513-533.

Hirshleifer, D. (2008). Psychological bias as a driver of financial regulation. *European Financial Management*, *14*(5), 856-874.

Huberman, G., & Kandel, S. (1987). Mean-variance spanning. *The Journal of Finance*, *42*(4), 873-888.

Humphrey, J. E., & Lee, D. D. (2011). Australian socially responsible funds: Performance, risk and screening intensity. *Journal of Business Ethics*, 102(4), 519-535.

Ibikunle, G., & Steffen, T. (2017). European green mutual fund performance: A comparative analysis with their conventional and black peers. *Journal of Business Ethics*, *145*(2), 337-355.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *The Journal of finance*, *23*(2), 389-416.

Jiang, G. J., Yao, T., & Yu, T. (2007). Do mutual funds time the market? Evidence from portfolio holdings. *Journal of Financial Economics*, *86*(3), 724-758.

Jones, S., Van, S., Frost, G., & Loftus, J. (2008). The investment performance of socially responsible investment funds in Australia. *Journal of Business Ethics*, 80(2), 181-203.

Kempf, A., & Osthoff, P. (2007). The effect of socially responsible investing on portfolio performance. *European Financial Management*, *13*(5), 908-922.

Lean, H. H., Ang, W. R., & Smyth, R. (2015). Performance and performance persistence of socially responsible investment funds in Europe and North America. *The North American Journal of Economics and Finance*, *34*, 254-266.

Leite, P., & Cortez, M. C. (2014a). Selectivity and timing abilities of international socially responsible funds. *Applied Economics Letters*, *21*(3), 185-188.

Leite, P., & Cortez, M. C. (2014b). Style and performance of international socially responsible funds in Europe. *Research in International Business and Finance*, 30(c), 248-267.

Leite, P., & Cortez, M. C. (2015). Performance of European socially responsible funds during market crises: Evidence from France. *International review of financial analysis*, *40*, 132-141.

Lins, K., Servaes, H., & Tamayo, A. (2015). Social capital, trust, and firm performance during the financial crisis.

Moskowitz, M. (1972). Choosing socially responsible stocks. *Business and Society Review*, *1*(1), 71-75.

Nofsinger, J., & Varma, A. (2014). Socially responsible funds and market crises. *Journal of Banking & Finance*, *48*, 180-193.

Rathner, S. (2012). *The performance of socially responsible investment funds: A meta analysis* (No. 2012-03). Working Papers in Economics and Finance, University of Salzburg.

Renneboog, L., Ter Horst, J. and Zhang, C. (2008) The price of ethics and stakeholder governance: evidence from socially responsible mutual funds. *Journal of Corporate Finance*, 14(3), 302–32.

Responsible Investment Association Australasia. (2017). Retrieved from http://responsibleinvestment.org/

S&P Dow Jones Indices LLC. (2018). *Dow Jones Sustainability Australia Index (AUD)*. Retrieved from https://us.spindices.com/indices/equity/dow-jones-sustainability-australia-index-aud

Schröder, M. (2007). Is there a difference? The performance characteristics of SRI equity indices. *Journal of Business Finance & Accounting*, *34*(1-2), 331-348.

Statman, M., & Glushkov, D. (2009). The wages of social responsibility. *Financial Analysts Journal*, *65*(4), 33-46.

Thompson, J. C., Engle Sr, A. D., & Spain, J. W. (2011). "A rose by any other name": Models of social responsibility as predictors of financial performance. *Journal of Financial and Economic Practice, 11*(1), 37-51.

Trinks, P. J., & Scholtens, B. (2017). The opportunity cost of negative screening in socially responsible investing. *Journal of Business Ethics, 140*(2), 193-208.

Van, D. M., & Nijhof, A. H. (2015). Socially Responsible Investment Funds: a review of research priorities and strategic options. *Journal of Sustainable Finance & Investment*, 5(3), 178-204.

Appendices

Appendix A: List of Australia domestic SRIFs

No.	Name	ISIN	Global Category	Inception Date
1	AEI Retail Emerging Companies	AU60AUG00267	Australia Equity	1/07/2015
2	AEI Wholesale Emerging Companies	AU60AUG00275	Australia Equity	1/07/2015
3	Alphinity Socially Responsible Share	AU60HOW01211	Australia Equity	30/06/2000
4	Alphinity Socially Responsible Share B	AU60GLO00150	Australia Equity	14/04/1989
5	AMP Capital Res Inv Leaders Aus Shr	AU60AMP11528	Australia Equity	1/02/2006
6	AMP Capital Res Inv Leaders Aus Shr A	AU60AMP11510	Australia Equity	24/01/2006
7	AMP Capital Sustainable Share	AU60AMP04507	Australia Equity	21/02/2001
8	AMP Capital Sustainable Share A	AU60AMP04499	Australia Equity	20/04/2001
9	AMP Capital Sustainable Share H	AU60AMP11007	Australia Equity	4/04/2007
10	AMP Capital WS Australian Share	AU60AMP02733	Australia Equity	13/01/1995
11	AMP Capital WS Australian Share A	AU60AMP02584	Australia Equity	31/01/1998
12	AMP FLI S2-AMP Australian Share	AU60AMP13896	Australia Equity	1/07/2010
13	AMP FLI S2-Res Inv Leaders Aus Shr	AU60AMP14332	Australia Equity	1/07/2010
14	AMP FLI-AMP Australian Share	AU60AMP08276	Australia Equity	23/03/2004
15	AMP FLI-AMP Sustainable Future Aus Shr	AU60AMP04481	Australia Equity	16/02/2001
16	AMP FLI-Res Inv Leaders Aus Share	AU60AMP10553	Australia Equity	8/08/2005
17	Antares Prof Sustainable Investment	AU60PPL00034	Australia Equity	16/02/2006
18	ANZ OA Inv-Perpetual Ethical SRI EF/Sel	AU60MMF10583	Australia Equity	10/12/2007
19	ANZ OA Inv-Perpetual Ethical SRI-DEF	AU60MMF11219	Australia Equity	10/12/2007
20	ANZ OA IP-OP Sustainable Inv Aus EF	AU60ANZ03647	Australia Equity	31/05/2003
21	ANZ OA IP-OP Sustainable Inv Aus NE	AU60ANZ03654	Australia Equity	31/05/2003
22	Australian Ethical Advocacy	AU60AUG00085	Australia Equity	26/02/2010
23	Australian Ethical Advocacy B Whols	AU60AUG00200	Australia Equity	13/01/2012
24	Australian Ethical Australian Shrs	AU60AUG00028	Australia Equity	19/09/1994
25	Australian Ethical Australian Shrs Whols	AU60AUG00184	Australia Equity	23/01/2012

26	BT Balanced Equity Income	AU60BTA04288	Australia Equity	1/11/2012
27	BT Class Inv Ethical Shr	AU60RFA00273	Australia Equity	1/08/2001
28	BT Defensive Equity Income	AU60BTA04270	Australia Equity	2/10/2012
29	BT Investor Choice Sust Aus NEF	AU60WFS03303	Australia Equity	20/05/2002
30	BT PPSI-Westpac Ins Aus Sust Shr	AU60WFS02917	Australia Equity	5/10/2001
31	BT Sustainable Australian Share	AU60WFS02859	Australia Equity	30/09/2001
32	BT WE-BT Ethical Share	AU60WFS04236	Australia Equity	2/11/2009
33	BT Wholesale Australian Share	AU60BTA00559	Australia Equity	1/08/1996
34	BT Wholesale Core Australian Share	AU60RFA08185	Australia Equity	22/09/1992
35	BT Wholesale Ethical Share	AU60RFA00257	Australia Equity	1/05/2001
36	BT Wholesale Geared Imputation	AU60RFA01305	Australia Equity	8/01/2003
37	BT Wholesale Imputation	AU60RFA01032	Australia Equity	19/10/1999
38	BT Wholesale MicroCap Opportunities	AU60RFA00612	Australia Equity	1/03/2006
39	BT Wholesale MidCap	AU60BTA03132	Australia Equity	1/07/2008
40	BT Wholesale Smaller Companies	AU60RFA08193	Australia Equity	29/12/1992
41	CI Australian Equities Fund	AU60CIP00053	Australia Equity	4/07/2002
42	Greencape Broadcap	AU60HOW00346	Australia Equity	11/09/2006
43	Greencape Broadcap Class P	AU60HOW01583	Australia Equity	13/03/2015
44	IOOF GIS Hunter Hall Australian Value	AU60ASK02160	Australia Equity	15/11/2002
45	IOOF GIS Perpetual Ethical SRI	AU60ASK10593	Australia Equity	12/12/2007
46	IOOF OIS Hunter Hall Australian Value	AU60ASK02392	Australia Equity	10/02/2003
47	IOOF OIS Perpetual Ethical SRI	AU60ASK10916	Australia Equity	12/12/2007
48	IOOF WIS Hunter Hall Australian Value	AU60ASK02061	Australia Equity	10/10/2002
49	IOOF WIS Perpetual Ethical SRI	AU60ASK10734	Australia Equity	12/12/2007
50	IOOF/Perennial Flexi-Socially Resp Sh	AU60IOF02022	Australia Equity	24/09/2001
51	Legg Mason Martin Currie Eth Val WithInc	AU60SSB00645	Australia Equity	9/12/2015
52	Maple-Brown Abbott Responsible Invmt		Australia Equity	16/09/2009
53	Mercer Socially Resp Australian	AU60MIN00453	Australia Equity	30/06/2010
54	Microequities Deep Value	AU60MIC00019	Australia Equity	6/03/2009
55	Nikko AM Australian Share	AU60TYN00265	Australia Equity	29/11/1995

56	Nikko AM Australian Share Income	AU60TYN00380	Australia Equity	13/11/2008
57	Nikko AM Australian Share Value	AU60TYN00109	Australia Equity	4/06/1987
58	Nikko AM Australian Share W	AU60TYN00281	Australia Equity	27/03/1995
59	OA Frontier IP-Perpetual Ethical SRI	AU60MMF14635	Australia Equity	15/11/2010
60	OnePath OA FR IP-OP Sust Inv Aus Shares	AU60MMF15293	Australia Equity	15/11/2010
61	OnePath OA IP-OP Sust Inv Aus Share EF	AU60MMF05567	Australia Equity	10/09/2003
62	OnePath OA IP-OP Sust Inv Aus Share NE	AU60MMF05575	Australia Equity	10/09/2003
63	OnePath OA IP-Perpetual Ethcl SRI EF/Sel	AU60MMF10799	Australia Equity	8/10/2007
64	OnePath OA IP-Perpetual Ethical SRI NEF	AU60MMF11003	Australia Equity	8/10/2007
65	OnePath WS-Sustainable Inv Aus Shares	AU60MMF03356	Australia Equity	22/06/2001
66	Ophir High Conviction	AU60OPH00027	Australia Equity	3/08/2015
67	Pengana Australian Equities Income	AU60HHA00015	Australia Equity	30/11/2001
68	Perennial Socially Responsive Shares Tr	AU60IOF01172	Australia Equity	1/11/2001
69	Perennial Wholesale Socially Res Share	AU60IOF02055	Australia Equity	14/06/2001
70	Perpetual WFIA-AMP Capital Sust Shr	AU60PER04482	Australia Equity	10/11/2008
71	Perpetual WFI-AMP Capital Sust Shr	AU60PER01637	Australia Equity	29/10/2003
72	Perpetual WFIA-Perpetual Ethical SRI	AU60PER04912	Australia Equity	10/11/2008
73	Perpetual WFI-Perpetual Ethical SRI	AU60PER02437	Australia Equity	29/10/2003
74	Perpetual Wholesale Ethical SRI	AU60PER01165	Australia Equity	3/05/2002
75	Redpoint Active Australian Equity Fund	AU60PPL00307	Australia Equity	25/02/2014
76	Schroder Equity Opps	AU60SCH00356	Australia Equity	14/12/2007
77	SGH Micro Cap Fund	AU60ETL00220	Australia Equity	1/03/2004
78	Spheria Australian Smaller Companies	AU60WHT00089	Australia Equity	4/07/2005
79	SSgA Australian SAM Sustainability Index	AU60VAN01228	Australia Equity	27/09/2001
80	Uniting Ethical Australian Equities Tr	AU60UGF00019	Australia Equity	7/07/2003
81	Westpac Aus Sust Shr Retail	AU60WFS02891	Australia Equity	9/10/2001
82	Wisdom Australian Equities	AU60HHA00171	Australia Equity	16/07/2013
83	Yarra Australian Real Assets Secs Fund	AU60JBW00307	Australia Equity	22/12/2005

Note: This table reports the name, ISIN, global category and inception date of the 83 domestic equity SRIFs in Australia.

Appendix B

Results for constructed equally-weighted index.

a) CAPM

	α		***β***		***Adj. R^2***
Average-weighted Portfolio	0.012353	***	0.608416	***	0.604291
Value-weighted Portfolio	0.012096	***	0.589051	***	0.572002

b) Three-factor model

	α		***β***		***β (SMB)***		***β (HML)***	***Adj. R^2***
Average-weighted Portfolio	0.00906	***	0.76418	***	-0.38236	***	0.01775	0.75773
Value-weighted Portfolio	0.00855	***	0.74688	***	-0.40225	***	0.03572	0.74461

c) Four-factor model

	α		***β***		***β (SMB)***		***β (HML)***	***β (MOM)***	***Adj. R^2***
Average-weighted Portfolio	0.00889	***	0.76924	***	-0.36442	***	0.02194	0.053976	0.75863
Value-weighted Portfolio	0.00846	***	0.74958	***	-0.39265	***	0.03796	0.02886	0.74383

Note: This table reports the regression results of the SRIFs on the constructed equally-weighted index between November 2002 and February 2018. Panel A presents the results for CAPM. Panel B presents the results for three-factor models. Panel c presents the results for four-factor models. *,**,*** Indicate significant at 10%, 5% and 1% level, respectively.

Appendix C Results for managerial skills analysis by using the constructed equally-weighted index

	α (H_0: α=0)	β_{0i} (H_0: β_{0i}=0)	γ_i (H_0: γ_i=0)	β_{1i}	β_{2i}	β_{3i}	Adj.R^2	F-test
Panel A the HM model								
Value weighted SRIFs	0.0167***	0.6891***	-0.3101***				0.5860	13.52***
Average weighted SRIFs	0.0172***	0.07146***	-0.3289***				0.6203	150.50***
Panel B the BB model								
Value weighted SRIFs	0.0091***	*0.7590***	-0.0373	*-0.3908***	*0.0386*	*0.0229*	0.7426	106.58***
Average weighted SRIFs	0.0097***	0.7819***	-0.0500	-0.3619***	0.0229	0.0460	0.7576	115.40***

Note: This table reports the managerial skills analysis by using the constructed equally-weighted index. Panel A presents the regression results for the Henriksson and Merton (1981) model, based on Equation (4). Panel B presents the regression results for the Bollen and Busse (2001) model, based on Equation (5). The sample period is between November 2002 and February 2018. *,**,*** Indicate significant at 10%, 5% and 1%, respectively.