

Could Morningstar Sustainability Rating
be an indicator for downside protection?



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Morningstar Sustainability Rating ของกองทุน
สามารถเป็นตัวบ่งบอกถึง downside protection ได้หรือไม่



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This study investigates whether the Morningstar Sustainability Rating indicates the downside protection for the 2018 Global stock market downturn and 2020 Stock market crash by using daily time-series analysis and investigate whether fund characteristics have an effect on performance of each Morningstar Sustainability Rating by using a panel data analysis at a quarterly frequency for the active equity mutual fund in the US market.

This paper finds the neutral performance in every group of ratings in any market period according to the neutral alpha or abnormal return and the fund characteristics influence the fund performance pattern which can observe that the better rating's fund tend to have the better performance which can indicate that the better Morningstar Sustainability Rating provides the less downside risk in the crisis period.

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1 Introduction

Socially Responsible Investment (SRI) is an investment strategy that not only concerns about financial performance in investment decision but also pays attention to the environmental, social, and governance issues (ESG) to the construction investment portfolio. The objective of the SRI fund is to maximize financial return and attempt to maximize social good. In the recent decade, the investor demand for socially responsible investing strategies has been increasing due to observation from The Forum for Sustainable and Responsible Investment and The Global Sustainable Investment Alliance report that SRI assets in the United States in 2018 have expanded to \$12.0 trillion, up 38% from \$8.7 trillion from 2016 ([US SIF, 2018](#)) and 34% on the five major markets which are Europe, the United States, Canada, Japan, and Australia and New Zealand ([GSIA, 2018](#)). In the same direction as the SRI assets growth rate of 2014 to 2016 and 2012 to 2014 which are 25% and 61% respectively in the five major markets ([GSIA, 2016](#); [GSIA, 2014](#)) while 33% and 76% respectively in the U.S. ([US SIF, 2016](#); [US SIF, 2014](#)).

Prior studies present SRI fund performance are not differ significantly from conventional funds performance according to analysed data from many nations although the investors pay a cost for the ethics ([Renneboog et al., 2008](#)). On the other hand, the researchers also concentrate on the question

of whether demand of SRI funds in the market has been continuously increasing while the empirical study state that the risk-adjusted return of SRI funds is generally not statistically different from the conventional funds. [Glode, 2011](#) finds that the ability of active fund managers who can deliver a superior performance during the unexpected bad time than a good time can generate a demand from the investor. [Kosowski, 2011](#) shows that conventional mutual funds tend to perform better during recessions than during expansion periods, suggesting that fund managers' abilities may be state-dependent.

However, empirical evidence on the performance of SRI funds during crisis and non-crisis period is mostly focused on SRI funds and observed until the Global Financial Crisis ([Areal et al., 2013](#); [Nofsinger & Varma, 2014](#)).

In 2016, Morningstar introduced the Morningstar Sustainability Rating which is a tool designed to enable individual investors to evaluate funds based on sustainability criteria and help investors use environmental, social, and governance issues (ESG) to evaluate portfolio. It is an independent tool that gives investors an easy way to assess the sustainability of the holdings in a portfolio on the basis of sustainability criteria. Since more sophisticated institutional investors can partially address these challenges by hiring expert consultants to customize their manager selection and monitoring process.

Individual investors face a greater challenge in finding the sustainability portfolios ([Morningstar, 2017](#)). Morningstar assigns the rating along with bell curve distribution to five groups – High, Above Average, Average, Below Average, and Low – and depict them with corresponding globe icons by the Low is 1 globe to the High is 5 globes.

Therefore, this paper aims to apply the Morningstar Sustainability Rating to evaluate the performance of active equity sustainable mutual funds and examines the relationship between funds performance along with each Morningstar Sustainability Ratings and the market return in the U.S. market during the crisis and non-crisis period. Besides, this paper also investigates the fund performance of each Morningstar Sustainability Rating when adding the fund characteristics variables to observe whether the funds play a role as downside protection for 2018 Global stock market downturn and 2020 Stock market crash or whether the funds can deliver a superior return performance during a crisis period that a non-crisis period.

This paper uses the Morningstar Sustainability Rating to categorize funds and construct the equally-weighted portfolio returns according to their ratings and use CAPM and Carhart 4-factor model ([Carhart, 1997](#)) to examine the abnormal returns or alpha in each rating compared to the market benchmark in the overall market, non-crisis, and crisis period by using a dataset of US active

equity fund in the period of September 2018 – June 2020 or based on available Morningstar Sustainability Rating data in Morningstar Direct. Some could argue that they might have some differences in the characteristics of the fund managers picking the stocks and their funds' characteristics to the portfolio which is beyond the socially responsible attributes that can drive fund performance and abnormal return. Therefore, this paper use quarterly fund holdings data and control for various fund characteristics and stock portfolio characteristics to observe with multi-factor asset pricing models.

2 Literature Review

2.1 Performance of SRI funds and Conventional funds

Early research suggests that SRI funds are insignificant difference in risk-adjusted return between SRI and conventional funds and SRI funds' portfolio managers do not show superior stock-picking or market-timing skills. (Sauer, 1997; Gol-dreyer and Diltz, 1999; Bauer et al., 2005; Benson and Humphrey, 2008; Renneboog et al., 2008; Leite and Cortez, 2014; Munoz et al., 2015; Erragragui and Lagoarde-Segot, 2016).

Statman, 2004 and Bollen, 2007 argue that investor perception for the conventional fund and SRI funds is different. They are less sensitive to negative return for the SRI funds compared to the

conventional fund but more sensitive to positive return. Therefore, SRI investors can bear some lagged return compared to conventional fund's investors. So SRI funds obtain some additional non-financial utility to investors. Consistent with [Kahneman and Tversky, 1979](#), Prospect Theory, investors are more negatively impacted by losses than a gain of similar magnitude positively impacts them. Thus, they would protect themselves from the loss by investing in the securities that have downside protection ability and compensate with giving up some return in good times. Therefore, the SRI fund investors may be more bear to hold the SRI mutual funds than are conventional investors in the bad time and have a reason to hold the SRI mutual funds in the good time which can imply that the SRI fund investors may be more royal compared with conventional fund investors. [Renneboog et al., 2011](#) and [Benson and Humphrey, 2008](#) use monthly to annual lead-lag relationships between return and money flow into SRI and conventional funds. They report that SRI flows are significantly less sensitive to past negative returns than flow to conventional funds. Meanwhile, 80% of investors said they are interested in sustainable investing and believe companies with leading sustainability practices may be better long-term investments ([Morgan Stanley survey, 2020](#)).

More recent study [Nofsinger and Varma, 2014](#) aim to examine the question that whether SRI investors be willing to give up some return in non-crisis periods to gain some higher returns during crisis period by comparing the performance of US SRI and conventional mutual funds during periods

of crisis, particularly March 2000 – October 2002 as the technology bubble burst, and October 2007 – March 2009 during the global financial crisis, in addition to periods of non-crisis other than those two crisis periods during 2000–2011. Their estimation results show that SRI funds significantly outperformed conventional funds during the crises, although the opposite result was obtained during the non-crisis period.

Besides, [Leite and Cortez, 2015](#) compared the performance of SRI and conventional funds during market crises in France: the period until the technology bubble burst (January 2001–March 2003), the global financial crisis (June 2007–February 2009), and the euro sovereign debt crisis (May 2011–May 2012). Their principal finding was that SRI funds significantly underperformed compared to conventional funds during non-crisis periods, and the difference between SRI and conventional funds was not significant during crises. In contrast, [Nakai, Yanaguchi, and Takeuchi, 2016](#) find that SRI funds better resisted the bankruptcy of the Lehman Brothers than conventional funds in the Japanese market.

2.2 Performance of different Morningstar Sustainability Ratings

As [Morgan Stanley survey, 2020](#) surveys that 80% of investors said they are interested in sustainable investing and have a faith that if company concerns with sustainability by using the

sustainability practices in the operation may have a better long-term investments. Nevertheless, [Krigsvoll et al., 2016](#) find no statistical evidence to support that there exists a risk-adjusted difference in performance between high and low-sustainability for the European open-end mutual funds. For the high and low sustainability fund are defined from Morningstar Sustainability Rating with a descriptive score high and low respectively.

2.3 Performance of different fund characteristics

[Nofsinger and Varma, 2014](#) investigate whether it is the SRI aspects of these funds characteristics or stock portfolio characteristics that are important for the performance pattern. They find that the conventional funds and SRI funds have different funds characteristics. The conventional funds tend to have more active investors compared to the SRI funds as they can indicate from the greater number of turnover ratio. For the number of the stocks in the portfolios, the SRI funds hold more stocks during the non-crisis periods while the conventional funds hold more during the crisis periods which can imply that the SRI funds are more diversified during non-crisis periods and conventional funds are better diversified during crisis periods. For allocation to defensive stock, the SRI funds are managed differently from conventional funds.

As for the characteristics of the stocks held in the fund portfolio, SRI funds invest in younger and smaller firms, more profitable firms, and firms with lower return volatility.

After controlling for differences in these stock portfolio characteristics and portfolio characteristics, find that although there are differences characteristics in SRI and conventional funds, they do not drive the asymmetric return. It is still the socially responsible attributes that are associated with the outperformance in crisis periods.

2.4 Environmental, Social and Governance issues (ESG)

Active and passive SRI funds consider both ESG performance and fundamentals of their holdings when assigning individual weights. [Starks et al. \(2017\)](#) and [Nofsinger et al., 2019](#), using aggregate net ESG scores, they find that institutional investors with a longer horizon prefer higher-ESG firms, while short-term investors prefer the opposite. Many studies find that the size of firms also matters for ESG decision. Larger firms are more likely to adopt ESG activities and to promote external communication and reporting about their activities than smaller firms ([Neu et al., 1998](#); [Baumann-Pauly et al., 2013](#); [Boesso and Kumar, 2007](#); [Chan et al., 2014](#)). Moreover, [Cho et al., 2013](#) support that more sustainable firms have more incentives to disclose ESG information to differentiate themselves from less sustainable firms.

As for the financial performance of ESG firms, [Rezaee, 2016](#) finds that firms that are managed more effectively in terms of their governance, address their social and environmental initiatives, and run their business more ethically are more financially sustainable in the long-term than other firms. In addition, [Desclee et al., 2016](#) find a positive correlation between ESG rating scores and credit ratings. Companies with a better ESG rating are better comply with credit rating and a stronger balance sheet.

In addition, [Kim, Li, and Li, 2014](#) also find that firm's CSR performance is negatively associated with future crash risk which is consistent with [Kim et al., 2012](#) find that socially responsible firms have well behaved in financial reporting and exhibit less evidence of earnings management, suggesting that firms' commitment to higher ethical standards has a positive impact on accounting information quality. If firms with better CSR cultures maintain the same high level of ethical standards in accurate financial reporting, they are likely to be associated with a higher level of transparency based on the less likely to conceal bad news from investors. Many studies support that the socially responsible firms are more stable relations with communities and governments based on the lower degree of legal prosecutions and fines ([McGuire et al., 1998](#); [Maxwell et al., 2000](#); [Innes and Sam, 2008](#)).

On the other hand, [Lys et al., 2015](#) find that ESG expenditures are made strategically and firms tend to invest in them in the current period when they anticipate strong future financial performance. Thus, ESG disclosures are channels by which management conveys private information regarding future performance to stakeholders. Besides, many studies argue that ESG fund scores indicate the required ESG standards. Superior ESG scored funds usually face additional screening information costs and investment opportunity losses, which may cause suboptimal performance of the company ([Aslaksen and Synnestvedt, 2003](#); [Barnett and Solomon, 2006](#); [Becchetti and Ciciretti, 2009](#); [Gangi and Varrone, 2018](#); [Jin and Han 2018](#)).

In addition, [Busch and Bassen, 2015](#) study relationship between the environmental, social, and governance (ESG) criteria and corporate financial performance and found that the relationship is a neutral on average, not positive on average. Therefore, the finding contrasts with the common perception of investors which expect there is ESG outperformance.

As for the riskiness of ESG firms, the consideration of ESG issues can reduce the long-term risk and leads to improved risk-adjusted returns and decreased cost of capital. So, companies that include the sustainability factors into their corporate operation will confront the lower risks and can have the better business opportunities ([Eccles et al., 2014](#); [Verheyden et al., 2016](#)). Consistent with

Bhojraj and Sengupta, 2003 find that good corporate governance reduces a firm's risk of default by alleviating agency cost, monitoring efforts and reduce information asymmetries. This is based on a higher transparency and disclosures by the firm's management.

Based on the reasons above, this paper predicts that the sustainable funds' performance is related to ESG score both in overall market and in the crisis period. Since the ESG firms' performance might be more stable from the nature of the large firm, credit rating, and more financially sustainable in the long-term. Besides, ESG firms can reduce the long-term risk so they might be a downside protection when facing with uncertainty situation. This paper examines the relation between the sustainable funds' performance and ESG score by consider on the Morningstar Sustainability Rating which is derived from ESG Risk rating and expect to be a beneficial to investors for investing in ESG criteria since the rating is publicly published.

3 Data

3.1 Fund Performance

3.1.1 Morningstar Sustainability Rating – Sustainable Fund

For the identification of mutual funds that are deemed sustainable funds, this paper defines sustainable funds as the funds which provide with Morningstar Sustainability Rating.

In 2016, Morningstar released the Morningstar Sustainability Rating to help investors use environmental, social, and governance (ESG) information to evaluate portfolio. The Morningstar Sustainability Rating is ranked from the Morningstar Sustainability Score and distributed to High, Above Average, Average, Below Average and Low level.

In 2016, Morningstar Sustainability Rating is derived from the Morningstar Sustainability Portfolio calculated as following (Morningstar, 2016)

$$\text{Portfolio Sustainability Score} = \text{Portfolio ESG Score} - \text{Portfolio Controversy Deduction}$$

Portfolio ESG Score is the asset-weighted average of normalized company-level ESG scores and is a measure of how well a company is addressing ESG issues based on a series of indicators related to preparedness, disclosure and performance. *Portfolio Controversy Deduction* refers to companies ESG-related incidents and is assessed by the impact on the environment, society and the risk for the companies itself. The two measures combine to display a score between 0 and 100. A high score indicates that a fund has its majority of assets invested in stocks that has a high ESG score according to the methodology of Sustainalytics, a leading global independent data provider specializing in sustainability research.

However, In 2018, Sustainalytics launched a new company-level rating, the ESG Risk Rating, that measures the degree to which a company's economic value may be at risk driven by ESG issues. In late 2019, Morningstar will enhance the current Morningstar Sustainability Rating methodology by replacing Sustainalytics' company ESG Rating with its ESG Risk Rating and Morningstar Sustainability Rating is derived from the Morningstar Sustainability Portfolio calculated as following (Morningstar, 2019).

$$Portfolio\ Sustainability\ Score = \sum_{x=1}^n ESG\ Risk\ Rating \times Weights_{adj}$$

ESG Risk Rating measures the degree to which a company's economic value may be at risk driven by ESG issues. To be considered material to the risk rating, an ESG issue must have a potentially substantial impact on the economic value of a company and therefore on the risk-return profile of an investment in the company. The ESG issues that are material vary across industry groups and companies. The ESG Risk Rating evaluates the remaining unmanaged ESG risk exposure of a company after taking into account its management of such risks. The rating is rendered on a 0-100 scale. Lower is better, with 0 indicating that a company has no unmanaged ESG risk and 100 indicating the highest level of ESG risk.

This paper uses Portfolio Sustainability Score of equity fund in the U.S. market during September 2018 – June 2020 based on available Morningstar Sustainability Rating data in Morningstar Direct to classify the funds' rating in each period and concentrate only on active equity funds to capture on abnormal return due to no abnormal return in passive equity funds. Currently, there are 6,551 US domestic open-end active equity funds in the U.S. market providing with Morningstar Sustainability Rating. This paper distributes Morningstar Sustainability Rating into 3 groups which is High and Above Average, Average and, Below Average and Low rating as in [Table 1](#).

Table 1: Distribution of mutual funds based on Morningstar Sustainability Rating: This table summarizes our sample for the US domestic open-end active equity fund.

#funds	September-18	June-19	June-20
Total	6,551	6,551	6,551
High & Above Average	2,072	1,955	1,912
Average	2,305	2,381	2,550
Below Average & Low	2,174	2,215	2,089

3.1.2 Market return benchmark

To compare the performance of sustainable equity funds with the market benchmark, this study uses the total return index of market benchmark which are value-weight return of all

CRSP firms incorporated in the US and listed on the NYSE, AMEX, or NASDAQ that have a CRSP share code of 10 or 11 that are obtained from Kenneth R. [French's \(2012\)](#) website.

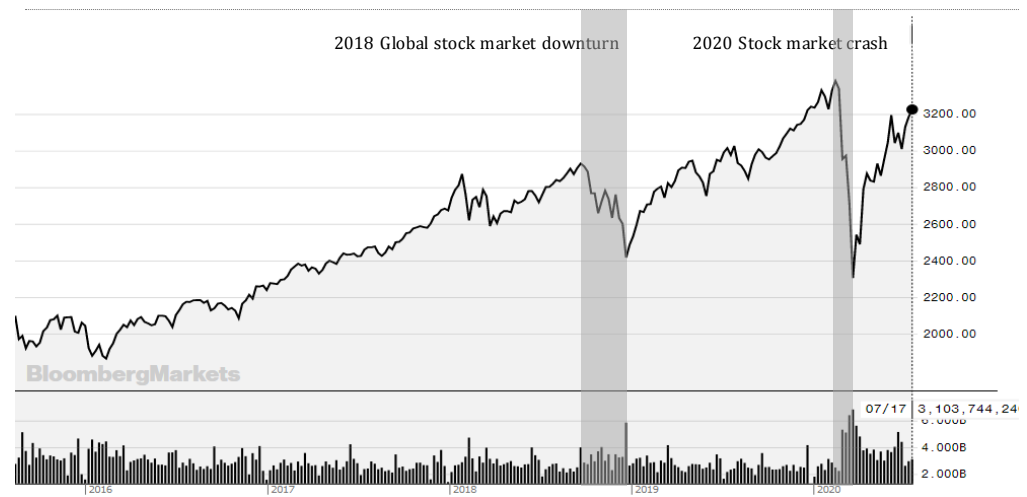
3.1.3 Risk factors in asset pricing model

To evaluate the performance of sustainable equity funds, this study uses CAPM and Carhart 4-factor model and use one-month U.S. Treasury bill as a proxy for risk-free rate and *risk-free rate*, *SMB*, *HML*, *MOM* are all obtained from Kenneth R. [French's \(2012\)](#) website.

3.1.4 Crisis periods

Crisis periods are characterized by a big fall in the stock market or the stock market crash. This paper identifies two crisis periods (2018 Global stock market downturn and 2020 Stock market crash) based on the peak and trough of the Standard & Poor's 500 Index as [Figure 1](#).

Figure 1 Standard & Poor's 500 Index



<https://www.bloomberg.com/quote/SPX:IND>

The first stock market crash, 2018 Global stock market downturn, investors concern of an economic slowdown and the ongoing trade negotiations between China and the U.S. moreover the market also fear of the Federal Reserve that might be making a monetary policy mistake as a result of stock pressure during the period September 20, 2018 to December 24, 2018 .

The second stock market crash, 2020 Stock market crash, investors concern of the COVID-19 pandemic and an oil price war between Russia and the OPEC countries led by Saudi Arabia during February 19, 2020 to March 23, 2020. In addition the stock market price collapsed more than during the 2008 Great Recession.

Descriptive statistics of the market and fund performance in each Morningstar Sustainability Rating groups with separated between overall, non-crisis, and crisis period are presented in [Table 2](#). For average return, all of funds which provide Morningstar Sustainability Rating are underperform the market in every period, overall, non-crisis and crisis period. In the overall, the market return is 0.044% (10.98% annualized) and the return of each group of funds, High and Above Average, Average, and Below Average and Low rating, are 0.029%, 0.021%, and 0.020% (7.31%, 5.39%, and 4.93% annualized) respectively.

As for the non-crisis period, the market return is 0.146% (36.80% annualized) and the funds' return are 0.135%, 0.130%, and 0.127% (33.93%, 32.67%, and 31.89% annualized) respectively for each group of funds.

Regarding the crisis period, the market return is -0.398% (-100.17% annualized) and the funds' return are -0.426%, -0.445%, and -0.441% (-107.32%, -112.08%, and -111.14% annualized) respectively for each group of funds.

Even though, every group of the funds' return are underperform the market but there are the trend that the better rating generate the better return in every period.

Table 2: Summary of Daily Fund Performance: The table present statistics on market and mutual funds' daily performance for the US domestic open-end active equity fund.

Portfolio	Overall		Non-Crisis		Crisis	
	Return	S.D.	Return	S.D.	Return	S.D.
Market	0.00044	1.32%	0.00146	1.11%	-0.00398	1.93%
High & Above Average	0.00029	1.31%	0.00135	1.14%	-0.00426	1.83%
Average	0.00021	1.37%	0.00130	1.19%	-0.00445	1.88%
Below Average & Low	0.00020	1.35%	0.00127	1.18%	-0.00441	1.83%

3.2 Fund Characteristics

This paper draws on [Nofsinger and Varma, 2014](#) which use the fund characteristic and stock characteristic in the fund variables to investigate the relation between their characteristics and performance pattern and this paper gathers the data of all variables from Morningstar Direct.

Fund characteristic variables include Age, Market Capitalization, Leverage (D/E ratio), and Return Volatility of each fund.

Stock characteristic in the fund variables include Number of Stocks and Fund Defensive Allocation in each fund.

These control variables have been studied and used by a number of study that they have an effect to fund performance. As of Market Capitalization or size of fund, some studies find that there is a negative relationship between fund size and fund performance because of the illiquidity ([Chen et al., 2004](#)) and the diseconomies of scale ([Ferreira et al., 2013](#)). In contrast, there are also have some argument that find a positive relationship between fund size and fund performance due to the

private information (Bhojraj et al., 2012) and a larger compensation to fund manager which be an incentive for fund performance (Ma et al., 2012). In addition, He et al., 2016 and Adrian et al., 2014 show that the leverage of fund is a hiding effect of the fund performance from leverage constraints. Livingston et al., 2019 find that the fund which have greater return volatility comes from the higher expense ratio and turn over ratio so they have a lower average performance. Nofsinger and Varma, 2014 use a number of stocks and fund defensive allocation to be a part of investigating the performance pattern of fund performance because a number of stocks might be a diversification level indicator of the mutual fund and the defensive stocks is the stocks that have more stable performance in the crisis period.

4 Methodology



4.1 Sustainable Fund Rating and Fund Performance

To categorized the sustainable fund, this paper divides sustainable funds into 3 categories as following:

- The first group is the funds with High and Above Average Morningstar Sustainability Rating.

- The second group is the funds with Average Morningstar Sustainability Rating.
- The third group is the funds with Below Average and Low Morningstar Sustainability Rating

This paper use CAPM and Carhart 4-factor model to calculate the abnormal return performance (alpha) in three-sustainable fund groups relative to the market benchmark for observing whether the better Morningstar Sustainability Rating generate the better performance by using entire daily time-series of the average mutual fund return of each group from September 2018 – June 2020 based on availability data in Morningstar Direct and estimate standard errors for the regression coefficients using the Newey-West ([Newey and West, 1987](#)) procedure to correct for auto-correlation.

CAMP

$$R_t - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \varepsilon_t \quad (1)$$

Carhart 4-factor model

$$R_t - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \varepsilon_t \quad (2)$$

4.2 Sustainable Fund Rating and Fund Performance During Crisis vs Non-Crisis Period

This paper also investigate whether the sustainable funds play a role as downside protection in the crisis by using CAPM and Carhart 4-factor model to calculate the abnormal return performance estimates the non-crisis and crisis period alpha through creating the dummy variable for crisis period (*Crisis*) and using the entire daily time-series of the mutual fund return separately in each group.

CAMP

$$R_t - R_{f,t} = \alpha_{NC} + \alpha_C * Crisis + \beta_1(R_{m,t} - R_{f,t}) + \epsilon_t \quad (3)$$

Carhart 4-factor model

$$R_t - R_{f,t} = \alpha_{NC} + \alpha_C * Crisis + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \epsilon_t \quad (4)$$

Where R_t is the equally-weighted average daily fund return belonging to a specific fund category at time t, $R_{f,t}$ is risk-free rate of one-month Treasury bill rate, $R_{m,t}$ is the market return, SMB_t is the difference in return between small-cap portfolio and large-cap portfolio at time t. The portfolios of small and big-cap stocks are formed by ranking market capitalization of the stock and distributed into low and high market capitalization portfolio, HML_t is the difference in return between value stock

(high book-to-market ratio) portfolio and growth stock portfolio (low book-to-market ratio) portfolio at time t , MOM_t is the difference in return between high prior return portfolio and low prior return portfolio at time t , $Crisis_t$ is a dummy variable that takes the value 1 if time t is defined as a crisis period and 0 otherwise, α_{NC} measures the non-crisis period daily abnormal return, and α_C measures the non-crisis period daily abnormal return. R_f , R_m , SMB , HML , MOM are obtained from [Kenneth French's \(2012\) website](#).

4.3 Fund Characteristics Performance

The another objective of this study is to investigate whether the fund characteristics and stock portfolio characteristics support a role as downside protection during period of crisis or whether characteristics affect the performance pattern.

The differences in mutual fund performance could be attributed to its underlying portfolio or fund investing characteristics. To investigate whether the fund characteristics support a role as downside protection during period of crisis, this paper draws on [Nofsinger and Varma, 2014's](#) method to compare abnormal return performance of sustainable fund in each group by adding the fund characteristics variables to be a control variables that could be a beneficial to generate fund's performance and creating a dummy variables for crisis period and for specifying a group of

Morningstar Sustainability Rating. To examine the alpha generating of each group of funds in each period, this paper examine by using a panel data of fund level observations at a quarterly frequency as following:

$$\begin{aligned}
 R_{j,t} - R_{r,t} = & \alpha_1 + \alpha_2 * Crisis_t + \alpha_3 D_{1j} + \alpha_4 D_{1j} * Crisis_t + \alpha_5 D_{2j} \\
 & + \alpha_6 D_{2j} * Crisis_t + \beta_1 (R_{m,t} - R_{r,t}) + \delta_1 Age_{j,t} + \delta_2 Cap_{j,t} \\
 & + \delta_3 Leverage_{j,t} + \delta_4 RetVol_{j,t} + \delta_5 Fund\#Stocks_{j,t} \\
 & + \delta_6 FundDefensiveAlloc_{j,t} + \epsilon_t
 \end{aligned} \tag{5}$$

Where $R_{j,t}$ is the quarterly fund return for fund j at time t , $R_{r,t}$ is risk free rate of one-month Treasury bill rate, $R_{m,t}$ is the market return, Age refers to the number of years since the inception date of the fund or indicates experience of the fund, Cap is calculated as the market capitalization of the stock at the end of the quarter, $Leverage$ refers to the debt-to-equity ratio, $Ret Vol$ is the standard deviation of daily excess returns (excess over CRSP value-weighted index) over the last calendar year, $Fund \# Stocks$ is calculated as the total number of stocks held in a fund's portfolio in a particular quarter, $FundDefensiveAlloc$ is calculated as the total percentage of fund's portfolio in a particular quarter that invested in Consumer Non-Durable, Utility and Healthcare industries, $Crisis_t$ is a dummy variable that takes the value 1 if time t is defined as a crisis period and 0 otherwise, D_{1j} is a dummy variable that takes the value of 1 if this sustainable fund is catagoried in group 1 (High and

Above Average Morningstar Sustainability Rating) and 0 otherwise, D_{2t} is a dummy variable that takes the value of 1 if this sustainable fund is categorized in group 2 (Average Morningstar Sustainability Rating) and 0 otherwise, α_1 measure quarterly abnormal return earned by sustainable fund which categorized in group 3 (Below Average and Low Morningstar Sustainability Rating), α_2 measure quarterly abnormal return in crisis period of sustainable fund which categorized in group 3 (Below Average and Low Morningstar Sustainability Rating), α_3 measures quarterly return earned by sustainable fund which categorized in group 1 (High and Above Average Morningstar Sustainability Rating), α_4 measures quarterly return in crisis period of sustainable fund which categorized in group 1 (High and Above Average Morningstar Sustainability Rating), α_5 measures quarterly return earned by sustainable fund which categorized in group 2 (Average Morningstar Sustainability Rating), α_6 measures quarterly return in crisis period of sustainable fund which categorized in group 2 (Average Morningstar Sustainability Rating).

5 Empirical Result

5.1 Sustainable Fund Rating and Fund Performance

The alpha estimates from the CAPM and Carhart 4-factor model in the overall

market which be shown in daily measure are reported in [Table 3](#). As for the alpha estimates

by the CAMP model, the alphas for every group of Morningstar Sustainability Rating are all negatively significantly which is the High and Above Average rating's alpha is significant at 10% level with -0.0139% (-3.50% annualized), the Average rating's alpha is significant at 5% level with -0.0227% (-5.72% annualized), and the Below Average and Low rating's alpha is significant at 10% level with -0.0238% (-6.00% annualized). However, the alphas for every group of Morningstar Sustainability Rating in the Carhart 4-factor model are all negative and not significantly different from zero which indicates that there is no difference between each group of ratings and the market return after adjusting the risk factors in the model.

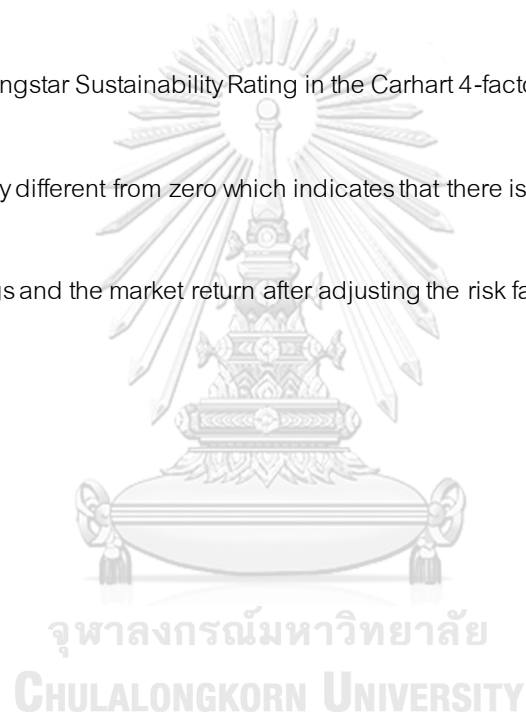


Table 3: Performance Measurement Result Overall Market: The performance measures use a daily time-series of an equally-weighted portfolio of each Morningstar Sustainability Rating's group for overall market during September 2018 – June 2020 by CAPM model following equation $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \epsilon_t$ and the Carhart (1997) 4-Factor Model following equation $R_{i,t} - R_{f,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \epsilon_t$. The t-statistics are presented in the brackets. The symbol *, **, and *** are indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Factor loadings for CAMP model

Portfolio	Alpha	MKTRF	R-Square
High & Above Average	-0.000139* [-1.73]	0.98*** [90.93]	0.98
Average	-0.000227** [-2.02]	1.01*** [67.64]	0.97
Below Average & Low	-0.000238* [-1.87]	0.99*** [55.01]	0.96

Panel B: Factor loadings for Carhart 4-factor model

Morningstar Sustainability Rating	Alpha	MKTRF	SMB	HML	MOM	R-Square
High & Above Average	-0.000047 [-0.83]	0.96*** [123.90]	0.173*** [16.08]	0.046*** [3.04]	0.035** [2.91]	0.99
Average	-0.000070 [-1.13]	0.98*** [122.02]	0.246*** [22.62]	0.097*** [6.40]	0.035* [2.66]	0.99
Below Average & Low	-0.000066 [-1.03]	0.95*** [88.54]	0.259*** [15.68]	0.104*** [6.35]	0.010 [0.64]	0.99

5.2 Sustainable Fund Rating and Fund Performance During Crisis vs Non-Crisis Period

The daily alpha estimates by the CAPM and Carhart 4-factor model in crisis and non-crisis periods which are reported in [Table 4](#) are negatively insignificantly different from zero in every group in both crisis and non-crisis period except the alpha in crisis period of High and Above Average

rating estimated by Carhart 4-factor model that is weakly significant at 10% level with -0.0292% (-7.3584% annualized) and positively insignificant in the non-crisis period. The result can imply that there are no difference performance comparing between each group of ratings' performance and the market return in non-crisis and crisis period in both CAPM and Carhart 4-factor model but the performance of High and Above Average rating in the crisis period is slightly fall behind the market when estimates with Carhart 4-factor model. The result could be supported with [Jansson and Biel \(2014\)](#) which show that the performance of social responsible investment fund is not influenced by social and environmental concerns. Indeed, [Fulton, Kahn, and Sharples \(2012\)](#) also finds that social responsible investment fund's performance are generally neutral. This finding also consistent with [Matallin-Saez et al. \(2019\)](#) who study with sustainable level which include portfolio sustainability measurement and find that the sustainable level is not associate with social responsible investment fund performance but associate with the persistant of funds' performance.

Table 4: Performance Measurement Result: Crisis vs Non-Crisis Period: The performance measures use a daily time-series of an equally-weighted portfolio of each Morningstar Sustainability Rating's group and identifies two *Crisis* periods (85 days) for the stock market based on the peak and the trough for the S&P500 index: September 20, 2018 to December 24, 2018 and February 19, 2020 to March 23, 2020, The remaining date are classified as *Non-Crisis* periods (366 days) and separate alphas for the Non-Crisis (NC) and Crisis (C) period estimated by the CAPM Model $R_t - R_{f,t} = \alpha_{NC} + \alpha_C * Crisis + \beta_1(R_{m,t} - R_{f,t}) + \epsilon_t$ and the Carhart (1997) 4-Factor Model $R_t - R_{f,t} = \alpha_{NC} + \alpha_C * Crisis + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \epsilon_t$. The t-statistics are presented in the brackets. The symbol *, **, and *** are indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Factor loadings for CAMP model

Portfolio	Alpha		MKTRF	R-Square
	NC	C		
High & Above Average	-0.000086 [-1.01]	-0.000280 [-1.00]	0.98*** [86.52]	0.98
Average	-0.000182 [-1.50]	-0.000236 [-0.65]	1.01*** [64.53]	0.97
Below Average & Low	-0.000281 [-0.64]	-0.000185 [-1.39]	0.99*** [52.39]	0.96

Panel B: Factor loadings for Carhart 4-factor model

Portfolio	Alpha		MKTRF	SBM	HML	MOM	R-Square
	NC	C					
High & Above Average	0.000008 [0.13]	-0.000292* [-1.81]	0.96*** [120.38]	0.174*** [16.63]	0.047*** [3.44]	0.035*** [2.95]	0.99
Average	-0.000022 [-0.32]	-0.000250 [-1.47]	0.98*** [119.39]	0.246*** [23.34]	0.097*** [6.44]	0.035*** [2.68]	0.99
Below Average & Low	-0.000011 [-0.17]	-0.000289 [-1.33]	0.95*** [86.95]	0.259*** [15.09]	0.104*** [6.37]	0.010 [0.65]	0.99

Moreover, the finding also indicate that every group of Morningstar Sustainability

Rating or U.S. equity active funds is perform at best as well as market benchmark. One

implication is on average active mutual funds do not outperform the passive benchmark that

may be due to the funds' expense ratio and the poor performance of unskilled managers,

Huang et al., 2020). In addition, there are numerous studies find the negative relationship between fees and after-fee alphas for mutual funds (Malkiel, 1995; Gruber, 1996; Carhart, 1997; Sirri & Tufano, 1998; Wermers, 2000; Christoffersen & Musto, 2002; and Kuhn, 2005)

While the factor loading of CAPM and Carhart 4-factor model are also reported in Table 3 and Table 4 which can represent investment style between each group of mutual funds, High and Above Average, Average, and Below Average and Low rating. The coefficient of MKTRF are all significant at 1% level and close to one or 0.98, 1.01 and 0.99 respectively for CAMP model and 0.96, 0.98 and 0.96 respectively for Carhart 4-factor model which can indicate that the mutual fund tends to move with market. The coefficient of SMB and HML are all significantly positive at 1% level which can imply that there are size effect and value effect in fund performance. In addition, the lower Morningstar Sustainability Rating tends to load little more on the size (SMB) and book-to-market valuation (HML) factors. Nonetheless, the coefficient of MOM is significantly positive only in High & Above Average and Average rating at 1% level and insignificantly positive in Below Average & Low rating momentum factor which can imply that there is no momentum effect in the Below Average and Low Morningstar Sustainabilityrating.

5.3 Fund Characteristics Performance

This section aims to investigate the impact of several fund level of fund characteristics variables to fund performance by adding fund characteristics variables as control variables and analyze a panel data of fund level observations at a quarterly frequency and using fixed effect model to control for regression residuals being correlated across time and fund.

The alpha estimates in the overall market before adding fund characteristics' control variables are reported in [Panel A of Table 5](#). The alpha of High and Above Average rating is significantly positive at 1% level with 0.56% (2.24% annualized) with a t-statistic of 5.30 and the alpha of Below Average and Low rating is significantly negative at 1% level with -2.14% (-8.56% annualized) with a t-statistic of -34.28. However the alpha of Average rating is not significantly different from zero. Since the panel data analysis is the composition of the time-series analysis and cross-sectional analysis, the result can indicate the performance pattern of each Morningstar Sustainability Rating by cross-sectional variation that the the better rating, the better performance comparing with each group of rating.

Adding fund characteristics' control variables in the overall market's result is reported in [Panel B of Table 5](#). The alpha of each rating's pattern is still in the same which is the alpha of High and Above Average rating is significantly positive at 1% level with 0.79% (3.14% annualized) with a t-statistic of 5.89 and the alpha of Below Average and Low rating is significantly negative at 1% level with -1.16% (-4.62% annualized) with a t-statistic of -8.67 while the alpha of Average rating is not significantly different from zero. For fund characteristics's variables the *Age*, *Return Volatility* and *Defensive Allocation* are significant at 1% level with coefficient 0.0077, -2.1455, and 0.0009 along with a t-statistics 8.09, -2.28 and 8.11 respectively and the *Cap* is significant at 5% level with coefficient 0.00 along with a t-statistics -2.28. While the *Leverage* and *Number of Stocks* in fund is insignificant.

So the result of both before and after adding the fund performance as a control variables indicates that the performance of the High and Above Average rating is marginally positive over the Below Average and Low rating while the performance of Average rating is not different from the Below Average and Low rating in the overall market.

To investigate the fund characteristics' impact to fund performance pattern in non-crisis and crisis period, this paper study fund performance pattern between before and after adding fund characteristics' control variables.

The alpha estimates in the crisis and non-crisis period before adding fund characteristics' control variables are reported in [Panel A of Table 6](#). In the non-crisis period, the alpha of High and Above Average and Average rating is insignificant or no different from zero while the Below Average and Low rating's alpha is significantly negative at 1% level with -0.87% (-3.47% annualized) with a t-statistics of -11.62. In crisis period, the alpha of High and Above Average rating is significantly positive at 1% level with 1.60% (6.43% annualized) with a t-statistic of 12.24 and the alpha of Below Average and Low rating is significantly negative at 1% level with -3.92% (-15.69% annualized) with a t-statistic of -11.87 although the alpha of Average rating is not significantly different from zero. For fund characteristics's variables the *Age*, *Return Volatility* and *Number of Stocks* is significant at 1% level with coefficient 0.003, -1.0311, and 0.0004 along with a t-statistics -3.55, -18.93 and 263.97 respectively and the *Cap* is significant at 5% level with coefficient -0.00 along with a t-statistics -2.05. While the *Leverage* and *Defensive Allocation* in fund is insignificant.

This paper adds fund's characteristics as a control variable to estimate alpha in each period and reports in [Panel B of Table 6](#). The alpha estimates in non-crisis period of High and Above Average rating and Average rating's alpha are insignificant from zero while the Below Average and Low rating's alpha is significantly positive at 5% level with 2.21% (8.84% annualized) with a t-statistics 2.06. However, the alpha estimates in crisis period are be in the same pattern of cross-sectional variation that the better rating, the better performance. The alpha of High and Above Average rating is significantly positive at 1% level with 2.23% (8.92% annualized) with a t-statistic of 16.07, the alpha of Average rating is significantly positive at 5% level with 0.30% (1.2% annualized) with a t-statistics 2.26, and the alpha of Below Average and Low rating is significantly negative at 1% level with -2.12%(-8.48% annualized) with a t-statistic of -10.22. In the crisis period, the performance of the High and Above Average rating is positive over the performance of Below Average and Low rating and the performance of the Average rating is also marginally positive over the performance of Below Average and Low rating.

From the result, this paper can conclude that the fund characteristics can drive the asymmetric return in finding of each fund and the performance pattern of the Morningstar Sustainability Rating fund is the better rating generate the better performance comparing

between each group of rating which the result can imply that the better performance in each rating is driven by the exceeding abnormal return in the crisis period.



6 Conclusion

Sustainable investing has been taken of the increasing investor awareness with continue increasing the asset under management of Socially Responsible Investment (SRI) fund in the recent decade. Academic research is now an extensive interest investigate the relationship between sustainable and financial performance. Empirical evidence is still discussing. Although the majority of studies find insignificant differences between the sustainable funds and conventional peers, there are some evidence find that they are significant difference in the crisis period which can help investors to manage their downside risk during the period of market crises.

Meanwhile, Morningstar has published the Morningstar Sustainability Rating to extract the sustainability of mutual funds on the basis of sustainability criteria which gives investors an easy way to focus on sustainable investing. Therefore this paper focuses on Morningstar Sustainability Rating to represent the degree of sustainability of sustainable investing to investigate the relationship between sustainable and financial performance.

Using a sample of the US active mutual funds performance in each Morningstar Sustainability Rating to compare with the market during September 2018 to June 2020 by computing alpha in the overall market, non-crisis, and crisis period. Overall, the alphas for each Morningstar Sustainability Rating are negatively significant by estimated with CAPM model but the alphas are not

different from the market benchmark in the Carhart 4-factor model or when adjusted with the risk factors. In addition, this paper also separates the sequence of time to non-crisis and crisis period to investigate the alpha, only the alpha of High and Above Average rating in the crisis period is weakly negative significant but the rest of alpha in every period are all insignificantly and not different from the market benchmark in both CAPM and Carhart 4-factor model. This finding of neutral performance can conclude that the Morningstar Sustainability Rating or the active equity sustainable fund performance perform at the best as the market benchmark.

This paper also investigate the fund characteristics' impact relative to fund performance pattern in each market period. The performance pattern in the overall period which is the better rating significantly generate the better performance comparing between each group of rating in term of cross-sectional variation and the fund performance pattern still consistent even adding fund characteristics as a control variable. Moreover, the performance pattern when focus on non-crisis and crisis period shows that the better rating generates the better performance in the crisis period both before and after adding control variables and the better performance of better rating is driven by the exceeding abnormal return in the crisis period. Therefore, the better Morningstar Sustainability Rating provides the less downside risk in the crisis period.

REFERENCES

- Adrian, T., Etula, E., & Muir, T. (2014). Financial Intermediaries and the Cross-Section of Asset Returns. *The Journal of Finance*, 69(6), 2557-2596.
- Alexander, G., & Buchholz, R. (1978). Corporate Social Responsibility and Stock Market Performance. *The Academy of Management Journal*, 21, 479-486.
- Amihud, Y. (2013). Illiquidity and Stock Returns: Cross-Section and Time-Series Effects. *Journal of Financial Markets*, 5, 31-56. doi:10.1016/S1386-4181(01)00024-6
- Areal, N., Cortez, M. C., & Silva, F. (2013). The conditional performance of US mutual funds over different market regimes: do different types of ethical screens matter? *Financial Markets and Portfolio Management*, 27(4), 397-429.
- Aslaksen, I., & Synnøstvedt, T. (2003). Ethical investment and the incentives for corporate environmental protection and social responsibility. *Corporate Social Responsibility and Environmental Management*, 10(4), 212-223.
- 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., Koedijk, K., & Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. *Journal of Banking & Finance*, 29(7), 1751-1767.
- Baumann-Pauly, D., Wickert, C., Spence, L., & Scherer, A. (2013). Organizing Corporate Social Responsibility in Small and Large Firms: Size Matters. *Journal of Business Ethics*, 115, 693-705. doi:10.2139/ssrn.1974194
- Benson, K. L., & Humphrey, J. E. (2008). Socially responsible investment funds: Investor reaction to current and past returns. *Journal of Banking & Finance*, 32(9), 1850-1859.

- Bhojraj, S., Cho, Y., & Yehuda, N. (2011). Mutual Fund Family Size and Mutual Fund Performance: The Role of Regulatory Changes. *Journal of Accounting Research*, 50.
- Bhojraj, S., & Sengupta, P. (2003). Effect of Corporate Governance on Bond Ratings and Yields: The Role of Institutional Investors and Outside Directors. *The Journal of Business*, 76, 455-476.
doi:10.2139/ssrn.291056
- Boesso, G., & Kumar, K. (2007). Drivers of corporate voluntary disclosure: A framework and empirical evidence from Italy and the United States. *Accounting, Auditing & Accountability Journal*, 20, 269-296.
- Bollen, N. (2007). Mutual Fund Attributes and Investor Behavior. *Journal of Financial and Quantitative Analysis*, 42, 683-708.
- Borgers, A., Derwall, J., Koedijk, K., & ter Horst, J. (2015). Do social factors influence investment behavior and performance? Evidence from mutual fund holdings. *Journal of Banking & Finance*, 60, 112-126.
- Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance*, 52(1), 57-82.
- Chan, M., Watson, J., & Woodliff, D. (2014). Corporate Governance Quality and CSR Disclosures. *Journal of Business Ethics*, 125. doi:10.1007/s10551-013-1887-8
- Chen, J., Hong, H., Huang, M., & Kubik, J. D. (2004). Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization. *The American Economic Review*, 94(5), 1276-1302.
Retrieved from <http://www.jstor.org/stable/3592823>
- Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society*, 32(7), 639-647.

- Christoffersen, S. E. K., & Musto, D. K. (2002). Demand Curves and the Pricing of Money Management. *The Review of Financial Studies*, 15(5), 1499-1524.
- Datar, V. T., Y. Naik, N., & Radcliffe, R. (1998). Liquidity and stock returns: An alternative test. *Journal of Financial Markets*, 1(2), 203-219. Retrieved from <https://EconPapers.repec.org/RePEc:eee:finmar:v:1:y:1998:i:2:p:203-219>
- Desclee, A, Dynkin, L., Hyman, J., & Polbennikov, S. (2016). Sustainable investing and bond returns; Research study into the impact of ESG on credit portfolio performance. *Barclays*.
- Eccles, R., Ioannou, I., & Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60, 2835-2857.
- Erragragui, E., & Lagoarde-Segot, T. (2016). Solving the SRI puzzle? A note on the mainstreaming of ethical investment. *Finance Research Letters*, 18, 32-42.
- Ferreira, M., Keswani, A., Miguel, A., & Ramos, S. (2013). The Determinants of Mutual Fund Performance: A Cross-Country Study. *CFA Digest*, 43.
- Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5, 210-233. doi:10.1080/20430795.2015.1118917
- Fulton, M., Kahn, B. M., & Sharples, C. (2012). Sustainable Investing: Establishing Long-Term Value and Performance. *Mutual Funds*.
- Gangi, F., & Varrone, N. (2018). Screening activities by socially responsible funds: A matter of agency? *Journal of Cleaner Production*, 197, 842-855.
- Glode, V. (2011). Why mutual funds "underperform". *Journal of Financial Economics*, 99(3), 546-559.
- Goldreyer, E., & Diltz, J. D. (1999). The performance of socially responsible mutual funds: incorporating

sociopolitical information in portfolio selection. *Managerial Finance*, 25, 23-36.

Gruber, M. J. (1996). Another Puzzle: The Growth in Actively Managed Mutual Funds. *The Journal of Finance*, 51(3), 783-810.

GSIA. (2016). Global Sustainable Investment Review 2016.

GSIA. (2018). Global Sustainable Investment Review 2018.

He, Z., Kelly, B., Manela, A. . (2016). *Intermediary asset pricing: New evidence from many asset classes*. University of Chicago,

Huang, R., Asteriou, D., & Pouliot, W. (2020). A reappraisal of luck versus skill in the cross-section of mutual fund returns. *Journal of Economic Behavior & Organization*, 176, 166-187.

Innes, R., & Sam, G. (2008). Voluntary Pollution Reductions and the Enforcement of Environmental Law: An Empirical Study of the 33/50 Program. *Journal of Law and Economics*, 51, 271-296.

Jansson, M., & Biel, A. (2014). Investment Institutions' Beliefs About and Attitudes Toward Socially Responsible Investment (SRI): A Comparison Between SRI and Non-SRI Management. *Sustainable Development*, 22(1), 33-41.

Jin, J., & Han, L. (2018). Assessment of Chinese green funds: Performance and industry allocation. *Journal of Cleaner Production*, 171, 1084-1093.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-291. Retrieved from

<https://EconPapers.repec.org/RePEc:ecm:emetrp:v:47:y:1979:i:2:p:263-91>

Kim, Y., Li, H., & Li, S. (2014). Corporate social responsibility and stock price crash risk. *Journal of Banking & Finance*, 43, 1-13.

Kim, Y., Park, M., & Wier, B. (2011). Is Earnings Quality Associated with Corporate Social

Responsibility? *The Accounting Review*, 87. doi:10.2308/accr-10209

Kosowski, R. (2006). Do Mutual Funds Perform When It Matters Most to Investors? US Mutual Fund Performance and Risk in Recessions and Expansions. *Quarterly Journal of Finance*, 1. doi:10.2139/ssrn.926971

Krigsvoll et al. (2016). *Investing in Sustainability: The risk-adjusted performance of European mutual fund committed to sustainable and responsible investing*. Norwegian School of Economics,

Kuhnen, C. M., & Knutson, B. (2005). The Neural Basis of Financial Risk Taking. *Neuron*, 47(5), 763-770.

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

Livingston, M., Yao, P., & Zhou, L. (2019). The volatility of mutual fund performance. *Journal of Economics and Business*, 104, 105835.

Lys, T., Naughton, J. P., & Wang, C. (2015). Signaling through corporate accountability reporting. *Journal of Accounting and Economics*, 60(1), 56-72.

Ma, L., Tang, Y., & GÓMez, J.-P. (2019). Portfolio Manager Compensation in the U.S. Mutual Fund Industry. *The Journal of Finance*, 74(2), 587-638.

Malkiel, B. G. (1995). Returns from Investing in Equity Mutual Funds 1971 to 1991. *The Journal of Finance*, 50(2), 549-572.

Matallín-Sáez, J. C., Soler-Domínguez, A., Tortosa-Ausina, E., & de Mingo-López, D. V. (2019). Ethical strategy focus and mutual fund management: Performance and persistence. *Journal of*

Cleaner Production, 213, 618-633.

Maxwell, J. W., Lyon, T. P., & Hackett, S. C. (2000). Self-Regulation and Social Welfare: The Political Economy of Corporate Environmentalism. *The Journal of Law & Economics*, 43(2), 583-618.

McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate Social Responsibility and Firm Financial Performance. *Academy of Management Journal*, 31(4), 854-872.

Morgan Stanley. (2020). Sustainable Signals Asset Owners See Sustainability as Core to the Future of Investing.

Morningstar. (2016). Morningstar Sustainability Rating Methodology.

Morningstar. (2017). Morningstar Sustainability Rating: Helping Investors Evaluate the Sustainability of Portfolios.

Morningstar. (2018). Morningstar Sustainable Funds U.S. Landscape Report.

Morningstar. (2019). Morningstar Sustainability Rating Methodology.

Nakai, M., Yamaguchi, K., & Takeuchi, K. (2016). Can SRI Funds Better Resist Global Financial Crisis? Evidence from Japan. *International Review of Financial Analysis*, 48.

Neu, D., Warsame, H., & Pedwell, K. (1998). Managing Public Impressions: Environmental Disclosures in Annual Reports. *Accounting, Organizations and Society*, 23(3), 265-282.

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

Nofsinger, J. R., Sulaeman, J., & Varma, A. (2019). Institutional investors and corporate social responsibility. *Journal of Corporate Finance*, 58(C), 700-725. Retrieved from

<https://EconPapers.repec.org/RePEc:eee:corfin:v:58:y:2019:i:c:p:700-725>

Renneboog, L., Ter Horst, J., & Zhang, C. (2008a). The price of ethics and stakeholder governance: The performance of socially responsible mutual funds. *Journal of Corporate Finance*, 14(3), 302-322.

Renneboog, L., Ter Horst, J., & Zhang, C. (2008b). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking & Finance*, 32(9), 1723-1742.

Renneboog, L., Ter Horst, J., & Zhang, C. (2011). Is ethical money financially smart? Nonfinancial attributes and money flows of socially responsible investment funds. *Journal of Financial Intermediation*, 20(4), 562-588.

Rezaee, Z. (2016). Business sustainability research: A theoretical and integrated perspective. *Journal of Accounting Literature*, 36, 48-64.

Sauer, D. A. (1997). The impact of social-responsibility screens on investment performance: Evidence from the Domini 400 social index and Domini Equity Mutual Fund. *Review of Financial Economics*, 6(2), 137-149.

Shefrin, H., & Statman, M. (2000). Behavioral Portfolio Theory. *Journal of Financial and Quantitative Analysis*, 35, 127-151. doi:10.2307/2676187

Sirri, E. R., & Tufano, P. (1998). Costly Search and Mutual Fund Flows. *The Journal of Finance*, 53(5), 1589-1622.

Statman, M. (2004). What Do Investors Want? *The Journal of Portfolio Management*, 30(5), 153.

US SIF. (2014). Report on US Sustainable, Responsible and Impact Investing Trends 2014.

US SIF. (2016). Report on US Sustainable, Responsible and Impact Investing Trends 2016.

US SIF. (2018). Report on US Sustainable, responsible and Impact Investing Trends 2018.

Verheyden, T., Eccles, R. G., & Feiner, A. (2016). ESG for AI? The Impact of ESG Screening on Return, Risk, and Diversification. *Journal of Applied Corporate Finance*, 28(2), 47-55.

Wermers, R. (2000). Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses. *The Journal of Finance*, 55(4), 1655-1695. Retrieved from <http://www.jstor.org/stable/222375>



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