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A Risk & Return Analysis of ESG Focused ETFs

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Abstract

Use of environmental, social and governance (ESG) data about a company or fund in the investment decision making process has increased significantly in the last 15 years. As a result, interest in understanding and analyzing the return potential that funds with high rated ESG scored holdings has grown. This paper examines the return potential ESG focused electronically traded funds (ETF) have, when compared to a conventional ETF and a benchmark. Three funds, including a conventional United States based fund, an ESG focused United States based fund and an ESG focused European based fund as well as the S&P 1500, as a benchmark are examined through a data sample from 2007 to 2020 to calculate their annual Sharpe Ratios and Information Ratios, in order to examine such return and performance differences.

Keywords: *Electronically traded funds (ETF), ESG, Sharpe ratio, Risk*

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Introduction

One of the most upcoming, state-of-the-art aspects of finance and investing is sustainable finance, also known as ESG. ESG stands for Environmental, Social and Governance. It is made up of three components, in which investors are using when making investment decisions and valuing out a potential or current investment (Team, 2021). ESG includes both internal and external data that is sourced from a company directly and ultimately, can have a significant impact on the overall enterprise value of said company.

ESG's environmental component allows investors to assess the risk presented to a company in terms of their involvement with sustainability and their role in the causes & effects of climate change (Team, 2021). An example of a data point found in the environmental category could include the percent carbon footprint that the company produces or use of renewable energy sources.

The social component of ESG consists of mostly internal data and information regarding the makeup of the company. Examples of social data points include employee fatality rate, turnover rate or even customer satisfaction. In short, the social component of ESG comprises the structure of the brand of a company and how society views it.

Governance, the last component of ESG, allows investors to evaluate how the company's leadership may cause risks or opportunities. Examples of governance include the number of shares that executive members hold, or the gender and diversity makeup of the board of directors (Team, 2021). Governance, which consists of the arrangement and structure of the company's executive board, can be extremely important when analyzing a company as it can forecast potential risks and returns.

Although each component focuses on specific sides to the company, it does provide potential and current investors with an additional and complete outlook on the company and allows for an analysis on potential risks or opportunities.

The motivation behind this selected topic comes about from the increased demand and increased importance sustainable finance has now and in the upcoming years. The process of taking social, governance and environmental information into consideration when making decisions on investments is only growing in significance and practice, and the industry is observing these trends worldwide. Non-financial reporting including ESG and sustainable finance has been around since the late 1990s and most investors have subconsciously been applying these metrics to their investment decision making process. However, since 2015 the application of sustainable finance has grown tremendously and as a result, the amount of ESG reporting by companies has increased significantly (Bloomberg Intelligence, 2021). For example, in December of 2017, the Climate Action 100+ group was launched with the intention of ensuring that the world's largest greenhouse gas emitters take necessary action on climate change and strengthen climate related financial disclosures. This investor led initiative is made up of over 615 investors including Blackrock Inc., JP Morgan and Deutsche Bank (Cabral, 2021). The industry is seeing many more investors interested in buying into companies or funds with higher and better ESG scores.

Therefore, research about the performance of higher ESG scored funds has escalated in recent years, showing greater interest in understanding how these funds work and perform when compared to other standard funds. In short, understanding the potential return and risk these funds produce will allow investors going forward, to make more informed decisions and potentially opt for ESG focused funds only.

Literature Review

In the last decade, the number of research studies produced regarding the return and risk comparison of ESG focused funds has only grown (Pavlova & de Boyrie, 2021). As sustainability goals become more influential for investors, interest in understanding the potential these investment options have has grown. Investigating how these options perform when compared to conventional options will allow the industry to pave the way towards future investment practices.

A recent study published this past year examined the returns of ESG focused funds during the recent Coronavirus Pandemic. Titled "ESG ETFs and the COVID_19 stock market crash of 2020: Did clean funds fare better?", the research study provided compelling results regarding ETFs' performance during the calm points, as well as the crashes in the market. Published in April 2021, the study analyzed the risk-adjusted returns of 62 various ESG ETFs, derived from Morningstar's List of Sustainable Funds. The returns were analyzed prior to the COVID-19 pandemic from November 2019 until February 2020 and following the COVID-19 pandemic hit from February 2020 until May 2020. The researchers split up the 62 ETFs into four groups based on their ESG rankings and using five different factor models, including CAPM, the three factor model, Carhart, the five factor model and the five factor model plus momentum factor, they analyzed the group's returns. The researchers found that in the pre-COVID market crash period, clean ESG focused ETFS had positive and significant alpha, outperforming the market, as expected. The study also found that during the crash higher risk ESG focused ETFS actually outperformed the market and medium to lower risk ESG ETFS stayed in line with the market and did not underperform. Consistently for all five of the factor models tested, the ESG focused ETFs had greater CAPM, FF3, Carhart's Alpha and FF5 calculations, showing a

stronger growth and higher performance potential (Pavlova & de Boyrie, 2021). All in all, ESG focused funds provided a sense of security for investors, lacking in traditional funds with no focus.

Another study that was conducted in the last decade, examined the risk and return of ESG funds by grouping the funds based off megatrend themes. Comparing the different ESG themes, the study was titled "Performance measurement of ESG-themed megatrend investments in global equity markets using pure factor portfolios methodology." This study analyzed the risk adjusted financial performance of ESG themed megatrend investment strategies in various global equity markets. The study was conducted by separating the funds into nine themes varying from each of three components of ESG. Examples of the themes included energy efficiency and water scarcity, aging and urbanization and cybersecurity and robotics. Using data from 2015 until 2019, the researchers constructed thematic portfolios from ESG-themed ETFS. The researchers then calculated the portfolios' returns using CAPM Alphas and Sharpe Ratios relative to the market benchmark and measured the alpha using the three-factor model and the five-factor model. The study found that most of the megatrend factor portfolios yielded significant non-negative alphas, indicating an outperforming security or fund. Moreover, the researchers found that the environmentally themed portfolios in particular, yielded higher, more positive and significant alphas relative to traditional passive strategies. The results supported the study's original assumptions that megatrend investing strategies are able to promote Sustainable Development Goals (SDG), declared by the United Nations (UN) while not sacrificing overall returns (Naffa & Fain, 2020) In short, funds that follow UN guidelines for sustainability and are ESG focused were found to remove risk while safeguarding returns.

A third study that examined ESG focused funds' performance and conducted a risk and return analysis from 2016 to 2018 was titled "Does Sustainability Score Impact Mutual Fund Performance?". This study used 2016, 2017 and 2018 ESG score data to understand the effects of socially responsible investments, known as SRIs on the performance of various European equity funds. The researchers analyzed the risk adjusted and non-risk adjusted performance and compared it to mutual fund flows and risk. In terms of methodology, 1,690 European equity funds, rated by Morningstar Sustainability, were analyzed. The equity funds' performance and return were measured using Carhart's alpha, Sharpe Ratio and Net Return. The equity funds' risk was measured using Value at Risk. The study found that the level of sustainability was positively correlated to higher return and negatively correlated to higher value at risk (Dúran-Santomil et al., 2019). Indicating that as the level of sustainability increased for a fund, the fund's return increased and risk decreased. These findings supported the fact that as a fund's sustainability score increased, the better the protection that is offered against extreme losses.

Research Question

Based on previous research that has been conducted and the current trends being observed in the markets, the research question that will be studied consisted of uncovering whether or not an ESG focused, United States-based ETF and an ESG focused, Sweden based ESG focused ETF both consistently generate higher return and lower risk when compared to a conventional non-ESG focused ETF and the S&P 1500, as a benchmark.

Hypothesis

H_0: ESG focused ETFs based in the United States and Europe will not generate higher returns and lower risk compared to a conventional ETF and the S&P 1500

H_1: ESG focused ETFs based in the United States and Europe will generate higher returns and lower risk compared to a conventional ETF and the S&P 1500

In terms of this research question, it is hypothesized that both the US based and Sweden based ESG focused ETFs will generate consistently higher returns and lower risk than the general ETF and S&P 1500. In other words, the degree of sustainability and ESG focus of a fund will have a positive correlation with performance and return and a negative correlation with the risk measured. The null hypothesis, which will be tested to be rejected, is that both the US-based and Sweden-based ESG focused ETFS will generate lower returns and higher risk than the traditional fund.

Sample & Data

In order to determine if the ESG-focused ETFs generate higher return and lower risk compared to a conventional ETF, the return and risk of the differing funds will be calculated over a 13-year period. The United States-based ESG focused ETF used in this study was the iShares MSCI KLD 400 Social ETF, with a ticker of DSI. DSI is a fund comprised of approximately 404 large-cap American companies, with a focus on companies with positive environmental, social, and corporate governance criteria. The fund's net assets total approximately $3.75 billion, and its positions include, but are not limited to Microsoft, Alphabet, Tesla, Nvidia Corp, Home Depot and Walt Disney. In terms of ESG ratings, the fund holds an AA MSCI ESG fund rating with AAA as the highest level and a 7.7 MSCI ESG Quality Score with 10 as the highest level.

DSI	The United States based, ESG focused ETF with approximately 400 large-cap American companies, a net asset value of $3.75 billion and an inception date of November 14, 2006.
EWD	The European based, ESG focused ETF with approximately 45 mid to large-cap Swedish companies, a net asset value of $687 million and an inception date of March 12, 1996.
ITOT	The conventional, S&P Total US Stock Market ETF with over 3,670 holdings, a net asset value of $43 billion and an inception date of January 20, 2004.
S&P 1500	Serving as the benchmark, the S&P 1500 covers approximately 90% of the U.S. market capitalization, has a net asset value per share of $996.49 as of October 1, 2021.

Figure 1. ETF and Benchmark Descriptions Summary

The European-based ESG focused ETF used in this study was iShares MSCI Sweden ETF, with a ticker of EWD. This fund is comprised of mid to large-cap Swedish equities that show strong and improving environmental, social and governance characteristics. The fund's net assets total approximately $687 million. Its positions include Sweden based companies such as Atlas, Nordea Bank, Volvo, Ericsson, Hexagon, and Evolution. EWD holds a MSCI ESG Fund Rating of AA and an 8.1 MSCI ESG Quality Score and has 41 holdings in total.

The conventional ETF used in this study to compare return and risk was iShares Core S&P Total US Stock Market ETF, with a ticker of ITOT. ITOT's main objective is to track investment results of a broad-based index which is composed of small, medium, and large United States equities with no concrete focus (Blackrock Inc., 2021). The fund holds roughly 3,675 positions including Apple, Johnson & Johnson, Amazon, Facebook, JP Morgan Chase, Exxon Mobile and Walmart to name a few. Compared to the two ESG focused ETFs, ITOT holds both a lower MSCI ESG Fund Rating and Quality Score. Acting as a market benchmark, the S&P Composite 1500 was chosen as its original objective is to replicate the performance of the U.S.

Equity Market as it covers approximately 90% of the U.S. Market. The S&P 1500's net asset value as of October 1, 2021 total $996.49.

Methodology

The data of these four funds will be researched over a 13-year period from 2007 to 2020, as this time frame includes all the inception dates of the four data sources. Over this 13-year period, return will be calculated annually using the Sharpe Ratio. The Sharpe Ratio, which is a standard industry measure used, consists of subtracting the portfolio or fund's historical return from the risk-free rate and dividing that by the standard deviation of the return. The Sharpe Ratio calculations were measured as:

$$S_a = \frac{E\left[R_a - R_b\right]}{\sigma_a}$$

The risk-free rate was calculated using the annual 30-day treasury bill yield. In order to measure the risk that the funds have experienced, the annual information ratio was calculate. The information ratio is a measure that calculates the risk adjusted return by dividing the difference between a fund's return and a benchmark's return by the active return's standard deviation. The information ratio calculations were measured as:

$$Information\ Ratio_{Annualized} = (R_p - R_b) \,/\, Tracking\ Error$$

Active return's standard deviation is also known as tracking error. The information ratio, which focuses on active return, is often used to assess a fund's performance relative to a benchmark or the market overall (Murphy, 2020). Similarly, to the Sharpe ratio, the information ratio was used to measure risk exposure of the three funds when compared to the benchmark, the

S&P 1500. These calculations for the Sharpe ratio and information ratio were made using the fund's annual performance and the benchmark's annual performance from 2007 to 2020. The funds' annual performance was determined by calculating the annual price percent change, with the formula of new price subtracted from the old price divided by the old price as shown below:

$$\boldsymbol{Annual\ Perfomance = (Current\ Price - Original\ Price)/Orignial\ Price}$$

When analyzing the information ratio, the higher the result, the better and from precedent, information ratios ranging from 0.40 to 0.60 are considered at good standing. Following the calculations, each of three funds will be compared and depending on their overall trends, it will be concluded of their performance.

The data to make these calculations was derived from Investing.com and Macro Trends. This raw data included the month, closing price, the high and low price, and the percent change in price for that price. For each of the funds used, this raw data was collected since their inception dates.

Results

The first parameter that was studied in this analysis was return. In specific, the annual return was analyzed, and this was conducted by calculating the annual Sharpe Ratio of each of the four funds used and comparing their returns over a 13-year period. Using the individual funds' information from 2007 to 2020, their annual performances were observed, showing the differences in their potential.

Over the period observed, all four funds followed a similar pattern and shape in terms of Sharpe ratio measurements. All four were negatively impacted due to the 2008 Recession and all

four experience peaks in 2009, 2013 and 2017, which can be seen on Table 1, which holds the annual Sharpe Ratio calculations for the three funds and S&P 1500 that were analyzed from 2007 until 2020.

Table 1. Sharpe Ratio Annual Results

	Sharpe Ratio Calculations from 2007-2020:			
Year	iShares MSCI KLD 400 (DSI)	iShares MSCI Sweden ETF (EWD)	iShares Core S&P Total US (ITOT)	S&P 1500
2020	2.48	2.61	2.28	2.01
2019	7.31	1.15	6.92	6.82
2018	-1.58	-2.05	-1.97	-1.92
2017	16.34	8.94	15.76	15.79
2016	2.69	-1.60	3.16	3.41
2015	-0.29	-1.28	-0.28	-0.27
2014	4.58	0.30	4.40	4.48
2013	13.07	5.07	11.87	11.92
2012	3.63	2.53	4.47	4.47
2011	-0.01	-1.36	-0.04	-0.06
2010	1.79	2.33	2.53	2.49
2009	4.55	6.84	3.68	3.71
2008	-5.59	-6.18	-6.24	-6.35
2007	-1.09	0.79	-0.47	-0.43

Interestingly enough, the United Stated based, ESG focused ETF, DSI performed better than the benchmark S&P 1500 consistently almost every year, as its annual Sharpe ratio was higher or in line with the S&P 1500. This is shown in Figure 2, which summarizes the annual Sharpe ratio calculations for ITOT, DSI, EWD and the S&P 1500 from 2007 until 2020. In terms of Sharpe Ratios, the higher the Sharpe Ratio, the more acceptable the fund is for investors. At the peak in 2013, the Sharpe ratio for DSI was approximately 13.07 while the conventional ETF, ITOT was only 11.87. This is also consistent in the 2017 peak, when DSI had a Sharpe Ratio of 16.34, while ITOT held a 15.76 ratio. Although it was not a significant difference, it did represent a greater revenue and performance potential from the ESG fund based in the US.

The ESG focused ETF, based in Europe, EWD however, did not perform as well as the other funds over the 13-year period. From 2011 on, EWD underperformed the three other funds including the DSI, ITOT and the S&P 1500. Although it followed a similar pattern of highs and

lows each year it's Sharpe Ratio for each year was less than the ratios of the other three funds. For example, as shown in Figure 2, the Sharpe ratio of the EWD in 2013 was only 5.07, compared to ITOT which held a 11.87 Sharpe Ratio or DSI of 13.07. Additionally, in 2017, EWD observed an 8.94 Sharpe Ratio in comparison to the 15.76 Sharpe Ratio of ITOT. These two points were at peaks, in which all four funds experienced a significant increase in revenue. However, the Sweden ETF did not observe as great of an increase.

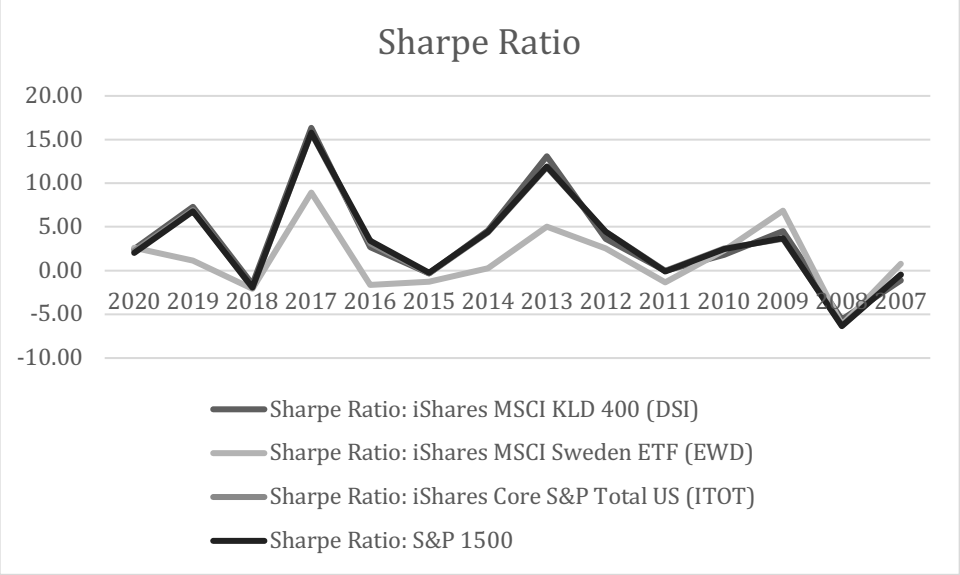

Figure 2. Sharpe Ratio Results Summary

Although EWD indicated lower revenue calculations, the pattern EWD held was consistently in line with ITOT and DSI indicates that the three funds and the S&P 1500 share similar revenue potentials and when one fund experiences positive revenue, it can be assumed that the others most likely will as well.

Furthermore, in the last year of the data collection, 2020, the conventional fund, ITOT, the S&P 1500 and U.S. based, DSI all consistently experienced a drop in revenue and Sharpe

ratio, while the Sweden based EWD experienced an increase. This finding shows how the COVID-19 Pandemic may have impacted the US based funds in early 2020, differently compared to European based funds.

The second parameter that was studied in this return and risk analysis was the annual Information ratio. The information ratio provides investors with information about the performance of a fund or stock when compared to a benchmark. Therefore, the higher the information ratio the better performance. In other words, if a fund gives off a positive information ratio that indicates the fund outperformed the benchmark, while a negative ratio would indicate an underperformance. These results can be found in Table 2, which holds the annual Information Ratio calculations from 2007 until 2020 for the three funds when compared to the S&P 1500 benchmark.

Table 2. Information Ratio Annual Results

	Information Ratio Calculations from 2007-2020:		
Year	iShares MSCI KLD 400 (DSI)	iShares MSCI Sweden ETF (EWD)	iShares Core S&P Total US (ITOT)
2020	0.45	1.37	0.37
2019	0.22	-3.66	-0.04
2018	0.33	-0.25	-0.09
2017	0.41	3.84	0.36
2016	-0.59	-4.75	-0.06
2015	-0.04	-1.07	-0.02
2014	-0.01	-3.31	0.04
2013	1.38	-1.87	0.07
2012	-1.17	0.90	-0.03
2011	0.06	-1.67	0.03
2010	-0.80	0.92	0.00
2009	0.68	6.77	-0.07
2008	0.29	-2.49	0.06
2007	-0.62	1.29	-0.05

Overall, during the 13-year period, the ESG focused US based ETF, DSI held a negative Information ratio for only 6 years, while the conventional US based ETF, ITOT held a negative

information for 7 years. This goes to show that the ESG focused fund outperformed the benchmark for more years than the ITOT.

Furthermore, DSI held a much larger information ratio compared to ITOT for multiple years. This analysis can be shown in Figure 3, which summarizes the annual information ratio calculations for the conventional ETF, ITOT, the ESG focused United States based ETF, DSI, the ESG focused European based ETF, EWD and the S&P 1500 from 2007 until 2020. The higher the information ratio, the better the investment option.

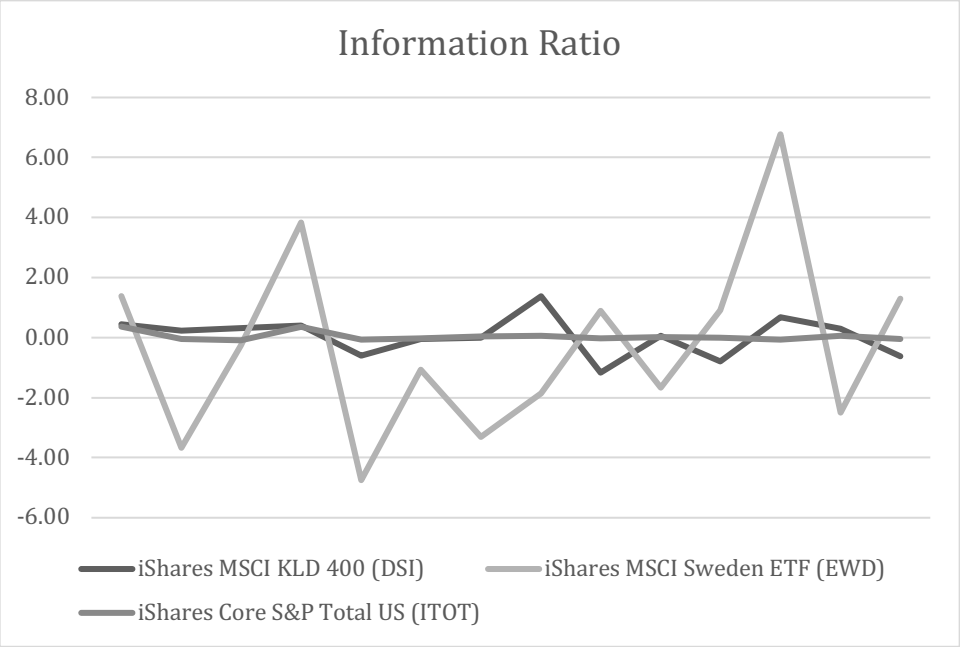

Figure 3. Information Ratio Results Summary

For example, as shown in Figure 3 in 2013, DSI observed an Information ratio of 1.38, while ITOT only observed a 0.07 Information Ratio. Additionally, in 2009, DSI recorded a 0.68 ratio compared to ITOT which recorded a -0.07 ratio. All in all, the two US based funds held homogeneous patterns and ratios for a majority of the years, although the ESG focused fund, DSI

beat the conventional fund, ITOT for a few of the recorded years. On the other hand, the Sweden based ESG focused fund, EWD did not follow suit and did not follow a similar pattern as the other funds and benchmark.

Empirical Analysis and Discussion

In terms of the Sharpe Ratio calculations, the Sweden based ETF had relatively lower measurements each year, compared to the other ETFs analyzed. Reasons behind this lower growth may have come about from the fund holding a smaller number of positions. EWD only has approximately 40 holdings. However, ITOT, the conventional fund, has over 3,500 holdings in ITOT. The difference in sizes impacts the influence potential that long term and short-term market fluctuation factors can have on the risk and return of the fund.

Moreover, it was observed in the results that the only period of time in which the Sweden based ETF outperformed the other funds and held higher Sharpe Ratio measurements was specifically during the 2008 Recession, taking place and showing impacts from 2008 until 2010. Indicating that although the Great Recession impacted countries globally, Sweden was not affected as significantly as the United States or Western Europe. Overall, the results can be shown in Table 3, which summarizes the Sharpe and Information ratios for each electronically traded fund used in this study. The cells highlighted in blue represent the years in which the fund outperformed the S&P 1500 and the conventional ETF. Below each of the annual calculations, the number of the years in which the fund outperformed is shown.

Table 3. Complete Summary of Results

		Information Ratio Calculations from 2007-2020:	
Year	iShares MSCI KLD 400 (DSI)	iShares MSCI Sweden ETF (EWD)	iShares Core S&P Total US (ITOT)
2020	0.45	1.37	0.37
2019	0.22	-3.66	-0.04
2018	0.33	-0.25	-0.09
2017	0.41	3.84	0.36
2016	-0.59	-4.75	-0.06
2015	-0.04	-1.07	-0.02
2014	-0.01	-3.31	0.04
2013	1.38	-1.87	0.07
2012	-1.17	0.90	-0.03
2011	0.06	-1.67	0.03
2010	-0.80	0.92	0.00
2009	0.68	6.77	-0.07
2008	0.29	-2.49	0.06
2007	-0.62	1.29	-0.05

	DSI	EWD
Total Outperformed Years:	7 years	6 years
Total Years Analyzed:	13 years	13 years

			Sharpe Ratio Calculations from 2007-2020:	
Year	DSI	iShares MSCI Sweden ETF (EWD)	iShares Core S&P Total US (ITOT)	S&P 1500
2020	2.48	2.61	2.28	2.01
2019	7.31	1.15	6.92	6.82
2018	-1.58	-2.05	-1.97	-1.92
2017	16.34	8.94	15.76	15.79
2016	2.69	-1.60	3.16	3.41
2015	-0.29	-1.28	-0.28	-0.27
2014	4.58	0.30	4.40	4.48
2013	13.07	5.07	11.87	11.92
2012	3.63	2.53	4.47	4.47
2011	-0.01	-1.36	-0.04	-0.06
2010	1.79	2.33	2.53	2.49
2009	4.55	6.84	3.68	3.71
2008	-5.59	-6.18	-6.24	-6.35
2007	-1.09	0.79	-0.47	-0.43

	DSI	EWD
Total Outperformed Years:	9 years	4 years
Total Years Analyzed:	13 years	13 years

Specifically for the U.S. based ETF, DSI, the alternative hypothesis that ESG focused ETFs will generate higher returns and lower risk compared to a conventional ETF and the S&P 1500 was supported, as in 7 and 9 of the 13 years analyzed, the fund did produce higher

Information and Sharpe ratio calculations, respectively. For EWD, the Sweden based ETF, the results were not found to be as statistically significant and therefore the alternative hypothesis can not be supported as the fund only outperformed the benchmark for 4 and 6 of the years analyzed.

In general, the initial idea that higher return potential may equate to higher risk potential was supported. Considering DSI produced higher Sharper ratio and Information ratio calculations for 8 and 4 of the 13 years, respectively, it can be determined that funds focusing on ESG and companies with higher ESG scores, may produce higher return.

Conclusion

Unconsciously, equity and fixed income investors have been using non-financial data to analyze and evaluate stock options for a long period of time. However, in the last 15 years, the industry has started to put a name to this action and the data that is becoming essential in making correct decisions. This phenomenon is called ESG. An acronym standing for environmental, social and governance, ESG data provides a holistic view and perspective on a potential investment option and advises the investors in analyzing and predicting any potential risks. In short, Environmental, Social and Governance factors measure ethical and sustainability impacts of potential investment options. Examples include carbon emissions that the company's operations produce, the composition of the board of directors or management committee, the company's data protection and privacy or their employee engagement

As a result of increased interest in using ESG data in the investment decision making process, there is a correlated interest in understanding and analyzing the performance potential that higher ESG rated companies have. This includes the risk and return potential these

companies hold. Therefore, in recent years, many studies have been carried out to understand these potentials at various points in time and in various asset classes or industries in the markets.

Three previous studies that examined this relation included a study published in 2021, which examined ESG focused ETFs and their performance before the COVID-19 Stock Market Crash in February 2020 and the following the crash. The study analyzed over 60 sustainable ETFs and measured the risk adjusted return before and after using five factor models. Overall, the study found that although the ESG focused funds were not protected completely during the crash, they did not underperform the market during either period (Pavlova & de Boyrie, 2021). The second study that examined this performance potential, focused on megatrend themes and compared their performance over a four-year period (Naffa & Fain, 2020, 2020). Risk-adjusted return calculations were also completed in order to determine which megatrend ESG theme generates superior returns. It was concluded that most megatrend portfolios yielded non-negative alphas and environmental themed portfolios performed the best. The last study examined the change in mutual fund performance based on the sustainability of ESG score that each fund holds (Dúran-Santomil et al., 2019). This was calculated by measuring the risk and non-risk adjusted returns of over 1,650 funds and determined that the higher the sustainability score the higher or better the performance of the fund.

Based on the results of similar historically published literature and previous research conducted, it was hypothesized that if a conventional ETF was compared to an ESG focused ETF based in the United States and Europe, the US Based ESG focused ETF and the Sweden Based ESG-focused ETF will both generate consistently higher return and lower risk than the general, conventional ETF as well as the S&P Composite 1500, which is included in the study as a benchmark.

The three funds that were used to examine this performance potential was iShares MSCI KLD 400 Social ETF, ticker DSI which represented the United States based ESG focused ETF, iShares MSCI Sweden ETF, ticker EWD, which represented the European based ESG focused ETF and iShares Core S&P Total US, ticker ITOT, which represented the general United States based ETF. As a benchmark, the S&P 1500 was included in the study to provide a standard for the overall market at the time of the calculation. In order to analyze the funds' performances, Sharpe Ratio and Information Ratio were each calculated for the three funds and the S&P 1500 on an annual basis from 2007 to 2020.

In terms of the return analysis conducted using Sharpe Ratios, the calculations of DSI were consistently in line with the conventional ETF, ITOT, each year. When the conventional ETF experienced a peak in Sharpe Ratio, DSI also experienced that peak. However, in 4 of the years examined, including 2009, 2013, 2017 and 2019, the DSI fund significantly outperformed the conventional, ITOT. This can be viewed in Figure 2 as the Sharpe ratios exceeded the conventional fund's Sharpe ratio calculations. Therefore, for those 4 years, it can be concluded that for the US based ESG focused ETF, the null hypothesis was rejected and the alternative hypothesis, which stated that the ESG focused ETF would generate higher return and lower risk was accepted.

Regarding the information ratio, different results were observed. In terms of the European based EWD fund, its information ratio was extremely volatile and did not mirror closely to the conventional fund, ITOT. As shown in Figure 3, reporting a low of -4.75 in 2016 and a high in 2009 of 6.77, EWD varied year by year and did not show a consistent pattern. On the other hand, the US based DSI fund, held a more linear pattern with less volatility. ITOT stayed quite stagnant throughout the 13-year period with a high of 0.37 in 2020 and a low of -0.09 in 2018

correlated continuously with the conventional fund. For 8 of 13 years, DWI and EWD both held a larger information ratio indicating that it experienced higher performance potential than the conventional ETF.

Therefore, the alternative hypothesis, which stated the ESG focused ETFS would experience higher return and lower risk than the conventional ETF was supported specifically for the US based ETF, DWI because it reported higher Sharpe ratio calculations in 9 of the 13 years and higher information ratio calculations in 7 of the 13 years, compared to the conventional U.S. ETF. EWD, the European based ETF's measurements did not support the alternative hypothesis as significantly as it only reported higher Sharpe Ratios and Information ratios for 4 and 6 of the 13 years measured, respectively.

Although these results were observed, it was also concluded that the Sweden based ETF did not perform in line with the conventional ETF. Although it followed a similar pattern each year, it's measured Sharpe Ratio was significantly lower than the two U.S. based ETFs. This was most likely due to the smaller position size and net asset value that the European fund holds. Going forward, it is recommended that a similar study is conducted with the same structure and purpose, however the funds chosen for the study should be identical in size and value. This will ensure that no uncontrollable variables come about during the study which may alter the results gathered.

With the volatility of today's market and the unexpected market disruption that has been observed for the past decade, many more individual investors and analysts are interested in understanding how ESG focused investing performs when compared to traditional investing. Examining ESG focused ETFs based in the United State and Europe, as well as a standard fund and a benchmark, the return potential of all four investing options were assessed to determine the

differences in their performance. The main purpose of this study was to assess whether or not ESG focused funds would generate higher return and lower risk consistently over a long-term period, compared to a standard fund. In order to calculate their performances, Sharpe Ratio and Information Ratio were used. Over the 13-year period tested, the US and European Based ESG focused ETFs were relatively consistent with conventional ETF and reported higher Sharpe Ratios and Information Ratios in 8 of the 13 years. Therefore, it was concluded that the US based ESG focused ETF did generate higher returns than the conventional ETF for the majority of the years tested.

References

Blackrock Inc. (2021). *IShares core S&P total U.S. stock market ETF | ITOT*. IShares.com. Retrieved November 24, 2021, from https://www.ishares.com/us/products/239724/ishares-core-sp-total-us-stock-market-etf

Bloomberg Intelligence. (2021, February 23). *ESG Assets may hit $53 trillion by 2025, a third of global AUM*. Bloomberg.com. Retrieved November 24, 2021, from https://www.bloomberg.com/professional/blog/esg-assets-may-hit-53-trillion-by-2025-a-third-of-global-aum/

Cabral, M. (2021). *About climate action 100+*. Climate Action 100+. Retrieved November 23, 2021, from https://www.climateaction100.org/about/

Durán-Santomil, P., Otero-González, L., Correia-Domingues, R. H., & Reboredo, J. C. (2019). Does sustainability score impact mutual fund performance? *Sustainability*, *11*(10), 2972. https://doi.org/10.3390/su11102972

Murphy, C. B. (2020). *The information ratio helps measure portfolio performance*. Investopedia.com. Retrieved November 24, 2021, from https://www.investopedia.com/terms/i/informationratio.asp

Naffa, H., & Fain, M. (2020). Performance measurement of ESG-themed megatrend investments in global equity markets using Pure Factor Portfolios Methodology. *PLOS ONE*, *15*(12). https://doi.org/10.1371/journal.pone.0244225

Pavlova, I., & de Boyrie, M. E. (2021). ESG ETFs and the COVID-19 stock market crash of 2020: Did clean funds fare better? *Finance Research Letters*, *44, 102051*. https://doi.org/10.1016/j.frl.2021.102051

Team, T. I. (2021). *Environmental, social & governance (ESG) criteria definition*. Investopedia.com. Retrieved November 23, 2021, from https://www.investopedia.com/terms/e/environmental-social-and-governance-esg-criteria.asp