

## University of Dayton eCommons

---

Honors Theses

University Honors Program


---

4-2017

# Sustainable Portfolios to Maximize Alpha

Douglas Stephen Carey

Follow this and additional works at: [https://ecommons.udayton.edu/uhp\\_theses](https://ecommons.udayton.edu/uhp_theses)

 Part of the [Finance and Financial Management Commons](#), and the [Portfolio and Security Analysis Commons](#)

---

### eCommons Citation

Carey, Douglas Stephen, "Sustainable Portfolios to Maximize Alpha" (2017). *Honors Theses*. 93.  
[https://ecommons.udayton.edu/uhp\\_theses/93](https://ecommons.udayton.edu/uhp_theses/93)

This Honors Thesis is brought to you for free and open access by the University Honors Program at eCommons. It has been accepted for inclusion in Honors Theses by an authorized administrator of eCommons. For more information, please contact [frice1@udayton.edu](mailto:frice1@udayton.edu), [mschlangen1@udayton.edu](mailto:mschlangen1@udayton.edu).

# **Sustainable Portfolios to Maximize Alpha**



Honors Thesis

Douglas Stephen Carey

Department: Finance and Economics

Mentor: Donald Shimmin, M.A.

Advisor: John Ruggiero, Ph.D.

April 2017

# Sustainable Portfolio to Maximize Alpha

Honors Thesis

Douglas Stephen Carey

Department: Finance and Economics

Mentor: Donald Shimmin, M.A.

Advisor: John Ruggiero, Ph.D.

April 2017

## **Abstract**

There has been a new movement for investment funds to align with investor morals. They are known as Environmental, Social, and Governance (ESG) funds, and have become a strong focus for asset management firms. Currently these funds have a negative stigma because most investors believe that due to added constraints on these portfolios, they will not be able to outperform non-sustainable portfolios. This is why the sustainable investment portfolios will be created. The portfolios undergo two focuses. The first portfolio employs a negative screening, which means that the portfolio will exclude specific industries that are deemed unsustainable. The other portfolio undergoes a positive screening. This means that there are specific parameters that focus on green initiatives. The purpose of these sustainable portfolios is to show investors that they can have strong returns compared to their benchmarks and still align with their values.

## **Dedication**

I want to thank the University of Dayton for an incredible four years filled with new challenges and exciting opportunities. Especially from Professors Shimmin and Ruggiero for their constant support these past two years. Overall this has been a wonderful experience where I have been given the opportunity to study and learn about portfolio construction.



# Table of Contents

Abstract	Title Page
Introduction	1
Background	1
Project Description	3
Model	6
Parameters	9
Portfolio Composition	11
Portfolio Analysis	14
Limitations	18
Final Results	20
Bibliography	22

## **Introduction**

The sustainable investment portfolio undergoes two focuses. The first portfolio undergoes a positive screening. This means that there are specific parameters that focus on green initiatives, but do not exclude any industries or sectors. This will allow the opportunity for fossil fuel companies that can pose negative impacts on the environment, but they will be the least negative impactful companies in their industry. The other portfolio will undergo negative screening. This means that the portfolio will completely exclude specific industries and sectors that are deemed unsustainable.

The desire for this thesis is to see if sustainability can help generate alpha for these portfolios. Alpha measures the portfolio's return to risk, if alpha is positive this means that the portfolio is earning excess returns for the risk it is taking on. If the portfolio is negative that means the portfolio is taking on too much risk for the returns it is generating. Alpha allows investors to see how a portfolio will perform against the market.

The thesis focuses on companies that are top tier for the sustainability data that Bloomberg supplies. These portfolios will perform against their benchmark on a risk to return spectrum. This process will show investors how they can invest with their values, but also maintain strong returns for their future.

## **Background**

The reason for these sustainable portfolios is that throughout the investment community there has been a movement towards Environmental, Social, and Governance (ESG) focused funds. These funds are a desire for people to begin to invest in their

values. Areas of interest for ESG funds are LGBT rights, women's rights, environmental impact, and more. This is important because there has been a shift where investors are beginning to take a real interest in ESG funds. This is especially true with the millennial generation. In a study that is following generational desires, the study shows that 63% of millennials are interested in impact investing, while only 40% of generation X are interested in sustainable companies [12]. The millennial desire is big due to the fact that they will be inheriting \$59 trillion, where even a portion of this will be a significant investment for ESG focused funds and companies [11]. The main problem though is that many investors do not want ESG funds in their portfolios because they believe they will not provide strong return. The focus for this thesis will be to create an environmental portfolio to show that investors can still make strong returns throughout their life and that these investments will coincide with their values. This thesis not only has sustainability criteria for companies to buy into, but to also allows for strong returns compared to the risk it takes on.

There has been an increase in CO2 emissions, hazardous materials, energy waste, and other negative impacts that are caused by companies all over the world. Environmentalists have seen negative impacts on the planet through climate change, damaged ecosystems, and other pollutants coming into the planet's atmosphere. This has caused for heavy investment in sustainable initiatives throughout the world. The new movement has been brought by the Paris Agreement and is significantly looking to invest into sustainable companies, projects, and initiatives for the future. There are significant pushes by the public sector all over the world, but true momentum will come from the private sector. This means getting the company's board of directors to take action on their

sustainability practices. If shareholders hold their companies accountable, this will be a large push, but they need to be incentivized. The problem again though comes from how investors will make strong returns for the future. If shareholders, and more importantly the board of directors don't see the need for it, due to poor returns in their stock price, then there will be no focus or push in the private sector. Even with government regulations put in place, these policies can change constantly from both sides of the spectrum.

The government push allows for publicity and awareness of ESG funds. These funds give investors the ability to see which companies are actually taking an active approach in creating a stable and greener environment compared to their peers. This allows companies to gain a strong stance in their community, causing investors to be more likely to invest in them. There has been a strong trend of investors taking an active approach into investing in companies that have an ESG focus. A strong proponent is coming mainly from the environmental community and the millennial generation. This generation is twice as likely to invest into sustainable companies compared to any other generation [11]. Still this is not just the tech savvy generation, Gen X and Baby Boomers are also taking a more active approach in owning an ESG fund in their portfolio. This allows companies who are taking an active approach in their community and the world to gain the upper hand with new projects and maximize returns. At the end of the day investing green is just good business.

## **Project Description**

The reason this project came to be was at the Divesting Conference hosted by George Hanley. Speakers from all over came to talk about sustainable investing. The

conversation on pointed out how environmental investing was one of the most important measures for shareholders to start taking on. There were also talks about corporate social responsibility investing. They were the first movements by investors to take a different approach in their investment practices [4]. This new era of investing focused on companies that were treating their employees well, giving back to the community, and working toward gender/racial equality [4]. As this trend has continued it has gained a new resurgence/focus into sustainability.

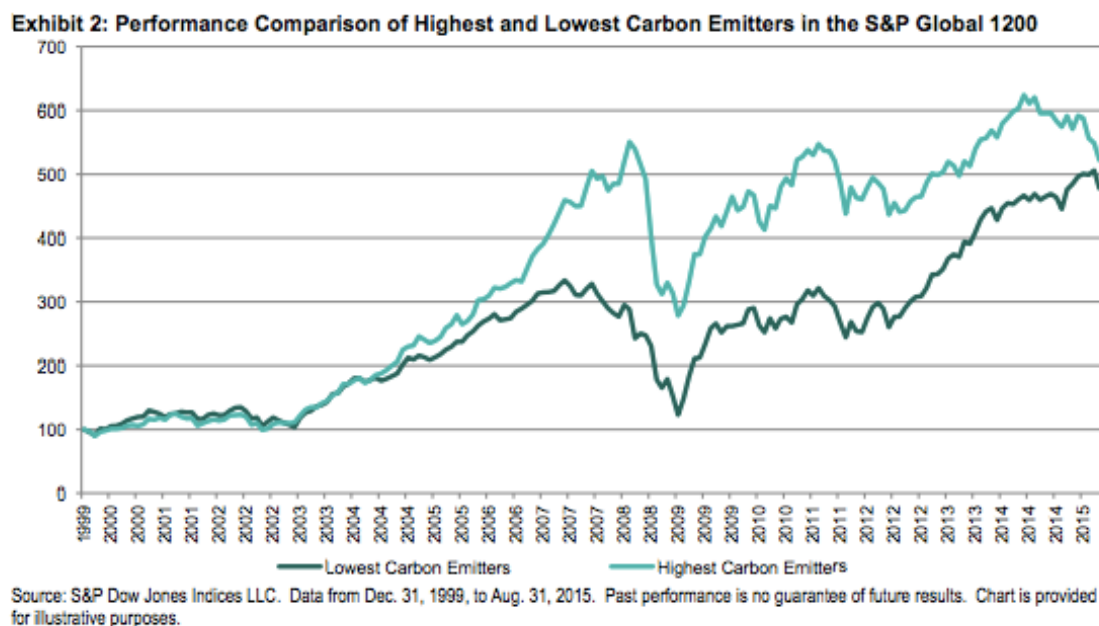
Research begins by gathering data on what companies believe meet specific sustainable criteria. This comes from a multitude of areas like understanding how they impact the environment, how much energy consumption they use a year to power their buildings, and being able to see what impacts they have been changing to mitigate their consumption on energy and other resources. These companies will become symbols of what it takes to be a well-established sustainable company that seeks to provide little negative impact to the environment.

Now there are a multitude of sustainable indexes and funds out there. To name a couple there is the Dow Jones Sustainability Index (multiple variations), S&P 500 fossil fuel free index, and the STOXX Global ESG Leaders (multiple variations). While these indexes help to better align investors' morals and have relatively good returns, they do not fully exclude oil companies [9]. They also have much wider margins on their versions of sustainability. The idea of taking out oil companies comes from the idea of constraints. When you add a constraint, or use a negative screen, it is unlikely to have a stronger return than another portfolio if all other factors are the same for the long term. This is why all of these indexes allow certain companies to be in their portfolio. These indexes



have companies like Exxon Mobile, BP, Chevron, and other companies that many would argue are not sustainable companies [9]. The negative screen portfolio seeks to exclude these companies and have a much smaller selection than these indexes. Other research shows how high emissions compared to low emissions have been outperforming for the last 5 years, but we can see in Figure 1, part of this was due to the ramp up before the 2009 Financial Crisis and the fall of oil. As we see before, the performance of these

[Figure 1]



[6]

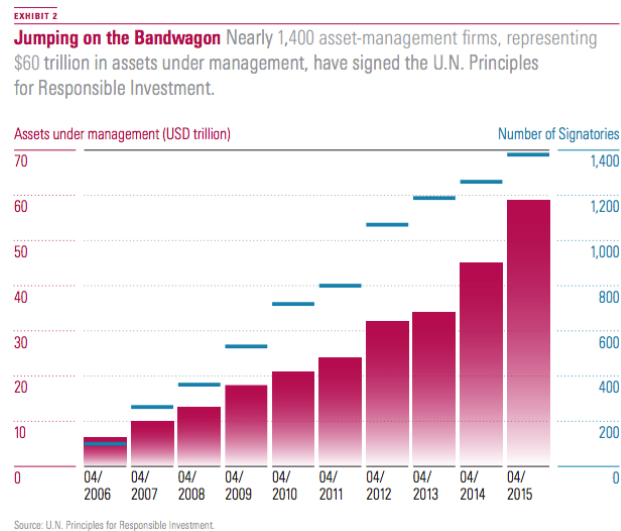
companies were closely correlated and now as time has moved past 2014 into 2015 the low carbon emissions have had a strong uptrend while the high carbon emissions have started moving toward a downtrend [6]. This shows that certain periods of sustainable companies can outperform their opposites.

Another index is the M&E LatinFinance Sustainability Stars Index. This index focuses on market capitalization and sustainability scores [8]. Still this index is similar to

the research for the sustainable portfolios where it focuses on certain criteria to list what they see as a sustainable company, but it is only focused in Latin America. They focus on a company's corporate and governance factors, and then rates the companies through their compliance, performance, risk and overall strategy [8]. Overall the company has seen strong performance since inception in 2009 [8].

The ESG world will continue to grow as time goes on. Figure 2 shows the time period of 2006 to 2015 of the number of asset management firms signing the U.N. Principles for Responsible Investments [13]. Together these asset management firms have over \$60 trillion in assets under management. As time progresses, they will continue to see growth due to the millennial generation desire to invest with their morals.

[Figure 2]



[13]

## Model

The sustainable portfolios screen the above average companies on sustainable criteria. This research is based off the data from the Bloomberg terminal. It has an equity

screener that uses specific criteria to screen through each company. Bloomberg has data on every publicly owned company and has gathered data on their environmental factors. Through this criterion there are four areas that are big topics in the environmental community: waste, water usage, CO2 emissions, and energy usage. Bloomberg provided 10 parameters to hit on each of these topics. The sectors that are excluded were oil & gas and forestry & paper. The reason for this is that most of these companies that fit under these industries have high negative impacts on the environment.

Once the criteria were set, the screening process commenced. One of the companies was Johnson & Johnson; it became a base for the parameters used for this criteria [2]. Other research came from scholarly articles, one based on CO2 emissions from the University of Cambridge. This college tested their CO2 emissions and based it on Scopes 1, 2, and 3 [1]. This shows their emissions and how much is being generated.

The Russell 3000 is the index used for the Bloomberg screening process. This index is comprised of companies that are from the U.S. The purpose of this screen is to gather data from the 2011 and 2012 period. Then compile all of the companies' data and look for the above average companies. This is how the equity screen is able to see if these companies would be sustainable or not. If they met the criteria specified in Figure 3, they were considered green companies.

[Figure 3]

Screening Criteria as of Yesterday	
Trading Status: Active	248689
Indices: Russell 3000 Index	2953
<b>Analytic Criteria</b>	<b>2953</b>
Latest FY Total Waste (Th Tonnes) < 8673.51	242
Latest FY Total Water Use < 343392	179
Latest FY Total Energy Consumption (Mwh) < 182505	168
Latest FY Waste Reduction Policy >= 1	147
Latest FY GHG Scope 1 < 5994.93	128
Latest FY GHG Scope 2 < 1172.66	107
Latest FY Hazardous Waste (Th Tonnes) < 55.2341	58
Latest FY ESG Disclosure Score > 16.5893	50
Latest FY GHG Scope 3 < 6934.55	35

(Bloomberg Equity Screen Criteria)

The final numbers that come from the 2011 to 2012 period are: Scope 1 – 5994.93 metric tons, Scope 2 – 1172 metric tons, Scope 3 – 6934.55 metric tons, Total Waste – 8673.51 tonnes, Hazardous Waste – 55.23 tonnes, Total Water Use – 343392, Total Energy Consumption – 182505, Waste Reduction Policy – Yes, and ESG Disclosure Score – 16.59. These parameters are set to be less than the following numbers. For example, the companies that produce fewer emissions are more sustainable than a company that uses more emissions than the rest. The negative screen sustainable portfolio also excluded the following sectors: oil & gas, and forestry & paper. If any companies are above these numbers or are in these sectors, they are immediately taken out of the pool that has been created. Once the quantitative parameters have been set in place, a qualitative measurement will be done to make sure all companies are working to maintain their sustainable requirements.

Once the measurements have been completed and the portfolio is set, the portfolio then back tests these companies with rolling periods. The back test is for 4 years and gathers data monthly. There will be 50 data points to use as measurements for the portfolios risk statistics and returns, which will then be compared to their benchmark the S&P 500.

If there are enough periods, it will show that sustainable companies can outperform non-sustainable companies. If this does not happen, the next step will be to capture the risk measurements for both portfolios and see how much more risk it takes to allow this to happen. The other possibility is to widen the portfolios' criteria on the sustainable measurements to allow more companies into the pool. This will give an

accurate description of what happens when investing into sustainable companies and how shareholders can achieve positive returns while also preserving the planet.

## **Parameters**

The portfolios focus on specific parameters that meet the desires of the environmental community. First is the need to see companies with little CO<sub>2</sub> emissions being emitted into the atmosphere. The negative impact is overly worrisome since it has spiked difficult weather patterns like hurricanes, tsunamis, and tornados. The parameters for this topic focus on three aspects of CO<sub>2</sub> emissions. They are Scopes 1, 2, and 3.

Scope 1 is the direct Greenhouse gas emissions of a company [10]. GHG focuses on specific gases that contribute to trapping heat in the atmosphere. These gases include: carbon dioxide (CO<sub>2</sub>), methane, and nitrous oxide. Compared to the other scopes, Scope 1 focuses on the direct emissions that come from the company. This field does not only include CO<sub>2</sub>, it also captures other GHG emissions and its CO<sub>2</sub> equivalents. What they look for when they report this information on direct emissions is that from the companies standpoint, how they use furnaces, vehicle output, boilers, and more [10].

Scope 2, unlike Scope 1, uses indirect GHG emissions that affect the planet. It looks at the emissions that are a consequence of the activity that the company does. The indirect emissions are purchased electricity, steam, and/or heating and cooling [10]. If these are CO<sub>2</sub> only it will not occur. This is important because the portfolios can judge certain energy and industrial companies on how their boilers and machinery affects the planet, but cannot judge how a technology or consumer staples company would affect the planet through emissions. This allows these companies to be on a more equal plain field and not subject to one being over the other.

Scope 3 captures GHG emissions using indirect impacts. Unlike Scope 2, it focuses on extraction and production of purchased materials and fuels [10]. A good way to think about it is when a truck is delivering your goods from another company, but you do not own them. Again Scope 3 does not report CO<sub>2</sub> emissions only; it looks for generic GHG emissions or CO<sub>2</sub> equivalents.

Waste is having a negative impact on ecosystems. Chemicals are being put into our water systems, the use of plastics and other materials that aren't being recycled and other inefficiencies that are happening in the workplace. This form of pollution is having adverse affects on our livelihoods. This is why the sustainable portfolios search for companies that take into account how much waste they expose to the world. While making sure they continue to take active initiatives to reduce their waste. The parameter is known as total waste, the data that it procures focuses on companies that discard both hazardous and non-hazardous materials. The hope is to see these companies use less waste as time goes on.

Companies use a lot of water to cool their systems. Bloomberg provides data on total water usage. It displays the sum of all water that is being taken through from a company's operational process. The other parameter is known as water reduction, this allows companies to show that they are taking proactive steps in reducing their water intake each year.

Another key impact for companies is there use of energy. Of course some companies that are larger are going to need more energy. This is something that may come as a limitation in the portfolio later on. This parameter looks into the energy that is

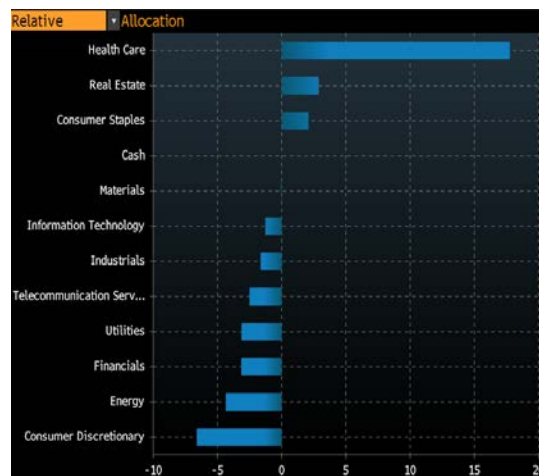
being directly consumed, like from vehicles, boilers, and plants. This allows the portfolios to see what companies are using less energy compared to others.

The final factor is the ESG disclosure score. Sustainability is important, but there are arguably other ways to be sustainable. The desire is for companies to take active approaches in their community. The ESG disclosure score take the information from each company. If there is no ESG data at all, then the company receives an N/A. If the company does have data it will receive points. If it has few data points the company will score a 0.1, where the maximum amount can be 100. Each data point is weighted by importance; for instance greenhouse gas emissions carries a lot of weight, but there are other factors that don't. The ESG disclosure score evaluates in terms of the data that is relevant to its industry [10].

## Portfolio Composition

Overall the two portfolios were relatively similar. In figure 4, the positive screen portfolio saw overweight in Healthcare in the 4-year period. This is compared to the S&P

[Figure 4]



(Positive Screen Portfolio's Allocation)

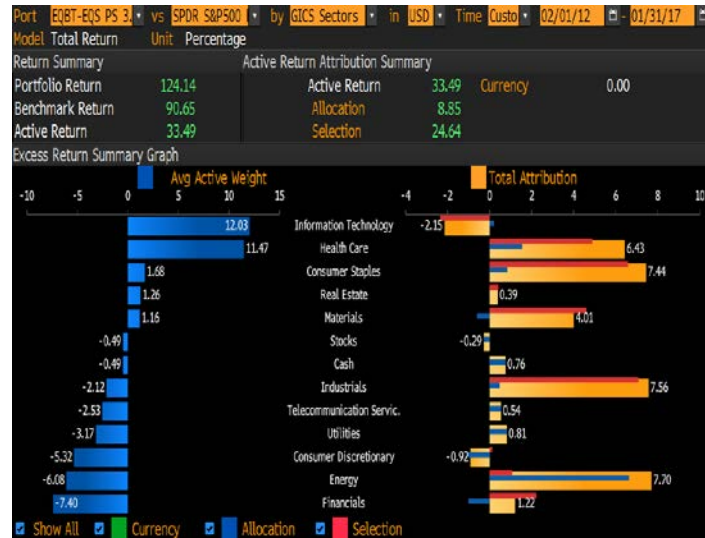
500; the parameters had some selection bias since the portfolio focuses on companies that have low CO2 emissions, Waste, and water usage. Since there are many industrial and oil companies that typically will output more CO2 emissions and other harmful factors than most other sectors. This creates a selection bias for these sectors; it is likely the reason for a sector like healthcare that already wouldn't have the problem of high CO2 emissions to be able to have so many companies coming into the portfolio.

In Figure 4, the positive screen portfolio also has strong underweighting in Consumer Discretionary. This is an interesting development, but there can be a few reasons for this. When breaking down some of the research, there are 3000 companies in the Russell 3000; only 400 companies actually had data that was in the index. Likely since most Consumer Discretionary companies typically aren't under a lot of scrutiny during this time for sustainable data they won't go and report it for Bloomberg's database.

In Figure 5, the positive screen portfolio outperformed due to its selection for its companies. The outperformance also comes from their allocation. The energy sector had a strong outperformance due to the portfolio's underweight in this sector. The reason why energy performed poorly in this time period was due to the oil crash in 2015. This is not a typical event, but since the portfolio was heavily underweighted in this sector it saw a strong outperformance from its benchmark. On the selection side the desire is that since the study is looking for companies that are sustainable, and part of sustainability is being efficient because they are using less waste to reduce their costs. This is extremely important in the long-term and shows that these companies are growing at a faster rate

[Figure 5]





(Positive Screen Portfolio's Attribution)

than their competitors. Still it must be noted that this could be selection bias, and these companies during this time period are strong, but could be different in other time periods.

The negative screen portfolio as we can expect had similar allocations. In Figure 6, there is no weight in the Energy sector since the portfolio omits all oil & gas companies. The reason for this is that oil & gas companies are typically the most

[Figure 6]

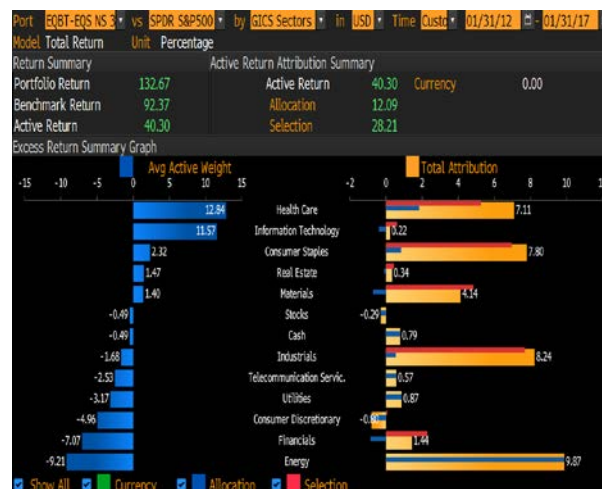


(Negative Screen Portfolio's Allocation)

harmful to the environment and have taken on a lot of negative publicity from government entities and other movements.

Overall the negative screen portfolio for its time period had strong returns in its allocation and its selection. In Figure 7, the portfolio's zero weight in the energy sector allowed for its strong outperformance in this sector. Again this is mainly due to other oil & gas industry collapsing in 2015. Still the main driver in performance comes from selection part for the negative screen portfolio in this time period.

[Figure 7]

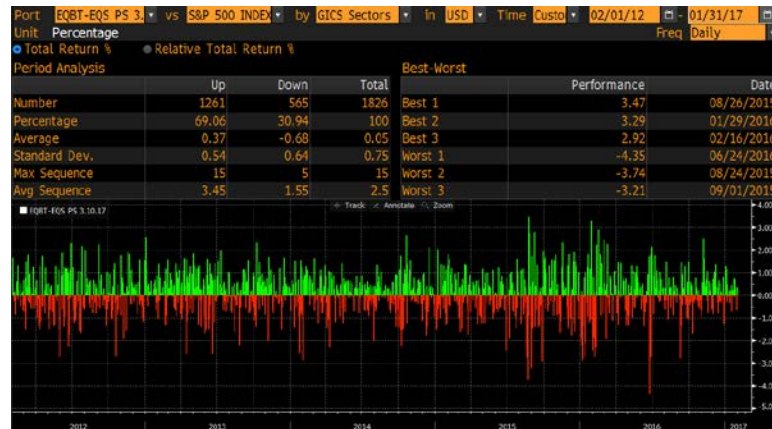


(Negative Screen Portfolio Attribution)

## Portfolio Analysis

The analysis gathered shows that the positive screen portfolio for the 4-year period, rebalanced quarterly, does outperform the S&P 500. During this period the daily performance data shows how often the positive screen outperformed. In Figure 8, there are 1826 daily observations; the positive screen outperformed 1261 times. Showing strong consistency in performance for the portfolio.

[Figure 8]



(Positive Screen Portfolio's Daily Changes)

In Figure 9, there was an underperformance in the 2012 period compared to the S&P 500.

[Figure 9]



(Positive Screen Portfolio's Graphing Price)

There are some drawbacks due to this portfolio. Overall the portfolio outperformed in large part, but in Figure 10 the risk measurements in the 3-year period have significant upswings in the risk that is taken. The Standard Deviation is typically higher than the S&P 500. This means that the positive screen portfolio is taking on more risk compared to the benchmark. The Sharpe Ratio is typically higher due to the fact that we see strong performance by the portfolio on a risk-adjusted basis.

[Figure 10]

Port EQBT-EQS PS 3 vs S&P 500 INDE by GICS Sectors in USD As Of 01/31/17									
Unit Percentage									
EQBT-EQS PS 3.10.17									
Portfolio Statistics	3 Months		6 Months		Year To Date		3 Year(s)		
	Port	Bench	Port	Bench	Port	Bench	Port	Bench	
<b>2. Return</b>									
Total Return	12.24	7.77	9.18	5.97	4.40	1.90	51.99	36.19	
Maximum Return	2.50	2.22	2.50	2.22	1.28	0.85	3.47	3.91	
Minimum Return	-1.28	-0.82	-2.80	-2.45	-0.72	-0.60	-4.35	-3.94	
Mean Return (Annualized)	58.98	35.01	19.77	12.64	66.54	25.00	16.24	11.82	
Mean Excess Return (Annualized)	17.77		6.33		33.25		3.95		
<b>3. Risk</b>									
Standard Deviation (Annualized)	9.05	7.10	9.48	7.66	6.88	5.35	12.57	11.24	
Downside Risk (Annualized)	5.68	4.12	6.59	5.30	4.28	3.25	9.11	8.10	
Skewness	0.91	1.51	-0.08	-0.09	0.70	0.70	-0.36	-0.31	
VaR 95% (ex-post)	-0.73	-0.55	-0.84	-0.63	-0.50	-0.36	-1.28	-1.16	
Tracking Error (Annualized)	4.09		3.82		3.57		3.98		
<b>4. Risk/Return</b>									
Sharpe Ratio	4.31	3.32	1.42	1.12	6.34	3.16	0.90	0.73	
Jensen Alpha	11.91		3.66		24.94		2.53		
Information Ratio	3.04		1.18		6.39		0.71		
Treynor Measure	0.34		0.12		0.40		0.11		
Beta (ex-post)	1.15		1.14		1.10		1.06		
Correlation	0.8996		0.9226		0.8592		0.9501		
Capture Ratio	0.93		0.95		0.61		1.10		

(Positive Screen Portfolio's Risk Statistics)

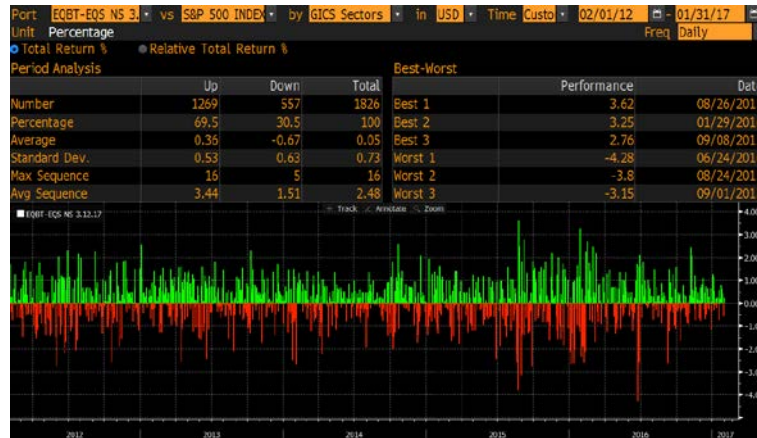
The question will be for investors is how much risk are they willing to take overall since some investors can't handle the volatility that is set in place when the portfolio does underperform. In the period of 2012 and part of 2013 the portfolio did underperform its benchmark, at one point it was close to 10%. Overall the portfolio only lost around 5% in returns for the entire portfolio.

The negative screen portfolio also saw similar results for the 4-year period even though it had the constraint of excluding all oil & gas and forestry & paper companies. Overall there was an outperformance for the 4-year period, but again ran into the same scenario where the portfolio underperformed the S&P 500 in 2012 and some of 2013. The underperformance at one point reached close to 10%, but as time moved on there is a strong outperformance.

In Figure 12, the period analysis shows that overall the portfolio outperformed the S&P 500 1269 times out of the 1826. The negative screen portfolio still runs into the

same risk scenario. In Figure 13, the Standard Deviation is typically higher than the benchmark. The Sharpe ratio was also higher though, which shows the strong

[Figure 12]



(Negative Screen Portfolio's Period Analysis)

performance for the overall portfolio due to the risk adjusted basis it takes on. Again the portfolio is taking more risk for its return. This likely is coming from fewer companies in

[Figure 13]

Portfolio Statistics	3 Months		6 Months		Year To Date		3 Year(s)	
	Port	Bench	Port	Bench	Port	Bench	Port	Bench
<b>2. Return</b>								
Total Return	12.80	7.77	10.65	5.97	4.74	1.90	59.64	36.19
Maximum Return	2.44	2.22	2.44	2.22	1.26	0.85	3.62	3.91
Minimum Return	-1.18	-0.82	-2.65	-2.45	-0.75	-0.60	-4.28	-3.94
Mean Return (Annualized)	62.18	35.01	22.97	12.64	73.06	25.00	18.09	11.82
Mean Excess Return (Annualized)	20.14		9.17		38.47		5.61	
<b>3. Risk</b>								
Standard Deviation (Annualized)	9.02	7.10	9.30	7.66	6.77	5.35	12.23	11.24
Downside Risk (Annualized)	5.54	4.12	6.35	5.30	4.17	3.25	8.85	8.10
Skewness	1.09	1.51	0.12	-0.09	0.70	0.70	-0.34	-0.31
VaR 95% (ex-post)	-0.73	-0.55	-0.78	-0.63	-0.44	-0.36	-1.22	-1.16
Tracking Error (Annualized)	4.27		3.82		3.83		3.89	
<b>4. Risk/Return</b>								
Sharpe Ratio	4.54	3.32	1.68	1.12	7.04	3.16	1.02	0.73
Jensen Alpha	14.38		6.08		29.98		4.04	
Information Ratio	3.28		1.69		6.83		1.02	
Treynor Measure	0.36		0.14		0.46		0.12	
Beta (ex-post)	1.13		1.11		1.04		1.03	
Correlation	0.8866		0.9164		0.8251		0.9486	
Capture Ratio	0.94		0.84		0.53		0.99	

(Negative Screen Portfolio's Risk Measurements)

the portfolio especially in the first quarter where there were 19 companies in the entire

portfolio. The first year the portfolio had only 22 companies on average, which overall hurts for diversification purposes.

Overall the portfolio again had strong performance in the long-term compared to its benchmark. In Figure 14, the 2012 period the portfolio underperformed around 10% compared to its benchmark. This underperformance would be deeply worrisome for investors in the first year. Overall though in the long term basis this portfolio held strong returns for its investors.

[Figure 14]



(Negative Screen Portfolio's Risk Measurements)

## Limitations

These portfolios overall came with interesting results. The companies are some of the most sustainable companies in many different aspects. This criteria did bring some challenges, these parameters overall gave the sustainable portfolios few companies to use. Typically a well-diversified portfolio has between 20 to 50 companies, but in many cases in how investment firms develop their portfolios they range from 40 to 200. The sustainable portfolios ranged from 20 to 40 companies in the 2012 to 2017 time period. There are a few reasons for this. First the portfolio only had around 4 years of data due to

the fact that most companies do not fit the sustainable criteria. Going back one more year did not allow for an accurate depiction of a portfolio because it would only have between 12 to 18 companies. This was considered too small of a pool of companies for the sustainable portfolios. Due to this limited time range there are a few factors to account for.

The sustainable portfolios create a possible selection bias due to the fact that most of these companies are going to be large capitalization companies and have the money and precision to record this data for the information. This makes smaller market capitalization companies unable to be in the process. The portfolios were screened through the Russell 3000 and had around 400 companies with the specified criteria. This creates a bias since most companies don't have the capital or ability to report sustainability reporting and since the U.S. government does not have a law to report for these specific parameters it makes it difficult for the companies to be incentivized. This overall skews some of the results on the companies that are being chosen and takes away some of the creditability from the attribution report.

The other limitation is due to the time period where this back test for the sustainable portfolios was done. The time period first comes after the 2008 - 2009 Financial Recession. During this time period we have seen strong growth in the U.S. economy and all time record highs. There were no large downturns from these portfolios. If you look at the attribution report, during this time period it had a significant fall in the oil & gas industry due to oversupply from OPEC. This pushed oil prices from \$100 a barrel all the way down to \$28. This creates a new perspective since the crash of oil gave the positive screen portfolio a gain over 6% return and the negative screen portfolio



gained over 9% on returns compared to the S&P 500. Due to the small time period this takes away from some of the outperformance for the sustainable portfolios.

## Final Results

Overall the thesis shows that the sustainable portfolios are able to outperform their benchmarks. Through the analysis of the 50 data points for rolling periods the positive screen portfolio on average outperformed the S&P 500. Still the standard

	Total Return	S&P 500	Standard Deviation	S&P 500	Downside Risk	S&P 500	Sharpe Ratio	S&P 500	Beta	S&P 500	Jenson Alpha	S&P 500
Average	19.83	13.91	12.32	10.93	8.87	7.85	1.25	1.04	1.06	1	2.89	1

deviation is higher compared to the benchmark, signaling that it is taking on more risk in the positive screen portfolio. It also has a higher beta, which means the portfolios volatility will be higher. Still the sharpe ratio is higher which means it will be gaining more return for its risk. At the end though the positive screen portfolio was able to outperform its benchmark and generate alpha. The portfolio's Jenson Alpha was 2.89; this is signaling that the portfolio has an above average return for the risk that it is taking on. This shows that the portfolio is taking on a healthy amount of risk for the returns that it is generating.

The negative screen portfolio has similar results to its benchmark. Overall

	Total Return	S&P 500	Standard Deviation	S&P 500	Downside Risk	S&P 500	Sharpe Ratio	S&P 500	Beta	S&P 500	Jenson Alpha	S&P 500
Average	19.31	13.91	11.92	10.93	8.56	7.85	1.26	1.04	1.03	1	3.32	1

strong returns compared to its benchmark but higher risk. It has a higher beta from its benchmark, but it is lower compared to the positive screen portfolio. This is interesting



since the negative screen portfolio excludes industries, which hurts diversification. Still it was able to get rid of a cyclical sector, this is especially important due to the oil crash in 2015. The last metric to highlight is the Jensen Alpha, which was a 3.32. This means that the negative screen portfolio is earning 3.32 of excess returns to the S&P 500 and performed better to the positive screen portfolio as well.

This overall analysis of the sustainable portfolios allows investors to see that they can get strong returns and have an investment that is consistent with their morals. As time continues on more data is coming out for sustainable criteria and there will be more companies to enter the portfolios, which will allow for greater diversification. These portfolios will be able to show that companies that are working to become more efficient will do better in the long run.

## Bibliography

- [1] University of Cambridge. "The University's Carbon Footprint." University of Cambridge Environment and Energy. 2013. Web. 10 March 2016. <<http://www.environment.admin.cam.ac.uk/what-are-we-doing/carbon/scope-1-2-and-3-emissions>>.
- [2] Schrank, Katherine. Seeking Alpha. Seeking Alpha. 17 December 2015. Web. 23 February 2016. <<http://seekingalpha.com/article/3763586-johnson-and-johnso-healthcare-behemoth-smaller-environmental-footprint-peers>>.
- [3] Oreskes, Naomi. "The Scientific Consensus on Climate Change." Science AAAS. 3 December 2004. Web. 23 February 2016. <<http://science.sciencemag.org/content/306/5702/1686>>.
- [4] Glac, Katherina. "The Influence Shareholders of Shareholders on Corporate Social Responsibility." Addleton Academic Publishers. 1 September 2014. Web. 27 March 2016. <<http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?sid=313be768-10ce-441a-b72d-66205ebd7be1@sessionmgr4003&vid=17&hid=4202&preview=false>>. <[http://www.cebcglobal.org/wpcontent/uploads/2015/02/Influence\\_of\\_Shareholders\\_on\\_Corporate\\_Social\\_Responsibility.pdf](http://www.cebcglobal.org/wpcontent/uploads/2015/02/Influence_of_Shareholders_on_Corporate_Social_Responsibility.pdf)>.
- [5] Kochetygova, Julia. "The S&P Green Project Bond Index: Capturing a Deeper Shade of Green." S&P Dow Jones Indices. McGraw Hill Financial. October 2014. Web. 23 February 2016. <[file:///Users/dougcarey/Downloads/research-the-sp-green-project-bond-index-capturing-a-deeper-shade-of-green%20\(2\).pdf](file:///Users/dougcarey/Downloads/research-the-sp-green-project-bond-index-capturing-a-deeper-shade-of-green%20(2).pdf)>.
- [6] Jacob, Angana. "Carbon Efficiency: A Strategic Look." S&P Dow Hones Indicies. McGraw Hill Financial. October 2015. Web. 23 February 2016 <[file:///Users/dougcarey/Downloads/research-carbon-efficiency-a-strategic-look%20\(2\).pdf](file:///Users/dougcarey/Downloads/research-carbon-efficiency-a-strategic-look%20(2).pdf)>.
- [7] Hansen, Erik. "Sustainability Balanced Scorecard: A Systematic Review of Architectures." Journal of Business Ethics. January 2016. Web. 23 February 2016 <<http://eds.a.ebscohost.com/eds/detail/detail?vid=11&sid=313be768-10ce-441a-b72d-66205ebd7be1%40sessionmgr4003&hid=4202&bdata=JnNpdGU9ZWRzLWxpdmU%3d#AN=112692438&db=bth>>.
- [8] LatinFinance. "Sustainable Outperformance." LatinFinance. May/June 2012. Web. 28 March 2016. <<http://eds.a.ebscohost.com/eds/detail/detail?sid=313be768-10ce-441a-b72d-66205ebd7be1%40sessionmgr4003&vid=20&hid=4202&bdata=JnNpdGU9ZWRzLWxpdmU%3d#AN=78326472&db=bth>>.

- 
- [9] Robecosam. “Annual Review 2015.” Robecoscam. 14 September 2015. Web. 29 March 2016. <<http://www.sustainability-indices.com/review/annual-review-2015.jsp>>.
- [10] Bloomberg L.P. Bloomberg database. 8 March 2017.
- [11] Mohan, Isvari. “Millennials drive growth in ‘impact investing’.” Boston Globe. 17 January 2017. Web. 19 March 2017. <<https://www.bostonglobe.com/business/2017/01/17/millennials-drive-growth-impact-investing/aMNLchyEeedGdqphGwIn2J/story.html>>
- [12] Clark, Casey. “Investing Alongside Your Values.” Glenmede. Web. 29 March 2017. <<https://www.glenmede.com/files/ii-nov14-investing-alongside-your-values.pdf>>
- [13] Phillips, Don. “The magazine of independent research for the world’s financial professionals.” Morningstar. December/January 2016. Web. 20 March 2017. <file:///Users/jonathan/Downloads/Morningstar-Mag\_ESG\_decjan16\_%20(1).pdf>