The Benefits of Socially Responsible Investing: An Active Manager's Perspective

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Abstract

Our research looks at the relationship between ESG (environmental, social and governance) ratings of a company and its stock returns, volatility and risk-adjusted return in the post 2008 financial crisis era. We find a clear relationship between ESG ratings and stock returns. Higher return companies in aggregate had better ESG ratings. There was a strong negative correlation between ESG ratings and stock volatility, and this relationship was stronger when market volatility was higher. This implies that asset managers can get diversification benefits by choosing better ESG stocks and this diversification benefit strengthens when markets are more volatile. The correlation between ESG rating and risk-adjusted return turned significantly positive in the recent years and this positive correlation strengthens further by excluding the lowest ESG stocks.

We also tested the effect of restricting the investible universe by deleting the lower tail of ESG companies on portfolio performance. We did this by creating portfolios from the complete and the restricted universe through random selection. We found that restricting the investible universe through deletion of the worst ESG stocks tends to improve the probability distribution of returns with a higher average and maximum portfolio return. Using risk-adjusted returns as the variable of interest (instead of returns) in the random selection from the restricted and unrestricted universe lead to similar conclusions. We conclude that excluding the worst ESG stocks from the investible universe tends to improve the return and risk-adjusted return distribution even through a process of random selection.

Asset managers can therefore utilize the association between corporate ESG ratings and stock return, volatility and risk-adjusted return, and actively use ESG information to enhance their stock-picking and portfolio construction ability. Active managers can create better portfolios by using ESG ratings and excluding the worst ESG rated stocks.

Introduction

Socially responsible investing has been around since early 1990s, and has many nomenclature, the most common one being ESG (Environment, Social and Governance)[1] .There has been a lot of research on the predictive power of ESG ratings, the relationship between ESG ratings and subsequent stock performance and whether using ESG data in stock analysis and portfolio management is value-additive or value-detracting. This line of analysis has mainly been from the return perspective – whether higher ESG rated stocks tend to have higher returns or whether ESG ratings are an alpha signal. The results in this area of research are mixed, and the results are also time specific with some research indicating that the alpha-addition from ESG has been diluted in recent years.

De and Clayman (2010) find that ESG scores have predictive and positive association with subsequent total stock returns and financial performance measured by Return on Equity, though the impact on returns weakened after around year 2000, while the impact of ROE continued to remain strong. Huppe (2011) suggest that CSR[1] alpha arose since investors historically overlooked the relevance of this information and would be surprised after earnings announcement. But investor attention to this CSR[1] information has increased and the stock market now more fully reflects the value of CSR[1] information. Kurtz and DiBartolomeo (2011) suggest that investors may not get a performance advantage through the use of social or environmental factors since market valuations already correctly incorporate this information. Borgers et al (2013) have a similar finding that shareholder information predicted risk-adjusted return till 2004, but increased attention to stakeholder issues since has reduced the errors in investors' expectations and eliminated the mispricing. ESG becoming a more commonly tracked datapoint is certainly borne out by the fact that the share of S&P 500 companies filing sustainability reports has increased from 20% in 2011 to 72% in 2013[2].

Risk and return are the two paramount criteria in making investment decisions. Since the 2008 financial crisis, the world of investments has become more focussed on risk. Hoepner (2010) develops a theoretical model that argues that inclusion of ESG criteria into investment processes could improves portfolio diversification through a reduction of the average stock's specific risk. Fulton et al (2012) looked at more than 100 academic studies on sustainable investing and found that ESG factors are correlated with superior risk-adjusted returns at a securities level. Their findings were remarkable, that 100% of the academic studies agreed that highly rated ESG companies have a lower cost of capital (loan, bonds and equities) since the market recognizes them to have lower risk, 89% of the studies showed superior ESG companies to exhibit market-based outperformance and 85% of studies showed them to exhibit accounting-based outperformance.

This paper builds upon existing research to answer questions such as: Do low ESG rated companies represent tail risk? Does deleting low ESG rated companies from the investment consideration pool lead to better portfolios or does restricting the investment pool impose costs for the investor? It is important to note that the exclusion of low ESG rated stocks is *not* the same as having exclusionary screens to screen out stocks with operations in areas deemed 'sinful'[3]. Excluding 'sin' stocks have the effect of excluding all stocks with operation in certain industries. ESG ratings are based on a 'best-in-class' among industry peers methodology and excluding stocks based on ESG ratings is equivalent to excluding stocks with the worst ESG profile in a peer comparison.

Some investment managers, either due to convictions on the importance of responsible investing for idealistic purposes, or to meet client guidelines or as a risk-reduction technique, throw out low rated ESG companies from their potential investment pool. But the question arises whether restricting the investment pool in this way hurts or helps investment performance. Given the recent surge in investments funds incorporating ESG criteria in their decisions, this is a question of enormous implications to all investors and money managers. According to US SIF (the Forum for Sustainable and Responsible Investment), investments funds deemed sustainable and responsible grew from 260 in 2007 to 720 in 2012 (22.6% CAGR). The assets under management for such firms grew even faster from $ 202 billion in 2007 to $ 1 trillion in 2012 (37.7% CAGR)[4]. This paper aims to answer that question

by considering time sample from the years of the financial crisis and after, and its implications in current market conditions.

Adler and Krtizman (2008) tried to answer the question in a purely mathematical way by restricting the investment pool by randomly deleting securities from the universe and simulating portfolios from the restricted and unrestricted universe, and the return distribution of the investment pool used was also a theoretical normal distribution generated through monte-carlo simulation. They concluded that socially responsible investing imposes a cost to skilled investors. Adler and Krtizman (2008) also opined that investors owning good ESG companies because of higher expected return were not socially responsible investors, but rather active managers. In rebutting this paper, Kazner (2013) pointed out that a random deletion of observations implicitly assumes that good ESG companies are no more or less likely to outperform bad ESG companies, and that random deletion cannot be a proxy for SRI[1].

We argue that there is no contradiction between being socially responsible and an active manager. In fact the two go hand in hand…if we believe that better ESG companies improve the portfolio risk-return profile. As an active manager, we believe that a manager would restrict the potential investment universe based on certain criteria only, and the criterion we are exploring in this paper is restricting the potential investment universe by eliminating only the lowest ESG rated companies. Our first hypothesis then is that ESG ratings have an association with and/or have predictive power on the return and risk profile of stocks. And if so, then incorporating these factors into the investment process would improve the portfolio performance.

An even more powerful test would be if restricting the investible universe by deleting the lower tail of ESG companies and then creating portfolios randomly does not detract from investment performance, or even better, improves the investment outcomes. Put another way, if the return (and risk-adjusted returns) distribution of portfolios created randomly from an universe restricted by deleting the lower tail of ESG companies exhibits equal or superior characteristics to those randomly generated from the complete ESG rated stocks universe, then using ESG criterion is value-additive. If a randomly generated portfolio from a restricted universe (restriction based on lowest ESG rated stocks) has a high probability of being superior to a randomly generated portfolio from the entire universe, then active managers should consider incorporating ESG profile in stock selection and portfolio construction. We also used the actual returns in the post-financial crisis era, and therefore believe that our results are very applicable.

Our main conclusion was that deleting lower rated ESG companies as a tail risk does not necessarily impose opportunity costs….and in fact tends to be value additive for investors. Restricting the investible universe through deletion of the worst ESG stocks tends to improve the probability distribution of returns with a higher average and maximum portfolio return. Using risk-adjusted returns as the variable of interest (instead of returns) in the random selection from the restricted and unrestricted universe lead to similar conclusions. This implies that excluding the worst ESG stocks from the investible universe tends to improve (or keep same) the return and risk-adjusted return distribution even through a process of random selection. But active management is not a random process. And we found a strong negative correlation between ESG ratings and stock volatility, and this relationship strengthened when market volatility was higher. Asset managers can get diversification benefits by choosing better ESG stocks and this diversification benefit strengthens when markets are more volatile. The correlation between ESG rating and risk-adjusted return turned significantly positive in the recent years and this positive correlation strengthens by excluding the lowest ESG stocks. This implies that asset managers can enhance their stock-picking ability by using ESG information, and even more so by excluding the bottom ESG stocks.

Data

We used Thomson Reuters Corporate Responsibility Data. The data-set has annual data files from 2007 through 2012. ESG data file YY refers to ratings created using data available during calender YY. To ensure no look-ahead bias, we assumed that ratings using YY data would have been available by 6/30/ (YY+1), and hence use total stock returns for the subsequent twelve months [6/30/(YY+1)–6/30/(YY+2)]. The last return period analyzed was [6/30/13–3/31/14], since the analysis for this research paper was started in April 2014.

We restricted the sample to United States for two reasons. One was that this automatically controls for the market effect, the biggest common factor in stock returns, and secondly ESG (Environment, Social and Goverance) standards and the market perception of the importance of these factors differ widely across countries.

Methodology and Statistics

As a starting point, we analyzed the sample and its over-lap with various indices across the market capitalization and value-growth spectrum to identify any sample characteristics that could be affecting our analysis. For the sample each year, we looked at the descriptive statistics for ESG rating, stock returns and risk-adjusted returns (RAR). Risk Adjusted Returns = [Annual stock Return/ Annualized (Standard Deviation of Monthly Return]. Given that our research is on stock returns post June 2008, a period of historically low and close to zero interest rates, we felt that the simplication by not deducting the risk-free rate in the numerator was immaterial.

We did exploratory analysis on the relationship between ESG ratings and subsequent stock return. We divided the dataset into the (bottom tail) and (rest of the sample) based on ESG ratings and analyzed the returns of both groups. We also divided the dataset into the (bottom tail) and (rest of the sample) based on returns and analyzed their prior ESG ratings. We did this analysis with the break point at 10^{th} and 5^{th} percentile. Essentially we divided the dataset into the bottom 10% (5%) and top 90% (95%) based on ratings and analyze their returns, and then divided the dataset into the bottom 10% (5%) and top 90% (95%) based on returns and analyzed their ESG ratings.

We followed up with similar analysis using risk-adjusted returns (RAR). We divided the dataset into the bottom 10% and top 90% based on ESG ratings and analyzed the risk-adjusted returns of both groups. We also divided the dataset into the bottom 10% and top 90% based on risk-adjusted returns and analyzed their ESG ratings.

We consistently used the terminology of BN_Variable and TN_Variable, where;
BN = bottom N percentile group (N = 10% or 5%)
TN = top percentile group (N = 90% or 95%)
Variable = ESG (ratings), Return (stock return) or RAR (risk-adjusted return)

We looked at the correlation between ESG ratings and subsequent stock performance, for the entire dataset and the dataset with the bottom 10% of ESG rated companies truncated. We next analyzed the correlation between ESG ratings and subsequent volatility of the stock. We measured the volatility using the standard deviation of daily returns for the same one year period used in stock return analysis. The relationship between ESG ratings and stock volatility was compared with the market volatility to understand if this relationship (or its strength) varied based on the level of market risk. We used two measures of market risk, (a) the daily average of the closing level of VIX over the same subsequent one year period used to measure stock return (b) the standard deviation of the S&P 500 daily returns for the same one year period used in stock return analysis. We used the VIX because it is the most commonly used number to gauge the volatility or fear in the market, but it is a measure of implied volatility. We used measure (b) to have an apple-apple comparison with the measure of individual stock and market volatility. We followed up the analysis of the relationship between ESG rating and stock-specific risk, with correlation between ESG ratings and risk-adjusted return. We did this for the entire dataset and the dataset with the bottom 10% of ESG rated companies truncated.

The next part of our analysis was based on a probability estimation of the impact on portfolio construction by excluding the lower tail of ESG rated companies (stocks with worst ESG profile). Using the entire dataset (E), we created 100 random portfolios P_{ei} (P_{e1}, P_{e2}…..P_{e100}) of N stocks each. We choose a fixed value of N = 40. This value of N was chosen since 40 stocks denote a fairly concentrated portfolio that would be indicative of active management. The stocks in each individual portfolio are selected randomly without replacement so that one stock can have only a 2.5% weight (1/40) in the portfolio. Once a portfolio was generated, all stocks were again available for the next random portfolio generation. For each randomly generated portfolio $P_{ei,}$ we calculated the average portfolio return (M_{ei}). So we got 100 values of M_{ei} from the entire dataset (E), and named this distribution (E_1_M).

We next identified the 10th percentile value of ESG rating (B10) and truncate the dataset (E) at the value of B10, and call this truncated dataset as (S10). We repeated the same random sampling without replacement method as above to create 100 random portfolios P_{si} (P_{s2}, P_{s2}…..P_{s100}) of N=40 stocks each. For each randomly generated portfolio $P_{si,}$ we calculated the average portfolio return (M_{si}). We got 100 values of M_{si} from the restricted dataset (S10), and named this distribution (S10_M).

We generated the random samples using the SAS procedure for random sampling without replacement, and we used a seed number (125) so that the results can be duplicated on re-running the program.We compared the properties of the distributions E_1_M and S10_M.

Restricting the investment pool by truncating the lowest rated ESG stocks still involves a judgement on how to define tail risk. Our initial analysis used the 10th percentile as the tail risk cut off. As a cross-check we also used a more extreme definition of tail risk by setting it at 5th percentile. We again did the creation of 100 samples of 40 stocks each through random selection without replacement during each portfolio creation, from the entire dataset (E) and again by truncating the lower tail of ESG rated stocks. This time we truncated the dataset (E) at the 5th percentile value of ESG rating (B5) and call this restricted dataset as (S5). Following the same methodology (though to create more randomness in the process, this time we used a different seed number (75)), we calculated the average portfolio return of each of the 100 portfolio samples created from datasets (E) and (S5), and named these distributions E_2_M and S5_M. We compared the properties of the distributions E_2_M and S5_M.

As a further cross-check, we repeated our analysis with randomly generated portfolios using risk-adjusted return as the variable of interest.We did the random portfolio generation of 100 portfolios of 40 stocks each from the entire sample and from the sample with bottom 10% ESG companies truncated. It was the same process as we did for returns, except that this time we analyzed the risk-adjusted return as the variable of interest, getting a distribution of the average risk-adjusted return of the 100 portfolios generated from entire ESG sample and restricted dataset (excluding bottom 10% ESG stocks). We called the two samples E_1_M_RAR and S10_M_RAR (In the case of returns we had called them E_1_M and S10_M). We compared the properties of the distributions E_1_M_RAR and S10_M_RAR.

It is important to point out that we consistently did all our analysis with each ESG data file of a certain year and the subsequent stock return, risk and risk-adjusted return, with a six month time lead to avoid look-ahead bias. We believed that a year-wise analysis shows variations over time which would be lost in case of doing a pooled analysis.

Statistical Analysis and Results

1. Sample Analysis

Overlap between ESG Rating Sample and Various Indices

Table 1A: Percentage of the ESG Dataset belonging to various indices

	R1000	R1000 G	RMC	RMC G	R2500	R2000
2007	96%	67%	68%	47%	33%	3%
2008	94%	60%	74%	45%	47%	4%
2009	93%	60%	74%	47%	52%	5%
2010	90%	58%	72%	45%	53%	8%
2011	92%	56%	73%	44%	52%	7%
2012	90%	51%	71%	40%	52%	9%
Average	93%	59%	72%	45%	48%	6%

Table 1B: Percentage of the Indices covered in ESG Dataset

	R1000	R1000 G	RMC	RMC G	R2500	R2000
2007	66%	66%	58%	59%	9%	1%
2008	82%	81%	80%	77%	17%	2%
2009	93%	94%	92%	93%	20%	3%
2010	92%	92%	91%	91%	21%	4%
2011	92%	93%	91%	92%	21%	4%
2012	88%	87%	86%	84%	20%	4%
Average	86%	85%	83%	83%	18%	3%

R1000 = Russell 1000, R1000 G = Russell 1000 Growth, RMC = Russell Midcap, RMC G = Russell Midcap Growth, R2500 = Russell 2500, R2000 = Russell 2000.

The sample has a large cap bias, with maximum overlap with the large cap indices and progressively less so as we go down the market cap spectrum. On average 93% of the sample belongs to the Russell 1000, 72% belong to the Russell Midcap, 48% belong to the Russell 2500 and only 6% belong to the Russell 2000. Analyzing it in reverse – we found that around 85% of the Russell Largecap and Midcap index have ESG rating coverage, and this ratio drops dramatically to 18% for Russell 2500 and to a negligible 3% for the Russell 2000. The coverage extends more into the mid-cap companies in later time periods. There is also a bias towards the growth companies.

2. Summary Statistics of the Sample

Table 2: ESG Rating, Return, Risk-Adjusted Return Characteristics: Complete Distribution

ESG Data Year	Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Skew	Kurtosis
2007	Rating	51.1	49.2	10.0	31.3	83.5	0.7	0.1
	Return	-28.3	-27.5	27.3	-99.5	136.0	0.6	3.0
	RAR	-0.5	-0.5	0.4	-1.6	2.0	0.9	3.0
2008	Rating	50.9	48.8	10.4	26.0	80.4	0.6	-0.3
	Return	30.0	23.1	49.5	-97.0	635.0	5.5	57.0
	RAR	0.9	0.9	1.0	-1.4	5.2	0.6	0.9
2009	Rating	49.8	47.3	11.2	24.9	79.1	0.6	-0.5
	Return	37.0	33.4	34.9	-84.4	247.3	0.9	3.2
	RAR	1.5	1.4	1.2	-1.3	7.2	0.5	0.7
2010	Rating	50.9	48.4	10.7	28.2	81.4	0.6	-0.5
	Return	-3.1	-2.0	27.4	-97.7	111.1	-0.1	1.4
	RAR	0.1	-0.1	1.0	-2.8	6.8	1.5	5.1
2011	Rating	51.2	49.0	11.1	27.9	82.5	0.5	-0.7
	Return	27.6	22.3	41.7	-77.2	634.1	5.1	56.6
	RAR	1.3	1.2	1.2	-1.5	5.6	0.5	0.2
2012	Rating	51.3	49.0	11.2	28.0	82.6	0.5	-0.8
	Return	21.2	18.7	24.5	-82.1	181.6	1.1	4.9
	RAR	1.0	0.9	0.9	-1.6	5.5	0.6	1.3

Rating = ESG Rating, Return = Twelve months stock return, RAR = Annual Risk-Adjusted Return
ESG Data Year (YY) is associated with Return and Risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Returns and Risk-adjusted Return are mid-2013 through 1Q-2014, the latest available at time of the study.

3. Relationship between ESG Ratings and Stock Return

Table 3A: DistributionsTruncated by ESG Ratings (Tail risk bottom 10%)

- Bottom 10% of ESG Companies (B10_ESG)
- Top 90% of ESG Companies (T90_ESG)

ESG Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean Return of [T90_ESG > B10_ESG]
2007	B10_ESG	Rating	37.2	37.8	2.2	31.3	39.8	-0.9	0.1	
	B10_ESG	Return	-32.1	-33.2	28.2	-99.5	60.7	0.3	0.8	
	T90_ESG	Rating	52.7	50.4	9.3	39.9	83.5	0.9	0.2	
	T90_ESG	Return	-27.9	-26.3	27.2	-98.9	136.0	0.6	3.3	Y
2008	B10_ESG	Rating	36.6	36.9	2.3	26.0	39.4	-1.6	4.3	
	B10_ESG	Return	37.3	31.6	34.7	-33.1	141.7	1.1	1.7	
	T90_ESG	Rating	52.6	50.1	9.6	39.6	80.4	0.8	-0.3	
	T90_ESG	Return	29.1	21.8	50.8	-97.0	635.0	5.6	57.3	N
2009	B10_ESG	Rating	34.6	35.2	2.3	24.9	37.2	-1.7	4.1	
	B10_ESG	Return	35.3	28.5	40.5	-84.4	196.5	0.9	3.1	
	T90_ESG	Rating	51.5	48.7	10.5	37.3	79.1	0.7	-0.6	
	T90_ESG	Return	37.2	34.0	34.3	-79.5	247.3	0.9	3.3	Y
2010	B10_ESG	Rating	36.3	36.9	2.4	28.2	38.9	-1.4	1.8	
	B10_ESG	Return	-1.5	-1.3	26.9	-73.9	78.0	-0.2	1.1	
	T90_ESG	Rating	52.5	50.0	10.0	39.0	81.4	0.6	-0.6	
	T90_ESG	Return	-3.3	-2.2	27.4	-97.7	111.1	-0.0	1.4	N
2011	B10_ESG	Rating	36.1	36.6	2.2	27.9	38.4	-1.3	2.0	
	B10_ESG	Return	34.8	26.6	46.0	-31.8	346.0	3.9	22.6	
	T90_ESG	Rating	52.9	50.7	10.4	38.5	82.5	0.5	-0.8	
	T90_ESG	Return	26.8	22.1	41.1	-77.2	634.1	5.3	62.9	N
2012	B10_ESG	Rating	36.1	36.8	2.2	28.0	38.4	-1.3	1.8	
	B10_ESG	Return	21.9	19.0	25.1	-31.1	125.1	1.3	4.2	
	T90_ ESG	Rating	53.1	51.1	10.5	38.5	82.6	0.5	-0.8	
	T90_ESG	Return	21.1	18.7	24.4	-82.1	181.6	1.1	5.0	N

Rating = ESG Rating, Return = Twelve months stock return
ESG Data Year (YY) is associated with Return and Risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Returns and Risk-adjusted Return are mid-2013 through 1Q-2014, the latest available at time of the study.

In table 3A, we see that the mean and median stock return for the T90_ESG group was higher than that of the B10_ESG group in only two of the six sample time periods. However the volatility (standard deviation) of returns is less for the T90_ESG group in four out of six sample time periods and the maximum return of the T90_ESG group is higher in all sample time periods. For an asset manager it is reassuring that the highest return stocks are always in the non-lower tail group, implying that the stocks that every asset manager wants to identify will not be lost in their opportunity set by excluding the worst ESG rated stocks.

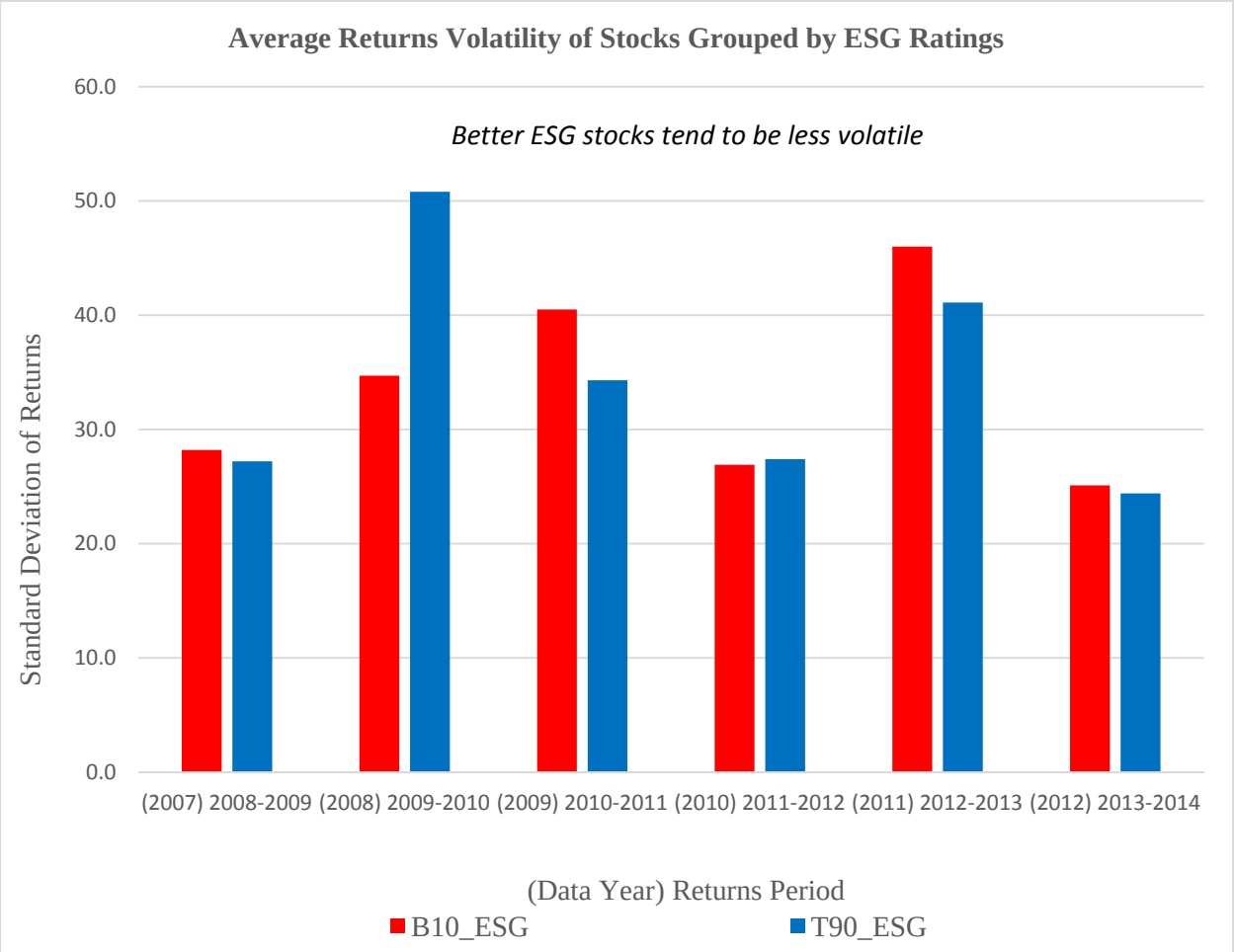

Average Returns Volatility of Stocks Grouped by ESG Ratings
Better ESG stocks tend to be less volatile
Standard Deviation of Returns
60.0
50.0
40.0
30.0
20.0
10.0
0.0
(2007) 2008-2009
(2008) 2009-2010
(2009) 2010-2011
(2010) 2011-2012
(2011) 2012-2013
(2012) 2013-2014
(Data Year) Returns Period
B10_ESG
T90_ESG

Table 3B: Distributions Truncated by ESG Ratings (Tail risk bottom 5%)

- Bottom 5% of ESG Companies (B5_ESG)
- Top 95% of ESG Companies (T95_ESG)

ESG Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean Return of [T95_ESG > B5_ESG]
2007	B5_ESG	Rating	35.6	35.8	1.8	31.3	37.8	-0.8	-0.1	
	B5_ESG	Return	-33.0	-34.1	27.1	-86.8	15.4	-0.1	-0.7	
	T95_ESG	Rating	52.0	49.9	9.5	37.9	83.5	0.8	0.1	
	T95_ESG	Return	-28.1	-27.1	27.3	-99.5	136.0	0.6	3.2	Y
2008	B5_ESG	Rating	34.8	35.5	2.0	26.0	36.7	-2.6	8.8	
	B5_ESG	Return	41.3	36.9	33.0	-12.8	141.7	1.3	2.8	
	T95_ESG	Rating	51.8	49.5	9.9	37.0	80.4	0.7	-0.3	
	T95_ESG	Return	29.4	22.4	50.1	-97.0	635.0	5.6	57.2	N
2009	B5_ESG	Rating	33.1	33.5	2.2	24.9	35.2	-1.9	4.4	
	B5_ESG	Return	27.6	23.7	33.2	-84.4	99.7	-0.6	2.3	
	T95_ESG	Rating	50.7	47.8	10.8	35.3	79.1	0.7	-0.5	
	T95_ESG	Return	37.5	33.9	34.9	-79.5	247.3	1.0	3.2	Y
2010	B5_ESG	Rating	34.5	35.2	2.1	28.2	36.7	-1.4	1.3	
	B5_ESG	Return	-6.1	-3.1	28.9	-73.9	78.0	-0.2	1.3	
	T95_ESG	Rating	51.7	49.3	10.3	36.8	81.4	0.6	-0.6	
	T95_ESG	Return	-3.0	-1.9	27.3	-97.7	111.1	-0.1	1.4	Y
2011	B5_ESG	Rating	34.4	35.2	1.9	27.9	36.6	-1.5	2.3	
	B5_ESG	Return	45.8	35.7	57.6	-17.3	346.0	3.6	16.4	
	T95_ESG	Rating	52.1	50.1	10.7	36.7	82.5	0.5	-0.8	
	T95_ESG	Return	26.7	21.9	40.5	-77.2	634.1	5.2	63.3	N
2012	B5_ESG	Rating	34.4	34.9	1.9	28.0	36.6	-1.4	2.0	
	B5_ESG	Return	25.2	21.6	26.3	-30.0	119.2	1.1	2.9	
	T95_ ESG	Rating	52.2	50.0	10.8	36.8	82.6	0.5	-0.8	
	T95_ESG	Return	21.0	18.6	24.4	-82.1	181.6	1.1	5.1	N

Rating = ESG Rating, Return = Twelve months stock return
ESG Data Year (YY) is associated with Return and Risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Returns and Risk-adjusted Return are mid-2013 through 1Q-2014, the latest available at time of the study.

In table 3B, we see that the mean and median stock return for the T95_ESG group was higher than that of the B10_ESG group in three of the six sample time periods. The volatility (standard deviation) of returns is less for the T95_ESG group in three out of six sample time periods and the maximum return of the T95_ESG group is higher in all sample time periods.

Table 3A & 3B above would lend support to the often stated view that ESG ratings are not always an alpha factor for stock returns (better ESG companies had higher returns in 2/6 years when the lower tail was defined as 10% and in 3/6 time periods when the lower tail was defined as 5%, an average 42% of the time). But they do tend to reflect risk characteristics. Eliminating the lower tail ESG companies tends to reduce volatility (better ESG

companies had lower volatility in 4/6 years when the lower tail was defined as 10% and in 3/6 time periods when the lower tail was defined as 5%, an average 58% of the time). And the maximum return stocks have better ESG profile (6/6 cases with the lower tail defined as 10% or 5%, an average 100% of the time). So a manager using ESG information can reduce portfolio volatility, and an active manager who by definition is seeking out the really out-performing stocks is not adversely affected by excluding the worst ESG stocks.

Table 3C: DistributionsTruncated by Stock Return (Tail risk bottom 10%)

- Bottom 10% of Stock Return Companies (B10_Return)
- Top 90% of Stock Return Companies (T90_Return)

ESG Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean ESG of [T90_Return> B10_Return]
2007	B10_Return	Rating	48.4	46.8	8.6	31.7	72.7	0.9	0.6	
	B10_Return	Return	-75.7	-76.5	10.4	-99.5	-61.2	-0.6	-0.4	
	T90_Return	Rating	51.6	49.6	10.1	31.3	83.5	0.6	0.0	Y
	T90_Return	Return	-23.0	-24.1	23.2	-61.2	136.0	1.4	5.7	
2008	B10_Return	Rating	49.8	46.7	9.7	26.0	75.1	0.7	-0.1	
	B10_Return	Return	-24.1	-20.3	14.3	-97.0	-10.6	-2.3	7.9	
	T90_Return	Rating	51.1	49.1	10.4	29.6	80.4	0.6	-0.3	Y
	T90_Return	Return	35.8	26.4	48.4	-10.0	635.0	6.3	66.5	
2009	B10_Return	Rating	47.5	45.0	11.1	24.9	78.9	1.0	0.7	
	B10_Return	Return	-17.4	-13.6	15.9	-84.4	-0.1	-1.9	4.9	
	T90_Return	Rating	50.2	47.5	11.2	26.3	79.1	0.5	-0.6	Y
	T90_Return	Return	43.1	37.3	31.0	-0.0	247.3	1.7	4.8	
2010	B10_Return	Rating	49.2	46.7	10.1	29.8	77.4	0.7	-0.3	
	B10_Return	Return	-54.1	-49.3	15.3	-97.7	-36.6	-0.9	0.1	
	T90_Return	Rating	51.1	48.9	10.8	28.2	81.4	0.5	-0.6	Y
	T90_Return	Return	2.5	1.3	22.0	-36.5	111.1	0.9	2.0	
2011	B10_Return	Rating	49.3	47.1	10.9	33.9	78.7	1.0	0.4	
	B10_Return	Return	-24.4	-18.1	18.0	-77.2	-5.6	-1.2	0.7	
	T90_Return	Rating	51.5	49.4	11.1	27.9	82.5	0.4	-0.8	Y
	T90_Return	Return	33.4	25.9	39.5	-5.5	634.1	6.5	74.7	
2012	B10_Return	Rating	49.7	46.7	11.5	31.8	77.6	0.7	-0.4	
	B10_Return	Return	-15.6	-11.3	13.9	-82.1	-3.7	-2.3	6.8	
	T90_Return	Rating	51.6	49.7	11.2	28.0	82.6	0.4	-0.8	Y
	T90_Return	Return	25.3	21.0	21.8	-3.5	181.6	1.9	6.9	

Rating = ESG Rating, Return = Twelve months stock return
ESG Data Year (YY) is associated with Return and Risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Returns and Risk-adjusted Return are mid-2013 through 1Q-2014, the latest available at time of the study.

In Table 3C, in all six sample time periods, the mean and median ESG rating of the T90_Return group is higher than that of the B10_Return group.

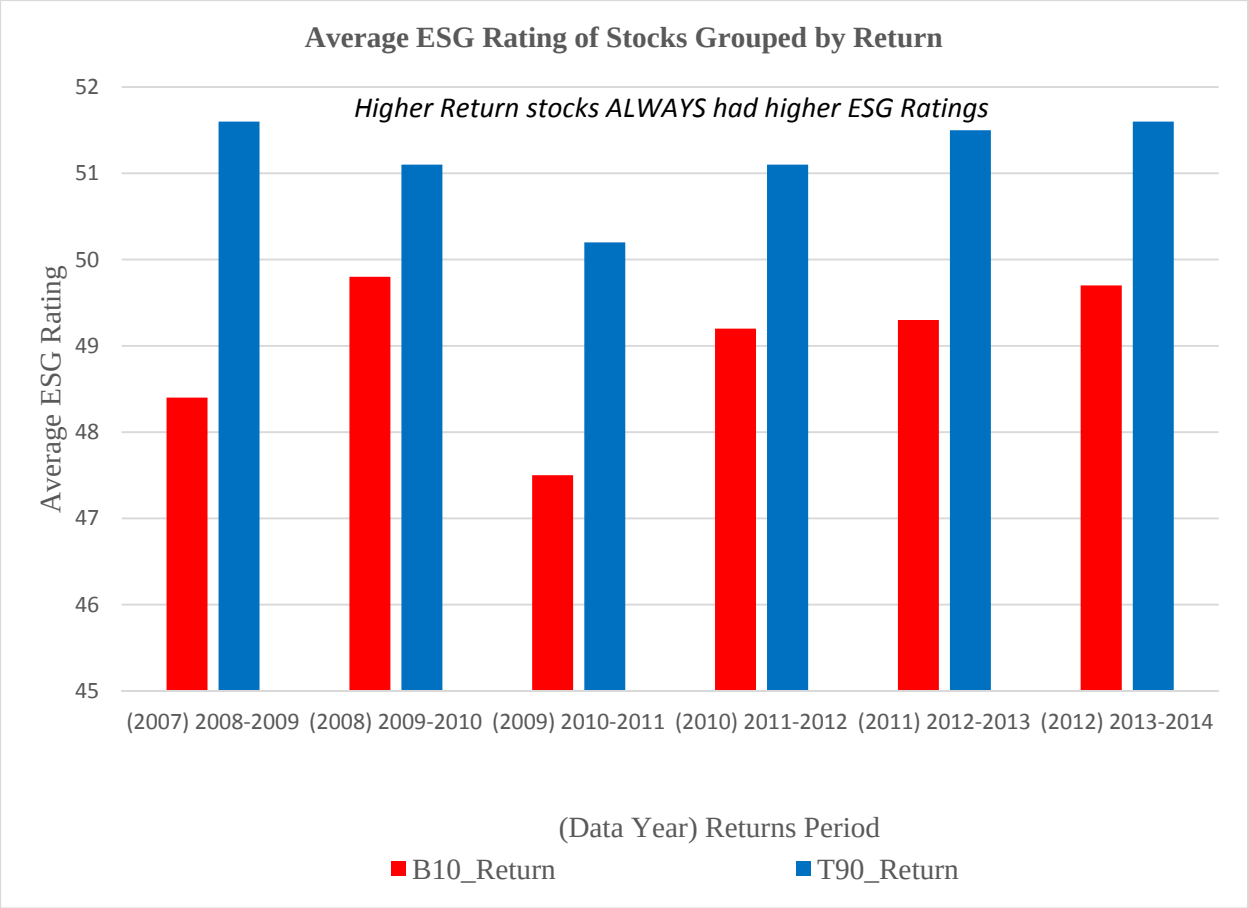

Average ESG Rating of Stocks Grouped by Return
Higher Return stocks ALWAYS had higher ESG Ratings
Average ESG Rating
52
51
50
49
48
47
46
45
(2007) 2008-2009
(2008) 2009-2010
(2009) 2010-2011
(2010) 2011-2012
(2011) 2012-2013
(2012) 2013-2014
(Data Year) Returns Period
B10_Return
T90_Return

Table 3D: DistributionsTruncated by Stock Return (Tail risk bottom 5%)

- Bottom 5% of Stock Return Companies (B5_Return)
- Top 95% of Stock Return Companies (T95_Return)

ESG Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean ESG of [T95_ Return > B5_Return]
2007	B5_Return	Rating	49.0	48.1	8.7	35.1	72.7	1.0	0.7	
	B5_Return	Return	-84.1	-80.2	7.4	-99.5	-76.5	-1.0	-0.5	
	T95_Return	Rating	51.3	49.2	10.1	31.3	83.5	0.7	0.0	Y
	T95_Return	Return	-25.3	-25.5	24.7	-76.5	136.0	1.1	4.4	
2008	B5_Return	Rating	48.8	46.2	9.6	26.0	75.1	0.8	0.6	
	B5_Return	Return	-33.4	-29.5	14.7	-97.0	-20.1	-2.4	7.8	
	T95_Return	Rating	51.1	49.1	10.4	29.6	80.4	0.6	-0.3	Y
	T95_Return	Return	33.3	24.8	48.4	-19.7	635.0	6.1	64.1	
2009	B5_Return	Rating	47.0	45.6	10.5	24.9	78.7	0.9	1.0	
	B5_Return	Return	-28.4	-23.2	15.6	-84.4	-13.6	-2.1	4.7	
	T95_Return	Rating	50.1	47.5	11.3	26.3	79.1	0.6	-0.6	Y
	T95_Return	Return	40.5	35.7	32.1	-13.6	247.3	1.5	4.2	
2010	B5_Return	Rating	49.0	47.3	9.2	29.8	70.6	0.7	-0.0	
	B5_Return	Return	-66.2	-64.8	12.5	-97.7	-49.8	-0.7	-0.1	
	T95_Return	Rating	51.1	48.6	10.8	28.2	81.4	0.5	-0.6	Y
	T95_Return	Return	0.2	-0.4	23.7	-48.8	111.1	0.6	1.4	
2011	B5_Return	Rating	49.1	47.2	10.3	33.9	77.8	1.1	0.8	
	B5_Return	Return	-38.1	-33.4	16.2	-77.2	-18.5	-0.9	-0.1	
	T95_Return	Rating	51.3	49.2	11.2	27.9	82.5	0.4	-0.8	Y
	T95_Return	Return	31.1	24.4	39.7	-17.7	634.1	6.2	70.6	
2012	B5_Return	Rating	49.8	46.7	11.3	31.8	77.4	0.7	-0.5	
	B5_Return	Return	-24.4	-19.7	15.0	-82.1	-11.4	-2.0	4.6	
	T95_Return	Rating	51.5	49.3	11.2	28.0	82.6	0.4	-0.8	Y
	T95_Return	Return	23.6	20.1	22.4	-11.2	181.6	1.8	6.1	

Rating = ESG Rating, Return = Twelve months stock return
ESG Data Year (YY) is associated with Return and Risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Returns and Risk-adjusted Return are mid-2013 through 1Q-2014, the latest available at time of the study.

In Table 3D, in all six sample time periods, the mean and median ESG rating of the T95_Return group is higher than that of the B5_Return group. Table 3C and 3D both show that the lowest return stocks (whether defined at bottom 10% or bottom 5%) always had ESG ratings, on average, lower than the non-tail population.

The results from Table 3 (A, B, C and D) indicate a strong association between ESG ratings and returns. Higher return companies, on average, always had higher ESG ratings than the lowest return companies. Truncating the bottom ESG rated companies lowered the standard deviation 58% of time. ESG ratings appear to reflect risk characteristics, and eliminating the lower tail ESG companies tends to reduce volatility. And the maximum return stock was always from the better ESG profile group. An active manager seeking out the really out-performing stocks could improve the probability of doing so by eliminating the lower tail ESG stocks.

4. Relationship between ESG Ratings and Risk-Adjusted Stock Return

Table 4A: Distributions Truncated by ESG Ratings (Tail risk bottom 10%)[5]

- Bottom 10% of ESG Companies (B10_ESG)
- Top 90% of ESG Companies (T90_ESG)

ESG Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean RAR of [T90_ESG > B10_ESG]
2007	B10_ESG	RAR	-0.4	-0.5	0.39	-1.4	1.1	0.9	2.8	
	T90_ESG	RAR	-0.5	-0.5	0.44	-1.6	2.0	1.0	3.1	N
2008	B10_ESG	RAR	1.1	1.1	0.9	-1.0	3.1	0.0	-0.3	
	T90_ESG	RAR	0.8	0.8	1.0	-1.4	5.2	0.6	1.1	N
2009	B10_ESG	RAR	1.4	1.2	1.21	-1.3	4.1	0.4	-0.1	
	T90_ESG	RAR	1.5	1.4	1.20	-1.1	7.2	0.5	0.8	Y
2010	B10_ESG	RAR	0.09	-0.0	0.9	-2.8	2.8	0.6	2.2	
	T90_ESG	RAR	0.12	-0.1	1.0	-2.4	6.8	1.6	5.3	Y
2011	B10_ESG	RAR	1.4	1.3	1.3	-0.7	5.2	0.8	0.7	
	T90_ESG	RAR	1.3	1.2	1.2	-1.5	5.6	0.4	0.2	N
2012	B10_ESG	RAR	0.9	1.0	0.86	-0.7	3.2	0.3	-0.1	
	T90_ESG	RAR	1.0	0.9	0.94	-1.6	5.5	0.7	1.4	Y

Table 4B: DistributionsTruncated by Stock RAR (Tail risk bottom 10%)[5]

- Bottom 10% of Stock Risk-Adjusted Return Companies (B10_RAR)
- Top 90% of Stock Risk-Adjusted Return Companies (T90_RAR)

Data Year	Distribution	Variable	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis	Mean ESG of [T90_ RAR >B10_RAR]
2007	B10_RAR	Rating	51.4	49.9	8.7	35.1	75.5	0.5	-0.1	
	T90_RAR	Rating	51.1	49.1	10.2	31.3	83.5	0.7	0.1	N
2008	B10_RAR	Rating	49.7	46.8	9.6	26.0	75.1	0.7	0.0	
	T90_RAR	Rating	51.1	49.1	10.5	29.6	80.4	0.6	-0.3	Y
2009	B10_RAR	Rating	47.8	45.3	11.2	24.9	78.9	0.9	0.5	
	T90_RAR	Rating	50.2	47.5	11.2	26.3	79.1	0.6	-0.6	Y
2010	B10_RAR	Rating	49.9	47.5	9.8	29.8	81.3	0.6	-0.0	
	T90_RAR	Rating	51.0	48.6	10.8	28.2	81.4	0.5	-0.6	Y
2011	B10_RAR	Rating	49.3	47.1	10.8	33.9	78.7	1.1	0.4	
	T90_RAR	Rating	51.4	49.4	11.1	27.9	82.5	0.4	-0.8	Y
2012	B10_RAR	Rating	50.5	47.0	11.7	31.8	77.6	0.6	-0.6	
	T90_RAR	Rating	51.5	49.5	11.1	28.0	82.6	0.4	-0.8	Y

In Tables 4A & 4B, ESG Data Year (YY) is associated with risk-adjusted Return in Period mid-(YY+1) through mid-(YY+2).
For ESG Data Year (2012), the Risk-adjusted Return is mid-2013 through 1Q-2014, the latest available at time of the study.

Tables 4A showed that excluding the bottom 10% tail ESG companies may or may not (50% chance) increase the average risk-adjusted return, but the stocks with maximum risk-adjusted return were always in the non-lower tail (ESG rating) group. And there is a definite association between risk-adjusted return and ESG profile since in five out of six time periods, the higher risk-adjusted return group (T90_RAR) had higher average and median ESG rating than the lowest risk-adjusted return stocks (B10_RAR).

So there is a positive association between the ESG profile and risk-adjusted stock returns, and the stocks with maximum risk-adjusted return that active managers try to identify are always from the non-lower tail (ESG) group. The effect of excluding the lowest tail ESG stocks can therefore be beneficial to active managers by increasing their probablity of identifying really good stocks (the probability of identifying stocks with highest risk-adjusted return in a smaller set will be higher).

5. Correlation: ESG Rating and Return, Risk, and Risk-Adjusted Return

Table 5A: Correlation between Ratings & Return

ESG Data Year	Returns Period	Entire Distribution	B10_ESG	T90_ESG
2007	Mid 2008 – Mid 2009	+10.3% ***	+ 5.7%	+ 9.6% **
2008	Mid 2009 – Mid 2010	- 7.6% **	- 13.0%	- 5.9%
2009	Mid 2010 – Mid 2011	- 2.5%	+13.9%	- 4.2%
2010	Mid 2011 – Mid 2012	+ 0.5%	+10.6%	+ 1.5%
2011	Mid 2012 – Mid 2013	+ 0.1%	-23.5%**	+ 4.0%
2012	Mid 2013 – Q1/ 2014	+ 2.9%	- 6.1%	+ 4.1%

***, **, * indicates statistical significance at 99%, 95% and 90% confidence level respectively
B10_ESG = Bottom 10% ESG companies
T90_ESG = Distribution excluding bottom 10% ESG companies

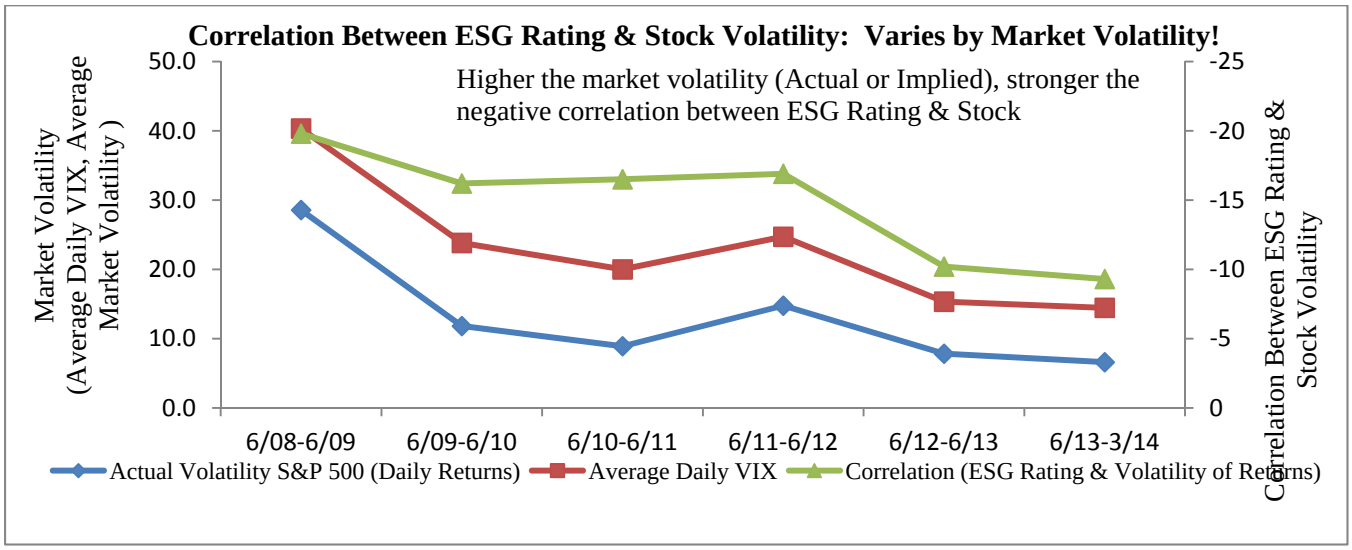
The results in Table 5A indicates that the only time-period when there was a statistically significant positive correlation between ESG ratings and stocks returns, in the entire sample, was during the financial crisis (mid 2008 – mid 2009). This could indicate a market preference for better ESG stocks during times of stress or high-risk. It is important to note that the positively significant correlation was driven by the T90_ESG group. In the sharp stock market recovery period (mid 2009 – mid 2010) there was actually a negative significant correlation between ESG and returns. This is in-line with the view that the early stage of a strong rally is often led by low quality stocks. This negative correlation was much stronger in the lower tail of ESG stocks than in the rest of the sample (-13.0% for B_10 ESG group versus -5.9% for the T_90 ESG group). In the other years, there was no statistically significant correlation between ESG rating and stock return in the entire sample. However excluding the bottom 10% of ESG rated companies either does not change the relationship between ESG ratings and returns or improves it for investors.

Table 5B: Correlation between ESG Ratings & Stock Risk: Does it Vary Based on Market Risk?

ESG Data Year	Returns & Market VIX Period	Entire Distribution	VIX	Actual Market Volatility
2007	Mid 2008 – Mid 2009	-19.8% ***	40.3	2.86
2008	Mid 2009 – Mid 2010	-16.2% ***	23.8	1.18
2009	Mid 2010 – Mid 2011	-16.5% ***	20.0	0.89
2010	Mid 2011 – Mid 2012	-16.9% ***	24.7	1.48
2011	Mid 2012 – Mid 2013	-10.2% ***	15.3	0.78
2012	Mid 2013 – Q1/ 2014	-9.3% ***	14.4	0.66

***, **, * indicates statistical significance at 99%, 95% and 90% confidence level respectively
The actual market volatility was the standard deviation of the daily returns of S&P 500

The results in Table 5B clearly show a very statistically strong negative correlation between ESG ratings and stock volatility. Higher ESG rated stocks have lower stock volatility. What is also important is that the strength of the negative correlation between ESG rating and stock volatility varies based on the level of market risk. Higher the market volatility or fear in the market, greater is the benefit of investing in higher ESG rated stocks as a way to reduce individual stock volatility (and individual stock volatilty is one of the three components of portfolio volatility). This relationship is true whether we use the implied volatility (VIX) or the actual market volatility, since the two measures of volatility move together very closely. This implies that this portfolio diversification effect of using ESG ratings as an input is highest when the portfolio manager needs it the most.



Note: The actual volatility (standard deviation of the daily returns of S&P 500) was multiplies by 10 so as to plot it in the graph on the same axis as VIX

Table 5C: Correlation between Ratings & Risk Adjusted Return

ESG Data Year	Returns Period	Entire Distribution	B10_ESG	T90_ESG
2007	Mid 2008 – Mid 2009	- 1.5%	+ 2.9%	+0.3%
2008	Mid 2009 – Mid 2010	- 4.4%	-10.2%	-0.2%
2009	Mid 2010 – Mid 2011	+ 4.0%	+10.4%	+3.0%
2010	Mid 2011 – Mid 2012	+ 6.3% *	+ 8.0%	+6.8% **
2011	Mid 2012 – Mid 2013	+ 3.6%	-13.4%	+6.9% **
2012	Mid 2013 – Q1/ 2014	+11.4% ***	-14.2%	+12.9% ***

***, **, * indicates statistical significance at 99%, 95% and 90% confidence level respectively
B10_ESG = Bottom 10% ESG companies
T90_ESG = Distribution excluding bottom 10% ESG companies

It is interesting that the correlation between ESG rating and risk-adjusted return turned positive and then significantly positive with the passage of years since the financial crisis. It is also interesting to note that the correlation between ESG rating and risk-adjusted return is much more strongly positive and statistically significant in recent years, in the sample after excluding the bottom 10% of ESG rated companies. The implication is significant for asset managers. Excluding the bottom 10% ESG companies as a tail risk enhances the value of using ESG ratings in picking stocks with superior risk-return profile.

The results in Section 5 indicate that except in times of extreme distress, generally there was no statistically significant correlation between ESG and stock return. But excluding the lowest ESG stocks either does not change

or improves this relationship. On the other hand, there is a consistent and significantly strong negative correlation between ESG ratings and stock volatility, and this relationship implying diversification opportunities is stronger when market volatility is higher. Combining the risk and return through using risk-adjusted returns, we saw that the correlation between ESG rating and risk-adjusted return turned significantly positive in the recent years (since 2011). It is also important to note that the positive correlation between ESG rating and risk-adjusted return strengthens by excluding the lowest ESG stocks. This implies that an asset manager can use ESG information as a portfolio risk control strategy, and further enhance the value of using ESG in picking superior stocks (stocks with higher risk-adjusted return) by excluding the bottom ESG stocks.

6. Return Distribution of Randomly Generated Portfolios: From Unrestricted & Restricted Universe (excluding ESG tail risk companies)

Table 6A: Return Distribution of E_1_M and S10_M [5]
(Effect of Truncating the bottom 10% ESG rated companies), (Seed value for Random Sampling = 125)

ESG Data Year	Distribution	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis
2007	E_1_M	-27.8	-27.9	3.7	-35.2	-17.2	0.1	-0.3
	S10_M	-27.6	-27.6	3.6	-36.9	-19.3	0.1	-0.3
2008	E_1_M	30.3	28.7	7.8	13.7	51.3	0.6	-0.1
	S10_M	30.7	29.7	9.8	15.3	64.5	1.2	1.8
2009	E_1_M	36.85	37.0	5.4	23.0	49.7	0.0	0.2
	S10_M	36.93	36.8	5.3	24.1	51.2	0.2	-0.2
2010	E_1_M	-2.9	-2.8	4.2	-12.1	7.1	0.0	-0.3
	S10_M	-2.5	-2.7	4.6	-11.2	7.7	0.1	-0.6
2011	E_1_M	27.6	26.7	6.1	18.0	50.0	1.2	2.3
	S10_M	27.2	26.9	6.9	12.6	46.4	0.6	0.4
2012	E_1_M	21.4	21.6	3.7	12.0	30.0	0.1	-0.4
	S10_M	21.7	21.4	3.8	9.6	32.0	0.2	0.7
	S10_M same or superior in >= half the sample years	Yes (5/6 years)	Yes (4/6) years		Yes (3/6) years	Yes (4/6) years		

The cells highlighted are where the return distribution of the portfolios created after truncating the bottom 10% ESG rated companies exhibit a more favorable outcome – higher mean, median, minimum or maximum return or lower volatility.

Table 6A shows that in five of the six sample years (83%), we got a better return distribution for active portfolios (since only 40 stocks in the portfolio) created through random selection from the restricted stock pool (after truncating the bottom 10% of ESG rated stocks) as measured by a higher average. We got a higher median and a higher maximum in four of the six sample years (67%).

The entire distribution for E_1_M and S10_M, in each year with both the normal and kernel density are included in Annexure 1.

Table 6B: Return Distribution of E_2_M and S5_M [5]
(Effect of Truncating the bottom 5% ESG rated companies), (Seed value for Random Sampling = 75)

ESG Data Year	Distribution	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis
2007	E_2_M	-28.0	-28.3	4.29	-39.4	-19.3	-0.0	-0.1
	S5_M	-28.3	-28.5	4.34	-40.6	-17.8	0.2	0.3
2008	E_2_M	29.42	28.9	7.9	17.1	53.2	1.1	1.4
	S5_M	29.40	28.1	8.4	13.1	63.0	1.3	2.8
2009	E_2_M	35.9	36.1	5.8	22.4	53.9	0.4	0.6
	S5_M	37.9	38.1	5.7	24.6	57.7	0.1	0.6
2010	E_2_M	-3.4	-3.1	4.2	-13.1	5.8	-0.1	-0.4
	S5_M	-3.2	-4.0	4.3	-13.8	8.3	0.2	-0.5
2011	E_2_M	27.5	26.6	6.6	13.9	48.0	0.7	0.6
	S5_M	26.9	26.3	5.5	13.0	40.9	0.2	-0.1
2012	E_2_M	20.82	20.6	3.6	12.7	29.5	0.26	-0.1
	S5_M	20.83	20.8	4.0	11.5	32.5	0.29	0.3
	S5_M Almost same or superior in >= half the sample years	Yes (4/6 years)		Yes (3/6 years)		Yes (5/6 years)		

Table 6B shows that we got almost the same or better average return in three to four of the six sample years (50%-67%), for active portfolios created through random selection from the restricted stocks pool (after truncating the bottom 5% ESG rated stocks) in terms of the average portfolio return. In five of the six years (83%) we got higher maximum return in the distribution from the restricted pool.

The main conclusion from Table 6 (A and B) would be that in 71% [6] of cases, we got a better return distribution for active portfolios created from a restricted sample (excluding lower tail ESG stocks) in terms of the average. In 75% [6] of cases, the return distribution for active portfolios created from a restricted sample had a higher maximum. So restricting the investible universe through deletion of the worst ESG stocks tends to improve the probability distribution of returns with a higher average and maximum portfolio return.

7. Risk-Adjusted Return Distribution of Randomly Generated Portfolios: From Unrestricted & Restricted Universe (excluding ESG tail risk companies)

Table 7A: Risk-Adjusted Return Distribution of E_1_M_RAR and S10_M_RAR (Effect of Truncating the bottom 10% ESG rated companies), (Seed value for Random Sampling = 125)

ESG Data Year	Distribution	Mean	Median	Std Dev	Min	Max	Skew	Kurtosis
2007	E_1_M_RAR	-0.47	-0.47	0.06	-0.61	-0.34	-0.10	-0.49
	S10_M_RAR	-0.48	-0.48	0.07	-0.64	-0.30	-0.02	+0.04
2008	E_1_M_RAR	0.88	0.87	0.15	0.48	1.32	0.10	0.37
	S10_M_RAR	0.84	0.85	0.14	0.54	1.18	-0.01	-0.67
2009	E_1_M_RAR	1.48	1.48	0.18	0.99	1.91	-0.09	0.11
	S10_M_RAR	1.50	1.47	0.21	0.94	2.15	0.49	0.89
2010	E_1_M_RAR	0.12	0.10	0.16	-0.20	0.50	0.24	-0.36
	S10_M_RAR	0.15	0.13	0.16	-0.19	0.69	0.38	0.14
2011	E_1_M_RAR	1.30	1.31	0.17	0.92	1.75	0.30	0.12
	S10_M_RAR	1.26	1.24	0.20	0.78	1.79	0.29	-0.19
2012	E_1_M_RAR	0.98	0.99	0.15	0.60	1.27	-0.14	-0.54
	S10_M_RAR	0.98	0.97	0.13	0.65	1.32	0.26	0.20
	S10_M_RAR same or superior in >= half the sample years	Yes (3/6 years)		Yes (3/6 years)	Yes (3/6 years)	Yes (5/6 years)		

The results in Table 7A are in-line with those in Table 6 (A and B). Excluding the lower tail ESG companies, in three out of six years (50%) we get the same/ better risk-adjusted return distribution for active portfolios created through random selection from the restricted stocks pool. And in ESG data sample for 2007, the average from the restricted sample was almost the same (-0.48 versus -0.47 from unrestricted sample). The standard deviation and minimum risk-adjusted return in the distribution from the restricted pool is superior in 50% of time periods. But in five of the six years (83%) we got higher maximum risk-adjusted return in the distribution from the restricted pool.

So an entirely random portfolio selection process from the restricted universe (excluding worst ESG companies) leads to a distribution of risk-adjusted returns that are in-line or superior to those created randomly from the total unrestricted universe in terms of the mean, minimum, maximum and standard deviation.

Conclusions

We found a strong association between ESG ratings and portfolio performance. ESG factors may indicate risk and return characteristics that might otherwise be overlooked in portfolio construction. Higher return companies had higher ESG ratings on average. The highest return stocks that every active manager seeks to identify always had better ESG profiles. It follows that an active manager seeking out the really out-performing stocks can improve the probability of doing so by eliminating the lower tail ESG stocks. It is also logical to think of low ESG rated

stocks as potential (lower) tail investment-risk companies and we found that eliminating the lower tail ESG companies tends to reduce portfolio volatility.

The risk-return trade off is a cornerstone of modern portfolio theory. And it is interesting that the results were similiar when we used risk-adjusted returns (instead of simple returns). Higher risk-adjusted return stocks almost always had higher average ESG rating than the lowest risk-adjusted return stocks. And stocks with maximum risk-adjusted return that active managers try to identify were always from the non-lower tail (ESG) group.

While we did not find a statistically significant positive correlation between ESG and stock return except during the peak financial crisis period, excluding the lowest ESG stocks either does not change or improves this relationship. However there was a significantly strong negative correlation between ESG ratings and stock volatility, and this relationship implying diversification opportunities was stronger when market volatility was higher. So while ESG ratings may not have predictive alpha capability, they do predict the stock risk. Combining the risk and return through using risk-adjusted returns, we saw that the correlation between ESG rating and risk-adjusted return turned significantly positive in the recent years (since 2011). It is also important to note that the positive correlation between ESG rating and risk-adjusted return strengthens by excluding the lowest ESG stocks. This implies that asset managers can enhance their stock-picking ability by using ESG information, and even more so by excluding the bottom ESG stocks.

Some academic research has indicated that excluding any set of stocks from the investible universe imposes a cost. But we found that low ESG ratings are a risk indicator, and using this information in stock picking and excluding the worst ESG stocks improves the risk-return profile of stocks. Logically it follows that excluding such a tail-risk group of stocks can have a beneficial impact on portfolio construction.

We created a powerful mathematical test by restricting the investible universe through deletion of the lowest ESG companies and then created portfolios randomly, once from the complete universe and again from the restricted universe. We compared the distribution of portfolio returns created once from an unrestricted universe and next created from this restricted universe. We found that deleting lower rated ESG companies as a tail risk does not necessarily impose opportunity costs….and in fact tends to be value additive for investors. In 71% of cases, we got a better return distribution for active portfolios created from a restricted universe in terms of the average return. In 75% of cases, the return distribution for active portfolios created from a restricted sample had a higher maximum return. So restricting the investible universe through deletion of the worst ESG stocks tends to improve the probability distribution of returns with a higher average and maximum portfolio return.

Using risk-adjusted returns as the variable of interest (instead of returns) in the random selection from the unrestricted and restricted universe lead to similar conclusions. Randomly created portfolios from the ESG restricted universe tend to have similar average risk-adjusted returns but the maximum is almost always higher.

These results imply that excluding the worst ESG stocks from the investible universe tends to improve (or keep same) the return and risk-adjusted return distribution even through a process of random portfolio creation. But active management is not a random process. There is a strong negative correlation between ESG ratings and stock volatility, and this relationship was stronger when market volatility was higher. Asset managers can get diversification benefits by choosing better ESG stocks and this diversification benefit strengthens when markets are more volatile. The correlation between ESG rating and risk-adjusted return turned significantly positive in the recent years and this positive correlation strengthens by excluding the lowest ESG stocks. This implies that asset managers can enhance their stock-picking ability by using ESG information, and even more so by excluding the bottom ESG stocks. Active managers can create better portfolios by using ESG ratings and excluding the worst ESG rated stocks.

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Notes

1. There are different nomenclatures for Environmental, Social, Governance (ESG) based investing. Other commonly used terms are Socially Responsible Investing (SRI), Green Investing, Impact Investing, Corporate Social Responsibility (CSR).
2. Report by Governance and Accountability Instute, Wall Street Journal, June 10, 2014.
3. “Sin” stocks are defined as stocks operating in industries that an investor deems to have morally objectionable traits, and typically include industries like tobacco, military, contraceptives, alcohol etc.
4. The Surge in Investing By Conscience,The New York Times, June 1, 2014
5. We generally report numbers with one decimal point. But if two numbers to be compared round upto the same with first decimal point, then we show them both with second decimal points.
6. 71% is the average of 83% (improved average in Table 6A) and 58% (50% - 67% same to improved average in Table 6B). 75% is the average of 67% (improved maximum in Table 6A) and 83% (improved maximum in Table 6B)

We would like to thank Thomson Reuters for giving us access to the ESG Ratings data.

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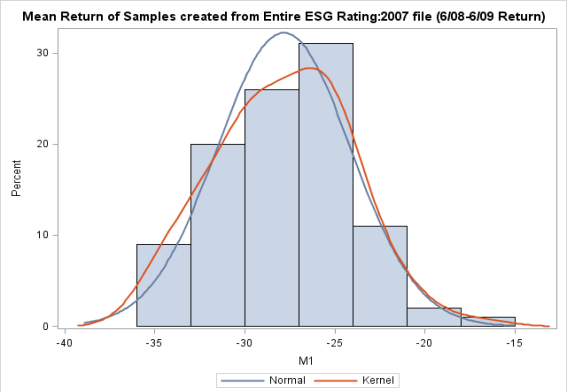
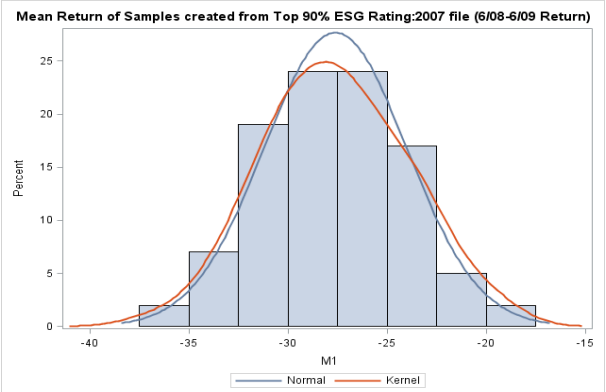
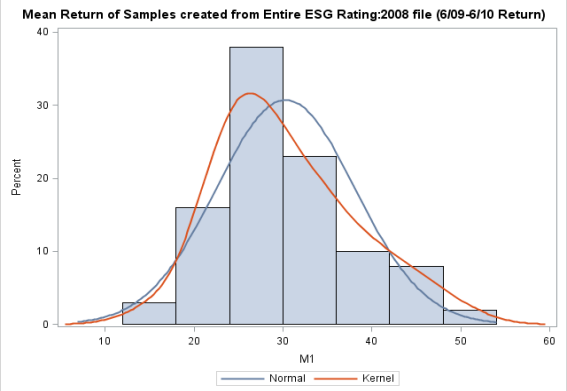
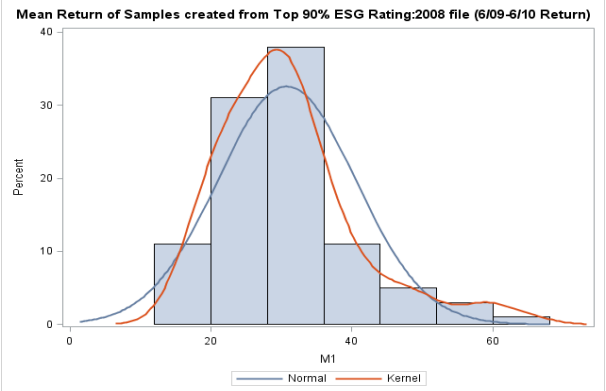
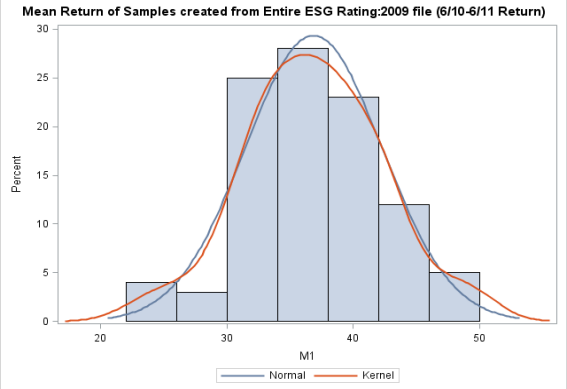
Annexure 1: Complete Return Distribution of E_1_M and S10_M.
E_1_M = Mean Return of Samples created from *Entire* ESG Rating
S10_M = Mean Return of Samples created from *Top 90%* ESG Rating (Excluding bottom 10% ESG)

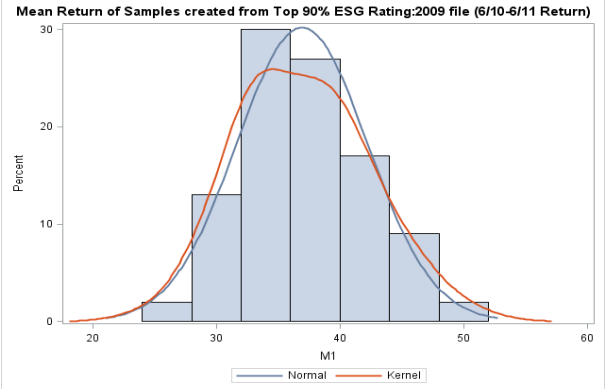


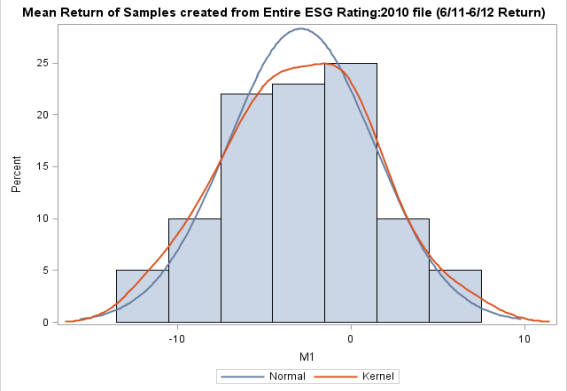


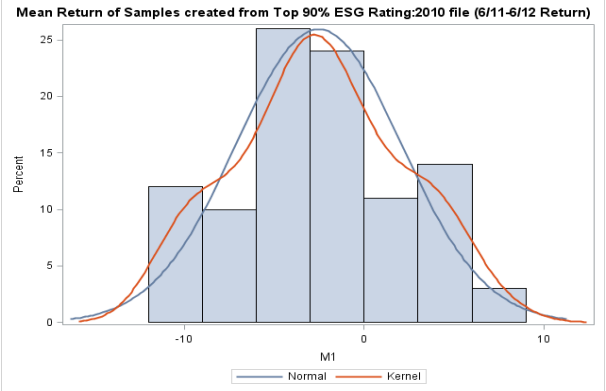


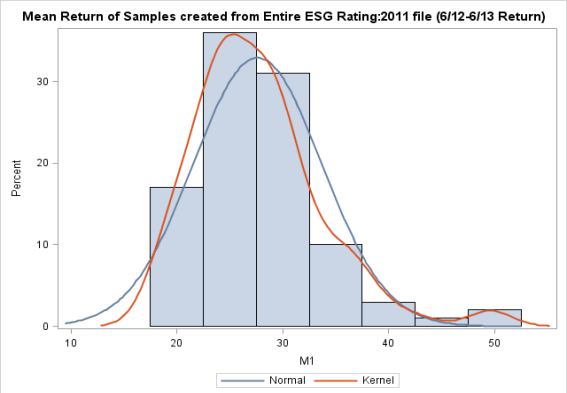


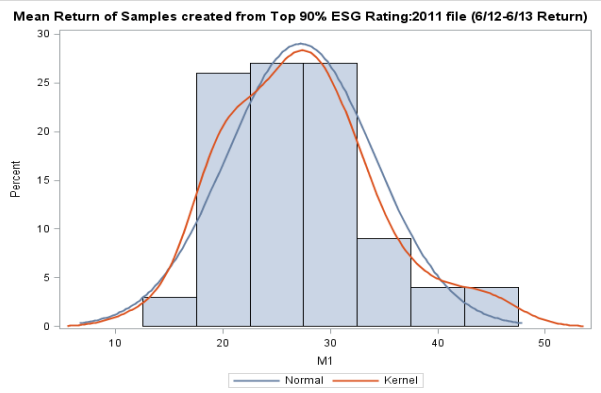


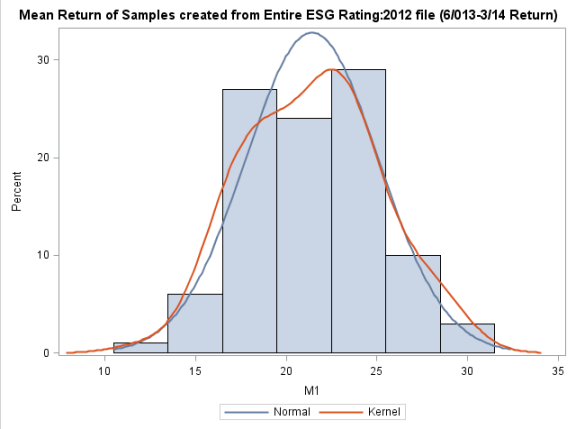


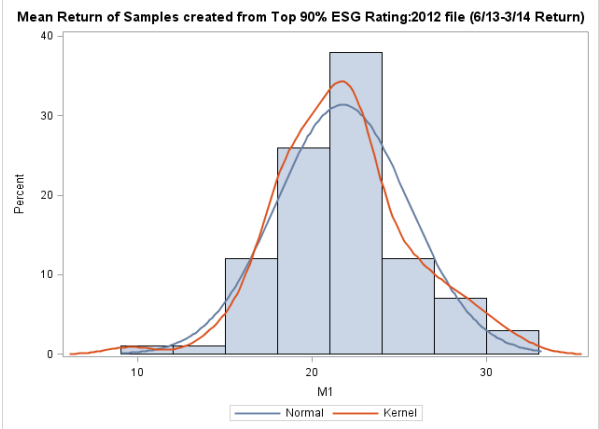





Mean Return of Samples created from Entire ESG Rating:2011 file (6/12-6/13 Return)
Percent
M1
Normal
Kernel


Mean Return of Samples created from Top 90% ESG Rating:2011 file (6/12-6/13 Return)
Percent
M1
Normal
Kernel


Mean Return of Samples created from Entire ESG Rating:2012 file (6/013-3/14 Return)
Percent
M1
Normal
Kernel


Mean Return of Samples created from Top 90% ESG Rating:2012 file (6/13-3/14 Return)
Percent
M1
Normal
Kernel