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"So far, about morals, I know only that what is moral is what you feel good after and what is immoral is what you feel bad after."

—Ernest Hemingway

The concept of social responsibility likely has its roots in the Puritan and Quaker teachings of the 16th and 17th centuries. Puritans characterized humanity negatively, believing humankind to be hopelessly sinful. Quakers held a positive view, believing that God (good) is inside everyone. According to Heald [1970], corporate management began to demonstrate social responsibility by incorporating community welfare as a whole in their goal to maximize profits and shareholder value. Shareholder response to social responsibility became more prominent during the 1980s. Broyles [1998] highlighted the role of shareholder activism, which was responsible for ending U.S. corporations' involvement in South Africa during Apartheid. As a result, many management teams incorporated corporate social responsibility (CSR) into their management philosophy.

At the time, CSR's benefit to the shareholder was widely debated. Some argued against CSR by using agency theory. Friedman [1970] stated that the only social responsibility of business is to increase profits, a view that is commonly known as the shareholder model of business. For investors, CSR can be viewed through either a Puritan or Quaker lens. They can invest in firms that promote social responsibility (a Quaker approach) or divest in firms that are socially irresponsible (a Puritan approach). Initially, religious organizations began to shun investing in corporations whose businesses involved production of alcohol, gambling, tobacco, and weapons.

As this movement became more prevalent, the use of the following practices emerged: (1) social and environmental standards, (2) shareholder activism to promote specific social and environmental goals, and (3) corporate investment to promote development and enhance social welfare. These practices have become the current form of socially responsible investing (SRI).

What is "socially responsible" depends on whom you ask (as per the Hemingway quote). Standards are continually evolving; however, the industry is reaching a consensus on a framework for analysis. A company can be socially responsible in three different ways: First, it can operate sustainably and have a minimal or positive impact on the environment. Second, it can produce products or offer services that benefit society. Third, it can adhere to prudent and proven corporate governance practices. Collectively, these three components of social responsibility are known as environmental, social, and governance (ESG) factors. By harnessing

ESG factors, there are multiple ways to implement SRI, whether by launching a standalone product or incorporating new techniques into an existing investment process.

A review of academic literature suggests a lack of consensus on the benefit of incorporating ESG factors. Academic studies present evidence of either positive or negative abnormal returns associated with SRI/ESG. Hamilton, Jo, and Statman [1993] found that socially responsible mutual funds did not earn statistically significant excess returns over conventional funds from 1981 to 1990. Statman [2000] reported that the Domini Social Index (DSI) did as well as the S&P 500 from 1990 to 1998. Additionally, he found that socially responsible mutual funds underperformed the S&P 500 and the DSI, but no worse than conventional mutual funds. Konar and Cohen [2001] found that firms increased their market value by reducing the emission of toxic chemicals. Gompers, Ishii, and Metrick [2003] showed that firms with stronger shareholder rights are rewarded with higher share values, profits, and sales growths. Statman and Glushkov [2009] found that stocks with high social responsibility scores outperformed those with low scores. However, the authors recognized that excluding sin stocks (stocks linked with alcohol, gambling, firearms, military or nuclear operations, and tobacco) negatively impacted investor returns.

Kurtz and diBartolomeo [2011] found no evidence of a distinct social factor for the 1990s and 2000s. The authors concluded that managers using the KLD400 Social Index as their investment universe faced neither headwinds nor tailwinds. Mollet and Ziegler [2014] analyzed the U.S. and the European markets from 1998 to 2009 and concluded that socially responsible stocks were correctly priced by investors and that abnormal returns attributable to SRI were not statistically significant. De and Clayman [2015] found a significantly strong negative correlation between ESG and stock volatility. They also observed a positive correlation between ESG and stock return, but it was not significant. Ioannou and Serafeim [2015] found that sell-side analysts gave high-CSR-rated firms more pessimistic ratings in the early 1990s, but the analysts' view became progressively more optimistic. The authors attributed their finding to the perceived agency cost associated with high-CSR-rated firms. Rodriguez-Fernandez [2016] demonstrated a bidirectional relationship of CSR and profitability in the Spanish market, whereby CSR investments led to improved profitability and highly profitable firms tended to have higher CSR.

The lack of consensus on the benefit of incorporating ESG factors motivated us to re-examine the ESG data over a more recent period to acknowledge the investment trend toward ESG. In this article, we explore whether ESG factors are effective predictors of expected returns, both at an overall and component level (E, S, and G). Additionally, we show the effect of overlaying ESG factors onto an existing investment process.

The remainder of this article is organized as follows. After describing the data and discussing the research and design of measuring and evaluating ESG factors, we present our empirical results and conclusions.

DATA

The research universe is defined as publicly traded companies in the global market with a minimum market capitalization of $1 billion, excluding American depositary receipts (ADRs). To avoid survivorship bias, we include not only companies currently trading, but also companies that dropped out of our data sample due to a bankruptcy or a merger. As a result, we can be confident that our backtest results will likely not suffer from upward performance bias.

Fundamental data for U.S. domiciled securities were retrieved from Compustat Point-in-Time monthly databases for the period from August 31, 2009–July 31, 2016. Fundamental data for non-U.S. domiciled securities were retrieved from the FactSet Fundamentals database for the period from August 31, 2009–July 31, 2016. The data from the FactSet Fundamentals database were used with an appropriate data lag to avoid look-ahead bias. Stock price/return data were provided by FactSet Research Systems Inc. ESG data for all securities were provided by Sustainalytics for the period from August 31, 2009–July 31, 2016. As of July 31, 2016, there were a total of 5,940 companies in our research universe. The starting date of August 31, 2009, was chosen due to ESG data availability from Sustainalytics.

RESEARCH AND DESIGN

ESG Factor Backtest

We limit our research universe to firms currently rated by Sustainalytics. As of August 31, 2009,

roughly one-third of our research universe was rated by Sustainalytics—a total of 1,600 firms. By July 31, 2016, three-quarters of our research universe was rated by Sustainalytics—a total of 4,500 firms. Our backtest period is from August 31, 2009–July 31, 2016.

We define this limited research universe and backtest period as the out-sample research universe and the out-sample period for the remainder of this article. Because we are evaluating ESG data as reported by Sustainalytics, we do not subdivide the backtest into an in- and out-sample period. We recognize the importance of in- and out-sample testing, as highlighted by Hagin [1990]. However, the goal of our study is an out-sample evaluation of ESG factors, not to incorporate ESG factors alongside fundamental factors to construct a new multifactor, ESG-compliant quantitative model.

To evaluate ESG factors, we quintile (Quintile 1 = most ESG compliant, Quintile 5 = least ESG compliant) the out-sample research universe by Sustainalytics ESG percentile scores at each month-end for the entire out-sample period. Sustainalytics calculates an ESG score of 0 (least ESG compliant) to 100 (ESG compliant). Then, assuming a 12-month buy-and-hold strategy, we calculate the average return of each quintile. We select a 12-month holding period for analyzing factor performance in order to limit turnover and to avoid short-term capital gains tax. Using the same methodology as presented in Aw, Dornick, and Jiang [2014], we calculate the following measurement statistics to evaluate ESG factors:

1. *Buy Value Added (BVA)*: BVA is defined as the spread of Quintile 1 average return to the out-sample research universe average return. A positive BVA indicates that holding most ESG-compliant firms is providing value, while a negative BVA indicates that holding those firms is detracting value.

$$\text{BVA} = \frac{\sum_1^n R_n(Q1)}{n} - \frac{\sum_1^u R_u(Universe)}{u} \qquad (1)$$

where R = returns, n = total number of stocks in Quintile 1, and u = total number of stocks in the out-sample research universe.

2. *Torpedo Avoidance Value (TAV)*: TAV is defined as the spread of the out-sample research universe average return to Quintile 5 average return. A positive TAV indicates that not holding the least ESG compliant firms was effective in avoiding negative returns.

$$\text{TAV} = \frac{\sum_1^u R_u(Universe)}{u} - \frac{\sum_1^x R_x(Q5)}{x} \qquad (2)$$

where R = Returns, u = total number of stocks in the out-sample research universe, and x = total number of stocks in Quintile 5.

3. *Persistent Hit Rate (PHR)*: PHR is defined as the total number of periods when the selected quintile outperforms the out-sample research universe as a percentage of the total number of periods. For example, if the equally weighted returns of Quintile 1 outperform the equally weighted returns of the universe 20 out of 30 monthly periods, the PHR is 20 divided by 30 (66.67%).

$$\text{PHR} = \frac{B}{P} \qquad (3)$$

where B = total number of stock ranking periods when BVA > 0 and P = total number of stock ranking periods.

4. *Downside Persistent Hit Rate (DPHR)*: DPHR is defined as PHR calculated for only those time periods when the out-sample research universe performance is negative.

$$\text{DPHR} = \frac{b}{p} \qquad (4)$$

where b = total number of stock ranking periods when BVA > 0, given $p > 0$, and p = total number of stock ranking periods when out-sample research universe returns < 0.

5. *Hit Rate (HR)*: HR is defined as the percentage of stocks in any selected quintile that outperform the out-sample research universe average return. For example, if 60 out of 100 stocks in Quintile 1 outperform the out-sample research universe average, the HR will be 60%. To properly evaluate HR, one should also calculate the HR for the entire out-sample research universe—the percentage of stocks that actually beat the out-sample research universe. A Quintile's HR must be compared with the out-sample research universe HR.
6. *Information Coefficient (IC)*: IC is a measure of how a factor's ranking score is correlated with subsequent

returns. It is the correlation coefficient between the factor rank and the return rank for all companies in the out-sample research universe for a specific period.

7. t-*Statistic (*t-*stat)*: *t*-stat is a measure of the confidence interval for a given hypothesis test. The *t*-stat is used to determine whether the alpha being provided by the model is significantly different from zero. For a 95% confidence level, the *t*-stat value should not be between −1.96 and +1.96, allowing the rejection of the null hypothesis that alpha is zero.

To determine the effectiveness of the component ESG factors, we calculate the aforementioned measurements for E, S, and G individually.

An ESG Overlay

Next, we evaluate the impact of incorporating the ESG factors into an existing investment process. A proxy for an existing investment process is our live quantitative model (QM). The QM is a global model covering all stocks with market caps of greater than $1 billion. The QM is based on the following four broad factor categories: (*1*) *Valuation,* (*2*) *Profitability, Capital Deployment, and Financing*, (*3*) *Earnings Quality*, and (*4*) *Business Risk*. The QM ranked stocks in the research universe from Quintile 1 to Quintile 5 (Quintile 1 = most attractive, Quintile 5 = least attractive). Panels A and B of Exhibit 1 show the QM live performance from August 31, 2009–July 31, 2016.

BVA and TAV values of the QM shown in Panel A of Exhibit 1 are mostly statistically significant, indicating that our proxy investment process is robust. Furthermore, HR data in Panel B of Exhibit 1 also indicate added value delivered by the QM, although quintile HRs are not perfectly monotonic.

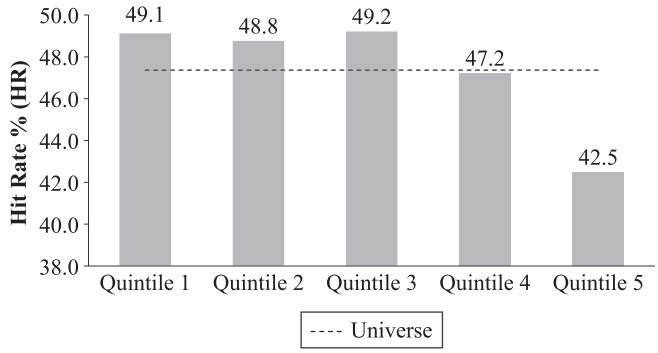
Sustainalytics calculates ESG scores from a scale of 0 to 100 (0 = least ESG compliant, 100 = most ESG compliant). We overlay the ESG score onto a subset of our research universe that is ranked Quintile 1 by the QM. To evaluate the impact of both investing in firms with a favorable ESG score and avoiding firms with an unfavorable ESG score, we apply the following grouping criteria to evaluate the overlay strategy. Quintile 1 QM firms are filtered by an ESG score of more than 80 (Q1 + Top 20), less than 80 (Q1 + Bottom 80), more than 20 (Q1 + Top 80), and less than 20 (Q1 + Bottom 20). They are also filtered by no ESG score (Q1 + NA). By analyzing the ESG overlay based on these five groupings, we estimate the approximate reward or penalty associated with ESG on limiting our research universe.

EXHIBIT 1
Quantitative Model Performance

Panel A

	BVA	BVA *t*-Stat	TAV	TAV *t*-Stat	PHR	DPHR	IC
One-Month Holding Period	1.5***	2.57	2.8**	2.39	57.1	75.8	0.02
Three-Month Holding Period	1.2**	2.26	3.0***	2.66	56.1	73.1	0.03
Six-Month Holding Period	1.3*	1.91	3.5***	3.32	67.1	83.3	0.04
Twelve-Month Holding Period	1.3	1.19	3.2**	2.23	67.1	71.4	0.06

Panel B†: Percentage of Stocks Outperforming the Universe



Notes: BVA and TAV in annualized percentage terms. Data as presented based on live results for the period from August 31, 2009–July 31, 2016. Following Hjalmarsson [2008], we adjusted the t-statistic by dividing it by the square root of the time horizon to correct for the effects of the overlap in the data.

**Significant at the 10% level.*

***Significant at the 5% level.*

****Significant at the 1% level.*

†Twelve-Month holding period.

Sources: Compustat, FactSet Research Systems Inc.

ESG Portfolios Construction: Inclusion vs. Exclusion Methodology

While the ESG overlay described previously appraises the reward or penalty associated with limiting our research universe, it does not quantify the likely risk and reward impact that investors with an ESG goal

will experience. To assess this impact, we construct three portfolios. First, to simulate the risk and reward of a portfolio without an ESG overlay, we construct a QM-based portfolio, identifying it as the QM portfolio. We use the passive turnover constraint (PTC) optimization approach as presented by Aw, Dornick, and Jiang [2014]. The QM portfolio construction process concentrates on buying stocks rated Quintile 1 by the QM and selling them when they become Quintile 5. Other rating changes between Quintiles 2 and 4 are generally ignored. The appendix explains Aw, Dornick, and Jiang's [2014] PTC optimization methodology. Second, we construct an inclusion-methodology based ESG portfolio, identifying it as the ESG-I portfolio. Its buy universe is also identical to that of the QM portfolio. However, we implement an ESG score as a constraint in our PTC optimization process whereby we instruct the optimizer to achieve higher ESG scores. Third, we construct an exclusion-methodology-based ESG portfolio, identifying it as the ESG-E portfolio. Its construction process is identical to that of the QM portfolio, with the exception of the portfolio buy universe. For the ESG-E portfolio, we remove stocks with an ESG score of less than 20 from the portfolio as well as its buy universe.

EMPIRICAL RESULTS

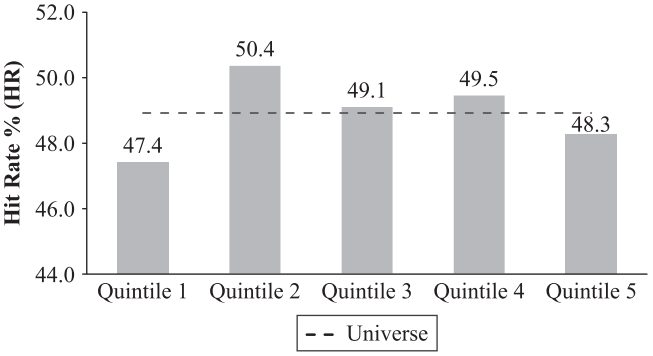
In this section, we present our findings on the impact of introducing ESG scores into an existing investment process. As shown in Panel A of Exhibit 2, we found evidence that limiting our out-sample research universe by ESG factors produced a performance headwind. BVA and TAV values for ESG factors showed perverse results. On average, selecting from the most compliant ESG quintile resulted in 110 basis points (bps) of underperformance versus the out-sample research universe. This underperformance is statistically significant at the 10% level. At the component level, we found E and S to generate a performance headwind. The BVA *t*-stat and TAV *t*-stat for E and S, however, show no statistical significance. The BVA value for G shows there is some reward for investing in firms that are in Quintile 1, although it is not statistically significant. Moreover, avoiding firms in Quintile 5, by governance, delivered 103 bps of outperformance versus out-sample research universe, although the finding is not statistically significant.

EXHIBIT 2
ESG Factors' Performance

Panel A: 12-Month Holding Period

	BVA	BVA *t*-Stat	TAV	TAV *t*-Stat	PHR	DPHR	IC
E (environmental)	–0.8	0.75	–0.09	–0.10	43.8	52.2	–0.01
S (social)	–0.7	1.52	–0.92	–1.63	39.7	21.7	–0.01
G (governance)	0.3	1.03	1.22	0.26	58.9	17.4	0.03
ESG Factors' Performance	–1.1*	1.64	–0.20	–0.38	35.6	17.4	–0.01

Panel B†: Percentage of Stocks Outperforming the Universe



Notes: BVA and TAV in annualized percentage terms. Data as presented based on live results for the period from August 31, 2009–July 31, 2016. Following Hjalmarsson [2008], we adjusted the t-statistic by dividing it by the square root of the time horizon to correct for the effects of the overlap in the data.

**Significant at the 10% level.*

†Twelve-Month holding period.

Sources: Compustat, FactSet Research Systems Inc.

Panel B of Exhibit 2 further illustrates the performance headwind that investors face when overlaying ESG onto an existing investment process. The HR value in Panel B of Exhibit 2 displayed no monotonic signal, and more important, Quintile 1 HR was the lowest. Comparing Panels A and B of Exhibits 1 to 2, we can see evidence of the QM adding value and ESG factors detracting value when limiting an investment universe.

Next, we present the result of overlaying ESG factors onto an existing investment process as represented by the QM. Exhibit 3 shows that limiting the QM Quintile 1 universe by firms with an ESG score of 80 or greater (Q1 + Top 20) resulted in average relative underperformance of 220 bps for any 12-month holding horizon. Although this underperformance is not statistically

EXHIBIT 3

ESG Factor Overlay on an Existing Investment Process†

	BVA	BVA *t*-Stat	PHR	DPHR
Q1 + Top 20	–2.2	–1.60	28.8	27.3
Q1 + Bottom 80	–0.2	1.00	46.6	81.8
Q1 + Top 80	–0.9	–0.46	45.2	40.9
Q1 + Bottom 20	0.4	0.98	57.5	72.7
Q1 + NA	0.4	0.05	56.2	54.5

Notes: BVA and TAV in annualized percentage terms. Data as presented based on live results for the period from August 31, 2009–July 31, 2016. Following Hjalmarsson [2008], we adjusted the t-statistic by dividing it by the square root of the time horizon to correct for the effects of the overlap in the data.

†Twelve-Month Holding Period.

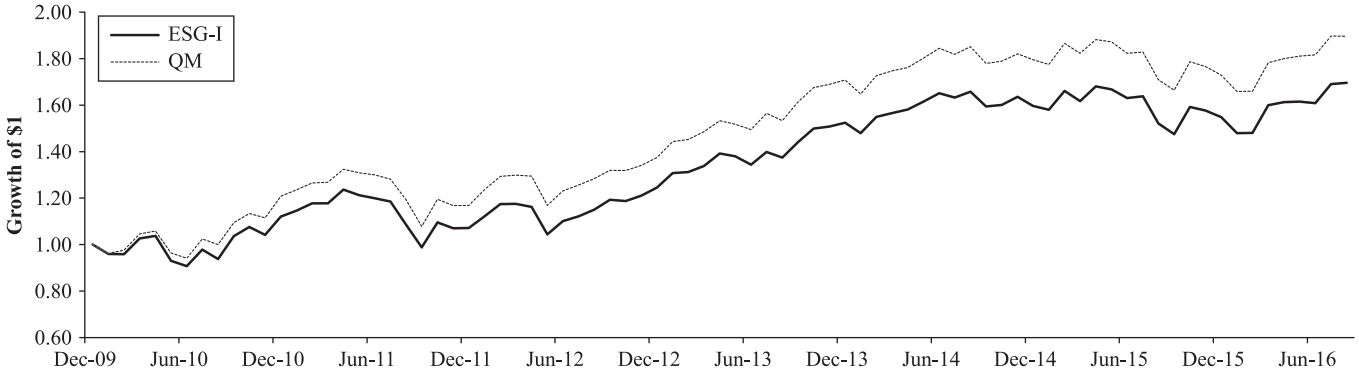
Sources: Compustat, FactSet Research Systems Inc.

significant, it does indicate that there is a performance detraction from limiting the buy universe to those firms that are most ESG compliant. Exhibit 3 also shows limiting the QM Quintile 1 universe to firms with an ESG score of 20 or less (Q1 + Bottom 20) resulted in average relative outperformance of 40 bps for any 12-month holding horizon. Although the outperformance is not statistically significant, it does indicate that there is a relative outperformance from limiting the buy universe to those firms that are least ESG compliant. The results for Q1 + Bottom 80 and Q1 + Top 80 also detracted from relative performance of the out-sample research universe, but the results are not statistically significant. Those Quintile 1 firms that are not rated by Sustainalytics (Q1 + NA) outperformed the out-sample universe, although the results are not statistically significant.

Finally, we present the impact of incorporating ESG into a portfolio construction process. Exhibit 4

EXHIBIT 4

ESG Inclusion Portfolio vs. QM Portfolio



	2010				2011				2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ESG-I Portfolio	2.7%	–11.6%	14.2%	8.2%	5.1%	1.8%	–17.6%	8.3%	9.7%	–6.4%	8.4%	4.4%	7.5%	0.4%	7.2%	5.8%
QM Portfolio	4.6%	–10.0%	16.3%	10.4%	5.0%	2.5%	–17.1%	8.4%	11.1%	–5.2%	7.2%	4.1%	8.1%	0.6%	7.9%	5.9%
Difference	**–2.0%**	**–1.6%**	**–2.1%**	**–2.2%**	0.0%	**–0.6%**	**–0.5%**	**–0.1%**	**–1.4%**	**–1.2%**	1.2%	0.2%	**–0.6%**	**–0.2%**	**–0.7%**	**–0.1%**

	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3*	Q4
ESG-I Portfolio	2.7%	5.4%	–3.4%	0.1%	1.3%	0.8%	–9.5%	5.0%	3.3%	0.6%	5.5%	
QM Portfolio	2.3%	5.6%	–3.6%	0.9%	1.6%	–0.1%	–8.7%	3.9%	3.1%	1.9%	4.4%	
Difference	0.4%	**–0.2%**	0.2%	**–0.8%**	**–0.3%**	0.9%	**–0.8%**	1.1%	0.2%	**–1.3%**	1.0%	

**Partial Quarter: June 30, 2016–August 31, 2016.*

shows ESG-I underperformed the QM by 180 bps annually, on average, for the period from December 31, 2009–August 31, 2016.

Although ESG-I underperformed the QM, it outperformed the MSCI All Country World Index by 91 bps annually, on average, for the period from December 31, 2009–August 31, 2016, as shown in Exhibit 5.

Exhibit 6 shows ESG-E underperformed the QM by 100 bps annually, on average, for the period from December 31, 2009–August 31, 2016.

Although ESG-E underperformed the QM, it outperformed the MSCI All Country World Index by 173 bps annually, on average, for the period from December 31, 2009–August 31, 2016, as shown in Exhibit 7.

Note that the data ESG-I and ESG-E portfolios are presented to approximate the impact of each portfolio construction methodology. They are not comparable with respect to the level of ESG compliance. For example, ESG-I's average ESG score is 81%, while ESG-E's average ESG score is 71%. We recognize that each individual investor can have a different response curve with respect to ESG score and portfolio performance.

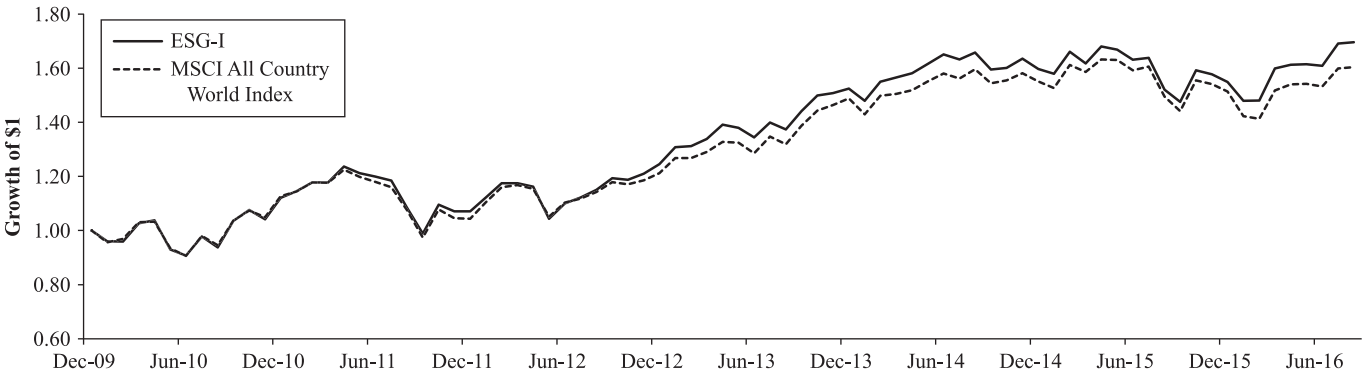
CONCLUSION

In this study, we examine the benefit of incorporating ESG factors over a more recent period to acknowledge the ongoing investment trend toward ESG. By using the methodology outlined in Aw, Dornick, and Jiang [2014], we evaluate ESG factors, both overall and as components, to determine whether they are a useful estimator of expected returns.

We find that the top-quintile (most compliant) stocks ranked by the ESG score underperform the out-sample research universe. This underperformance

EXHIBIT 5

ESG Inclusion Portfolio vs. MSCI All Country World Index

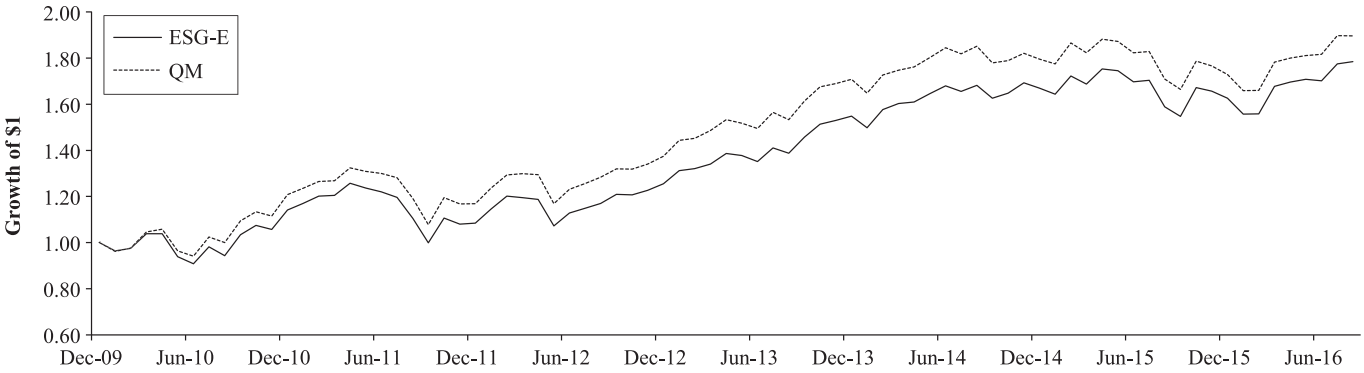


	2010				2011				2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ESG-I Portfolio	2.7%	–11.6%	14.2%	8.2%	5.1%	1.8%	–17.6%	8.3%	9.7%	–6.4%	8.4%	4.4%	7.5%	0.4%	7.2%	5.8%
MSCI ACWI	3.1%	–12.1%	14.3%	8.7%	4.4%	0.2%	–17.4%	7.2%	11.9%	–5.6%	6.8%	2.9%	6.5%	–0.4%	7.9%	7.3%
Difference	**–0.5%**	0.5%	**–0.2%**	**–0.6%**	0.7%	1.6%	**–0.1%**	1.2%	**–2.2%**	**–0.8%**	1.6%	1.5%	1.0%	0.9%	**–0.7%**	**–1.5%**

	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3*	Q4
ESG-I Portfolio	2.7%	5.4%	–3.4%	0.1%	1.3%	0.8%	–9.5%	5.0%	3.3%	0.6%	5.5%	
MSCI ACWI	1.1%	5.0%	–2.3%	0.4%	2.3%	0.3%	–9.4%	5.0%	0.2%	1.0%	4.7%	
Difference	1.6%	0.4%	**–1.1%**	**–0.3%**	**–1.0%**	0.5%	**–0.1%**	**–0.1%**	3.0%	**–0.4%**	0.8%	

**Partial Quarter: June 30, 2016–August 31, 2016.*

EXHIBIT 6
ESG Exclusion Portfolio vs. QM Portfolio



	2010				2011				2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ESG-E Portfolio	3.9%	–12.6%	13.8%	10.5%	5.5%	1.2%	–18.1%	8.6%	10.2%	–5.6%	7.2%	3.9%	6.8%	0.8%	7.9%	6.2%
QM Portfolio	4.6%	–10.0%	16.3%	10.4%	5.0%	2.5%	–17.1%	8.4%	11.1%	–5.2%	7.2%	4.1%	8.1%	0.6%	7.9%	5.9%
Difference	**–0.7%**	**–2.5%**	**–2.4%**	0.1%	0.5%	**–1.3%**	**–1.0%**	0.2%	**–0.9%**	**–0.4%**	**0.0%**	**–0.3%**	**–1.3%**	0.2%	**–0.1%**	0.3%

	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3*	Q4
ESG-E Portfolio	3.5%	4.8%	–3.2%	2.7%	1.1%	0.5%	–8.8%	5.1%	3.2%	1.4%	4.9%	
QM Portfolio	2.3%	5.6%	–3.6%	0.9%	1.6%	–0.1%	–8.7%	3.9%	3.1%	1.9%	4.4%	
Difference	1.3%	**–0.8%**	0.4%	1.8%	**–0.5%**	0.6%	**–0.1%**	1.2%	0.1%	**–0.4%**	0.4%	

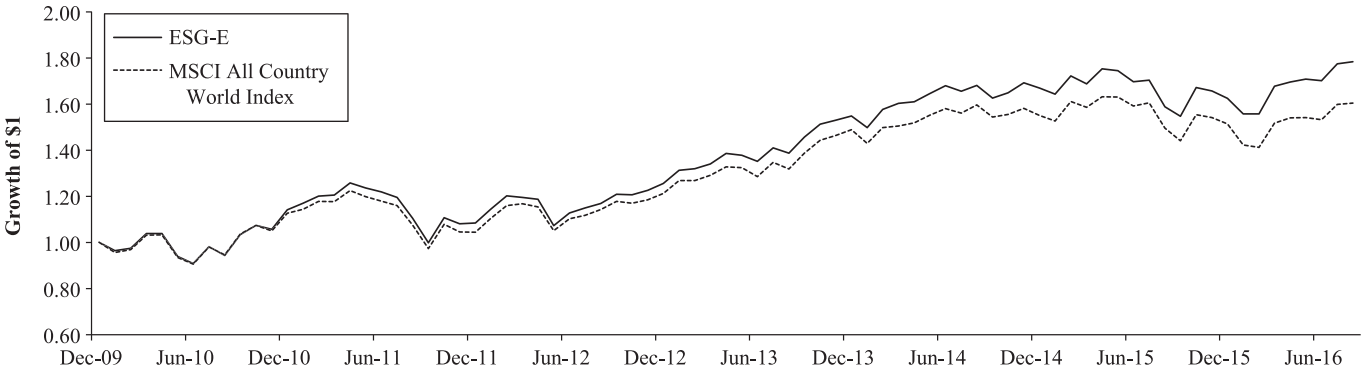
**Partial Quarter: June 30, 2016–August 31, 2016.*

is statistically significant at a 10% level. Although not statistically significant, E and S underperformed, while G outperformed the out-sample universe. Thus, filtering an investment research universe by ESG factors in general detracts value for investors. We also determine the impact of incorporating the ESG factors into an existing investment process, as defined by our live QM. We conclude that overlaying ESG factors onto an existing investment process detracts value, although the results are not statistically significant.

Furthermore, consistent with Statman and Glushkov [2009], we find evidence of a negative impact to investor returns when low-ESG stocks are excluded. Finally, introducing ESG into an existing portfolio construction process based on a QM negatively impacts returns. While ESG detracted from the returns delivered by a QM portfolio, our ESG QM portfolios using both inclusion and exclusion methodology continued to outperform a benchmark. Therefore, we conclude that incorporating ESG into a robust quantitative investment process can mitigate negative effects, thus providing investors with a portfolio that outperforms a benchmark while allowing investors to embrace ESG.

EXHIBIT 7

ESG Exclusion Portfolio vs. MSCI All Country World Index



	2010				2011				2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ESG-E Portfolio	3.9%	–12.6%	13.8%	10.5%	5.5%	1.2%	–18.1%	8.6%	10.2%	–5.6%	7.2%	3.9%	6.8%	0.8%	7.9%	6.2%
MSCI ACWI	3.1%	–12.1%	14.3%	8.7%	4.4%	0.2%	–17.4%	7.2%	11.9%	–5.6%	6.8%	2.9%	6.5%	–0.4%	7.9%	7.3%
Difference	0.8%	**–0.5%**	**–0.5%**	1.7%	1.1%	0.9%	**–0.7%**	1.4%	**–1.6%**	**0.0%**	0.3%	1.0%	0.3%	1.2%	**–0.1%**	**–1.1%**

	2014				2015				2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3*	Q4
ESG-E Portfolio	3.5%	4.8%	–3.2%	2.7%	1.1%	0.5%	–8.8%	5.1%	3.2%	1.4%	4.9%	
MSCI ACWI	1.1%	5.0%	–2.3%	0.4%	2.3%	0.3%	–9.4%	5.0%	0.2%	1.0%	4.7%	
Difference	2.5%	**–0.3%**	**–0.9%**	2.3%	**–1.2%**	0.2%	0.6%	0.0%	3.0%	0.5%	0.2%	

**Partial Quarter: June 30, 2016–August 31, 2016.*

APPENDIX

PASSIVE TURNOVER CONSTRAINT (PTC) OPTIMIZATION METHODOLOGY

The PTC approach is a simplification of a common optimization approach used in the industry. Most commercially available optimizers' objective function can be represented as follows:

$$U = \alpha - \frac{\sigma^2}{\lambda} - C$$

where U = investor's utility, α = expected excess returns relative to a predefined benchmark, σ^2 = tracking error or relative volatility versus the predefined benchmark, λ = investor's risk tolerance, and C = constraints.

In the PTC optimization approach, we assume alpha to be zero for all stocks in the investment universe. The differentiation between various quintiles is made during portfolio construction via a weight constraint. We can also assume that we will hold the Quintile 1 stocks until they fall to Quintile 5. The following steps describe the PTC optimization at time t:

- Alpha is assumed to be zero in the optimization utility equation
- The buy universe consists only of Quintile 1 stocks at time t
- Maximum weight of zero is assigned to stocks in the naive portfolio rated as Quintile 5 at time t
- Zero weight change for stocks in Quintiles 2 and 3
- Weight can be reduced for stocks in Quintile 4 to improve utility
- Number of names, maximum or minimum security weights, and relative sector weights (relative to a benchmark) as constraints
- No turnover constraints are needed

The PTC approach allows for the natural turnover of the quantitative model to be recognized through the portfolio optimization process. More important, the PTC optimization also removes the arbitrary scaling of alpha.

ENDNOTE

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REFERENCES

Aw, E.N.W., C.R. Dornick, and J.Q. Jiang. "Combining Quantitative and Fundamental Analysis: A Quant-amental Approach." *The Journal of Investing*, Vol. 23, No. 2 (2014), pp. 28-43.

Broyles, P.A. "The Impact of Shareholder Activism on Corporate Involvement in South Africa During the Regan Era." *International Review of Modern Sociology*, Vol. 28, No. 1 (1998), pp. 1-19.

De, I., and M.R. Clayman. "The Benefits of Socially Responsible Investing: An Active Manager's Perspective." *The Journal of Investing*, Vol. 24, No. 4 (2015), pp. 50-72.

Friedman, M. "The Social Responsibility of Business Is to Increase Its Profits." *The New York Times Magazine*, September 13, 1970, pp. 32-33.

Gompers, P., J. Ishii, and A. Metrick. "Corporate Governance and Equity Prices." *Quarterly Journal of Economics*, Vol. 118, No. 1 (2003), pp. 107-155.

Hagin, R. "What Practitioners Need to Know…About Backtesting." *Financial Analysts Journal*, Vol. 46, No. 4 (1990), pp. 17-20.

Hamilton, A., H. Jo, and M. Statman. "Doing Well While Doing Good? The Investment Performance of Socially Responsible Mutual Fund." *Financial Analysts Journal*, Vol. 49, No. 6 (1993), pp. 62-66.

Heald, M. *The Social Responsibilities of Business, Company, and Community, 1900–1960*, New Brunswick, USA: Transaction Publishers, 1970.

Hjalmarsson, E. "Inference in Long-Horizon Regression." International Finance Discussion Paper, No. 853, Board of Governors of the Federal Reserve System, October 2008.

Ioannou, I., and G. Serafeim. "The Impact of Corporate Social Responsibility on Investment Recommendations: Analysts' Perceptions and Shifting Institutional Logics." *Strategic Management Journal*, Vol. 36, No. 7 (2015), pp. 1053-1081.

Konar, S., and M.A. Cohen. "Does the Market Value Environmental Performance?" *Review of Economics and Statistics*, Vol. 83, No. 2 (2001), pp. 281-289.

Kurtz, L., and D. diBartolomeo. "The Long-Term Performance of a Social Investment Universe." *The Journal of Investing*, Vol. 20, No. 3, (2011), pp. 95-102.

Mollet, J.C., and A. Ziegler. "Socially Responsible Investing and Stock Performance: New Empirical Evidence for the US and European Stock Markets." *Review of Economics*, Vol. 23, No. 4 (2014), pp. 208-216.

Rodriguez-Fernandez, M. "Social Responsibility and Financial Performance: The Role of Good Corporate Governance." *Business Research Quarterly*, Vol. 19, No. 2 (2016), pp. 137-151.

Statman, M. "Socially Responsible Mutual Funds." *Financial Analysts Journal*, Vol. 56, No. 3 (2000), pp. 30-39.

Statman, M., and D. Glushkov. "The Wages of Social Responsibility." *Financial Analysts Journal*, Vol. 65, No. 4, (2009), pp. 33-46.