

INTEGRATING ESG IN PORTFOLIO CONSTRUCTION

An innovative data lens gives a wider view on sustainable investing.

There is growing interest by investors to “do the right thing” by using their influence to pressure companies to improve their approach to environmental, social and governance (ESG) issues. But a major challenge is how to minimize the potential costs imposed by ESG constraints on portfolios and overcome the persistent sparsity of ESG data resulting from companies’ non-reporting. In this study, we propose a quantitative approach to integrating ESG into portfolios that is expected to deliver comparable performance to non-ESG portfolios and is capable of classifying companies based on ESG even when they do not disclose sufficient data. The approach is particularly suitable for quantitative portfolios with large numbers of positions and many small exposures. In such portfolios, one can generally identify companies with bad ESG metrics and swap them out for companies with similar expected future returns and better ESG scores. This allows the manager to efficiently tilt the entire portfolio towards better ESG companies without the need to employ detailed ESG analysis of individual firms.

Key Findings

- Classification of companies should be performed using ESG items material to their specific industry.
- Our innovative Good Minus Bad (GMB) ESG factor can be used to extend ESG classification to non-reporting companies, expanding the universe by over 200%. This approach helps to overcome one of the most challenging obstacles to ESG portfolio construction: the lack of available ESG data.
- With our quantitative approach, which combines the material ESG items and ESG expansion, the companies with better ESG metrics have higher valuations than lower-scoring companies but comparable future returns. We find that financial analysts misprice the returns of good ESG companies by expecting their higher valuations to continue, in much the same way that good-quality companies often enjoy both current higher valuations and potentially higher future returns.

For professional investors only.

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Introduction

Even as the popularity of ESG investing has grown, investors have continued to struggle with an essential challenge: incorporating ESG factors into portfolio construction. Adding ESG considerations typically means that the universe of investment candidates becomes more restricted or that additional restraints are placed on the portfolios. In either case, short-term returns may suffer.

Our extensive literature review convincingly shows that firms with better ESG scores tend to have a lower cost of capital and enjoy higher valuations than firms with inferior ESG scores.¹ This suggests that firms with better ESG metrics should be expected to experience lower future returns. However, while some studies document lower future returns for better ESG firms, some show higher returns, and still others demonstrate no meaningful difference. A major shortcoming of all these studies, however, is that because ESG disclosures are voluntary, data is frequently incomplete due to non-reporting. In addition, a lack of uniform standards hinders comparability across companies, and low correlations among data vendors' company ratings adds more noise, further hampering the portfolio construction process.

To address these issues, we first leverage recent work by the Sustainability Accounting Standards Board (SASB) and suggest an approach using material ESG items. Second, we propose a new ESG factor-loading methodology that expands the universe to non-reporting companies. Using our innovative ESG approach, we find that companies with better ESG scores have higher valuations but similar returns to those with poor ESG scores.

Plotting ESG Data on the Materiality Map

Our first task was to establish a numeric framework for ESG issues to allow meaningful comparisons across firms. SASB has created a Materiality MapTM that maps 30 ESG issues to 79 industries based on evaluations by analysts specialized in each industry. Utilizing this industry-specific materiality map, we first mapped each of SASB's 30 material items to one or more of 52 Bloomberg raw data items and aligned each of the 79 industries with one of the 157 MSCI GICS sub-industries.

We then created a numeric sub-score for each ESG data item. For items consisting of a "Yes" or "No" response corresponding to a positive or negative ESG impact, we assigned +1 or -1, reversing the score to -1 or +1 when "Yes" was a negative (such as a product recall). For unscaled numeric metrics such as carbon emissions, we manually scaled them by market capitalization. We then ranked all scaled numeric items into two groups — above and below median — and again assigned a +1 and -1 sub-score, reversing the score if the item was negative (such as above-median emissions).

This mapping and scoring system allowed us to classify a firm as having good ESG metrics (with at least six material items and at least 50% being positive) or bad ESG metrics (with at least six

material items but fewer than 20% being positive), with the rest classified as either neutral or missing. To determine the benefit of using the SASB materiality mapping, we then followed the same classification procedure using not only the material items but all disclosed ESG items.

ESG Scores and Future Returns

We analyzed the Bloomberg ESG data from December 2008 through December 2015 for Russell 3000[®] and S&P 500 companies. ESG scores were constructed for December of each year (e.g., 12/2009), using data identified from the previous year (e.g., 2008), while stock performance was examined for the following year (e.g., 2010). For stock returns, we used the CRSP database, using the buy-and-hold return on stocks from January through December minus the buy-and-hold return of similar stocks in terms of size, book-to-market ratio and momentum.

As shown in Table 1, for the Russell[®] universe we had over 23,000 annual observations of market values and subsequent returns for the eight years we studied. Strikingly, though, only 7,766, or roughly a third, were from companies reporting six or more material ESG items. The average company reported fewer than two material ESG items. As for the S&P universe, we observed better ESG data availability, with the average company reporting over four material items and almost 80% reporting at least one material item. Both the Russell 3000[®] and S&P 500 had about four times more ESG than material ESG items.

Table 1
Summary Statistics for Russell 3000[®]

Variable	N	Mean	Std. Dev.	10th Pctl.	25th Pctl.	50th Pctl.	75th Pctl.	90th Pctl.
Number of material ESG Items	20955	1.439	2.550	0.000	0.000	0.000	2.000	5.000
Number of ESG items	23007	5.767	7.399	0.000	0.000	1.000	13.000	14.000
Material ESG score	7766	0.304	0.308	0.000	0.000	0.250	0.500	0.750
ESG score - All items	15445	0.283	0.335	0.000	0.000	0.154	0.444	1.000
Future annual excess return	23007	0.017	0.490	-0.453	-0.199	0.002	0.203	0.465
Market value (\$mil.)	23007	5867	21569	179	353	1018	3310	11074
Book/Market	22999	0.631	2.070	0.120	0.271	0.499	0.823	1.225

Summary Statistics for S&P 500

Variable	N	Mean	Std. Dev.	10th Pctl.	25th Pctl.	50th Pctl.	75th Pctl.	90th Pctl.
Number of material ESG Items	3419	4.436	3.542	0.000	2.000	4.000	6.000	9.000
Number of ESG items	3871	15.691	6.198	12.000	13.000	14.000	19.000	24.000
Material ESG score	3037	0.387	0.290	0.000	0.143	0.400	0.600	0.750
ESG score - All items	3694	0.347	0.203	0.083	0.154	0.333	0.500	0.619
Future annual excess return	3871	0.041	0.311	-0.265	-0.115	0.028	0.173	0.338
Market value (\$mil.)	3871	27536	46604	3981	6805	12638	26420	60163
Book/Market	3871	0.517	0.549	0.128	0.234	0.395	0.654	1.014

The table reports summary statistics for all observations on the portfolio formation dates of 12/2008-2015. Source: QMA, Bloomberg ESG data, CRSP database, Compustat Point-In-Time database, Russell 3000[®] Index, S&P 500 Index, SASB. The Russell[®] Indices are trademarks/service marks of the Frank Russell Company. Russell[®] is a trademark of the Frank Russell Company.

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¹ ESG Literature Review, QMA, 6/2018, https://www.qma.com/assets/pdf/QMA_ESG_Literature_Review_June2018.pdf

Table 2 demonstrates the average annual excess return for firms with metrics classified as good, bad, neutral or missing according to both the material ESG items and all items. Interestingly, the companies with good metrics according to material items showed a strong tendency to outperform the bad, with an average excess return of 1.7% (vs. -1.4% for companies with bad metrics), although a subsequent t-test did not reveal statistical significance. It's important to note that our classification of good and bad ESG firms according to the material items resulted in a very small percentage of the population, about 1.4% and 2%, respectively. This confirmed the need for expansion of the classification to non-reporting firms.

Table 2
Panel A: Russell 3000®

	SASB material items		All ESG items	
	Mean	N	Mean	N
Good ESG	0.017	482	0.038	1069
Bad ESG	-0.014	334	0.046	3777
Neutral ESG	0.045	6950	0.048	10599
Missing	0.005	15241	-0.042	7562

Panel B: S&P 500

	SASB material items		All ESG items	
	Mean	N	Mean	N
Good ESG	0.013	392	0.035	859
Bad ESG	-0.001	113	0.045	1121
Neutral ESG	0.041	2532	0.037	1714
Missing	0.059	834	0.074	177

The table reports average annual excess returns in the year immediately following the portfolio formation which occurs every December from 2008-2015.

Source: QMA, Bloomberg ESG data, CRSP database, SASB, Russell 3000® Index, S&P 500 Index. The Russell® Indices are trademarks/service marks of the Frank Russell Company. Russell® is a trademark of the Frank Russell Company.

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A very different picture emerged when we classified companies using all available ESG items. The companies with good ESG metrics had a tendency to underperform the bad, with excess returns of 3.8% and 4.6%, respectively, although statistical significance was not reached. Similar results were found in S&P 500 (i.e., just the largest) companies. When material items were used, companies with good metrics outperformed the bad (1.3% vs. -1.0% bps), and when all ESG items were used, companies with bad metrics outperformed good ones (4.5% vs. 3.5%).

Expanding the ESG Classification

To expand the ESG classifications to non-reporting Russell 3000® companies, we followed a procedure similar to the one used in pairs trading. We first created for each December a Good Minus Bad (GMB) ESG factor, which is the value-weighted return of the companies with good ESG metrics, according to the SASB

material items, minus the value-weighted return of the companies with bad ESG metrics. We then ran an ordinary least squares (OLS) regression of the monthly returns of both reporting and non-reporting companies on the five Fama-French factors plus the GMB ESG factor over the previous five years. Firms with positive loadings on the GMB ESG factor were considered good, and firms with negative loadings were considered bad.

As shown in Table 3, our method allowed for an increase of 240% (from 625 to 2,131) in the number of companies with good ESG metrics and an increase of 206% (from 510 to 1,561) in the number with bad ones. In addition, in the expanded universe, firms with positive loadings on GMB indeed showed a higher average ESG score (0.34) than those with negative loadings (0.26), and the difference was statistically significant ($p=0.0001$). This further corroborated our new ESG expansion methodology.

Table 3
Summary Statistics Russell 3000® —
Analysis Based on SASB Material Items

Observations with significant negative loadings on GMB								
Variable	N	Mean	Std. Dev.	10th Pctl.	25th Pctl.	50th Pctl.	75th Pctl.	90th Pctl.
t-statistic	2131	-2.496	0.482	-3.184	-2.721	-2.370	-2.131	-2.018
Future annual excess return	2131	-0.032	0.653	-0.604	-0.285	-0.042	0.195	0.536
Material ESG score	625	0.257	0.276	0.000	0.000	0.200	0.500	0.667
ESG score - All items	896	0.238	0.257	0.000	0.077	0.154	0.351	0.556
Book/Market ratio	2131	1.425	13.721	0.194	0.359	0.662	1.155	2.080
Analysts' average B/M	1497	0.836	4.638	0.150	0.282	0.476	0.777	1.206
Analysts' average implied return	1497	1.334	2.299	1.022	1.091	1.172	1.305	1.571
Market value (\$mil.)	2131	5002	19678	24	91	729	3609	11098

Observations with significant positive loadings on GMB								
Variable	N	Mean	Std. Dev.	10th Pctl.	25th Pctl.	50th Pctl.	75th Pctl.	90th Pctl.
t-statistic	1561	2.535	0.523	2.040	2.158	2.374	2.764	3.276
Future annual excess return	1561	0.027	0.441	-0.338	-0.126	0.022	0.180	0.399
Material ESG score	510	0.339	0.302	0.000	0.000	0.333	0.500	0.750
ESG score - All items	944	0.331	0.343	0.000	0.000	0.214	0.524	1.000
Book/Market ratio	1561	0.789	0.956	0.201	0.381	0.602	0.888	1.325
Analysts' average B/M	1237	0.612	0.532	0.176	0.321	0.531	0.770	1.063
Analysts' average implied return	1237	1.211	2.281	0.994	1.045	1.101	1.189	1.328
Market value (\$mil.)	1561	10220	35573	111	298	1005	4041	18164

The table reports summary statistics for all observations on the portfolio formation dates of 12/2008-2015.

Source: QMA, Bloomberg ESG data, CRSP database, Compustat Point-In-Time database, SASB IBES, Russell 3000® Index.

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When the annual excess return was analyzed, the expanded universe of companies with good ESG metrics outperformed the expanded universe with bad metrics by close to six percentage points (2.7% to -3.2%), and the difference was statistically significant ($p=0.0021$). Nevertheless, when the returns of the good and bad ESG companies were analyzed on an annual basis, we found that more variation existed, with the bad actually outperforming in four of the eight years. Thus, although we show statistically better performance of good ESG firms during the entire period, practically speaking, we should probably think of the two groups as having equivalent returns. Still, these results show the benefit of using the expanded ESG universe.

In addition, Table 3 shows an average book-to-market ratio of 0.79 for companies with good ESG metrics and 1.43 for bad, confirming previous findings that companies with good ESG metrics enjoy higher valuations (M/B ratios). If current valuations of the good ESG firms are higher, why do they not have lower future excess returns?

To address this counterintuitive finding, we analyzed the future valuations and implied rates of return by some of the most informed investors — sell-side research analysts. The ratio of book value per share to average target price (from IBES) showed an average of 0.84 for bad ESG firms and 0.61 for good ESG firms, indicating that analysts expected a higher future valuation on the good firms. Meanwhile, the average implied rate of return (12-month target price divided by current price) was higher for bad firms than good firms at 33% and 21%, but this difference was not statistically significant ($p=0.1642$). Thus, while security analysts price firms with good ESG metrics at higher valuations than bad ones, they seem to misprice their future returns somewhat by expecting those higher valuations to continue.

Conclusions

This study provides two major contributions to the efforts to integrate ESG into portfolio construction. We provide evidence that using only material ESG items in each industry is preferable to using all disclosed ESG items. We further show that it is possible to expand the classification of non-ESG-reporting firms into good and bad ESG groups using our innovative GMB ESG factor. This expansion allows us to increase the number of good and bad companies by over 200% while preserving the characteristics and return patterns of the original good and bad ESG firms. Using our ESG approach, we find that companies with better ESG scores have similar returns to those with poor ESG scores, suggesting it should be possible to systematically tilt a portfolio toward better-scoring companies without detracting from performance. As quantitative investment processes are likely the most efficient at incorporating sparse ESG data, our study provides an innovative and potentially powerful approach for quant investors to do well through doing good.



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*As of 6/30/2018.

Sources: QMA, Bloomberg ESG data, CRSP database, Russell 3000 Index, S&P 500 Index. SASB, IBES. Compustat Point-In-Time database.

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