Invesco

The Influence of ESG on Fixed Income Portfolio Manager Behavior

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Abstract

Environmental, Social and Governance (ESG) signals have gained increased attention with investors especially in equities. Existing work has looked extensively at the impact on the risk and return profile of ESG portfolios, their impact on asset pricing and interactions with existing factors. Moreover, several studies have also noted the different ESG data sources and methodologies can create uncertainty in ESG measurement. However, both adoption and analysis of ESG in corporate bonds has lagged behind equities. We explore the impact of ESG exposures on corporate bond returns and characteristics. We find similar results to previous studies that observe a strong correlation between ESG exposures and corporate default risk. To better understand how potential uncertainty in ESG data and the correlation of ESG to corporate default risk effects portfolio construction, we look at the portfolio exposures and characteristics of the largest fixed income ESG managers. Among several interesting observations, we note that ESG exposures reduce the credit beta of a portfolio to traditional fixed income benchmarks and managers tend to overweight lower rated, longer dated bonds with high ESG score to offset this impact. This behavior by individual managers has broad implications for investors in their own portfolio construction.

Introduction

The increasing interest in investments that target companies with strong environmental, social or governance characteristics (ESG) is evidenced by the large number of new ESG fund launches, the flow of new assets directed at ESG funds, and the myriad of recent research papers devoted to the topic. However, ESG research related to equities has received markedly more attention than research related to fixed income, for several good reasons. First, long-term equity investors will naturally look for information that can reduce the potentially unrewarded long-term risks of a stock, particularly given the higher total risk. In this way, ESG information can complement traditional analysis especially for the long-term horizon investors. Therefore, it is not surprising that institutional equity investors are at the forefront of ESG investing. Second, for those seeking an active ESG engagement approach, equity investors can actively engage the company boards on ESG issues directly whereas fixed income investors cannot. Finally, many institutional fixed income investors tend to hold their investments to maturity. Therefore, systematic rebalancing with ESG signals is not as applicable. Before investors can incorporate ESG criteria or signals in their investment process, they must carefully assess the risk and return impact of ESG exposures on their portfolios. An argument can be made in both directions on the impact of ESG on asset returns. If companies are better at assessing their ESG risks and opportunities, that should reduce the discount rate and improve valuations. On the other hand, there could be a sin premium because poor ESG companies could have reputational risk which investors need to be rewarded for. The research in equities has been mixed so far. Atz et al. (2021) review over 1000 peer reviewed research papers from 2005-2020. Studies focused on the impact of ESG from a corporate perspective found a positive impact for ESG. For investor-type studies, ESG was indistinguishable from traditional investing.

The availability of ESG signals from third party providers for corporate bond portfolios allows us to address the impact of ESG on firm value from the debt side. Unlike equities, several authors have found a correlation of ESG scores to corporate spreads.

Corporate spreads, referred to as option adjusted spread (OAS) in the below, measure the yield difference between a corporate bond and a maturity matched Treasury bond. The spread is often viewed as compensation for the default risks associated with holding a corporate bond. In addition to spreads, duration is another key metric in assessing fixed income portfolios. The OAS of a portfolio multiplied by its duration is referred to as DTS and is a common metric for assessing a portfolios risk. From Ben Dor et al. 2007, DTS is an ex-ante measure of the systematic credit risk in the portfolio. Funds with higher DTS have higher risk exposure to the systemic credit risk. This is important for investors who are seeking to harvest the credit risk premium (Asvanunt and Richardson 2017). DTS in that sense is like beta in equities. The ratio of a fund's DTS to its benchmark is a good ex-ante approximate beta, and therefore will be a metric highlighted throughout this analysis

Further, with regards to research on spread and ESG scores, Reznick and Veihs (2019) using a proprietary ESG measure find a negative correlation between ESG scores and corporate spreads – meaning companies with better ESG characteristics have lower spreads on their debt. Silmane Barclays (2020) using their own proprietary measure also find a negative correlation between ESG scores and spreads. While the previous studies used proprietary versions, Razak et al. (2020) looked closely at MSCI ESG ratings and their underlying components. They find a strong negative correlation between spreads and some ESG measures such as climate change, natural resource use and corporate governance. Barth et al. (2021) confirm the negative correlation between ESG rating and credit spreads by looking at credit default swaps (CDS). In addition to looking at MSCI data, they also confirm their results using Refinitiv ESG data. Very compellingly, these studies find consistent results using multiple different ESG measures. Moreover, if we accept these results, then fixed income data would strongly suggest that higher rated ESG companies should have a lower cost of capital and potentially lower discount rates.

From the perspective of portfolio management, the negative correlation between firms with high ESG exposures and low credit spreads raises an important issue. Increasing allocations to higher ESG/lower spread investments is likely to result in lower returns for ESG bond investors. What steps can be taken by investors to reduce the tracking error and impact on ESG? What impact would this have on risk and return? In this study, we focus on duration times spread (DTS) as a measure of risk. Specifically, we consider the ratio of a portfolio's DTS to the market value weighted portfolio's DTS as a forward-looking excess return beta. Portfolio managers generally seek to incorporate ESG into their portfolios while maintaining the same DTS as their benchmarks. From previous studies, we know that portfolios with higher ESG scores will tend to have lower spreads. To compensate for this bias, managers may overweight their allocation to credit holdings with higher spreads. For example, they could overweight BBB or BB securities with higher ESG scores while underweighting securities with higher credit ratings such as AA or A.

These decisions have different risk and return impacts on the final portfolio. Raol and Pope (2018), Houweling and van Zundert (2017) and Brooks et al. (2018) all find that lower rated securities with insufficient spread to compensate for the default risk have poor risk and return characteristics. Silmane et al. (2020) use an optimization approach to access the impact of ESG on the excess return and tracking error of optimized portfolios versus market value weighted benchmarks for both USD investment grade and EUR investment grade universes. They find that ESG meaningfully increases tracking error to benchmark indices. However, the return impact is mixed, with negative returns to ESG from 2010-2013 and positive returns from 2014-2019. While they do not detail their optimization approach, it is possible that an overweight to BBB securities in their optimized portfolios resulted in a large number of downgrades to junk during the European sovereign crises in the 2010-2013 time period while the strong intervention by central banks since then has allowed this same overweight to cause the optimized portfolio to outperform. Therefore, a deeper dive into portfolio construction is necessary to understand how ESG impacts portfolios. Finally, this leads us to consider that risk and return objectives may not be aligned with ESG considerations. How does the implementation of ESG get impacted by decisions to increase portfolio's spread?

Instead of continuing with any theoretical exercise, looking at existing portfolios would be the best way to understand 1) how ESG impacts the risk and return of portfolios; 2) how investors adjust risk of their portfolios because of ESG; 3) how this impacts ESG implementation? We look at a large sample of fund returns in the European investment grade universe to answer these questions. We believe the European market, which has a stronger regulatory structure to avoid the issue of funds "green washing" their funds. Therefore, the impact of ESG on funds is most likely to show up there. In addition, Ben Dor and Rosa (2020) indicate that more than 15% of all EUR investment grade funds have been identified as adhering to ESG policy versus less than 1% of the US investment grade funds. This will afford us a largest sample size for any test. We find that the negative correlation between ESG exposure and OAS persists in the funds. Most managers either increase their duration or spread to keep their DTS in line with or greater than the benchmark.

Data and Methodology

Our universe of bonds is the combined constituents of the Bloomberg Global Aggregate Corporate Index and the Bloomberg Global Corporate High Yield Index. The universe is larger than what most fund managers invest in, however it is important to have an investment grade and high yield index in the research so that spread and ESG changes can be tracked as securities are downgraded into high yield debt or upgraded into the investment grade universe.

For each bond, we have the amount outstanding, yield (in percent), time to maturity (years), duration (years), option-adjusted spread (OAS, in bps), average credit rating across the three rating agencies and Barclays level 4 sector. We source overall ESG scores as well as individual E, S and G scores from both MSCI and Sustainalytics. MSCI scores are scaled from 0 to 10 where 10 indicates the best ESG score and 0 the worst ESG score. Since providers typically have ESG metrics assigned to equity issuers, we map bonds to the equity ID using Bloomberg mapping data. Bloomberg assigns an ultimate parent issuer for each bond in the universe which we use to merge onto the ESG data.

The set of eligible funds is sourced from Morningstar. We select funds in peer groups benchmarked to the Bloomberg EURO Aggregate Corporate Index. We utilize Bloomberg to download fund holdings as of December 31, 2020. All security universe data including ESG scores are aligned to that date. As the peer group contains a significant number of funds with positions in covered or government bond securities, funds containing more than 30% of its assets in non-benchmark positions are excluded. After removing those non-corporates, remaining holdings are reweighted to 100% per fund. Morningstar also provides a flag for funds that explicitly follow an ESG mandate. In total, our selection resulted in 113 funds, out of which 38 were flagged as "ESG" by Morningstar.

Results

In the following chapters, we will first examine the impact of ESG "in bond space," i.e. looking at the cross-section of bonds in the universe, and then "in fund space", assessing the universe of ESG investment products in fixed income. In both the bond and fund level regressions the results are found to be highly similar.

ESG impacts the characteristics of a portfolio

First, we verify the existing work to show the relationship between ESG score and DTS through spread for individual bonds. We find very little impact on duration, i.e. bonds with better ESG scores do not seem to be skewed towards higher or lower duration. Table 1 reports the results of regression on the entire investment grade and high yield data set. We conduct three regressions. First (1), we regress OAS versus MSCI ESG Score which show strong explanatory power of ESG scores in the cross section of global corporate bonds. However, this could be due to correlations to existing and known fixed income risk factors. Therefore, in the second (2) regression, we control for duration, credit rating, and sector exposures. This regression contains several interesting observations. First, while credit ratings do consider ESG criteria, the negative correlation between ESG score and spread remains robust even after controlling for credit rating. Moreover, the results show a beta of –4.6 on MSCI ESG score implying the lowest ESG score group (1) has a spread that is 46 bps higher than the highest ESG score group (10). This is only a one period analysis and time variations in the estimate might account for this deviation. When broken down by pillar, each of the pillars remain significant. However, most of the decrease in spread is due to the governance pillar.

Table1. The table below summarizes the results of the three different regression studies within the combined global corporate and global high yield universe. In (1), OAS for each security is regressed against its MSCI ESG Score. In (2), OAS is regressed against MSCI ESG Score, duration, rating, and sector. Finally in (3), OAS is regressed against each individual pillar along with duration, rating and sector. The intercept and coefficient of the regression is reported along with the standard errors in parenthesis below. The significance of the estimate is denoted with asterisks. '***' denotes significance at the 99.9% confidence interval, not . '**' at the 99% confidence interval, not . '*' at the 95% confidence interval, and '.' At the 90% confidence interval. OAS is measured in bps. MSCI ESG Scores and pillars range from values from 0-10. Duration is in years. Ratings is the rating of the bond. In cases of multiples ratings by ratings agencies the median of three or more or the worst of two are taken. The ratings range from 29 for AAA, 28 for AA+, 27 for AA, etc. When controlling for sectors, Barclays level 4 is used. The average of all sectors is shown below. Finally, the number of observations and goodness-of-fit is shown at the bottom.

	(1)	(2)	(3)
Intercept	221 ***	786 ***	817 ***
	(2.9)	(6.7)	(6.7)
MSCI ESG Score	-19.6 ***	-4.6 ***	
	(0.51)	(0.12)	
Duration		4.8 ***	4.8 ***
		(0.12)	(0.2)
Rating		-31.7 ***	-31.9 ***
		(0.23)	(0.2)
Sector		23 ***	23 ***
		(7.1)	(7.1)
MSCI E Score			-1.6 ***
			(0.3)
MSCI S Score			-2.2 ***
			(0.4)
MSCI G Score			-7.1 ***
			(0.4)
Observations	15,492	15,492	15,492
R-squared	0.09	0.65	0.65

We now repeat this exercise for the funds. For each fund, we calculate their average duration, rating, OAS, DTS, MSCI Score and percentage weight to each credit rating (AAA, AA, etc.). We run cross-sectional regressions within the funds space to see the impact of ESG on the aggregate fund characteristics. Given the small sample size and the potential for outliers in the data, we run both OLS estimates in (1) and a MM-type estimates in (2) described in Koller and Stahel (2011) which are robust to outliers. Table 2 shows the results of the regression. In both regressions, higher MSCI scores translate to lower OAS, confirming the results from the security-level regressions. Most interestingly, the implied OAS difference between the highest and lowest rated ESG portfolios is the same as the estimates from the security level data. Within our funds data set, we see an interquartile range of ESG scores between the Q75 and Q25 percentiles of 6.9 and 6.2, respectively, which implies a roughly 3-4 bps lower spread for the 75th percentile ESG rated funds over the 25th percentile funds. This establishes that the relationship between ESG scores and portfolio spread is not only a relevant driver for the potential borrowing costs of a corporation but can directly impact investor returns.

Table 2. The table below reports the results of regressing the OAS of the funds in the peer group against their MSCI Score, Duration and rating. (1) represents the OLS estimates of the regression while (2) represents the MM-type estimator which is robust to outliers in small data sets. The significance of the estimate is denoted with asterisks. '***' denotes significance at the 99.9% confidence. '**' at the 99% confidence. '*' at the 95% confidence and '.' At the 90% confidence interval.

	(1)		(2)	
Intercept	806	***	621	***
	(37)		(34)	
MSCI Score	-4.5	*	-5.6	**
	(2.3)		(1.8)	
Duration	9	***	12.3	***
	(1.1)		(1.2)	
Rating	-32	***	-24.65	***
	(1.73)		(1.6)	
Observations	132		132	
R-squared	0.76		0.56	

Managers can deviate from the market value weighted benchmark in different ways to mitigate the impact of ESG

Before looking at the portfolio construction implications of ESG, we construct several different theoretical portfolios to make more concrete the impact of ESG on portfolio characteristics as well as several ways to potentially mitigate it. As previously mentioned, to understand portfolio risk, we focus on DTS (duration times spread) as well as its underlying components, duration and spread (OAS), under different portfolio construction scenarios. As a benchmark for the Morningstar peer group in our analysis, we construct a portfolio from the constituents of the Bloomberg EUR Aggregate Corporate Index with market value weights.

In our first exercise, we apply negative screening to the market value weighted benchmark to achieve better ESG exposure. Specifically, we exclude bonds with an MSCI ESG score smaller than 5.5 and reweight the remaining bonds to 100%. This represents the simplest implementation of ESG in portfolio construction. From Table 3, we can see that the overall ESG score of the portfolio is meaningfully higher than the benchmark. It contains only 2/3 of the original number of bonds. The correlation between higher ESG scores and higher rated credit is evident in this portfolios overweight to A or better securities compared to the starting universe. We can see that this portfolio has a meaningfully DTS of 4.7 compared to 5.2 for the index. The DTS ratio of the negatively screened ESG portfolio to the benchmark is 4.7 / 5.2 or approximately 0.90. Therefore, the negatively screened portfolio is expected to provide investors with a 10% lower exposure to the credit risk premium and potentially underperform the index.

In the second exercise, we attempt to mitigate the impact of the ESG bias by additionally excluding bonds with the best credit ratings from the universe, with the expectation to retain positive ESG exposure while increasing the DTS to be in line with the benchmark. Specifically, we remove bonds with a credit rating of AA or better from the ESG screened portfolio and market value weight the remaining securities. From Table 3, we can see that this portfolio dubbed "Overweight BBB" has higher spreads and brings the DTS ratio from 0.90 to 0.96 without decreasing the ESG score of the portfolio. However, the weight to BBB securities increases from 49% to 62%. This represents a 6% overweight to the index in higher credit risk bonds. This could potentially cause issues for Investors who cannot hold high yield rated securities. They would become forced sellers if securities downgrade further to high yield (BB or below). The so-called "Fallen Angel" premium would imply that higher rates of forced selling could cause this portfolio to underperform the index even if the DTS ratio was 1.00.

For those investors who can hold high yield bonds, we construct a portfolio that first combines the EUR investment grade and EUR high yield indices, screens out those bonds with an ESG score of 5.5 or below and market value weights the resulting securities. This portfolio's spread, duration and DTS is very similar to the portfolio with a large overweight to BBBs. However, the higher spread is coming from a 5% allocation to the high yield rated securities.

Finally, we simulate a more sophisticated portfolio construction approach by double sorting the ESG signal like Bai et. al 2019. Briefly, starting from the market value weighted benchmark, we form quintile portfolios by DTS. We then exclude bonds with ESG scores smaller than 5.5 and re-weight DTS quintiles back to their original weights, maintaining the market value weights within each quintile. The double sorts are expected to partially mitigate DTS biases from ESG, while market value weighting within each DTS quintile prevents excessive turnover. From Table 3, we see that the normalizing ESG scores increases the spread of the portfolio and improves the DTS ratio to 0.94. The ESG score does fall from the ESG screened portfolio but is still meaningfully higher than the benchmark. There is a small increase in names without MSCI ratings. Finally, the bias in holding lower rated securities is minimized but is still present. The portfolio has a 2% overweight to BBB securities relative to the index. While this portfolio reduces many of the risk characteristics towards the market value weighted portfolio, it will have higher turnover. Our conclusion for investors is that in order to reduce the impact of ESG on portfolio characteristics, they will have to take risk – either market risk or implementation risk.

Table 3. The table below summarizes key statistics of different portfolios. "Market Value Weighted" takes all the securities in the Bloomberg EUR Aggregate Corporate Index and market value weights them. This is the stated benchmark of the peer group. "Negative ESG Screening" removes low rated ESG bonds in the benchmark before market value weighting the remaining securities. "Overweight BBB" removes AA or better rated securities from the "Negative ESG Screening" universe before market value weighting the resulting securities. "Adding HY" first combines all bonds within the EUR investment grade and EUR high yield indices, removes low ESG rated securities and market value weights the remainder. Finally, "DTS Neutral ESG Scores" renormalizes ESG ranks by their DTS before removing low ESG rated securities in the benchmark and market value weighting them.

Portfolio	OAS (bps)	Dur (yrs)	DTS	Num of Bonds	MSCI ESG Score	Missing ESG (% Wgt)	Credit Rating (% Wgt)			
							AA or Better	A	BBB	BB or Below
Market Value Weighted	90	5.2	5.2	3,155	6.6	4	8	36	56	0
Negative ESG Screening	82	5.1	4.7	2,058	7.3	3	12	39	49	0
Overweight BBB	90	5.1	5.0	1,676	7.4	3	0	38	62	0
Adding HY	90	5.1	4.9	2,182	7.3	3	11	38	47	5
DTS Neutral ESG Scores	88	5.1	4.9	2,178	7.2	5	7	35	58	0

Classification of ESG fund manager portfolios

We use the previous exercise of different possible ESG portfolios and their characteristics to motivate the segmentation of the funds in the analysis. Instead of using the Morningstar ESG flag directly, we define "ESG funds" by their achieved ESG exposure. The rationale behind this different selection mechanism is that several funds flagged as ESG by Morningstar were thematic and not broadly ESG focused. Also, in the group non flagged as ESG there were examples of funds with consistently good average ESG ratings, which indicates that the manager has a realized ESG focus. Specifically, we choose an aggregate MSCI score of 7 as cut-off between ESG and non-ESG funds, which is the median average ESG score for funds flagged as ESG. With this selection mechanism, we identify 28 out of 113 funds in the Morningstar peer group as ESG.

Within the ESG funds, we segment funds into two groups by DTS to segment those that are implementing a passive negative screening from those which are attempting to increase their credit risk. To motivate that, we assume that a simple ESG-screened portfolio without further controls will have a lower DTS than the benchmark, while actively managed funds may take steps to mitigate that bias to increase expected returns. Within those ESG funds with higher DTS, we segment those with large overweight to BBB and below rated securities from those with weights closer to the market value weighted index.

Table 4 shows the results of the analysis. For funds with DTS < benchmark, we can see very clearly their fund characteristics match those of the negative screening portfolio. Specifically, we see a lower OAS, DTS and BBB exposure to the index with no significant HY exposure. Upon closer examination of the underlying funds themselves, many of them are explicitly index tracking funds that are tracking negatively screened ESG benchmarks. 10 funds out of the 28 ESG funds were found in this bucket.

Next, we look at funds with a DTS equivalent or higher than the benchmark without utilizing any significant overweight to BBB or high yield securities. We found four funds, and they tend to have significantly longer duration than the benchmark. Longer duration bonds usually have a higher OAS and higher DTS. Therefore, the overweight to these bonds helps increase the credit risk of the funds. It is also important to note that diversification has shrunk materially to an average of 350 bonds. The potentially higher idiosyncratic risk is also likely a driver of higher risk.

Finally, we look at ESG funds with a higher DTS and higher allocation to BBB and lower rated securities than the benchmark. This constitutes the largest group of funds within the sample. The OAS is significantly higher than both the benchmark and the portfolio constructed with HY in table 3. The median number of bonds in the group is only 150. The large amount of idiosyncratic risk from less diversification is likely another driver of the higher OAS.

It important to note that we found no fund with a high ESG score that was able to match the credit risk and characteristics of the market value weighted benchmark.

Table 4. The table below shows summary statistics for the funds in the peer group with an ESG score of 7 or above. The ESG funds are split into three group based on their DTS relative to the benchmark and weight in BBB or lower rated securities. After splitting the funds into these group, the median is calculated for the funds in each group and reported below.

Funds	OAS (bps)	Dur (yrs)	DTS	Num of Bonds	MSCI ESG Score	Missing ESG (% Wgt)	Rating (% Wgt)				Number of Funds
							AA or Better	A	BBB	BB or Below	
DTS < benchmark	86	5.1	4.8	1,550	7.2	2	9	40	51	0	10
DTS > benchmark, BBB or lower <= benchmark	98	5.6	6.0	350	7.4	1	7	38	54	1	4
DTS > benchmark, BBB or lower > benchmark	104	5.2	5.4	150	7.2	3	5	26	65	4	14

The presence of so many funds with a large overweight to BBB and lower rated securities is not necessarily very different from non-ESG funds. Therefore, we look at the distribution of the weight to those securities for both ESG and non-ESG funds. Figure 1 below shows the distribution of the weight to securities rated BBB or below including high yield for those funds with a DTS greater or equal to the benchmark. ESG funds are plotted against non-ESG funds. While the number of observations within the non-ESG funds is much higher with higher variance, the median ESG fund has a 68% weight to BBB and below rated securities, compared to a median of 64% for non-ESG funds and only 56% for the market value weighted benchmark. It is possible that an attempt at mitigating the ESG bias is creating an unintended increase in capital allocation to securities with higher default risk.

Figure 1. The figure shows the distribution of the weight to securities rated BBB or below in funds with an MSCI ESG Score of 7 or above labeled "ESG" and those below 7 labeled "non-ESG". The colored area indicates the range between the 25th and 75th percentile, the whiskers indicate minimum and maximum allocations.
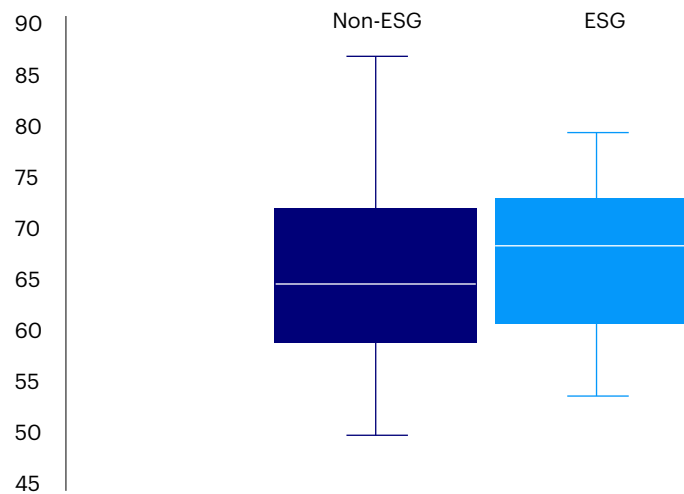
A practical factor-based approach to implement ESG
We believe that a transparent portfolio construction methodology that incorporates screening bonds based on ESG score and applying existing fixed income factor portfolio approaches already developed by Invesco can produce attractive returns while satisfying ESG considerations. In this chapter, we will therefore outline a practical proposal for a factor-based ESG bond portfolio that attempts to achieve better-than-benchmark ESG exposure with benchmark-like risk/return characteristics and avoids some of the risks other mitigation approaches may introduce.

Portfolio construction is done in 4 steps:

1. Apply ESG exclusions and best in class filter to the bond universe

2. Control for duration

3. Build ESG single-factor portfolios

4. Combine to an ESG multi-factor target portfolio

The first step relates to narrowing down the universe. Instead of following a conventional portfolio construction approach and applying any exclusions later, which may seem like ESG is implemented as an afterthought, we believe applying general ESG exclusions at the start helps control risks. Exclusions later in the process have the disadvantage of potentially changing any risk/return or factor-based characteristics targeted in earlier construction steps in unintended ways. Specifically, we select the top 80% of bonds by MSCI ESG score and apply a list of customizable values-based exclusions that are in line with commonly requested exclusions in equity mandates, such as weapons or tobacco.

In a second step, we control for duration. Bonds are sorted into duration buckets and their market value are rescaled across the duration buckets such that the new ESG filtered universe has a duration equal to the original starting universe. This new ESG and market value weight adjusted universe will serve as the ESG index for ESG factor portfolios. Note that instead of forming quintile portfolios by DTS, when following a factor approach, we form quintiles by duration. Spread, the other component of DTS, is explicitly targeted in a later step – both the targeted carry and value factors are defined by spread (with different control variables). In line with academic findings described earlier, we do not observe duration to be materially impacted by the pursuit of positive ESG exposure in the long term. However, to control for inadvertent short-term biases imposed by the ESG exclusions and best-in-class filter on duration, we bucket all bonds by duration and re-weight the ESG-screened portfolio back to benchmark duration bucket weights. This ensures the portfolio achieves positive ESG exposure while being broadly in line with the duration profile of the benchmark/starting universe.

The third step utilizes the existing approach implemented in US fixed income factor funds. Starting with the ESG-screened, duration-controlled universe after step 2, well-diversified single factor portfolios are constructed that target value, carry, and low volatility. Those factors have been shown to generate excess risk-adjusted returns over time. We refer to Raol and Pope (2018) for a description of the rationale and metrics we use to quantify factor exposure of bonds. Our factor-based bond selection methodology ensures no large unintended bets are taken by controlling for duration, credit rating and sector, depending on the factor.

In the fourth step, the three single factor portfolios are blended into an ESG multi-factor target portfolio. While more dynamic or customized factor-weighting approaches are sometimes pursued, in the spirit of transparency we remain cautious that those approaches may increase complexity and turnover. Therefore, for this case study we opt for factor weights that minimize the tracking error to the benchmark. Our allocations to carry and value increase the spread of the portfolio to counter the ESG bias while low volatility helps to diversify some of the risk. We also apply a light-tough optimization that serves multiple purposes. It reduces the number of bonds in the target to a manageable size for trading. At the same time, it enforces diversification constraints such as maximum issuer weight or active weight limits relative to the benchmark. Most importantly, aggregate DTS, spread and duration, our main metrics for risk and return, are brought in line with the benchmark while the positive ESG exposure is retained. Table 5 shows a comparison of the resulting portfolio to the ESG index and the market value weighted benchmark. The allocation to carry and value adds spread to the portfolio, while the allocation to low volatility helps maintain a credit quality similar to the benchmark.

Table 5. The table below shows summary statistics for the factor based ESG portfolio, the ESG index outlined in second step above and the Bloomberg EUR Investment Grade Index, or Benchmark.

Portfolio	OAS (bps)	Dur (yrs)	DTS	Num of Bonds	MSCI ESG Score	Missing ESG (% Wgt)	Credit Rating (% Wgt)			
							AA or Better	A	BBB	BB or Below
Market Value Weighted	90	5.2	5.2	3,155	6.6	4	8	36	56	0
ESG Index	82	5.2	4.8	2,058	7.3	3	12	39	49	0
Factor ESG Portfolio	90	5.2	5.2	1,245	7.4	3	8	37	55	0

Conclusion

We have shown how ESG and fixed income characteristics associated with risk and return are correlated. Higher ESG scores are linked with lower spreads in European investment grade funds. This relationship propagates from securities into funds. Some fund managers overweight lower rated securities and long duration bonds if they want to compensate for the ESG impact on portfolios.

One characteristic of the fixed income market is that the return for a bond is largely incorporated in the yield whereas equity returns are much noisier. Therefore, the ESG impact on fixed income is relevant at answering broader ESG questions with such short histories. It does seem that ESG lowers the cost of capital for corporations. While we do not explicitly test the impact on fixed income returns, the fact that so many ESG managers overweight lower credit rated securities to increase their yields implies that ESG may hurt returns. This would potentially put fixed income on the side that non-ESG names will have a "sin" premium associated with them.

Finally, we show how fixed income factors can be used to create a portfolio that maintains the desired positive ESG exposure while minimizing the difference in fixed income exposures important for tracking error.

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