Understanding ESG in credit portfolios
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Executive summary

The inclusion of Environmental, Social and Governance (ESG) factors in investment decisions is being widely adopted, including within credit portfolios. However, little research is available which explores the impact of ESG on credit returns. Importantly we do not look at investing from the perspective of Socially Responsible Investing or Ethical investing as this is very subjective and primarily driven by ideological preference. This paper analyses how ESG factors interact with credit quality, how they affect the pricing of credit, and finally how they affect credit returns.

Overall, all three factors have a small impact on the price of credit. However, the market tends to under-price the importance of Governance factors, and over-price the importance of social factors, which means that a portfolio with high Governance scores could outperform a portfolio of low Governance scores with similar credit ratings and industry classifications. Having a bias to better social practices could, on the other hand, create a drag on performance (this is a choice that some investors may make on ideological grounds).

A difficulty with using ESG scores is that they are often stale, and so when incorporating ESG into portfolio management it is best to directly consider ESG factors as part of the credit analysis process, with credit analysts responsible for doing their own analysis and providing more up-to-date research than is available from central sources. Doing so can generate more opportunities to add value through ESG in fixed income investing.
The rise of Environmental, Social and Governance (ESG)

ESG capabilities are becoming increasingly important to investors, heightening the scrutiny placed on manager’s capabilities in this area. UNPRI signatories now cover 75% of global assets managed by investment managers. In many cases, however, enthusiasm for ESG is running ahead of proper analysis of how to use it. This paper looks to answer a number of questions about how to effectively use ESG in credit portfolios.

Ethical investing, Socially Responsible Investing, and ESG

Ethical investing, Socially Responsible Investing (SRI), and ESG all have common elements, but are not the same thing. The first two, ‘Ethical Investing’ and ‘Socially Responsible Investing’ typically refer to an investment style that is primarily ideologically driven. Investors choose SRI strategies or ethical investment strategies because it is important to them that their money supports activities that they feel should be encouraged for the common good, and not activities which conflict with their beliefs or which make money on the basis of some form of exploitation. For SRI strategies there is no ambiguity, the fund explicitly chooses ideology over returns.

ESG is different. It is primarily intended to deliver better returns rather than better ideology, and is applied across a broad range of portfolios, rather than a group of specialised funds. The theory behind ESG investing is that if a company has bad Environmental, Social or Governance practices, it will eventually be bad for the company, and so by avoiding these companies an investment manager can avoid problems and ultimately outperform.

Therefore, in the analysis that follows, we will not make moral or ethical judgements on what is the ‘right’ thing to invest in, but rather how ESG affects pricing and returns.

Is ESG appropriate?

Before delving into any detail, a philosophical question needs to be asked, “Is it appropriate, ethical, or even legal for an investment manager to make investment decisions on the basis of ESG factors?” Investment managers and plan sponsors have a fiduciary responsibility to act in the best interests of their clients, but ESG processes could be an excuse for them to use other people’s money in order to pursue their own ideology. If ESG creates a drag on investment performance, then it is not in the best interests of the client.

Is ESG meaningful?

Of course, if ESG factors are analysed for the sole purpose of improving returns, then any ethical or legal ambiguity disappears. Unfortunately, this approach introduces its own ambiguities. In a presentation on how to incorporate ESG into investment processes in London in 2016, a fund manager surprised his audience by revealing that with ESG integrated into their process, two of the top three holdings in the portfolio were tobacco companies! His reasoning went like this:

- An old approach uses ESG filters, and avoids companies with low (poor) ESG scores.
- A new approach incorporates ESG into the investment process and assess whether investments appropriately compensate (for example through higher yields) for their ESG risks.
- Tobacco companies’ prices more than compensate for their poor ESG scores, and so they should be overweight in the portfolio.

These arguments may be true, and the two tobacco companies may prove to be strong performers. Further, the manager is acting in the interests of his client. However, it is not clear that the manager is acting in a way that is consistent with the spirit of ESG investing; investors may choose a fund manager with strong ESG credentials because they expect that by doing so they will not have tobacco as their top investments.

This approach also raises questions about how meaningful ESG is. If tobacco companies, which have very poor ESG scores, are top investment opportunities after accounting for the impact of ESG, then ESG must not be very impactful; ESG may be effectively meaningless.

E, S or G?

The area in which tobacco companies score especially poorly is the ‘Social’ (S) area. Perhaps different weights between ‘E’, ‘S’, and ‘G’ would generate different portfolios, filtering out more of the Socially irresponsible companies. As part of the investigation below, we will assess the relative importance of the three factors, ‘E’ (Environmental), ‘S’ (Social) and ‘G’ (Governance).

1 Source: UNPRI, December 2016
2 There is evidence that ESG decisions may create a drag on performance. The MSCI ESG global equity index has underperformed the broader MSCI index by approximately 2% since inception (see footnote 3). Also, in a high profile case in late 2016, CalPERS revealed that their decision to divest of tobacco earnings in 2000 had cost the fund an estimated US$3bn in returns (see footnote 4). Since CalPERS is underfunded, with a funding ratio of 68%, this represents either $3bn of additional monies that must be contributed to the scheme by governments, employers and employees, or $3bn of benefit shortfalls that could lead to reductions in pensioners’ benefits. Several pensions have already been cut in cases where near-bankrupt municipalities have withdrawn from CalPERS membership.
3 Source: Bloomberg. Underperformance of 16bp per annum since inception in September 2007.
5 SPS Conferences, November 2016
Credit: a natural environment for ESG in theory

Most ESG research to date has been done on equity portfolios, and the difficulties discussed previously are problematic in an equity portfolio. There are, however, logical reasons to believe that these difficulties will not exist when using ESG in a credit portfolio.

Credit and ESG in theory

Credit analysis and ESG analysis seems like a naturally good fit because the best way to manage credit is to avoid problems that could cause losses, and ‘E’, ‘S’ and ‘G’ factors can be another way of identifying potential problems. Poor ESG factors might increase the probability of negative shocks leading to losses in a company’s credit, and so avoiding companies with poor ESG processes should therefore help produce better returns for credit investors. In this case, the question of whether it’s ethical to pursue better ESG ratings within an investment portfolio disappears. In fact, if this hypothesis is true, it could also clarify the place of ESG in equity portfolios, since equity analysts have put an increasing emphasis on credit quality since the credit crisis of 2008.

Academic research has found that ESG scores and disclosure of ESG practices do impact companies’ borrowing costs. We find some evidence of this too, but we extend the research to consider investment returns, not just the borrowing costs a company must pay. Firstly, we assess the impact of ESG scores on the broader market, and secondly, we assess the impact of ESG scores on potential holdings within fixed income portfolios managed by Macquarie Investment Management Global with a discussion of how they differ from the results in the broad market.

Credit and ESG in practice

In theory, ESG and credit seem like natural partners, and the following analysis demonstrates that when analysing the broad market (all holdings in the Bloomberg Barclays Global Aggregate Index) ESG scores are only partly priced into the cost of credit. This means that choosing companies with better ESG scores, and specifically better Governance scores, does lead to better performance.

Very little study has been done in this area, but there is some support for this hypothesis. The analysis that follows aims to improve understanding of the interaction between ESG scores and 1) credit quality, 2) credit spreads, and 3) credit returns.

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6 Kolbel & Busch, 2013
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ESG and credit ratings

In this section, we consider how ESG scores relate to credit ratings.

ESG scores are correlated to credit ratings

Chart 1 plots the credit ratings of securities in the Bloomberg Barclays Global Aggregate and Bloomberg Barclays Global High Yield Indices against their ESG scores. Securities with better credit ratings have higher ESG scores on average, with a correlation of approximately 30%. This means that a portfolio with higher credit ratings will typically have higher ESG scores and vice versa.

The correlation between ESG scores and credit ratings complicates the adoption of ESG strategies in credit portfolios because strategies aimed at influencing the ESG characteristics of a portfolio will also influence the credit quality of that portfolio. Conversely, if a portfolio manager has a positive view on credit, and positions the portfolio accordingly long credit risk, the portfolio will likely have poor ESG scores as a result.

Any ESG credit strategy needs to take account of the interaction of ESG scores with credit spreads.

*Please refer to glossary for more information*
Credit ratings and changes in the ESG scores

Although there is a strong correlation between ESG scores and credit ratings, there are also many examples where the relationship doesn’t hold. In these examples, ESG scores would be very helpful to portfolio decisions if they could help predict changes in credit ratings. In practice, it works the other way; credit ratings can help predict changes in ESG scores. To demonstrate this, we use a linear regression model (refer to glossary for more information on this analysis methodology) which fits ESG scores to credit ratings using dummy variables for each rating grade. This model effectively fits an ESG score to each security that is equal to the average ESG score of securities with that same credit rating. These averages are shown in Chart 2.

Chart 2: Average ESG score for each credit rating

![Chart 2: Average ESG score for each credit rating](chart1.png)


Using these averages, Chart 3 plots the fitted ESG scores for each security against the actual ESG score for the same security. The correlation between fitted and actual scores is 33%.

**Chart 3: Actual and fitted ESG score**

![Chart 3: Actual and fitted ESG score](chart2.png)


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4 The regression is described by the formula: \( \hat{ESG} = a + \sum b_i D_i + \epsilon \) where \( \hat{ESG} \) is the estimated ESG score, \( a \) is a constant, \( b_i \) is the coefficient on each credit rating, \( D_i \) is a 1 if the security has the specified rating grade, and 0 if not, \( \epsilon \) is the ESG score residual.
If a security is above the orange line in the Chart 3, its actual ESG score is higher than its fitted score; a positive ESG score residual. If ESG score residuals predicted credit rating changes, then a positive ESG score residual would correspond to an improvement in the security’s credit rating. Visually, an improvement in credit rating to match the ESG score would be equivalent to a dot which is above the line moving to the right on Chart 3 so that it ends up on the line. Conversely, a change to the ESG score to match the credit rating would be equivalent to a dot that is above the line moving down so that it ends up on the line.

Chart 4 plots the ESG score residual at the end of 2015 against the change in fitted ESG score over the past year, from December 2015 to December 2016. (Because fitted ESG scores are completely determined by a security’s credit rating, the change in fitted ESG score is entirely driven by a change in credit rating.) If ESG scores predicted changes in credit ratings, there would be a positive correlation in Chart 4 because a positive residual, where the actual ESG score is above what is expected should create an upgrade in credit ratings and therefore a positive change in the fitted ESG score. However, the observed relationship is slightly negative. Pragmatically, the correlation between ESG residuals and changes in credit ratings is so close to zero that it indicates there is no relationship between the residual ESG score and subsequent changes in credit rating.

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**Chart 4: Change in credit rating vs ESG residual**

Conversely, Chart 5 plots the ESG score residual at the end of 2015 against the subsequent change in actual ESG score between the end of 2015 and the end of 2016. The difference between this and Chart 4 is that the variable on the vertical axes is driven by changing ESG scores, not changing credit ratings. The relationship is much stronger, with a coefficient of -0.25 and a correlation of 47%. In summary, where a security’s credit rating and ESG scores diverge, the ESG score usually changes, rather than the credit rating. ESG scores are stale compared to credit ratings.

**Chart 5: Change in ESG score vs ESG score residual**

In summary, ESG scores are more stale than credit ratings.
ESG and credit spreads

Having explored the relationship between ESG scores and the ratings of credit securities, now let’s consider how ESG scores can affect the yield spreads of those securities.

ESG scores explain some of the yield spread that is not due to credit ratings

It is widely accepted that credit ratings do not fully explain the spread differences between securities, but that much of the spread is explained by other factors such as liquidity and the market outlook for future rating changes. One of the factors that can explain part of the credit spread is the issuer’s ESG score. Chart 6 demonstrates the incremental power of ESG scores to explain that component of credit spreads not explained by credit ratings. The spread residual after accounting for credit rating\(^9\) is plotted against ESG scores for individual securities. There is an impact at the very low end of the ESG spectrum (the worst offending companies), but the impact elsewhere is of little to no importance. The relationship is highlighted by the solid orange dots which represent the average spread residual for any given ESG score.

There are two possible explanations for why the impact that ESG scores have on credit spreads is so small. One is that ESG is irrelevant to the credit quality of an issuer, and it is therefore logical that it will have little impact on its credit spread. The other is that ESG factors do matter, and the market is simply not pricing enough of a premium for ESG practices. Given the correlation between ESG and credit ratings, we believe the first explanation seems unlikely, and further analysis later in this report will reinforce this. **We believe the second explanation is the more likely one; there is value in ESG factors, and the market is not yet pricing them properly.**

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\(^9\) See stage 1 regression in previous footnote.
The individual ‘E’, ‘S’ and ‘G’ components have less power than the ESG average

Having determined that there is only a small difference in the pricing of securities with different weighted average ESG scores, the next section investigates the relationship between spreads and the individual components (the Environmental component, the Social component and the Governance component). Charts 7, 8 and 9 show the relative explanatory power of each score for investment grade securities.

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**Chart 7: Residual spread vs Environmental ‘E’ score**

-source: MSCI, Bloomberg Barclays, December 2016

**Chart 8: Residual spread vs Social ‘S’ score**

-source: MSCI, Bloomberg Barclays, December 2016
Most investors would expect the Governance score to have the greatest influence. In fact, we found that the Environmental score has slightly more impact, with the Social score having almost no impact at all. None of the components is as correlated as the weighted average of all three (as was shown in Chart 6).

A model that fits credit spreads using credit ratings and ESG scores together produce a better fit than a model using credit ratings alone. Even though the impact is small, it is still statistically significant, and the coefficients on ESG scores are significant even when credit ratings are included in the model.10 As seen in Chart 6, the component of the spread that is explained by ESG scores is not linear. Therefore, it has been modelled with a quadratic curve (a combination of the ESG score and the ESG score squared).

The relative impact of individual ‘E’, ‘S’ and ‘G’ scores is best displayed by plotting the impact of the score on the fitted spread for each component. This is in Chart 10 below and shows that as the E, S and G scores improve (higher values), the impact on credit spreads becomes more significant (lower spread compensation for higher ESG scores). Interestingly, the Environmental score appears to be the most priced in given the differential in credit spread impact between high and low E scores.

10 The regression is described by the formula: \( \Delta AS = a + \sum b_2(i) + b_1 ESG + b_2 ESG^2 + \varepsilon \). To deal with the issue of multicollinearity which occurs because of the correlation between credit ratings and ESG scores, the regression was also performed in 2 stages. Stage 1 regressed credit spreads against credit ratings: \( \Delta AS = a + \sum b_2(i) + \varepsilon_1 \) and stage 2 regressed the residual spreads from stage 1 against ESG scores \( \Delta G = a + b_1 ESG + b_2 ESG^2 + \varepsilon \) as shown in Chart 6.
In summary, we found that the market demands compensation for very poor ESG scores. Of the three scores, they demand the most compensation for poor Environmental practices.
ESG and credit returns

Finally, having considered the relationship between ESG scores and credit ratings and the impact of ESG scores on credit spreads, the next section investigates the impact of ESG scores on credit portfolio performance. Ultimately, this is what investors should be most interested in; not the impact of ESG on current spreads, as in Charts 7-10, but the impact of ESG on future spreads, or the future change in spreads.

Good ESG scores don’t necessarily lead to good performance

If ESG is going to add value to a portfolio, a credit investor would hope that securities with high ESG scores will subsequently have a larger contraction (or smaller expansion) in credit spreads over future periods than securities with low ESG scores. Chart 11 plots the change in the Option-Adjusted Spread (OAS) vs the starting ESG score. If securities with better ESG scores have better performance, the Chart should have a downward slope (that is, the securities with the highest ESG score should have the largest decrease in OAS spread).

The data spans from 2014 to 2016 because the period from 2014-2015 was a period during which spreads rallied, while 2015-2016 was a period where spreads sold off. In periods where credit rallies, securities with high credit ratings (and by correlation, those with high ESG scores) tend to underperform, and vice versa when credit sells off. By combining the two years from 2014-2016, this confounding is reduced, and sufficient time is given for ESG to feed through into valuations.

Unfortunately, securities with the worst ESG scores performed the best over the period, although the impact is marginal.

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Chart 11: Previous ESG score and subsequent OAS change (2014-2016).

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Securities with good ESG characteristics slightly underperform

Source: MSCI, Bloomberg Barclays, December 2016
To further reduce the potential confounding, Chart 12 plots the percentage change in spreads vs the ESG score. Percentage changes are less susceptible to confounding than level changes because the bonds with the widest credit spreads are the most volatile, but when measured as a percentage, they also have the largest denominator. Chart 12 confirms the observation in Chart 11; the bonds with the worst ESG scores performed the best. Securities with good ESG scores are not a path to easy outperformance.

Chart 12: OAS percentage change vs previous ESG score

Some researchers have found that specific high ESG portfolios do outperform certain low ESG portfolios. The reasons for these findings will be discussed in section 7. The findings appear to be due to factors other than ESG.

11 Truncated to +/-500%
Spread residuals and spread changes

While the relationship between outright ESG scores and subsequent OAS changes is disappointing, a relationship does exist between spread residuals and subsequent OAS changes. Chart 13 demonstrates the relationship between spread residuals, after fitting for both credit rating and ESG scores, and subsequent changes in OAS spreads. A model that appears to fit well is one where a high residual spread leads to a large reduction in OAS; a negative correlation. A simple model of spread residuals vs spread changes is unimpressive; bar a few excessively positive residual outliers, the spreads residuals have virtually no power to explain changes in OAS spreads.

Chart 13: OAS change vs initial residual

Spread residuals don’t predict spread moves

![Chart 13: OAS change vs initial residual](image)

Source: MSCI, Bloomberg Barclays, December 2016

However, a model that compares spread residuals with the percentage OAS change does better, as shown in Chart 14.

Chart 14: Residual and subsequent percent change in OAS

Spread residuals provide some information on spread percentage moves

![Chart 14: Residual and subsequent percent change in OAS](image)

Source: MSCI, Bloomberg Barclays, December 2016

12 Using the formula: $\Delta OAS = a + \sum b_{c,a}D_{c,a} + b_{ESG}ESG + b_{ESG}ESG^2 + \epsilon$. 

14 Using the formula: $\Delta OAS = a + \sum b_{c,a}D_{c,a} + b_{ESG}ESG + b_{ESG}ESG^2 + \epsilon$. 

The best results, however, compare the spread residual percentage\(^{13}\) with the subsequent percent spread change, as shown in Chart 15.

**Chart 15: Percentage residual and subsequent percentage OAS change**

Spread residual percentages appear to predict spread percentage moves

![Graph showing the relationship between OAS change and residual percentage](image)

Source: MSCI, Bloomberg Barclays, December 2016

The positive aspect of the model in Chart 15 is that those securities with a large negative spread residual percentages were much more likely to be the securities that had large percentage increases in their spread. This model is useful for identifying securities that are more likely to suffer losses. It may appear that this is strongly supportive of the thesis proposed at the beginning of this paper, that ESG factors are helpful in identifying risks of loss in credit.

Unfortunately, the power in the above model (and the associated performance from a high ESG score, matching portfolio) doesn’t come from ESG! Chart 16 shows the same relationship as Chart 15, but this time ignores ESG scores\(^{14}\), using only the information from credit ratings and yields. The Chart is almost identical, with a slight improvement when ESG scores are ignored.

**Chart 16: Percentage residual and subsequent percentage OAS change**

ESG information appears to be unnecessary when using residuals to identifying risky securities

![Graph showing the relationship between OAS change and residual percentage](image)

Source: MSCI, Bloomberg Barclays, December 2016

\(^{13}\) Spread residual percentage is defined as \(\frac{\Delta \text{OAS}}{\text{OAS}}\) where \(\epsilon\) is calculated using the formula: \(\Delta \text{OAS} = a + \sum b_i \text{ESG} + h \text{ESG}^2 + \epsilon\).

\(^{14}\) Effectively using stage 1 residuals as a percent of the original OAS. That is, \(\frac{\Delta \text{OAS}}{\text{OAS}}\) where \(\epsilon\) is calculated using the formula: \(\Delta \text{OAS} = a + \sum b_i \text{ESG} + \epsilon\).
Identifying securities that are overpriced for their rating grade highlights those likely to incur capital losses, and can be a way to have strong performance against the broader market. However, we found that ESG scores add no predictive power in this exercise. Once again, we observe that although weighted average ESG scores affect the price of credit, they do not predict future returns.

Logically, this explains a seeming incongruity between the research above which finds that high ESG securities underperform and the paper by Dunkin and Desclee which shows a portfolio of high ESG securities outperforming a portfolio of low ESG securities. The portfolios created by Dunkin and Desclee restricted both the high ESG portfolio to have the same yield, it needed to have higher residual yields. As we have just demonstrated, a portfolio with higher residual yields can outperform. But the performance appears to be driven by relative value rather than by ESG factors.

A useful analogy when considering the findings in ESG research is to consider a parallel study in credit ratings, since credit ratings and ESG scores are closely correlated. If two portfolios were constructed, one with high credit ratings and one with low credit ratings, but with the same yield, the portfolio with high ratings would likely outperform because the yield equality would mean that it will consist of holdings that offer good relative value. The portfolio of low rated, but also low yielding securities will underperform. However, few people would conclude that a means to outperformance is simply to hold higher rated securities.

A forward-looking approach shows no return benefits from weighted average ESG

In all the analysis of ESG scores and returns to this point, the analysis has begun with a hypothesis (that better ESG scores deliver better returns) and then tested that hypothesis (finding that the data do not support it). An alternative way of considering whether ESG scores can predict returns is to use perfect foresight of historic returns and then directly regress these returns against the E, S and G scores at the beginning of the period, mining for a relationship. The regressions still allow for other explanatory factors, such as credit rating, and use percentage changes to minimise the impact of general market movements on the results.

The resulting coefficients of the regression demonstrate the impact of various E, S and G scores on future spread changes. As before, a quadratic relationship between ESG scores and spread moves was used. Using this methodology, the correlations reveal that a very good ESG score can result in better performance than a middling score, but perversely, a low ESG score can also result in better performance than a middling score. Chart 17 shows the impact of the weighted average ESG coefficients on subsequent returns.

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Chart 17: ESG scores and subsequent spread percentage change (multi-variate regression removes rating impact)

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$$\text{ESG score} = a \sum_c (D_cE_c) + b_1E + b_2S + b_3G + b_4E^2 + b_5S^2 + b_6G^2 + \epsilon$$

Source: MSCI, Bloomberg Barclays, December 2016

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16 Two regressions were performed. The first, for each component of ESG was similar, but only used the weighted average ESG score. The second was

$$\text{ESG score} = a \sum_c (D_cE_c) + b_1E + b_2S + b_3G + b_4E^2 + \epsilon.$$
Effects of Governance

As highlighted in Chart 18 below, splitting the ESG score into its three components reveals that each component affects returns very differently to the other components. Environmental scores indicate that generally, the credit securities of those who exploit the environment have tended to perform better than those who care for it, except for the very upper tier of Environmental friendliness. Also, the securities of those who are Socially irresponsible perform better than those who are responsible. Conversely, getting Governance right is important for credit, with bonds from the companies that have the best Governance performing the best. Even more powerfully, the bonds from companies with very poor Governance tend to perform the worst.

Logically, these findings seem sensible; companies will often face choices between exploiting people for maximum profit or being Socially responsible and choices between exploiting the environment for maximum profit or being Environmentally friendly. The decisions to be Environmentally and Socially responsible come at a cost. On the other hand, bad Governance doesn’t represent a chance to exploit an opportunity for higher profits. Good Governance doesn’t come at the same sort of cost as good Environmental or Social policies.

Chart 18: ESG scores and subsequent spread percentage change

The ESG factors each affect future performance very differently

Source: MSCI, Bloomberg Barclays, December 2016
ESG scores will be strongly affected by the industry the issuer is in. Therefore, Chart 19 plots the same regressions as Chart 18, but this time with industry variables also included in the regression.

**Chart 19: Impact on percent change in OAS**

After allowing for industry effects, the Social score is unaffected – the bonds from those issuers that are least responsible perform best, even within an industry. The result for the Environmental score is different; within an industry, those who are more Environmentally friendly tend to outperform those who are not. In both cases (whether choosing across industries or within), the credits with the worst Governance scores performed the worst, but the result is less strong within industries than it is across them.

*Therefore, a portfolio that has a bias toward high Governance scores can perform strongly compared to a portfolio with low Governance scores and the same credit rating structure, and this remains even when controlling for industries. There can be value in tilting a credit portfolio towards issuers with better Governance. This confirms part of our hypothesis that there is a natural relationship between credit analysis and ESG; at least there is between credit analysis and Governance. Further, although credits with lower governance scores have higher spreads, we believe the full credit impact of poor Governance is not being priced into markets yet.*

However, a portfolio that has a bias to higher weighted average ESG scores, will slightly underperform a portfolio of matching credit ratings and industries with low ESG scores. Integrating social considerations into the credit process can therefore encourage the portfolio manager to buy securities issued by companies with poor social policies. (Perhaps this explains why the earlier mentioned ESG integrated credit manager in London had two tobacco stocks in his top three holdings).

**Within a single rating, securities with low ESG scores appear more volatile**

Securities with low ESG scores generally show greater subsequent return volatility than securities with high ESG scores. The table below shows the standard deviation of spread changes for securities in each rating grade, split into the securities in the bottom half of the ESG score scale and those in the top half.

<table>
<thead>
<tr>
<th>Rating Grade</th>
<th>Standard Deviation (bottom ESG scores)</th>
<th>Standard Deviation (top ESG scores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>17.5</td>
<td>13.2</td>
</tr>
<tr>
<td>AA</td>
<td>38.8</td>
<td>35.5</td>
</tr>
<tr>
<td>A</td>
<td>26.0</td>
<td>27.3</td>
</tr>
<tr>
<td>BBB</td>
<td>47.1</td>
<td>31.6</td>
</tr>
<tr>
<td>Average</td>
<td>32.4</td>
<td>26.9</td>
</tr>
</tbody>
</table>

Based on this, it would seem that poor ESG scores could be used as a warning indicator of potential return volatility, and as a flag for further investigation from credit analysts. However, simply using credit notches can provide a similar result.

<table>
<thead>
<tr>
<th>Rating Grade</th>
<th>Standard Deviation (‘-‘ notch)</th>
<th>Standard Deviation (‘+’ notch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AA</td>
<td>32.5</td>
<td>42.4</td>
</tr>
<tr>
<td>A</td>
<td>29.4</td>
<td>23.3</td>
</tr>
<tr>
<td>BBB</td>
<td>47.9</td>
<td>31.8</td>
</tr>
<tr>
<td>Average</td>
<td>36.6</td>
<td>32.8</td>
</tr>
</tbody>
</table>


A useful characteristic of ESG scores, is that a combination of notches and ESG scores can be used to explore the results further. While investment grade ratings are constrained to only vary a notch at a time, an ESG score is almost continuous, and this allows a portfolio manager with both credit ratings and ESG scores to split up the credit quality of an issuer into finer slices than would be possible with credit ratings alone. One example is that AAA ratings have no notches, but securities with the bottom ESG scores in the AAA universe are more volatile than securities with the top ESG scores. The same can be said when delving into each rating notch. As shown on Chart 20, the volatility of returns in each credit notch is higher for securities with low ESG ratings than for securities with high ESG ratings, especially at the lower end of the investment grade spectrum.

![Chart 20: Return volatility by rating and ESG](image)

Poor ESG scores are associated with more volatility


Using ESG ratings within each notch allows a credit analyst to identify which securities are likely to be more volatile.

In summary, good Governance practices tend to lead to outperformance once credit rating and industry is accounted for. In contrast, the credit of companies with good social practices tends to underperform. The debt of companies with poor ESG practices is more volatile than the debt of those with good ESG practices.
Opportunities revealed

So far, our analysis has revealed that Environmental, Social and Governance factors all impact on the cost of credit, indicating that these factors are at least partly ‘priced in’ to credit securities. The factor with the greatest impact on pricing is the Environmental factor. This is followed by the Governance factor. The Social factor has very little impact on the price of credit. If the factors were completely priced in, then there would be no benefit from tilting towards any of the factors. However, there remains a potential performance benefit to be gained from tilting towards higher quality Governance credits. Over time, as the market prices in ESG factors more, this performance impact may disappear.

Even then, the possibility will remain to outperform through ESG factors, but the method will be different. When credit ratings and ESG scores disagree, the credit rating has proved to be more stable, and the ESG score usually gets revised to be more in line with ESG scores of companies with similar credit ratings. This means that ESG scores are stale; even more stale than credit ratings. However, an analyst using fresh data to analyse a credit security could potentially be better able to identify which ones will outperform and which ones will underperform. In this way, even when ESG scores have been fully priced into the market, analysts taking account of ESG factors can still generate outperformance.

An analysis of our approach through Macquarie’s fixed income holdings demonstrates this point.17

17 The internal security holdings have been extracted from all Macquarie fixed income portfolios managed by Macquarie Investment Management Global Limited and includes both credit and bond strategies as of 31 December 2016.
Macquarie’s approach

The following analysis has been done on the credit holdings of securities in Macquarie fixed income portfolios. The results vary from the broad market (Bloomberg Barclays Global Aggregate index holdings) in the following ways:

- A greater premium is demanded for securities with low ESG scores
- A simple governance score filter cannot be used to better the performance of the portfolios.

This demonstrates that in Macquarie portfolios, ESG factors are more completely priced in, and that investment decisions are being made on data that is fresher than those used for ESG scores.

A greater premium is demanded for securities with low ESG scores

Our findings varied from the broader market in the amount of power ESG had to explain spreads. Our choices in holdings were more highly correlated with ESG scores, indicating that the impact of ESG factors is more fully priced into the analysis. In other words, Macquarie portfolio managers are demanding more compensation for poor ESG scores than the broader market does. This is particularly the case for the social factor plotted in Chart 21, and the Governance factor in Chart 22.

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**Chart 21: Impact of Social 'S' scores on credit spreads in Macquarie holdings vs market**

Source: MSCI, Bloomberg Barclays, Macquarie, December 2016
This analysis leads us to believe that governance scores are more fully priced in Macquarie portfolios than in the broader market; this is very important because we believe this is the factor that has been underpriced by the broader market. Macquarie demands more spread for poor governance than the market appears to leading us to believe that Macquarie has more correctly priced this risk and has effectively extracted the value that would otherwise be gained from a governance filter. We have found that this is reinforced by the second major difference between the broad market and Macquarie’s holdings from earlier.

**We believe a simple Governance score filter cannot be used to better the performance of the portfolios**

Chart 23 shows the return impact of different scores for the holdings in Macquarie portfolios. Unlike in the broad index, there is no benefit to be gained from applying a simple Governance filter, because Macquarie’s holdings have fully priced the impact of Governance and avoided the Governance issues that are driving these simple improvements in the broad market universe. The almost flat line on Governance demonstrates this.

**Chart 23: Impact on percentage change in OAS**

Source: MSCI, Bloomberg Barclays, Macquarie, December 2016
There remains a cost for Social responsibility, as shown by the positive sloping line for Social scores. This suggests we may be overpricing the value of Social responsibility, but the same results were found for the broader market. To extract alpha from this would bias would require somewhat perverse behaviour – a tilt towards Socially irresponsible investments. As previously discussed, perhaps this explains the tobacco bias of the ESG process discussed in the introduction. Time will tell whether Socially irresponsible companies continue to avoid the credit stress the market expects them to experience.

In summary, we find that ESG scores in credit analysis are often stale, and so when incorporating ESG into portfolio management it is best to directly consider ESG factors as part of the credit analysis process, with credit analysts responsible for doing their own analysis and providing more up-to-date research than is available from central sources.

Key risks and limitations:

- The key risk to the above approach is that there is a reliance on the skills, experience and capabilities of the credit analysts. If the credit analysts do not have the attributes to perform appropriate ESG credit analysis, there is the possibility of mispricing of ESG factors in their analysis and a sub-optimal impact on the portfolio.
- The research findings discussed in this paper are limited to our specified research scope, our methodology and our data collection method. The findings may or may not differ if these factors are modified.
- Investing in credit securities can lose value, and investors can lose principal, as interest rates rise. They also may be affected by economic conditions that hinder an issuer’s ability to make interest and principal payments on its debt. They may also be subject to prepayment risk, the risk that the principal of a bond that is held by a portfolio will be prepaid prior to maturity, at the time when interest rates are lower than what the bond was paying. A portfolio may then have to reinvest that money at a lower interest rate.
Conclusions

The information in ESG scores is already partly priced into credit markets, but in the broad market, some gains are still able to be made from a simple filter which eliminates issuers with low Governance scores. Over time, we believe it is likely that the market will price the Governance scores more fully into yields, and the forward return bias will reduce.

We believe the credit impact of Governance was shown to already be properly priced, and no alpha remains to be extracted. If anything, Macquarie may have a slight bias towards overpricing the importance of Governance and Social responsibility. This may be of value in times when the market becomes more tumultuous than it has been in recent years.

Credit ratings are widely known to be stale, and ESG scores have proven to be even staler, because when credit ratings and ESG scores diverge it is typically the ESG score that changes to catch up. For factors other than Governance, this means that portfolios with simple ESG filters will tend to underperform as stale ESG scores are revised to come in line with credit ratings and market pricing. The fact that ESG scores are stale offers an opportunity for analysts to add value by assessing ESG information (not just scores) when analysing credits. Credit analysts can examine up-to-date data on the components that generate ESG scores rather than just the ESG scores themselves. Because scores impact spreads, unearthing fresher ESG information than is used in public scores will deliver better returns to investors, and at the same time, a portfolio with stronger ESG characteristics. This type of careful analysis will become more important over time, as the broader market prices out the remaining simple gain from a Governance filter.
Bloomberg Barclays Global Aggregate Index:
This index consists of global investment grade debt from twenty-four local currency markets. This multi-currency benchmark includes treasury, government-related, corporate and securitised fixed-rate bonds from both developed and emerging markets issuers.

Bloomberg Barclays Global High Yield Index:
This index is a multi-currency representation of the high yield debt market. The index represents the combination of the US high yield, pan-European high yield and emerging markets (EM) hard currency high yield indices. The high yield and emerging markets sub-components are mutually exclusive.

ESG score:
MSCI apply a rating to 37 factors between zero and ten. Zero being the worst result and 10 being the best. The E, S and G scores are the weighted averages of the scores given to the E factors, the S factors and the G factors, and the ESG scores are the weighted averages of the E,S and G scores.

MSCI World Index:
The MSCI World Index is a free-float weighted equity index. It includes developed world markets and does not include emerging markets. It covers more than 1,600 securities across large and mid-cap size segments and across styles in 23 developed markets.

MSCI World ESG Index:
This index is based on the MSCI World Index, but is designed to reflect the performance of an investment strategy that, by tilting away from free-float market cap weights, seeks to gain exposure to those companies demonstrating both a robust ESG profile as well as a positive trend in improving that profile. It utilises the MSCI ESG rating process.

Regression analysis:
Regression analysis is a statistical method of (partially) explaining the behaviour of a dependant variable \( y \) by using an equation with one or more independent variables \( (x_1, x_2, ... x_n) \). The equation takes the form of:

\[
y = a + b_1 x_1 + b_2 x_2 + ... + b_n x_n + \epsilon
\]

Where:
- \( y \) = the (dependant) variable being explained
- \( x_n \) = the (independent) variables being used to explain \( y \)
- \( a \) = a constant
- \( b_n \) = the proportion of the \( n^{th} \) independent variable \( (x_n) \) which helps explain \( y \)
- \( \epsilon \) = the unexplained component of \( y \)

S&P credit ratings:
An S&P Global Ratings issue credit rating is a forward-looking opinion about the creditworthiness of an obligor with respect to a specific financial obligation, a specific class of financial obligations, or a specific financial program (including ratings on medium-term note programs and commercial paper programs). AAA is the highest rating assigned and represents an extremely strong capacity to meet financial commitments on its obligations. AA is less strong and so forth.

Standard deviation:
A statistical measure of the variance of an observation from its average observation over a specified time period, used as a gauge of volatility.

Dynkin, Desclée, Hyman and Polbennikov, *Sustainable Investing and Bond Returns*, Barclays, 2017

*ESG Ratings Methodology*, MSCI ESG Research, April 2016

Hann D, *ESG in the Credit Market*, DWS Investment GmbH, European Centre for Corporate Engagement, Paris 09/02/2012


*The impact of ESG performance on firms’ cost of debt*, Working Paper
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