Pricing ESG risk in sovereign credit

Part II: Developed and emerging-market spreads split the difference

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In 2019, the international business of Federated Hermes and Beyond Ratings published 'Pricing ESG risk in sovereign credit' and uncovered a robust correlation between environmental, social and governance (ESG) factors and sovereign credit spreads.

The study established an inverse relationship between national ESG scores and government-bond credit-default swap (CDS) spreads: on average, the countries with lower ESG scores have the widest CDS spreads, while those with the highest ESG scores have the tightest CDS spreads.

The link between ESG scores and CDS spreads remained even after controlling for risk that should be reflected in credit ratings, which suggests they do not entirely explain CDS spreads. The analysis also found that governance had the strongest, most consistent correlation with sovereign CDS spreads, while spreads do not seem to fully reflect environmental risks.

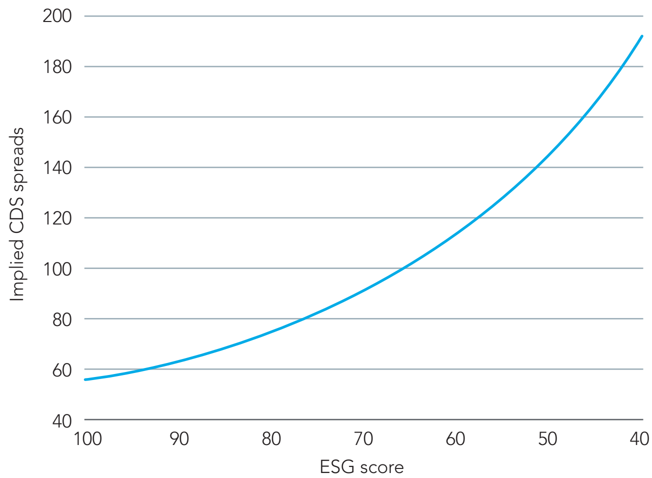
But the research triggered a range of follow-up queries from readers, particularly on whether our findings would hold up if we examine developed and emerging markets (DM and EMs) separately.

We applied the analytical techniques from our previous study and split the dataset into DMs and EMs. We found that:

1. Although the relationship between Beyond Ratings' ESG scores and CDS spreads is statistically significant for both datasets, it is stronger for developed markets.
2. Even when comparing a country's historical ESG performance to its current CDS spreads over several different time horizons, the relationship between CDS spreads and ESG factors is stable, which suggests a steady pricing relationship.
3. The strongest relationship between CDS spreads and ESG scores exists for the social and governance sub-risks – particularly for DMs – while a less clear relationship is observed for EMs.

The 10 years leading to 2018 were characterised by unconventional monetary policy, which may have affected the results. Nonetheless, we believe that our study points to an econometrically significant and economically meaningful relationship between sovereign ESG scores and CDS spreads, especially in DMs (see figure 1).

Figure 1. Implied CDS spreads and corresponding ESG scores in developed markets



Source: Federated Hermes and Beyond Ratings, as at December 2019.

Given the weaker statistical relationship between ESG scores and CDS spreads for EMs, we were not able to draw a similar pricing chart for EMs. This result suggests that movements on CDS spreads for EMs were related more to other country specific factors that our model does not consider (see case study). Nonetheless, we believe that the relative financial weakness of some EMs leaves them more vulnerable to deteriorating ESG factors, which translates directly into credit risk.

About the partnership

The international business of Federated Hermes and Beyond Ratings have partnered because both companies wanted to better understand the relationship between ESG risks in sovereigns and their CDS spreads. The two entities' complementary skillsets and experience in ESG investment and credit-risk assessments make this a natural partnership. In our research, we use Beyond Ratings' proprietary ESG scores in an analytical methodology originally developed by the international business of Federated Hermes to quantify ESG risk in corporate credit. This enabled our groundbreaking study on ESG risk in sovereigns, which was published last year. We now turn our attention to the relationship between ESG scores and CDS spreads in EMs and DMs.

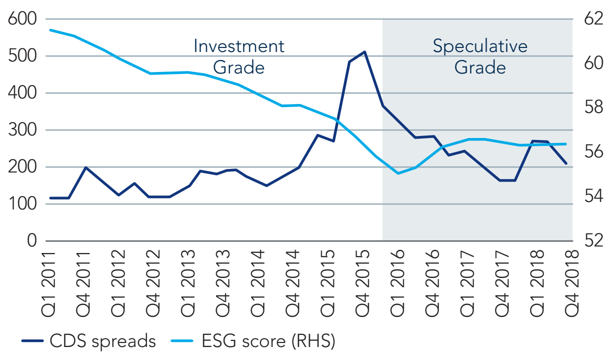
Case study: How country-level ESG factors affect credit risk in EMs

The relative financial weakness of some EMs leaves them more vulnerable to deteriorating ESG factors, which translates directly into credit risk. Consequently, extra-financial risks seem to be more important for EMs than DMs given the former's higher exposure to ESG shocks and the long-term effects that it could have on sovereign-risk metrics for those countries.

By analysing the evolution of ESG scores and CDS spreads for Brazil, we can notice that a deterioration in ESG scores is related to an increase in CDS spreads and that it could even be linked to the change in trend.

For instance, the deterioration in ESG scores between 2011-14 was accompanied with CDS spreads below 200bps. However, when the political crisis erupted in 2015, then-President Dilma Rousseff's impeachment in May 2016, CDS spreads rose abruptly to more than 500bps. Since then, even though the ESG score has stabilised at about 57 and the macroeconomic conditions have improved, CDS spreads continue to be higher than those at the end of 2011 (see figure 2).

Figure 2. Brazil: CDS spreads and ESG score



We conclude that the integration of ESG risk in sovereign risk could improve the overall assessment of credit risk in EMs, despite the weak statistical relationship in our model.

Method and findings

We divided the sample of countries in our original sovereign ESG paper into separate DM and EM groups, as defined by the International Monetary Fund. We also conducted several additional tests using different country classifications from other statistical agencies, such as the Organisation for Economic Co-operation and Development (OECD), to ensure our results were robust.

As we describe in the appendix, the results that were based on different country classifications were generally consistent with our main analysis.[1] We also tested whether there is a different relationship in cases that take historical ESG scores (those that are lagged more than four quarters) and credit ratings into account. The results remained consistent with our main specification.[2]

The two sub-samples of countries consist of 28 DM[3] countries with 873 country-quarter measurements and 31 EM[4] countries with 898 country-quarter observations.[5] As in the original study, our analysis covered the period 2009-2018.

We sourced sovereign five-year CDS spreads from Bloomberg and used Beyond Ratings' ESG scores as our proxy for ESG risk. We also used the Bloomberg composite credit-rating system, which blends data from three major financial-rating providers.[6] After dividing the sample into the DM and EM groups, we ran Ordinary Least Squares regression models, with robust standard errors, to determine if there were any significant relationships for the two different sub-samples.

Beyond Ratings' ESG scores

For the key independent variable in our analysis – a country's ESG profile – we used Beyond Ratings' ESG scores, which measure a country's ESG performance. These scores have been calculated quarterly according to a systematic, quantitative approach based on 40 indicators from the end of 1999.

To calculate an aggregate ESG score, individual environmental, social and governance scores are weighted 30%, 30% and 40% respectively. The weights for each indicator are estimated using an econometric modelling technique called Partial Least Squares (PLS), with a score for Variable Importance in Projection (VIP) added on. The methodology also assesses ESG risks, taking into account a country's state of development.

The assessment of a country's environmental performance embedded three dimensions: energy policy, climate risks, and natural-resources endowment and management. The social performance assessment includes five dimensions: human capital and innovation, health, inequality, employment and societal. The governance performance assessment measures risks related to corruption, government effectiveness, the rule of law, regulatory quality, political stability and the absence of violence, and voice and accountability. Please see the first installment of this paper, 'Pricing ESG risk in sovereign credit' for more details.

[1] The results in Table A2 in the appendix demonstrate that our key finding – the statistically significant relationship between ESG scores and countries' CDS spreads – is robust and consistent, but generally speaking is less significant for emerging markets, regardless of how we define DM and EM.

[2] Table A3 shows the results for our main regression specification, in which we lag the independent variables (i.e. the credit ratings and ESG scores) by various quarters. This shows that whatever the lag structure (from 0 to 10 lags), current CDS spreads are still influenced by ESG scores and credit ratings for both EM and DM.

[3] Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Slovakia, South Korea, Spain, Sweden, Switzerland, the United Kingdom and the United States.

[4] Abu Dhabi, Argentina, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, El Salvador, Hungary, India, Indonesia, Kazakhstan, Kuwait, Malaysia, Mexico, Morocco, Oman, Panama, Peru, Philippines, Poland, Qatar, Romania, Russia, Saudi Arabia, South Africa, Thailand, Ukraine and Uruguay.

[5] In all analyses, we winsorized the distribution of the observed CDS spreads at 97.5% to remove significant outliers that would bias our analyses and conclusions.

[6] For more details on the data, the construction of the dataset and the sample of countries we used in the analysis, see our original paper, 'Pricing ESG risk in sovereign credit'.

The results of the regression analyses (see table A1) show that ESG factors are significant at the 1% level for DM countries but only at 5% for the EM group. On average, ESG factors have a more significant effect on DM sovereign credit spreads than for EM countries, and the highly significant relationship between ESG scores and CDS spreads documented in the original study is clearly driven mainly by DM countries.

Yet despite this statistically weaker relationship, ESG scores do have an impact on EM credit spreads. We believe it is useful to include ESG factors in any analysis of EM sovereign risk, as ESG risk in EMs can quickly morph into credit risk that in turn can drive spreads higher as investors become concerned about defaults.

Quantifying the divergence between developed and emerging markets

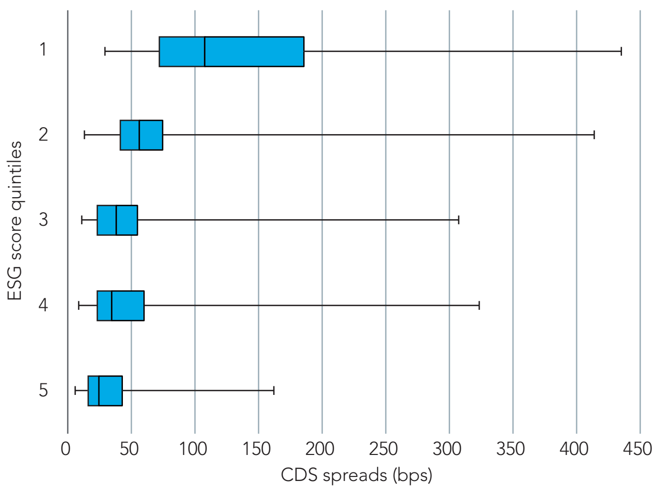
We started by looking at the relationship between ESG and CDS spreads in an unconditional way, without controlling for any effects that might influence the relationship. This was done by dividing the underlying data into DM and EM groups, splitting both sets into quintiles (or five equal groupings, with five being the strongest ESG performers) based on each country's ESG score, then constructing box plots to better understand the distribution of CDS spreads for each ESG quintile.

Figure 3 shows a clear pattern for DMs. The median CDS spread – shown by the vertical line within the green box – decreased from the first to the fifth quintile. Excluding the fourth quintile, the distribution of the observed CDS spreads also decreased from the first to the last quintile.

There is not such a clear pattern for EMs. The median CDS spread varies with no clear trend from the first to the fifth quintile, and the distribution of observed EM CDS spreads is consistent throughout the quintiles and much wider than for DMs.

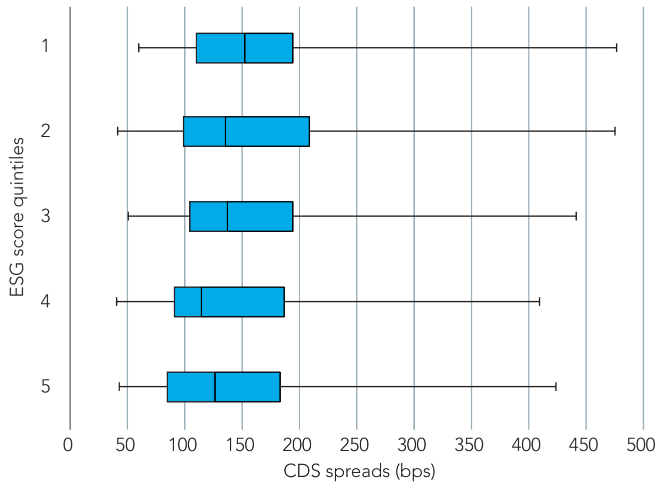
Figure 3: Distribution of spreads by ESG-score quintile in developed and emerging markets

Developed markets



Source: Beyond Ratings and Bloomberg, as at December 2019.

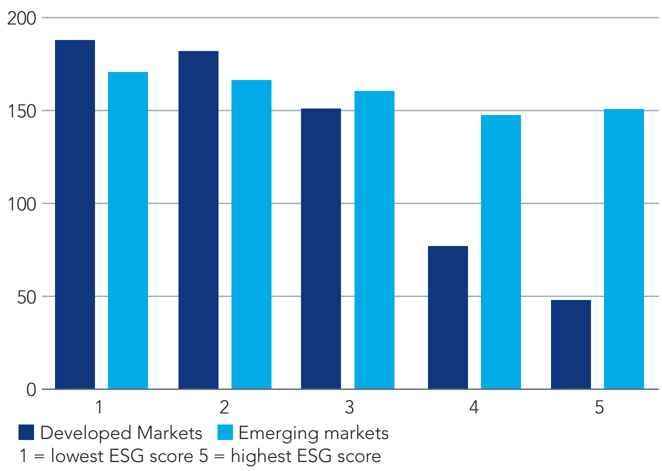
Emerging markets



Source: Beyond Ratings and Bloomberg, as at December 2019.

We then looked at the unconditional average CDS spread per quintile (see figure 4). There is a notable contrast between the notional level of CDS spreads per ESG quintile across DMs and EMs. Apart from a small anomaly in the fourth quintile, there is a clear, observable relationship between ESG strength and CDS spreads for DM sovereigns.

Figure 4: Average CDS spreads by ESG quintile, 2009-2018

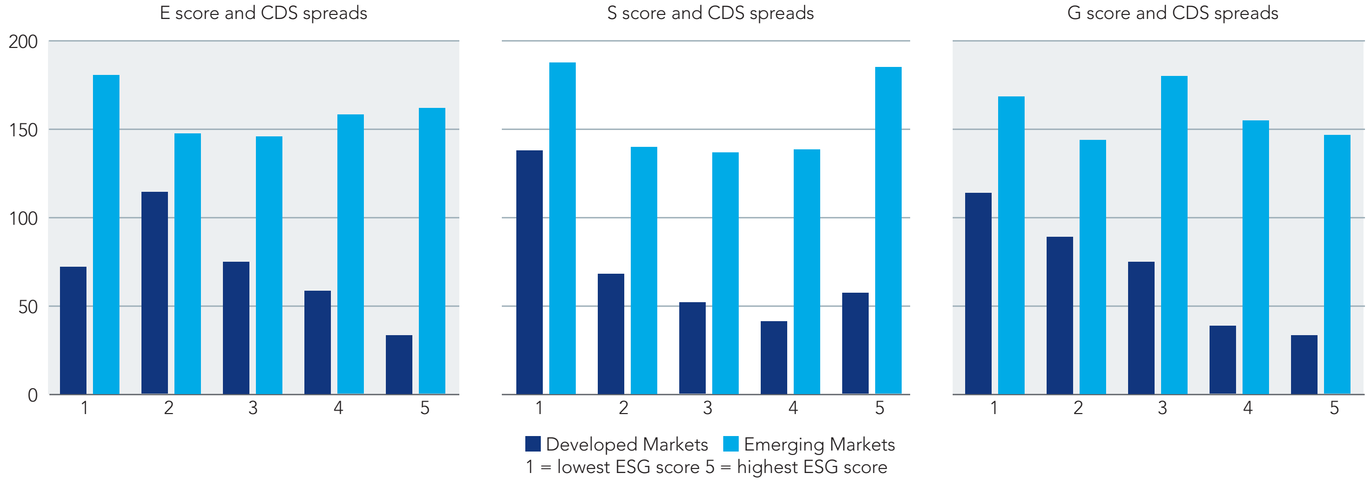


Source: Federated Hermes and Beyond Ratings, as at December 2019.

As we know from first instalment of this paper, this relationship cannot be entirely explained by conventional credit risk. This reinforces the need to assess and price the longer term risks associated with ESG factors before they translate into credit risk, which can be especially painful for countries with lower financial resilience. While there is also an observable pattern for EMs, the relationship is nowhere near as stark – which is consistent with our earlier findings.

The unconditional results for the E, S and G sub-risks also demonstrate that there is a strong relationship between CDS spreads and social and governance scores. The correlation between environmental scores and CDS spreads for both EMs and DMs is less compelling, which is generally consistent with the results of our original research (Figure 5).

Figure 5: Average CDS spreads by ESG sub-quintiles



Source: Federated Hermes and Beyond Ratings, as at December 2019.

Conclusion

Using the output from our regression analyses, we constructed an implied CDS curve that showed a strong link between sovereign credit risk and ESG scores for DMs. We could not establish a similar meaningful implied CDS curve using selected EM data and there is clearly a divergence between the relative financial strength of DM and EM countries and the way they assess and price ESG risks.

Yet ESG risks can rapidly develop into material financial risks in EM countries. As a result, ESG analysis is increasingly important for investors in both DM and EM sovereign debt – perhaps even more for EMs, given the risks are not yet priced into CDS spreads.

Appendix

Table A1

	Advanced economies – imf	Emerging and developing economies – imf
Intercept	8.7114***	6.4176***
	0.2433	0.0969
ESG score (lagged Q4)	-0.0369***	-0.0033*
	0.0046	0.0015
Credit ratings (lagged Q4)	-0.3301***	-0.3037***
	0.0286	0.0129
Number of countries	28	31
Number of observations	873	898
Adjusted r-squared	0.4503	0.3417
F-statistic	358	234
Degrees of freedom period (2009 – 2018)	870	895

Note: P values P≤0.001 is indicated with three asterisks, P≤0.01 is indicated with two asterisks, P≤0.05 is indicated with one asterisk, and P≤0.1 is indicated with one point. Robust standard errors are reported underneath each coefficient.

Table A2

	Developed markets ftse equity	Emerging and frontier markets ftse equity	Oecd members	Non-oecd members	European union 28	G7 countries	Brics countries
Intercept	9.7920***	6.5333***	8.2266***	6.5378***	8.8776***	10.5850***	6.9272***
	0.2558	0.0839	0.1767	0.0952	0.2405	0.4062	0.2880
ESG score (lagged Q4)	-0.0646***	-0.0062***	-0.0297***	-0.0033*	-0.0477***	-0.1034***	-0.0055
	0.0052	0.0015	0.0035	0.0016	0.0054	0.0095	0.0046
Credit ratings (lagged Q4)	-0.1628***	-0.3031***	-0.3429***	-0.3320***	-0.2219***	0.1691*	-0.3574***
	0.0349	0.0134	0.0249	0.0129	0.0352	0.0694	0.0286
Number of countries	24	30	29	30	21	7	5
Number of observations	771	876	968	803	669	228	161
Adjusted r-squared	0.46	0.38	0.49	0.44	0.55	0.45	0.40
F-statistic period (2009 – 2018)	330.4	264.8	466.7	310.3	412	93.34	54.94

Note: P values P≤0.001 is indicated with three asterisks, P≤0.01 is indicated with two asterisks, P≤0.05 is indicated with one asterisk, and P≤0.1 is indicated with one point. Results with P values larger than 0.1 are shown, but they lack of statistical significance. Robust standard errors are reported underneath each coefficient.

Table A3

Panel A: Developed Markets

	Esg&ratings n=1	Esg&ratings n=2	Esg&ratings n=3	Esg&ratings n=4	Esg&ratings n=6	Esg&ratings n=8	Esg&ratings n=10
Intercept	8.7512***	8.7226***	8.7133***	8.7114***	8.7941***	8.8546***	8.9077***
	0.2265	0.2339	0.2383	0.2433	0.2524	0.2579	0.2438
ESG score (lagged Q4)	-0.0354***	-0.0355***	-0.0363***	-0.0369***	-0.0393***	-0.0409***	-0.0414***
	0.0043	0.0044	0.0045	0.0046	0.0047	0.0048	0.0045
Credit ratings (lagged Q4)	-0.3489***	-0.3441***	-0.3361***	-0.3301***	-0.3183***	-0.3155***	-0.3288***
	0.0282	0.0285	0.0288	0.0286	0.0285	0.0283	0.0264
Number of countries	28	28	28	28	28	28	28
Number of observations	953	926	899	873	823	774	725
Adjusted r-squared	0.45	0.44	0.45	0.45	0.46	0.49	0.56
F-statistic period (2009 – 2018)	383.0	367.5	363.7	358.2	344.9	366.0	453.7

Note: P values P≤0.001 is indicated with three asterisks, P≤0.01 is indicated with two asterisks, P≤0.05 is indicated with one asterisk, and P≤0.1 is indicated with one point. Results with P values larger than 0.1 are shown, but they lack of statistical significance. Robust standard errors are reported underneath each coefficient.

Panel B: Emerging markets

	Esg&ratings n=1	Esg&ratings n=2	Esg&ratings n=3	Esg&ratings n=4	Esg&ratings n=6	Esg&ratings n=8	Esg&ratings n=10
Intercept	6.4195***	6.4148***	6.4090***	6.4176***	6.4343***	6.3963***	6.3609***
	0.0913	0.0937	0.0954	0.0969	0.1006	0.1035	0.1076
ESG score (lagged Q4)	-0.0025	-0.0028	-0.0030*	-0.0033*	-0.0038*	-0.0037*	-0.0035*
	0.0015	0.0015	0.0015	0.0015	0.0016	0.0017	0.0017
Credit ratings (lagged Q4)	-0.3145***	-0.3094***	-0.3055***	-0.3037***	-0.3008***	-0.2977***	-0.2955***
	0.0126	0.0128	0.0129	0.0129	0.0132	0.0134	0.0143
Number of countries	31	31	31	31	31	31	31
Number of observations	979	952	925	898	843	791	742
Adjusted r-squared	0.3549	0.3437	0.3409	0.3417	0.3419	0.3354	0.3261
F-statistic period (2009 – 2018)	270	250.1	240	233.8	219.7	200.3	180.3

Note: P values P≤0.001 is indicated with three asterisks, P≤0.01 is indicated with two asterisks, P≤0.05 is indicated with one asterisk, and P≤0.1 is indicated with one point. Results with P values larger than 0.1 are shown, but they lack of statistical significance. Robust standard errors are reported underneath each coefficient.

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