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# SOVEREIGNS AND SUSTAINABILITY

## INSIGHT'S COUNTRY SUSTAINABILITY RISK MODEL

OCTOBER 2018

> Fixed income investors are sharpening their focus on the sustainability risks of individual countries. We believe investing effectively in sovereign debt requires in-depth analysis of environmental, social and governance (ESG) matters, but most ESG analysis and research focuses on corporates – not countries. We have therefore built a proprietary model to help us better understand the ESG risks at the country level across our portfolios.

# EXECUTIVE SUMMARY

We believe investing effectively in sovereign debt requires in-depth analysis of environmental, social and governance (ESG) matters, especially in emerging markets. However, most ESG analysis and research focuses on corporates – not countries. We have therefore built a proprietary model to help us better understand the ESG risks at the country level across our portfolios.

**Insight's country sustainability risk model generates two complementary scores to give our portfolio managers greater insight over long-term trends**

- The model's overall ESG score offers a snapshot of a country's current standing with regard to ESG factors, based on the latest available data
- Longer-term trends in ESG factors can be more difficult to identify, but have the potential to develop into material risks. We have therefore developed the model's ESG momentum score, which illustrates a country's improvement or deterioration with regard to ESG factors over a six-year period

**Results from the model provide a starting point for further analysis. Initial insights include:**

- Countries with higher GDP per capita typically have better ESG scores. This is generally driven by governance and social factors, not environmental scores
- More countries are deteriorating on ESG than improving – with the majority of developed markets receiving a negative ESG momentum score
- ESG momentum has a weak relationship overall with standard industry measures of sovereign credit risk, but there are outliers

**The model supports our investment decision-making and helps us to serve clients more effectively by:**

- Expanding the scope of our existing risk tools
- Guiding the management of sovereign debt allocations or mandates with ESG-specific criteria
- Supporting reporting to clients on ESG-specific factors
- Informing our dialogue with sovereign issuers

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A decade on from the global financial crisis and against a backdrop of political and economic uncertainty, investors are sharpening their focus on the sustainability risks of individual countries



# COUNTRY SUSTAINABILITY RISKS

## A SHARPENING FOCUS

INSIGHT HAS DEVELOPED A MODEL TO MEASURE AND RANK COUNTRIES ACCORDING TO ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FACTORS. BY GENERATING AN ABSOLUTE MEASURE OF ESG PERFORMANCE, AND MOMENTUM SCORES TO HELP IDENTIFY IMPROVING AND DETERIORATING RATINGS, THE MODEL GIVES OUR PORTFOLIO MANAGERS DEEPER INFORMATION ON LONG-TERM TRENDS AND ENABLES US TO UNDERSTAND HOW ESG RISKS MIGHT AFFECT SOVEREIGN DEBT PORTFOLIOS.

Environmental, social and governance factors can have a major impact on countries and the perceived creditworthiness of their debt issuance. Environmental risks – such as natural disasters, weather patterns and climate change – can all have a significant effect on a country's economic and political outlook. Social factors, such as long-term demographic trends or short-term unrest, can materially shift investors' perceptions. Governance factors ranging from the quality of institutional frameworks to respect for the rule of law often have a material impact on sovereign debt performance.<sup>1</sup>

However, while investors have to some degree taken governance factors into account, environmental and social factors have historically been perceived to have a limited impact on both rating assessments and credit barometers, such as sovereign spreads<sup>2</sup>.

Now, a decade on from the global financial crisis and against a backdrop of political and economic uncertainty, investors are sharpening their focus on the sustainability risks of individual countries. In terms of governance, there is a perception that many countries are less welcoming for investors, with growing protectionism and less investor-friendly policies affecting sentiment. The focus has continued to sharpen on environmental risks as regulations and climate-change-related investor initiatives

highlight how the natural environment should be protected to withstand material human and economic costs. On the social side, headlines focusing on social instability, and trends such as immigration, have increased concerns around political stability and economic growth in some countries.

Credit rating agencies are increasingly taking ESG factors into account for their country ratings, according to the Principles for Responsible Investment (PRI): “[credit rating agencies] are increasingly researching ESG topics beyond traditional rating analysis. This is contributing to the development of evaluation tools and deeper understanding of the issues at stake”.<sup>3</sup> This includes the “availability and management of resources (including population trends, human capital, education and health), emerging technologies, the distribution of growth dividends, government regulations and policies”.<sup>4</sup>

Despite the increased focus on ESG risks at the country level, most research continues to focus more on the impact on corporate issuers. As a result, the awareness of the materiality of risks and the tools to help make informed decisions are lacking for sovereign debt investors. This is particularly important in emerging markets, where the quality of political and economic institutions is varied.

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<sup>1</sup> For specific examples of ESG factors having an impact on credit ratings, see “Environmental, social and governance risks influence sovereign ratings in multiple ways”, 27 June 2018, Moody's. <sup>2</sup> In this paper, we use credit default swap (CDS) spreads as a proxy for sovereign spreads. <sup>3</sup> Page 5, “Shifting perceptions: ESG, credit risk and ratings”, 3 July 2018, available at <https://www.unpri.org/fixed-income/what-rating-agencies-are-doing-on-esg-factors/81.article> <sup>4</sup> Shifting perceptions: ESG, credit risk and ratings”, 3 July 2018. See previous footnote.

# INSIGHT'S COUNTRY SUSTAINABILITY RISK MODEL

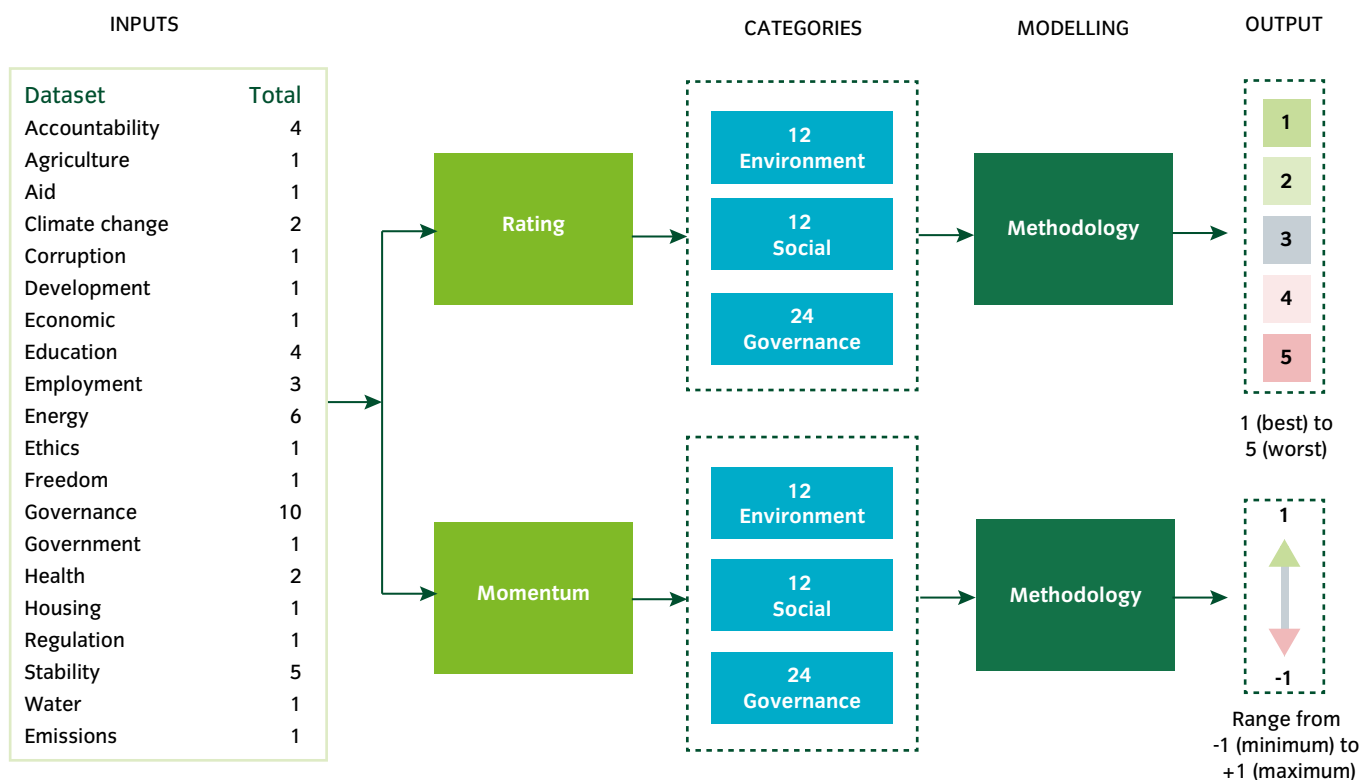
Our model generates two sustainability ratings for each country: an overall ESG score and an ESG momentum score.

- The **overall ESG rating**, from 1 to 5, which provides a current snapshot of a country's performance with regard to ESG factors. This rating can help to differentiate between leaders and laggards, and is designed to identify countries most at risk from ESG issues.
- The **ESG momentum score**, on a scale from +1 to -1, provides an indication of a country's improvement or deterioration with regard to ESG factors over a six-year period. This can help to identify how countries' susceptibility to ESG risks is evolving over time.

We believe the two scores are complementary and provide more useful information than simply an overall ESG score. While overall ESG performance is generally well understood, long-term trends can be more difficult to identify, and could have significant influence on short-term credit ratings and credit spreads. We believe ESG momentum can help to identify countries where historical ESG performance, which so often underpins credit ratings, may be subject to change.

We believe ESG factors can be material but the tools to identify and consider those risks are not well established and can be difficult to integrate within existing investment-risk models. Using this model, we are building sustainability factors directly into the risk and valuation tools that inform our investment decisions.

Figure 1: An overview of Insight's country sustainability risk model<sup>5</sup>



<sup>5</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.





Gareth Colesmith  
Head of Global Rates and  
Macro Research  
Insight Investment



Historically, ESG factors haven't typically been material for developed market sovereign debt – economic and political factors have been a bigger driver of credit risk. In recent years, governance has emerged as a factor directly relevant to credit quality, though third-party credit ratings haven't necessarily incorporated it effectively. Developing this model has therefore been a key development and research priority for us. It provides our portfolio managers and analysts with a new way to identify potentially material risks.



## HOW INSIGHT USES THE MODEL

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Insight integrates the scores generated by its country sustainability risk model within our research. It is used in four principal ways:

**To expand the scope of our existing risk models:** When making investment decisions regarding sovereign debt, and other related debt such as issues from state-owned enterprises where the sovereign is effectively the backing entity, identifying changes in economic conditions and the risk profile of the relevant country are key. ESG indicators can provide another angle on economic and other matters. For example, our country sustainability model supplies two further inputs to the Fixed Income Group's wider models, providing more in-depth information on their investment universe.

**To guide the management of client-specific portfolios with ESG guidelines:** We manage strategies for clients that specify that the overall ESG rating of portfolio holdings must exceed (be better than) that of the relevant benchmark. The model enables us to exclude or focus on issuers according to their ESG performance.

**To support reporting to clients on ESG-specific factors:** The model's ratings enable us to demonstrate how sovereign debt portfolios perform from an ESG perspective, either on an absolute basis or relative to a benchmark.

**To indicate issues for dialogue:** Dialogue with sovereign issuers can be challenging and politically sensitive, but there can be opportunities to open discussions with officials from relevant agencies. Our model presents a tool by which we might identify and prioritise matters to address with sovereign issuers. This is particularly relevant for emerging/developing markets. Dialogue with major sovereign issuers – such as the US – is unlikely to have a meaningful impact without collaboration across a pool of investors, given the amount of issuance. This underscores the importance of collaborative initiatives, such as the IIGCC (Institutional Investors Group on Climate Change), which Insight has supported for over 15 years.

# HOW THE MODEL WORKS

Insight set out to build a ratings model that can complement our existing country valuation and risk models. To ensure the relevance of our ratings for our fixed income strategies, we aimed to focus on metrics from credible sources that also have the potential to be material to country risks.

In this section, we explain how the model generates an overall ESG score and ESG momentum score for each country.

## INPUTS TO THE MODEL

The majority of the datasets are sourced from the World Bank, but also include the United Nations, US Energy Information Administration, International Labour Organisation and several others. In total, 48 specific datasets are incorporated into the model (see Appendix 2 on page 31 for the full list).

The financial significance of the issues covered by the datasets differs depending on the country in question – its political, economic, social, environmental and governance context – and the timeframe of interest to the investor. For the purposes of our

model, and to enable countries to be directly compared, we apply an equal weighting to all the datasets, irrespective of the short or long-term nature of the risk. We acknowledge that this is a broad approach given the range and variety of risks considered by the model. For specific purposes or targeted analyses, we can alter the weightings of the datasets.

Not all datasets include metrics for every country. In total, the model scores 186 countries. We have excluded 31 from inclusion in the final output due to insufficient data across the underlying datasets (see page 30). These countries are not relevant for most fixed income investors given their very limited debt issuance.

Below, we categorise the 48 datasets according to whether they are environmental, social or governance indicators. We also note the publication date of the data sources. While governance data tends to be published regularly, social and environmental data tends to lag behind (see Table 1).

Table 1: Timing of datasets underlying Insight’s country sustainability risk model<sup>6</sup>

Latest year of data	Environmental	Social	Governance	Total
2012	1			1
2014	7	4		11
2015	3	2		5
2016	1	3	6	10
2017		3		3
2018			18	18
<b>Total number of datasets</b>	12	12	24	48

<sup>6</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.





Colm McDonagh  
Head of Emerging Market  
Fixed Income  
Insight Investment



Governance factors have always been a large driver of credit risk and performance within emerging market debt. Therefore, within our country macro models, we have always paid close attention to governance and the quality of institutions to manage critical economic and government functions. Insight's sovereign ESG risk model provides a useful input into our credit evaluation. The use of momentum ratings is a particularly useful innovation, and provides a helpful prism through which we can identify evolving risks and opportunities.



## HOW SCORES ARE GENERATED

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### Overall ESG score

For each country, Insight takes the numerical output from each dataset and generates a score from 0 (the best possible score) to 3 (the worst possible score) for that metric. The scores are an absolute measure of ESG performance, meaning it is possible that many countries may have similar scores for any metric.

Three separate scores are then generated for environmental, social and governance risks for each country. These are an average of the scores for the relevant underlying datasets, which are all equally weighted.

Finally, the environmental, social and governance scores are combined to create an overall ESG score. The environmental and social scores account for 30% of the final overall score, while governance accounts for 40%. This reflects the tendency for governance issues to have a greater short-term impact on a country's creditworthiness, and the larger number of governance metrics within the model.

To sit alongside Insight's internal scoring framework, this overall ESG score is converted to a range from 1 (the best possible score) to 5 (the worst possible score). The distribution of these scores is managed so that the spread of countries across the scores is roughly equal.

### ESG momentum score

For each country, Insight takes the numerical output from each dataset over six years and calculates a positive or negative score to illustrate the trend over that time. Each metric is classified as improving, stable or declining.

A momentum score is then generated for environmental, social and governance risks for each country. This is generated according to the proportion of improving, stable or declining metrics within each pillar.

To ensure consistency between the ratings and momentum performance figures, environmental and social scores account for 30% of the final overall score, while governance accounts for 40%, as with the overall ESG scores.

Momentum scores are on a scale from +1 (maximum possible improvement) to -1 (maximum possible deterioration).

# RESULTS

Our model confirms some common perceptions of how countries perform with regard to ESG issues, but also presents some surprises:

- Stable, high-income developed markets generally score well for overall ESG
- Unstable, low-income emerging markets generally score badly for overall ESG
- ESG momentum scores are mixed - with surprises including Côte d'Ivoire (Ivory Coast) scoring as the most-improved country

We set out the full results from the model, listed alphabetically by country, in Appendix 1 (see pages 25 to 30). In this section, we focus on the best and worst performers by overall ESG score, and the most improved and deteriorated by ESG momentum score.

Some datasets do not include data for every country. We have excluded 31 countries from the model given insufficient data overall (see page 30).

## OVERALL ESG SCORES

For each country, Insight generates an absolute score for ESG performance from 0 (the best possible score) to 3 (the worst possible score).

These are based on environmental and social scores, which each account for 30% of the overall score, and a governance score, which accounts for 40%.

The weighted ESG score is converted to a range from 1 (the best possible score) to 5 (the worst possible score).

For more information, see page 9. Full results are available in Appendix 1.

### Top 10 overall ESG scores<sup>7</sup>

Country	Overall ESG rating 1 (best) to 5 (worst)	Weighted ESG score Range from 0 (best) to 3 (worst)
New Zealand	1	0.21
Iceland	1	0.37
Sweden	1	0.40
Finland	1	0.41
Spain	1	0.48
Denmark	1	0.50
Norway	1	0.52
Portugal	1	0.55
Ireland	1	0.55
Latvia	1	0.56

### Bottom 10 overall ESG scores<sup>7</sup>

Country	Overall ESG rating 1 (best) to 5 (worst)	Weighted ESG score Range from 0 (best) to 3 (worst)
Afghanistan	5	2.16
South Sudan	5	2.15
Syrian Arab Republic	5	2.12
Yemen, Rep.	5	2.01
Iraq	5	1.97
Equatorial Guinea	5	1.93
Niger	5	1.89
Congo, Rep.	5	1.89
Sudan	5	1.88
Cameroon	5	1.87

<sup>7</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.



### Best performer: New Zealand<sup>8</sup>

**New Zealand boasts robust institutions and governance, stable social relations with a broad acknowledgement of human rights based on the rule of law, and limited exposure to environmental risks.**

**Environmental factors:** New Zealand has ratings across all 12 environmental datasets in our database. It scores well for the proportion of its population with access to water and renewable energy but relatively poorly for total greenhouse gas emissions and energy consumption per GDP.

**Social factors:** New Zealand has ratings across 10 of the 12 social datasets in our database. It receives top ratings for all categories with the exception of expenditure on education, which is not as high versus comparable peers.

**Governance factors:** New Zealand has ratings across all 24 of our governance datasets and there are zero governance red flags. Strong ratings are found in multiple areas but there is room for improvement on regulatory environment and quality.

Factor	Score
Environmental	1
Social	1
Governance	1
<b>Rating</b>	<b>1</b>

### Worst performer: Afghanistan<sup>8</sup>

**Afghanistan has suffered after many years of conflict. Politically and socially unstable, little data is available on environmental factors.**

**Environmental factors:** Afghanistan has ratings across four of the 12 environmental datasets in our database. It scores well for the proportion of its population with access to water and fuel exports, but badly for renewable energy consumption and CO2 emissions per capita.

**Social factors:** Afghanistan has ratings across 10 of the 12 social datasets in our database. It receives the worst possible score in six of them, namely grants (excluding technical cooperation), unemployment, school enrolment, life expectancy, refugee population and the proportion of the urban population living in slums. It also scores badly on the proportion of public spending focused on education and mobile cellular subscriptions. On the positive side, it scores relatively well on the labour force participation rate for both men and women, and for child labour.

**Governance factors:** Afghanistan has ratings across all 24 of our governance datasets, and receives the worst possible score in 20 of them. These include perception of corruption, political stability, effectiveness of government, regulatory quality, personal autonomy and individual rights and the rule of law. The only governance factor on which it scores relatively well is on the ease of starting a business.

Factor	Score
Environmental	4
Social	5
Governance	5
<b>Rating</b>	<b>5</b>

<sup>8</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.

© Image: 'In Autumn Dance' by Kamil Nureev (Russia). Insight Astronomy Photographer of the Year competition 2017.

## ESG MOMENTUM SCORES

For each country, Insight generates a momentum score, on a scale from +1 (maximum possible improvement) to -1 (maximum possible deterioration).

These are based on the proportion of improving, stable or declining metrics among the environmental, social and governance datasets over the last six years.

To ensure consistency between the overall ESG ratings and momentum performance figures, environmental and social scores account for 30% of the final overall score, while governance accounts for 40%, as with the overall ESG scores.

For more information, see page 9. Full results are available in Appendix 1.

### Top 10 ESG momentum scores<sup>9</sup>

Country	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Côte d'Ivoire	0.45
Somalia	0.43
Pakistan	0.40
Latvia	0.34
Brunei Darussalam	0.29
Togo	0.28
Belarus	0.26
United States	0.25
Estonia	0.25
Nicaragua	0.24

### Bottom 10 ESG momentum scores<sup>9</sup>

Country	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Eritrea	-0.52
Libya	-0.52
Micronesia, Fed. Sts.	-0.50
Maldives	-0.43
Gabon	-0.42
South Sudan	-0.42
St. Lucia	-0.40
Syrian Arab Republic	-0.37
Barbados	-0.37
Grenada	-0.35

<sup>9</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.



**Most improved: Côte d'Ivoire<sup>10</sup>**

Côte d'Ivoire has stabilised since a coup in 1999 introduced many years of political instability and armed conflict. Since 2011, when UN and French forces helped president-elect Ouattara to gain power, the authorities have focused on rebuilding its economy and infrastructure. Improvements have been clearest in terms of its governance.

**Environmental factors:** Côte d'Ivoire has ratings across 11 of the 12 environmental datasets in our database. It has mixed performance trends for energy use, with negative trends for renewable energy generation, but positive trends for water access and food production.

**Social factors:** Côte d'Ivoire has ratings across 10 of the 12 social datasets in our database. It has a negative trend for education spending, refugee population and labour force participation. Positive trends are found for unemployment rate, life expectancy and access to communications.

**Deteriorated the most: Eritrea<sup>10</sup>**

Eritrea faces a range of challenges. A significant majority of the population is engaged in subsistence agriculture, and a material proportion of the labour force is conscripted into military service. Ruled by President Isaias since gaining independence in 1993, government policy has long-prioritised military spending over other areas.

**Environmental factors:** Eritrea has ratings across 10 of the 12 environmental datasets in our database. It scores well for use of renewable energy consumption and declining emissions. There are negative trends for electricity losses from the grid.

**Social factors:** Eritrea has ratings across nine of the 12 social datasets in our database. Half of metrics show a negative trend, including labour force participation and access to communications. Positive trends are shown for employment, life expectancy, and improvements in refugee population.

**Governance factors:** Côte d'Ivoire has ratings across 23 of the 24 governance datasets in our database. There is a positive momentum for 22 factors. This includes strengthening governance institutions, corruption enforcement, rule of law, economic governance and many others. There are no negative trends.

Factor	Momentum score
Environmental	0.27
Social	0.00
Governance	0.91
<b>ESG momentum score</b>	<b>0.45</b>

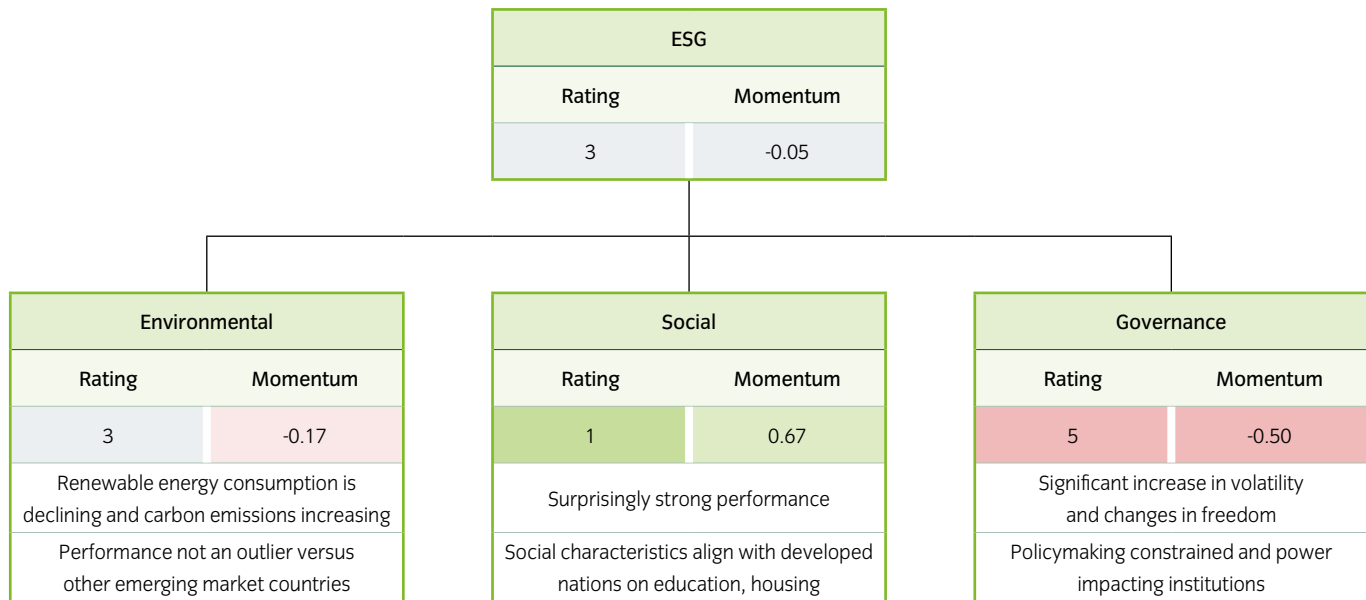
**Governance factors:** Eritrea has ratings across all 24 of our governance datasets. There is a negative trend for 16 metrics and none have a positive trend. Negative momentum is found for metrics that include rule of law, government effectiveness, corruption, functioning of government, and freedoms.

Factor	Momentum score
Environmental	-0.40
Social	-0.33
Governance	-0.75
<b>ESG momentum score</b>	<b>-0.44</b>

<sup>10</sup> As of September 30, 2018. For illustrative purposes only. Models are subject to change without notice.



# EMERGING MARKET CASE STUDY: TURKEY<sup>11</sup>



News flow from Turkey over recent years suggests the quality and effectiveness of governance has been deteriorating, and this has become increasingly material for qualitative risk measurements.

We believe Turkey was already on a path of structural deterioration which accelerated after the attempted coup in June 2016. Policymaking appears to have become constrained and the quality of policymakers has been reduced. President Erdogan has been seeking to consolidate powers for some time – removing technocrats deemed not to be loyal, revamping the judiciary, and reducing the independence of the central bank and other institutions. In 2017, Turkish citizens voted in favour of constitutional amendments that would shift the existing parliamentary system of government towards a presidential system. And since the June 2018 election, which the president's coalition won comfortably, he has moved to further consolidate power, nominating his son-in-law as finance minister. The president now has the power to appoint the governor of the central bank.

These developments have had a clear impact on investor sentiment. Turkey is heavily reliant on short-term portfolio inflows, but historically, fiscal policy has been generally prudent, offsetting the impact of more questionable monetary policy. However, this dependence on short-term flows has become exposed in recent months. Approaching the recent election, the president pushed

for an aggressive pro-growth agenda, much of which has been through aggressive lending at the state-owned bank level. This is a quasi-fiscal push which is hard to measure, and in a country where inflation pressures are elevated and fiscal policy is the strongest anchor for investor sentiment, Turkey's weaknesses have been highlighted – namely, its high current-account deficit and high inflation. In addition, the president has been vocal about his aversion to higher interest rates, which are the primary line of defence for the currency.

Against this backdrop, the outlook is uncertain. Growth is threatened by currency volatility, and the ability of small and medium-sized enterprises (SMEs) to continue spending at current levels, and to continue to finance this level of spending given loss of confidence and currency volatility, is uncertain. SMEs are a large contributor to economic performance and employment and so there is a risk of firms defaulting on loans, which could in turn lead to banks being forced to restructure loans. This is a worst-case scenario, but it would not be the first time, and there are plenty of tools the government and policymakers can use to mitigate the effects.

These changes could have negative social implications as the Turkish economy is not highly skilled and labour is plentiful, with a relatively young population. We don't expect these issues to have a significant environmental impact.

<sup>11</sup> As of September 30, 2018. Opinions are subject to change without notice.



## INVESTMENT VIEW<sup>12</sup>

**Positioning:** We have been more negative on Turkey over the last nine months as pro-growth policies were implemented and the push against sensible monetary policy was strengthened. We have not owned local bonds for some time, and own very little Turkish corporate credit. On average, we have had a short bias to the Turkish lira, but we have tactically managed this exposure since the central bank was forced to hike rates by 500bp in the face of a weakening currency.

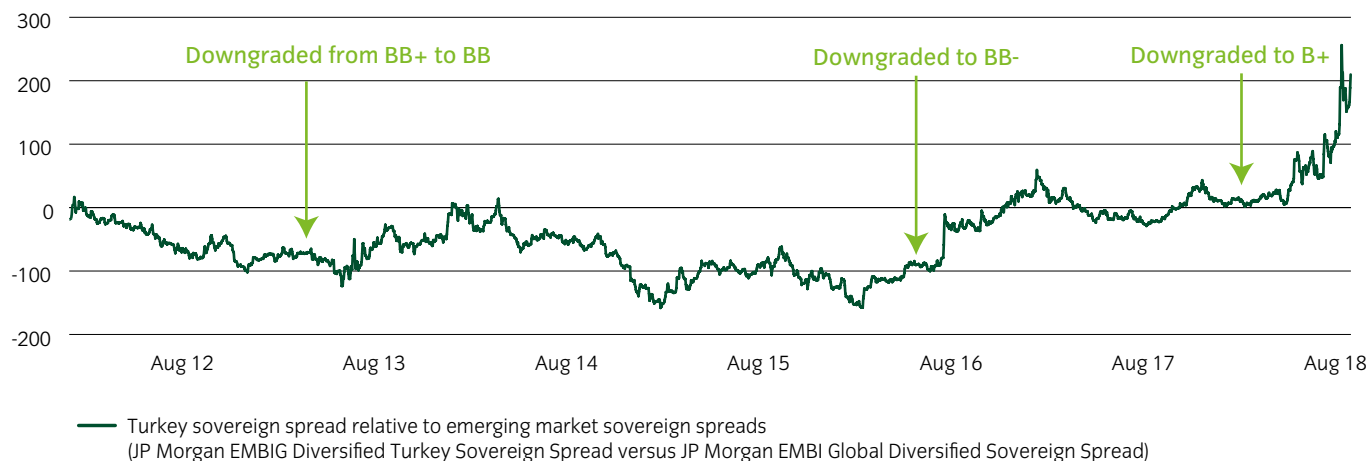
**Risk assessment:** Turkey has moved from a 'normal' emerging market to a country where we are constantly alert to tail risk. Since 2017 our risk assessment has classed Turkey as 'deteriorating'.

**Corporate exposure:** We only hold foreign-owned names. We will consider subsidiaries where the parent is headquartered outside the country as we consider the credit risks to be different.

**Banking sector:** Turkish banks are big issuers of US dollar-denominated debt, and we could potentially invest in these if we believed the risk/reward profile was attractive. We would note that some banks were involved in illegal transactions with Iran. Insight never held issuance from these banks due to concerns over governance – we are aware that for many corporate issuers, governance risks are not necessarily reflected in the price.

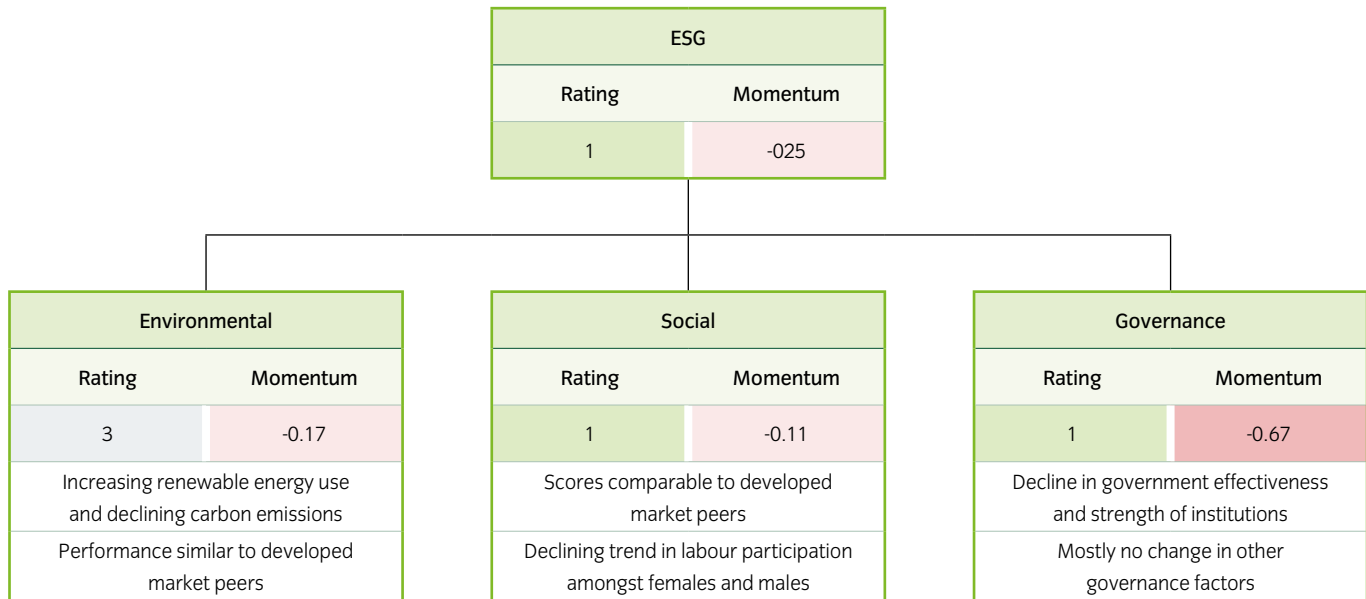
© Image: 'The Road Back Home' by Ruslan Merzlyakov (Latvia)  
Insight Astronomy Photographer of the Year competition 2017

Figure 2: Turkey sovereign spread versus other emerging markets<sup>13</sup>



<sup>12</sup> As of September 30, 2018. Opinions are subject to change without notice. <sup>13</sup> Source: Bloomberg. Credit ratings from Standard & Poor's.

# DEVELOPED MARKET CASE STUDY: AUSTRALIA<sup>14</sup>



Australia's ESG performance is generally strong, driven by social and governance scores, though its environmental score is average. In terms of momentum, its environmental performance has slightly improved and its social performance has deteriorated somewhat – but momentum of its governance score is materially negative.

Australia has experienced a long period of political change. The country's 2007 election led to the defeat of Prime Minister John Howard, who had been in power for over a decade. Since then, the country has been led by six prime ministers. This political instability has meant there is little direction on some fundamental environmental and social issues facing the country, with the influence of independent and minority-interest politicians limiting progress in political discourse. In short, policymaking has become less effective.

For example, in recent years, access to housing has become more limited, but the political sensitivities around the issue have led politicians to avoid discussing potential solutions.

Aside from politics, the Australian economy has an impressive record, with almost three decades of continuous growth. This was in part enabled by a sizeable boom in the mining sector, driven by China's continued near-double-digit growth during the global financial crisis. This more than mitigated the negative impact of the global financial crisis, making Australia somewhat unique among developed economies. However, this has had consequences. The majority of mines are foreign-owned (c.80%), resulting in income flowing out of the country. Also, workers in the industry have been somewhat reluctant to take jobs in other generally lower-paying sectors. As a result, levels of underemployment have risen.

The dominance of mining has also led to division over environmental issues. There is concern that legislation to protect the environment will add to pressure on the mining industry at a time when momentum is slowing, and so some politicians are looking to change previous environmental commitments, which would mean reducing enforcement of environmental regulations and renege on previous laws.

<sup>14</sup> As of September 30, 2018. Opinions are subject to change without notice.

Despite these political, social and environmental risks, Australia retains an AAA rating, although agencies have kept the country on negative watch. For example, in May 2018, S&P Global Ratings reaffirmed its negative outlook.

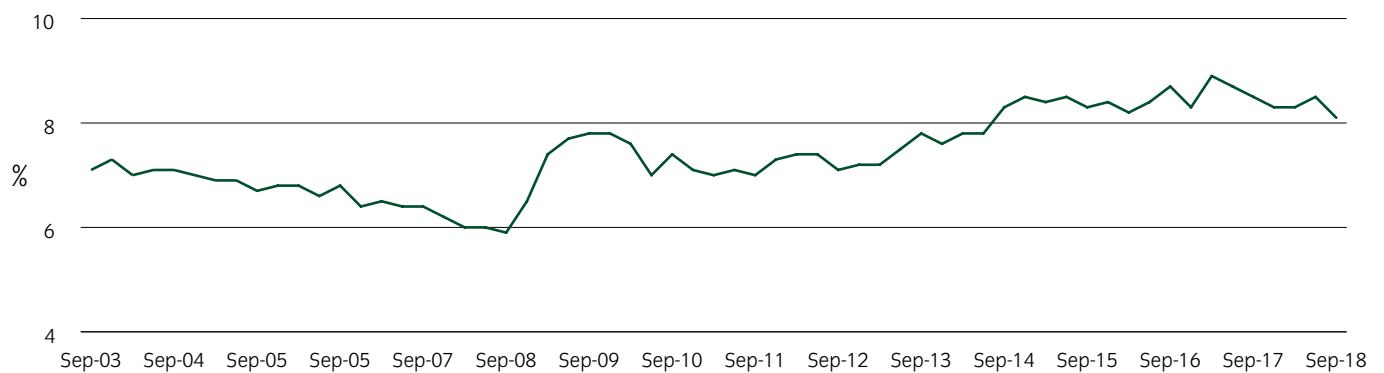
Insight's country sustainability risk model shows that while Australia's governance score remains among the highest in the world, it has notable negative momentum, which reflects the challenging political environment. It also aligns with our view that the country is likely to underperform on ESG performance at least in the near term, as government policymaking is

unlikely to be effective; social issues – such as underemployment and deteriorating social cohesion – are likely to have a negative impact; and the lack of enthusiasm for environmental regulations suggests little will happen to support an improvement in environmental risks.

We do not currently expect economic indicators or the markets to reflect Australia's ESG performance. However, the ESG scores from our model reinforce our view of Australia's weak fundamentals and overall direction, and reflect positioning in our investment portfolios.

© Image: 'The cable route of Half Dome at night' by Kurt Lawson and Sean Geobel (USA) Insight Astronomy Photographer of the Year competition 2017

Figure 3: Australian underemployment <sup>15</sup>



<sup>15</sup>Source: Bloomberg, as of June 30, 2018.



# INITIAL INSIGHTS

In this section, we highlight some insights from the model, but we would caution that these are initial observations to prompt avenues of further inquiry and in-depth analysis, rather than robust conclusions that should guide investor behaviour. We expect confidence on the significance and materiality of ESG factors will change over time as we refine our model and the quality and quantity of third-party research into the materiality of ESG factors on investment performance grows.

## HIGH INCOME AND GDP CORRELATES WITH STRONGER GOVERNANCE AND SOCIAL SCORES – BUT NOT ENVIRONMENTAL

The model suggests a positive relationship between a country's income level (as defined by the World Bank) and GDP, and its overall ESG score (see Figure 4).

However, while the same trend is generally true for governance and social ratings (where better scores broadly correlate with higher income and GDP per capita), this is not true of environmental scores. Our model flags many developed countries as having poor environmental scores. Examples of countries with high GDP-per-capita metrics and governance, but relatively weak environmental scores, are Australia, Singapore and the UK.

Figure 4: ESG scores of countries according to income and GDP<sup>16</sup>



Overall ESG		Environmental		Social		Governance	
Score	Average GDP per capita (USD)	Score	Average GDP per capita (USD)	Score	Average GDP per capita (USD)	Score	Average GDP per capita (USD)
1	39,934.09	1	16,093.55	1	21,650.78	1	49,323.21
2	14,875.42	2	13,552.24	2	5,464.79	2	24,358.48
3	7,469.57	3	10,770.48	3	2,421.84	3	7,771.91
4	3,753.55	4	12,621.42	4	862.08	4	3,721.46
5	1,879.35	5	15,893.70	5	1,713.02	5	1,872.57

<sup>16</sup>Source: Insight Investment and Bloomberg. As of September 30, 2018.

## EMERGING MARKETS' GDP GROWTH CORRELATES WITH IMPROVING ESG PERFORMANCE

There are indications that the model's ESG momentum signal correlates with GDP-per-capita growth rate. When momentum figures are placed into deciles, from most deteriorated to most improved, those in the top decile exhibit the strongest GDP-per-capita growth rate, while those with lower momentum scores generally have lower GDP-per-capita growth (see Figure 5).

This is driven by emerging markets (see Figure 6), while in developed markets, ESG momentum is mixed and does not appear to correlate with relative GDP-per-capita growth rates (see Figure 7). This suggests there is a relationship in non-developed markets between improving ESG characteristics and the growing wealth of a nation.

However, we would note that this data does not show whether GDP growth is a leading indicator of changes in ESG performance, or vice versa.

We would reiterate that in this analysis we measure the correlation between the rate of economic growth and ESG momentum, rather than a nation's actual/absolute GDP-per-capita over the period. We calculated the GDP-per-capita growth rate by taking an annual figure, based on an average of monthly GDP-per-capita growth rates. This was mapped against the ESG momentum figure, and to ensure similarity a linear-regression figure was generated.

Figure 5: Average GDP-per-capita growth, per decile of ESG momentum<sup>17</sup>

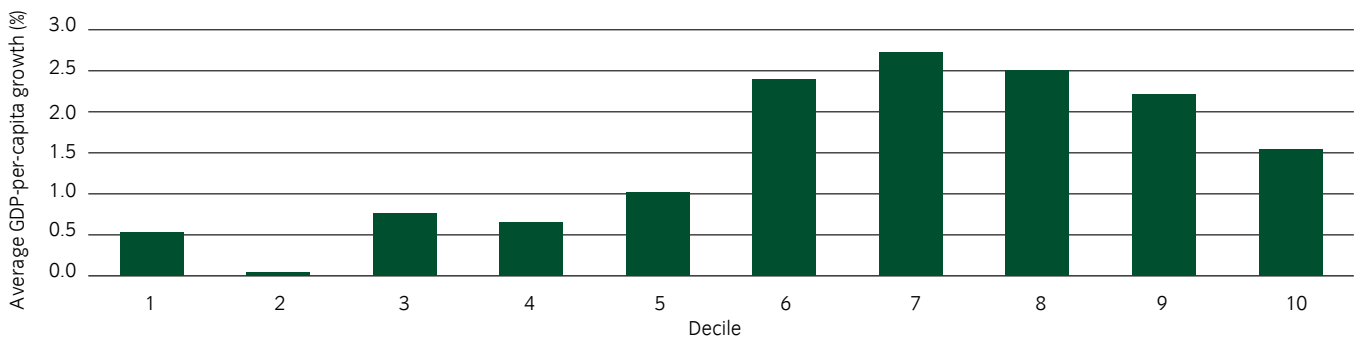
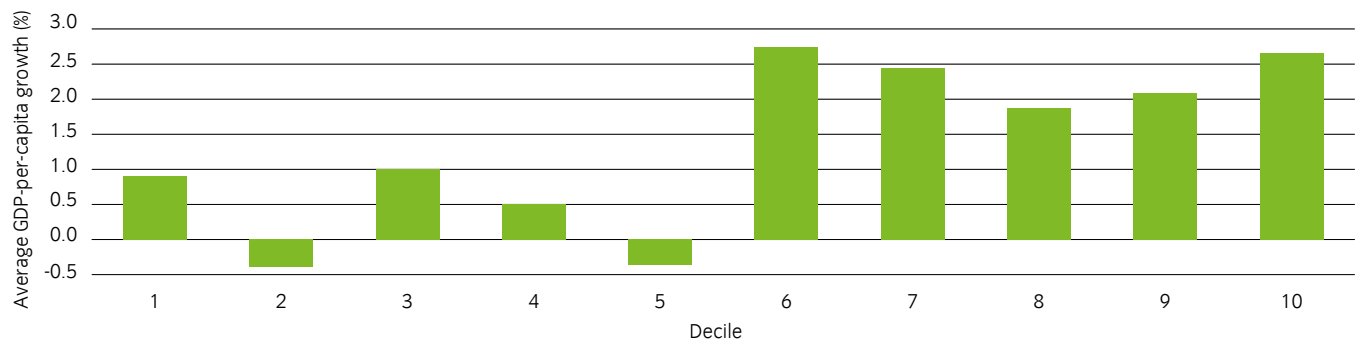
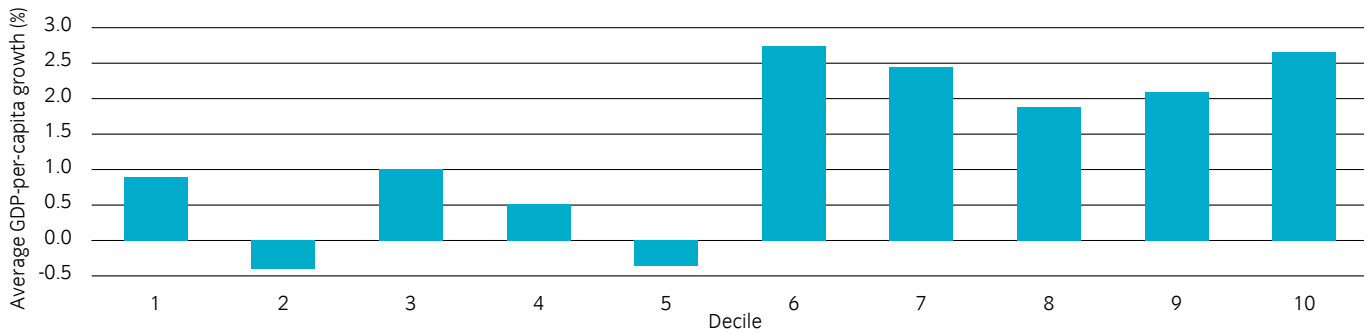


Figure 6: Average GDP-per-capita growth, per decile of ESG momentum, in emerging markets<sup>17</sup>



<sup>17</sup>Source: Insight Investment and Bloomberg. As of September 30, 2018.

Figure 7: Average GDP-per-capita growth, per decile of ESG momentum, in developed markets<sup>18</sup>



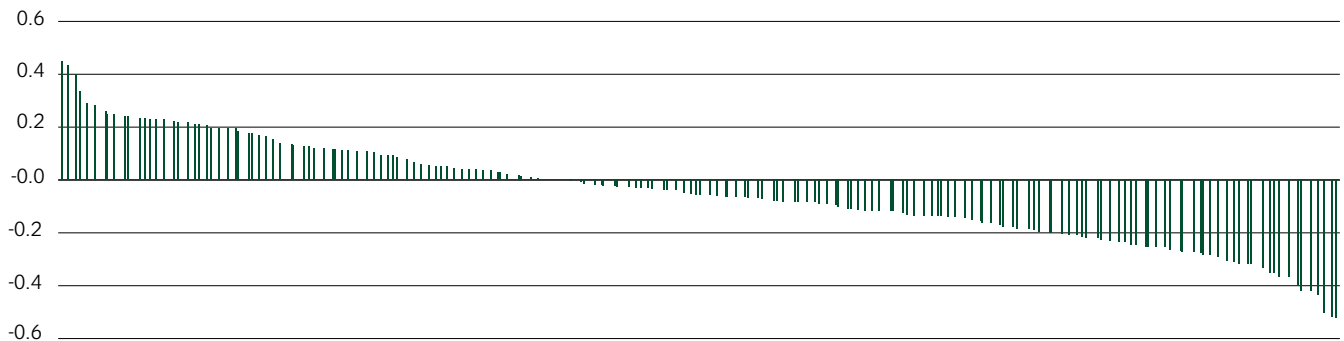
### MORE COUNTRIES ARE DETERIORATING ON ESG THAN IMPROVING

The ESG momentum scores generated by the model suggest that most countries' ESG performance has deteriorated in recent years (see Figure 8).

Notably, many developed markets have deteriorating ESG momentum scores. More than half of developed market countries have a negative governance momentum score, alongside mixed performance for environmental and social factors. Some developed nations have experienced a fall in GDP per capita but their performance in terms of governance has remained strong (e.g. Ireland). Others, perhaps as a result of economic weakness compounded by austerity policies, have moved towards forms of government that have weakened some institutions, leading to a deteriorating governance score.

Many developed markets have deteriorating ESG momentum scores

Figure 8: Countries' ESG momentum, from best to worst



<sup>18</sup>Source: Insight Investment and Bloomberg. As of September 30, 2018.



# CORRELATIONS WITH RATINGS AND RISK SENTIMENT

Initial analysis, shown in this section, suggests there has been little or no relationship between the ESG performance or momentum of a country and its credit rating or credit spreads.

We believe this reflects several points:

- Many other factors, as well as ESG issues, may have a more significant impact on a country's credit rating and credit spreads
- The materiality of ESG factors will differ according to country and region, reflecting political, economic, social and environmental diversity
- Credit ratings agencies vary in the extent to which ESG factors directly influence their ratings
- The time period over which ESG factors may have an impact can be very long term – longer than the six years currently covered by our model

We believe these points support our contention that more research on the impact of ESG factors and their relationship with other risk metrics is required. The fundamental proposition that investors should incorporate analysis of all potentially material risks – including ESG factors – remains unaffected.

## MODERATE CORRELATION BETWEEN ABSOLUTE ESG PERFORMANCE AND CREDIT RATINGS

Major credit rating agencies incorporate a range of sustainability and ESG factors within their sovereign ratings.<sup>19</sup> Our analysis shows that developed markets generally have both stronger credit ratings and overall ESG scores, while emerging markets generally have lower credit ratings and ESG scores.

We plotted the outputs of our country sustainability risk model against the major agencies' sovereign issuer ratings (Figures 9 and 10). To measure the relationship, Insight transposed an average credit rating (based on ratings provided by Moody's, S&P and Fitch) into a numerical scale. For example, AAA would be equivalent to 1, BBB equivalent to 9, and CCC equivalent to 18.

Figure 9: Developed markets' ESG performance and credit ratings<sup>20</sup>

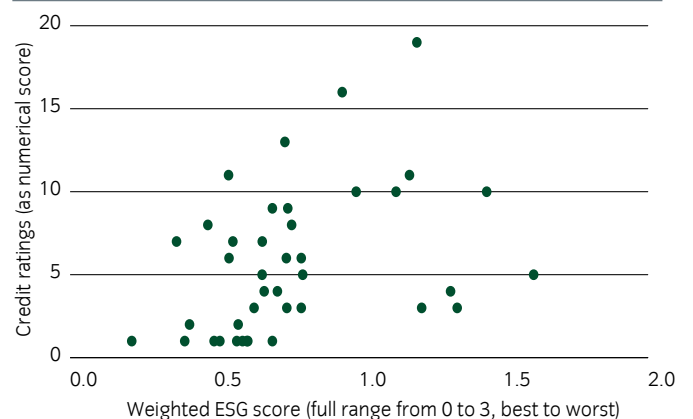
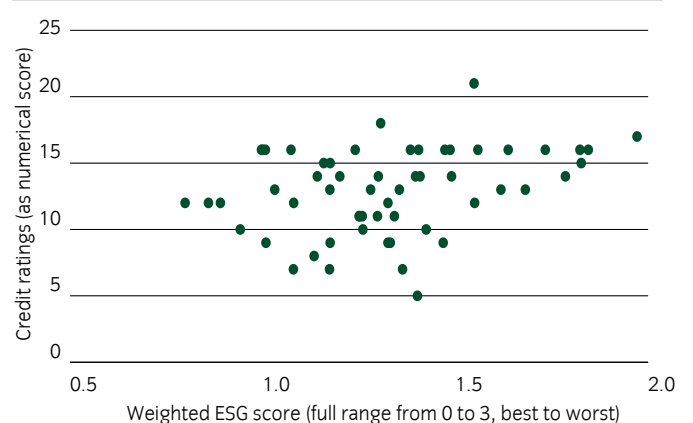


Figure 10: Emerging markets' ESG performance and credit ratings<sup>21</sup>



<sup>19</sup> For S&P, see [https://www.spratings.com/en\\_US/products/-/product-detail/our-approach-to-esg-in-ratings](https://www.spratings.com/en_US/products/-/product-detail/our-approach-to-esg-in-ratings). For Moody's, see "Environmental, social and governance risks influence sovereign ratings in multiple ways", June 27, 2018. For Fitch, see <https://www.fitchratings.com/api/v2/report/919171/file>. <sup>20</sup> Source: Insight Investment and Bloomberg. As of September 30, 2018. <sup>21</sup> Source: Insight Investment and Bloomberg. Credit rating used is Moody's and emerging market countries are those with available data. As of September 30, 2018.

## NO CLEAR CORRELATION BETWEEN ESG MOMENTUM AND CHANGE IN CREDIT RATINGS

Our analysis suggests there is no clear relationship between a country's ESG momentum score and how its credit rating has changed in recent years.

We plotted our model's ESG momentum scores against the change in credit ratings for each country over the last six years, for each of the three main credit rating agencies (see Figures 11, 12 and 13).

This analysis suggests:

- Most countries that have changing ESG scores have not experienced a change in credit ratings. This is likely because the changing ESG factors may not be deemed material to credit risk.
- There are some examples where a decline in credit rating correlates with a decline in ESG performance.

Figure 11: Relationship between change in Fitch credit ratings and Insight ESG momentum score<sup>22</sup>

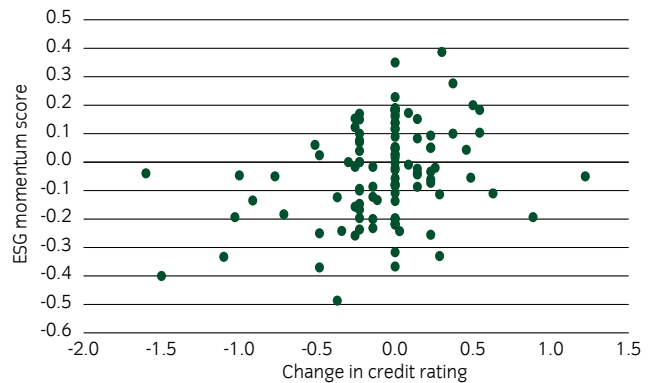


Figure 12: Relationship between change in S&P credit ratings and Insight ESG momentum score<sup>22</sup>

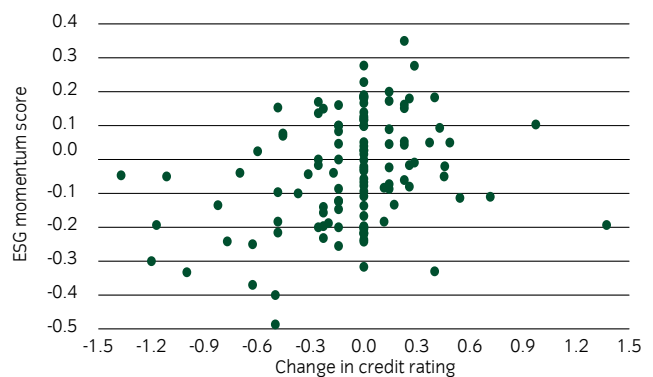
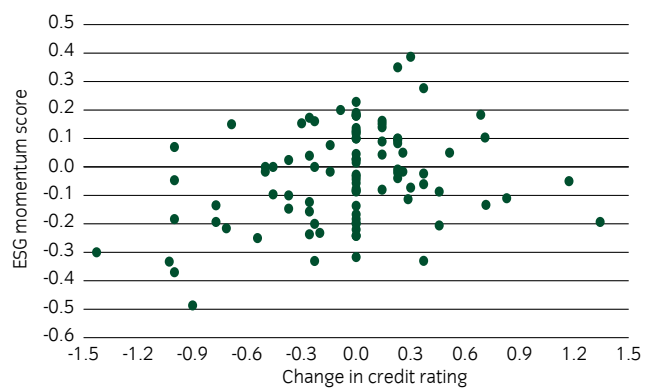


Figure 13: Relationship between change in Moody's credit ratings and Insight ESG momentum score<sup>22</sup>



<sup>22</sup> Source: Insight Investment and Bloomberg. As of September 30, 2018.

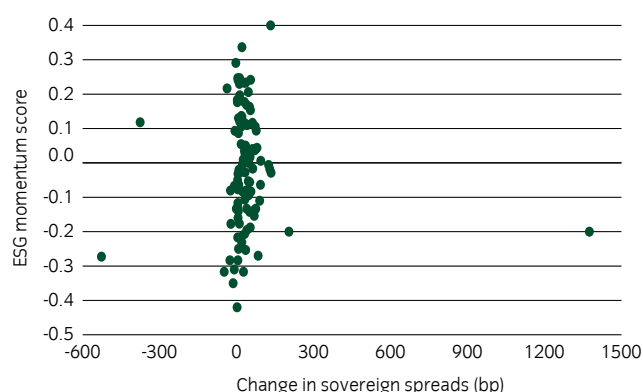
## NO APPARENT RELATIONSHIP BETWEEN ESG MOMENTUM AND MARKET PERCEPTION OF SOVEREIGN CREDIT RISK

The sovereign spread is the standard measure for how markets perceive changes in the credit risk of issuers. It is a useful barometer of issuer performance and is widely used by investors to hedge risk. Our analysis shows that there is no meaningful relationship between the improvement or deterioration in a country's ESG performance, and changes in its sovereign spreads.

There are some outliers: for example, a marked widening in the sovereign spread for Venezuela coincided with a strongly negative ESG momentum score. But such outliers are the exception to the overall trend.

We plotted the ESG momentum scores generated by our country sustainability risk model against changes in the relevant sovereign spreads over the same period of time (see Figure 14).

Figure 14: Relationship between change in sovereign spreads and Insight ESG momentum score<sup>23</sup>



<sup>23</sup> Source: Insight Investment and Bloomberg. As of September 30, 2018. For each country, we took the average annual 5-year CDS spread for each of the last six years, and applied a linear regression to generate a single measure that represents the change in CDS spreads over that period.

## LIMITATIONS OF INSIGHT'S COUNTRY SUSTAINABILITY RISK MODEL

We would note that while credit ratings and sovereign spreads data are always 'live' and reflect current perceptions and analysis of material risks, our country sustainability risk model is based on historical data, some of which is several years old – especially environmental datasets (see page 8 for more information).

As more timely ESG datasets become available, the relationship between ESG momentum and any change in credit ratings could become more, or less, pronounced.

As a participant in the PRI's ESG in Credit Ratings Initiative, we are collaborating with credit rating agencies and other stakeholders to ensure that ESG factors are effectively incorporated into credit rating models for sovereign as well as corporate issuers.

# CONCLUSION

Insight's country sustainability risk model provides clear signals of absolute ESG performance, and recent improvement or deterioration in ESG performance, for countries worldwide.

ESG factors have been understood as potentially material for sovereigns, but systematic processes and research methods to build these factors into credit ratings and evaluations have only been established more recently.

Insight's proprietary ratings and momentum scores complement our existing tools for evaluating sovereign and sovereign-related debt. Insight has shown that building a country sustainability risk model not only is possible and credible but can complement and reinforce traditional evaluations of sovereign issuers.

The model results are in many ways unsurprising: for example, better-governed countries exhibit stronger economic and credit performance. The relationship between the model's ESG results and economic or credit indicators are more clearly visible in emerging markets where these factors tend to be more material. Developed markets, according to the model, are less materially impacted by ESG issues on a systemic basis. However, the momentum scores often align with our portfolio managers' views on the direction of individual countries.

The model faces several challenges and limitations. The first is the timeliness of data. Most available environmental and social datasets were published before 2017, meaning they may not reflect existing political and policy directions. A second challenge

is the frequency of data updates, with some data points updated less than annually, meaning there can be a lag before they reflect country changes. A third limitation is the breadth of comparable data, with useful data available for developed markets but less data for emerging markets.

This may explain why there is less published research on the relationship between sustainability and individual country risk than corporate risk. We believe more research is needed in several areas, such as exploring the relationship between sustainability and country risk and how well these factors are priced in by the market. It seems ESG factors are often not considered material to issuer risk. Where ESG factors are material, they are most often governance factors, rather than environmental or social issues.

Insight has built several ESG models to complement our existing research and investment processes. This is our first model for sovereign assessments and was developed in response to client interest and ESG sovereign portfolios. The model results are integrated into portfolio-management systems and as part of our bottom-up review of country issuer risk. We believe the ESG research described in this report and its use by Insight teams is compatible with our commitment to the PRI to integrate ESG factors into our investment decision-making.

# APPENDIX 1

## FULL RESULTS

The full ratings table for 186 countries is listed below, alphabetically. Excluded countries are named on page 30. Scores as of September 30, 2018.

Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Afghanistan	4	5	5	→	5	-0.08
Albania	3	1	3	→	3	-0.25
Algeria	4	2	5	→	4	-0.18
Angola	4	3	5	→	5	-0.31
Antigua and Barbuda	3	1	3	→	2	-0.12
Argentina	3	1	4	→	3	0.00
Armenia	3	2	4	→	3	0.07
Australia	3	1	1	→	1	-0.25
Austria	1	1	1	→	1	-0.18
Azerbaijan	4	2	5	→	4	0.05
Bahamas, The	3	2	3	→	3	-0.18
Bahrain	4	1	5	→	3	-0.12
Bangladesh	3	2	5	→	4	-0.06
Barbados	5	1	3	→	3	-0.37
Belarus	4	1	4	→	3	0.26
Belgium	3	1	2	→	1	-0.11
Belize	2	2	3	→	2	-0.27
Benin	3	3	4	→	3	-0.25
Bhutan	2	2	3	→	3	0.06
Bolivia	3	3	5	→	4	-0.19
Bosnia and Herzegovina	3	2	5	→	3	0.19
Botswana	3	2	4	→	3	-0.13
Brazil	2	1	4	→	3	-0.08
Brunei Darussalam	3	1	4	→	2	0.29
Bulgaria	3	1	3	→	2	0.02
Burkina Faso	2	4	5	→	4	0.22
Burundi	1	4	5	→	4	-0.09
Cabo Verde	2	1	3	→	2	-0.12
Cambodia	2	5	5	→	5	-0.13

Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Cameroon	3	4	5	→	5	-0.14
Canada	2	1	1	→	1	0.18
Central African Republic	2	5	5	→	5	-0.16
Chad	2	3	5	→	5	-0.06
Chile	2	1	2	→	1	-0.03
China	3	1	5	→	3	0.11
Colombia	3	2	4	→	3	0.13
Comoros	1	5	5	→	4	-0.29
Congo, Dem. Rep.	2	4	5	→	5	-0.24
Congo, Rep.	3	3	5	→	5	-0.11
Costa Rica	1	1	3	→	2	0.05
Côte d'Ivoire	3	4	5	→	4	0.45
Croatia	3	1	3	→	2	0.09
Cyprus	3	1	1	→	1	-0.13
Czech Republic	3	1	1	→	1	0.17
Denmark	1	1	1	→	1	0.09
Djibouti	3	3	5	→	4	-0.17
Dominica	3	1	2	→	2	-0.23
Dominican Republic	3	1	4	→	3	-0.02
Ecuador	4	2	5	→	3	-0.09
Egypt, Arab Rep.	3	2	5	→	4	-0.06
El Salvador	2	2	3	→	3	-0.25
Equatorial Guinea	4	3	5	→	5	-0.22
Eritrea	3	4	5	→	5	-0.52
Estonia	2	1	1	→	1	0.25
Ethiopia	3	4	5	→	5	-0.08
Fiji	1	1	4	→	3	0.22
Finland	1	1	1	→	1	-0.22
France	2	1	2	→	1	-0.06
Gabon	3	5	5	→	5	-0.42
Gambia, The	1	4	5	→	4	-0.26
Georgia	2	1	3	→	2	0.19
Germany	2	1	1	→	1	-0.14
Ghana	3	3	4	→	3	-0.18
Greece	3	1	3	→	2	-0.20
Grenada	3	1	3	→	2	-0.35



Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Guatemala	2	2	4	→	3	0.05
Guinea	2	4	5	→	4	0.20
Guinea-Bissau	2	4	5	→	5	0.00
Guyana	1	3	4	→	3	-0.04
Haiti	3	4	5	→	5	-0.32
Honduras	2	2	5	→	3	-0.08
Hong Kong SAR, China	5	1	3	→	3	-0.13
Hungary	3	1	3	→	2	-0.08
Iceland	1	1	1	→	1	0.16
India	4	2	3	→	3	0.23
Indonesia	3	2	4	→	3	0.21
Iran, Islamic Rep.	3	1	5	→	4	0.03
Iraq	4	5	5	→	5	-0.05
Ireland	2	1	1	→	1	-0.11
Israel	3	1	2	→	2	0.03
Italy	2	1	2	→	1	-0.14
Jamaica	3	1	3	→	2	0.12
Japan	3	1	1	→	1	0.23
Jordan	3	3	4	→	3	0.04
Kazakhstan	4	1	4	→	3	0.09
Kenya	2	3	5	→	4	0.04
Kiribati	4	3	3	→	3	-0.24
Korea, Rep.	4	1	2	→	2	0.12
Kosovo	4	1	4	→	3	-0.04
Kuwait	4	1	5	→	4	-0.28
Kyrgyz Republic	3	1	5	→	3	0.00
Lao PDR	2	3	5	→	4	0.00
Latvia	2	1	1	→	1	0.34
Lebanon	3	1	5	→	3	-0.21
Lesotho	2	2	4	→	3	-0.20
Liberia	1	3	5	→	3	-0.23
Libya	4	1	5	→	4	-0.52
Lithuania	3	1	1	→	1	0.15
Luxembourg	2	1	1	→	1	-0.12
Macedonia, FYR	3	1	3	→	3	-0.15
Madagascar	2	4	5	→	4	0.11

Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Malawi	2	3	4	→	3	0.13
Malaysia	4	1	3	→	3	-0.02
Maldives	5	1	5	→	4	-0.43
Mali	1	5	5	→	4	-0.01
Malta	4	1	3	→	2	0.11
Marshall Islands	3	1	3	→	2	-0.33
Mauritania	4	3	5	→	4	-0.05
Mauritius	3	1	1	→	2	-0.23
Mexico	3	3	4	→	3	0.03
Micronesia, Fed. Sts.	4	3	3	→	3	-0.50
Moldova	4	1	4	→	3	-0.22
Mongolia	5	3	3	→	4	-0.32
Montenegro	5	1	3	→	3	-0.20
Morocco	3	1	4	→	3	-0.03
Mozambique	3	3	5	→	4	-0.35
Myanmar	3	4	5	→	5	-0.06
Namibia	3	3	4	→	3	-0.08
Nepal	2	3	5	→	3	0.21
Netherlands	3	1	1	→	1	-0.02
New Zealand	1	1	1	→	1	0.13
Nicaragua	1	2	5	→	3	0.24
Niger	4	4	5	→	5	0.23
Nigeria	3	4	5	→	5	0.01
Norway	2	1	1	→	1	-0.16
Oman	4	1	5	→	3	0.01
Pakistan	3	4	5	→	4	0.40
Palau	5	1	3	→	3	-0.12
Panama	3	2	3	→	3	-0.08
Papua New Guinea	2	3	4	→	3	-0.03
Paraguay	3	2	4	→	3	-0.01
Peru	3	2	3	→	3	-0.03
Philippines	3	3	5	→	3	0.04
Poland	2	1	2	→	2	0.20
Portugal	1	1	1	→	1	-0.27
Qatar	4	1	4	→	3	-0.07
Romania	3	1	3	→	2	0.11

Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Russian Federation	4	1	4	→	3	0.22
Rwanda	1	4	4	→	3	0.00
Samoa	1	1	4	→	2	-0.06
Saudi Arabia	4	2	5	→	4	-0.32
Senegal	3	3	4	→	3	0.04
Serbia	3	1	3	→	3	-0.02
Seychelles	3	1	4	→	3	0.02
Sierra Leone	2	3	5	→	3	-0.04
Singapore	4	1	3	→	2	0.18
Slovak Republic	3	1	2	→	1	0.12
Slovenia	3	1	1	→	2	0.11
Solomon Islands	1	1	4	→	2	0.13
Somalia	1	5	5	→	5	0.43
South Africa	4	2	4	→	3	-0.03
South Sudan	4	5	5	→	5	-0.42
Spain	1	1	1	→	1	-0.05
Sri Lanka	3	2	5	→	3	0.18
St. Kitts and Nevis	5	1	2	→	2	-0.10
St. Lucia	4	1	2	→	3	-0.40
St. Vincent and the Grenadines	2	1	3	→	2	-0.27
Sudan	2	5	5	→	5	-0.23
Suriname	3	1	4	→	3	-0.12
Swaziland	2	3	5	→	4	-0.09
Sweden	1	1	1	→	1	0.24
Switzerland	3	1	1	→	1	-0.28
Syrian Arab Republic	5	4	5	→	5	-0.37
Tajikistan	3	1	5	→	3	-0.07
Tanzania	2	4	5	→	4	0.05
Thailand	1	1	5	→	3	0.23
Timor-Leste	2	2	5	→	3	-0.15
Togo	3	5	5	→	5	0.28
Tonga	1	1	3	→	2	0.21
Trinidad and Tobago	3	1	3	→	3	-0.13
Tunisia	3	2	4	→	3	0.01
Turkey	3	1	5	→	3	-0.05
Uganda	2	5	5	→	4	-0.20

Country	Environmental	Social	Governance		Overall ESG rating 1 (best) to 5 (worst)	ESG momentum score Range from -1 (deteriorating) to +1 (improving)
Ukraine	3	2	4	→	3	0.12
United Arab Emirates	4	1	4	→	3	-0.07
United Kingdom	3	1	1	→	1	0.14
United States	2	1	2	→	2	0.25
Uruguay	2	1	1	→	1	-0.02
Uzbekistan	3	1	5	→	3	0.09
Vanuatu	1	1	3	→	2	0.08
Venezuela, RB	3	1	5	→	4	-0.27
Vietnam	3	3	5	→	3	0.04
West Bank and Gaza	3	2	5	→	4	-0.30
Yemen, Rep.	4	5	5	→	5	-0.21
Zambia	2	3	5	→	3	-0.13
Zimbabwe	3	3	5	→	5	0.23

## COUNTRIES EXCLUDED FROM INSIGHT'S COUNTRY SUSTAINABILITY RISK MODEL

Country	Bond issuance?
Aruba	Yes
Andorra	Yes
Bermuda	Yes
Channel Islands	No
Curaçao	No
Cayman Islands	Yes
Faroe Islands	Yes
Gibraltar	No
Greenland	No
Guam	No
Isle of Man	Yes
Liechtenstein	No
Macao SAR, China	No
St. Martin (French part)	No
Monaco	No
Northern Mariana Islands	No

Country	Bond issuance?
New Caledonia	No
Puerto Rico	Yes
French Polynesia	No
San Marino	Yes
Sint Maarten (Dutch part)	No
Turks and Caicos Islands	No
British Virgin Islands	No
Virgin Islands (U.S.)	No
Korea, Dem. People's Rep.	No
São Tomé and Príncipe	No
American Samoa	No
Cuba	No
Nauru	No
Turkmenistan	No
Tuvalu	No

# APPENDIX 2

## DATASETS USED IN INSIGHT'S COUNTRY SUSTAINABILITY RISK MODEL

Type	Indicator	Description	Data source	Latest year available
Environmental	Air pollution	Percent of population exposed to ambient concentrations of PM2.5 that exceed the WHO guideline value is defined as the portion of a country's population living in places where mean annual concentrations of PM2.5 are greater than 10 micrograms per cubic meter, the guideline value recommended by the World Health Organization as the lower end of the range of concentrations over which adverse health effects due to PM2.5 exposure have been observed.	Global Burden of Disease study	2015
Environmental	Coal usage	Sources of electricity refer to the inputs used to generate electricity. Coal refers to all coal and brown coal, both primary (including hard coal and lignite-brown coal) and derived fuels (including patent fuel, coke oven coke, gas coke, coke oven gas, and blast furnace gas). Peat is also included in this category.	IEA	2014
Environmental	Electricity efficiency	Electric power transmission and distribution losses include losses in transmission between sources of supply and points of distribution and in the distribution to consumers, including pilferage.	IEA	2014
Environmental	Electricity production from renewables	Electricity production from renewable sources, excluding hydroelectric, includes geothermal, solar, tides, wind, biomass, and biofuels.	IEA	2014
Environmental	Emissions per capita	Carbon dioxide emissions are those stemming from the burning of fossil fuels and the manufacture of cement.	World Bank	2014
Environmental	Energy exports	Fuels comprise the commodities in SITC section 3 (mineral fuels, lubricants and related materials).	World Bank	2016
Environmental	Food production	Food production index covers food crops that are considered edible and that contain nutrients. Coffee and tea are excluded because, although edible, they have no nutritive value.	FAO	2014
Environmental	GDP per unit of energy	GDP per unit of energy use is the PPP GDP per kilogram of oil equivalent of energy use. PPP GDP is gross domestic product converted to 2011 constant international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as a US dollar has in the United States.	IEA	2014
Environmental	Greenhouse gas emissions	Total greenhouse gas emissions in kt of CO2 equivalent are composed of CO2 totals excluding short-cycle biomass burning (such as agricultural waste burning and Savannah burning) but including other biomass burning (such as forest fires, post-burn decay, peat fires and decay of drained peatlands), all anthropogenic CH4 sources, N2O sources and F-gases (HFCs, PFCs and SF6).	Emission Database for Global Atmospheric Research	2012
Environmental	Net savings after environment externalities	Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage.	World Bank	2015
Environmental	Renewable energy consumption	Renewable energy consumption is the share of renewables energy in total final energy consumption.	Sustainable Energy for All	2014

Type	Indicator	Description	Data source	Latest year available
Environmental	Water quality access	Access to an improved water source refers to the percentage of the population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection).	WHO	2015
Social	Grant recipients	Grants are defined as legally binding commitments that obligate a specific value of funds available for disbursement for which there is no repayment requirement. Data are in current US dollars.	World Bank	2015
Social	Children workers	Children in employment refer to children involved in economic activity for at least one hour in the reference week of the survey.	ILO	2014
Social	Education enrolment	Gender parity index for gross enrollment ratio in primary and secondary education is the ratio of girls to boys enrolled at primary and secondary levels in public and private schools.	UNESCO	2014
Social	Education expense	Total general (local, regional and central) government expenditure on education (current, capital, and transfers), expressed as a percentage of total general government expenditure on all sectors (including health, education, social services, etc). It includes expenditure funded by transfers from international sources to government. Public education expenditure includes spending by local/municipal, regional and national governments (excluding household contributions) on educational institutions (both public and private), education administration, and subsidies for private entities (students/households and other private entities). In some instances data on total public expenditure on education refers only to the ministry of education and can exclude other ministries that spend a part of their budget on educational activities. The indicator is calculated by dividing total public expenditure on education incurred by all government agencies/departments by the total government expenditure and multiplying by 100. For more information, consult the UNESCO Institute of Statistics website: <a href="http://www.uis.unesco.org/Education/">http://www.uis.unesco.org/Education/</a>	UNESCO	2014
Social	Female labour participation	Labour force participation rate for ages 15-24 is the proportion of the population ages 15-24 that is economically active: all people who supply labour for the production of goods and services during a specified period.	ILO	2017
Social	Innovation	Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.	UNESCO	2016
Social	Life expectancy	Life expectancy at birth indicates the number of years a new-born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	World Bank	2015
Social	Male labour participation	Labour force participation rate for ages 15-24 is the proportion of the population ages 15-24 that is economically active: all people who supply labour for the production of goods and services during a specified period.	ILO	2017
Social	Poverty in cities	Population living in slums is the proportion of the urban population living in slum households. A slum household is defined as a group of individuals living under the same roof lacking one or more of the following conditions: access to improved water, access to improved sanitation, sufficient living area, and durability of housing.	UN Habitat	2014



Type	Indicator	Description	Data source	Latest year available
Social	Refugee population	Refugees are people who are recognized as refugees under the 1951 Convention Relating to the Status of Refugees or its 1967 Protocol, the 1969 Organization of African Unity Convention Governing the Specific Aspects of Refugee Problems in Africa, people recognized as refugees in accordance with the UNHCR statute, people granted refugee-like humanitarian status, and people provided temporary protection. Asylum seekers—people who have applied for asylum or refugee status and who have not yet received a decision or who are registered as asylum seekers—are excluded. Palestinian refugees are people (and their descendants) whose residence was Palestine between June 1946 and May 1948 and who lost their homes and means of livelihood as a result of the 1948 Arab-Israeli conflict. Country of origin generally refers to the nationality or country of citizenship of a claimant.	UNHCR	2016
Social	Technology access	Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e. that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.	International Telecommunication Union	2016
Social	Unemployment	Unemployment refers to the share of the labour force that is without work but available for and seeking employment.	ILO	2017
Governance	Corruption management process	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	Worldwide Governance Indicators	2016
Governance	Corruption Perception Index	The CPI scores and ranks countries/territories based on how corrupt a country's public sector is perceived to be by experts and business executives.	Transparency International	2018
Governance	Development efficiency	This topic tracks the procedures, time and cost to build a warehouse—including obtaining necessary the licenses and permits, submitting all required notifications, requesting and receiving all necessary inspections and obtaining utility connections.	World Bank	2018
Governance	Economic development	Doing Business records the time and cost associated with the logistical process of exporting and importing goods.	World Bank	2018
Governance	Efficiency starting a business	This topic measures the paid-in minimum capital requirement, number of procedures, time and cost for a small- to medium-sized limited liability company to start up and formally operate in economy's largest business city.	World Bank	2018
Governance	Electoral process	Executive and legislative elections, and electoral framework	Freedom House	2018
Governance	Electricity access	This topic measures the procedures, time and cost required for a business to obtain a permanent electricity connection for a newly constructed warehouse.	World Bank	2018
Governance	Fundamental freedoms	Media, religious freedom, academic freedom, and free private discussion	Freedom House	2018
Governance	Getting credit	This topic explores two sets of issues—the strength of credit reporting systems and the effectiveness of collateral and bankruptcy laws in facilitating lending.	World Bank	2018

Type	Indicator	Description	Data source	Latest year available
Governance	Governance accountability	Reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	Worldwide Governance Indicators	2016
Governance	Government effectiveness	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	Worldwide Governance Indicators	2016
Governance	Government process	Corruption, transparency, and ability of elected officials to govern in practice	Freedom House	2018
Governance	Individual rights	Freedom of movement, property rights, women's and family rights, and freedom from economic exploitation	Freedom House	2018
Governance	Insolvency process	Doing Business studies the time, cost and outcome of insolvency proceedings involving domestic legal entities.	World Bank	2018
Governance	Investor rights	This topic measures the strength of minority shareholder protections against misuse of corporate assets by directors for their personal gain as well as shareholder rights, governance safeguards and corporate transparency requirements that reduce the risk of abuse.	World Bank	2018
Governance	Judicial process	Independent judges and prosecutors, due process, crime and disorder, and legal equality	Freedom House	2018
Governance	Legal enforcement	The enforcing contracts indicator measures the time and cost for resolving a commercial dispute through a local first-instance court, and the quality of judicial processes index, evaluating whether each economy has adopted a series of good practices that promote quality and efficiency in the court system.	World Bank	2018
Governance	Organisation rights	Free assembly, civic groups, and labour unions	Freedom House	2018
Governance	Political representation	Party system, competition, and minority voting rights	Freedom House	2018
Governance	Political stability	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.	Worldwide Governance Indicators	2016
Governance	Property rights	This topic examines the steps, time and cost involved in registering property, assuming a standardized case of an entrepreneur who wants to purchase land and a building that is already registered and free of title dispute.	World Bank	2018
Governance	Quality of regulation framework and enforcement	Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	Worldwide Governance Indicators	2016
Governance	Rule of law	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Worldwide Governance Indicators	2016
Governance	Tax accountability	This topic records the taxes and mandatory contributions that a medium-size company must pay or withhold in a given year, as well as measures the administrative burden in paying taxes and contributions.	World Bank	2018

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