

sovereign bond rating and sustainability:

credit rating agencies are

20 years behind



About this report

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SolAbility is the maker of 3 DJSI Super-Sector Leaders. We have designed and implemented the sustainable management for GS Engineering & Construction (DJSI Global Industry leader 2012), Korea Telecom (DJSI Global Industry Leader 2011-2013, 2015), and Lotte Shopping (DJSI Global Industry Leader 2011-2015).



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Foreword

The financial industry has started to integrate ESG measurements 20 years ago. By now, ESG integration into investment risk/opportunity evaluation is mainstream, at least to a basic extent.

The credit rating industry – dominated by only 3 companies worldwide, Fitch, Moody's and Standard & Poor's – is just waking up to these challenges. While ESG factors are being integrated to a small (insufficient) extent into certain investment class ratings, sovereign bonds ratings are calculated without any sustainability considerations. Credit agencies are 20 years behind the financial industry.

The lack of ESG integration has two major implications: sovereign ratings do not completely reflected the full extent of investment risks. And second, the interest rates derived from sovereign ratings for individual countries are potentially too low – or too high.

This research report is based on a virtual sustainability-adjusted sovereign bond rating built on the Global Sustainable Competitiveness Index. The comparison between current sovereign bond ratings and sustainable adjusted ratings the deficits of current sovereign bond rating methodologies.

We hope you find this information helpful.

1 Introduction: Sovereign Bond Ratings & Sustainability

Credit ratings define the interest a country has to pay on loans, state bonds – and therefore have a huge impact on the investment freedom as well as capital cost of a country. It is therefore a very important parameter for every economy – it defines the level of capital cost for new investments, whatever the nature of those investments may be. The credit rating also affects the risks an investor is willing to take in overseas investments. Sovereign risk ratings are calculated by a number of rating agencies, most notable by the “three sisters”: Moody’s S&P, and Fitch. The ratings of these three therefore have an immense impact on the cost of capital of a specific country.

Sovereign risks are calculated based on a mix of economic, political and financial risks – i.e. current risks that, like GDP calculations, do not take into account the framework that enables and defines the current situation, the fundament of what the rating is trying to reflect. Credit ratings do not look at or consider the wider environment – the ability and motivation of the workforce, the health and well-being and the social fabric of a society, the physical environment (natural and man-made) that have caused the current situation. Credit ratings describe symptoms, they do not look at the root causes. It is therefore questionable whether credit ratings truly reflect investor risks of investing in a specific country.

The GSCI on the other hand is based on quantitative (i.e. subjective) indicators. It takes into account not only the financial value of the economic output, but also the state of the country in terms of natural capital, resource intensity, education and innovation level, and governance performance indicators. The GSCI measures the performance of what makes the outcome.

The GSCI is calculated based on 111 measurable quantitative indicators, normalised by relevant measurements, evaluating both the latest performance as well as the performance (trend) over time of the indicator. For further information on the GSCI and its methodology, please refer to the Index website.

2 A virtual Rating Comparison

In order to test sovereign bond ratings against sustainability, average country ratings are compared to a virtual sustainability-adjusted credit rating based on the Global Sustainable Competitiveness Index (GSCI).

For comparability, the scores of the GSCI have been converted to ratings equivalent to credit ratings - a sustainable credit rating. The sustainability-adjusted credit rating consist of the average conventional rating and the GSCI rating, each weighted at 50%.

The generated grades are compared to the average credit rating of Moody's, S&P, and Fitch.

2.1 Rating criteria: sovereign bond ratings vs. GSCI

2.1.1 Sovereign Bond ratings

The sovereign bond rating market is dominated by just three different providers, Moody's, S&P, and Fitch. All three of them use different methodologies, but very similar structures. They are based on similar rating frameworks and criteria, namely on 4 key pillars:

- Governance
- Finances & balance sheets
- Economic output development
- The political and regulatory framework, including event risks

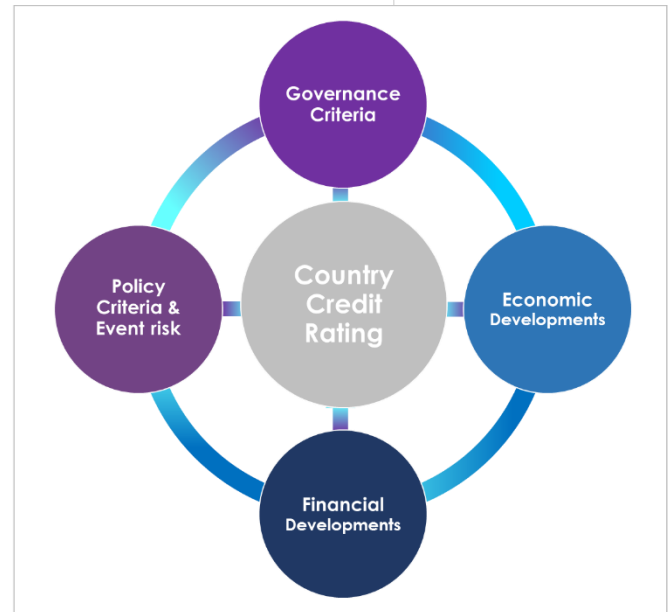
The naming of those pillars differs, and individual criteria also differ. However, all highly weight monetary numbers, in particular GDP-related numbers, government finance numbers, and market numbers. The non-quantitative criteria are less clear defined in publicly available documentation. Some are based on external evaluation (such as the World Bank Government Efficiency indicators or the WEF Competitiveness Index. The latter is itself a perception survey), and others on qualitative agency staff evaluation – a qualitative evaluation of frameworks, numbers, developments and expectations. Qualitative indicators based on a value-free framework that can and is consistently applied can represent a useful reflection of performance. The thinking behind the framework needs to be completely value free, free of thinking based on economic beliefs or expectations. However, qualitative criteria require a definition of “good” and “bad”, and therefore cannot guarantee absolute objectiveness. However, some cases of rating adjustments following political changes or decisions in the past suggest that the definitions of “good” and “bad” applied by the three large rating agencies are not completely free of ideological thinking.

Sovereign bond ratings structure:

Conventional credit ratings are based on 4 pillars. All consist of qualitative as well as quantitative criteria and indicators.

| Pillar | Key measurements |
|--------------------------------|---|
| Governance, Institutions | Quantitative, payment track record |
| | Qualitative, extern & internal indicators |
| Economic development | Quantitative output numbers & development (GDP) |
| | Qualitative, internal & external indicators |
| Finance & balance sheets | Quantitative, debt and payments |
| | Qualitative, |
| Policy framework & event risks | Quantitative, bank sector, liquidity |
| | Qualitative, political environment & risks |

2.1.2 Model comparison



The Global Competitiveness Model is based on 5 pillars, aiming to cover & evaluate performance of all elements that make economic development (the root). Conventional ratings are based on 4 areas of results. Conventional credit ratings rate the outcome (the end-result) – the GSCI the root cause of the outcome.

For more information on the Global Sustainable Competitiveness Methodology, please refer to [the index website](#).

2.1.3 Criteria comparison: conventional ratings vs. sustainability rating

The criteria comparison is based on a the country-level extension of the ESG (Environment, Societal, Governance) model to an ESGE (Environment, Society, Governance, Economy) model

| | | Sovereign ratings | | Sustainable ratings | |
|-------------|------------------------------|-------------------|--|---------------------|---|
| Pillar | Issue | Coverage | Criteria | Coverage | Criteria |
| Environment | Renewable resources | Not covered | - | Covered | Water, land |
| | Non-renewable resources | Not covered | - | Covered | Commodities |
| | Biodiversity | Not covered | - | Partly covered | Forest, fertility, species |
| | Resource efficiency | Not covered | - | Covered | Resource efficiency |
| | Pollution | Not covered | - | Covered | Pollution levels (air, soil) |
| | Climate change vulnerability | Not covered | - | Partly covered | Emissions, exposure to risks |
| Social | Health | Not covered | - | Covered | Availability, cost |
| | Equality | Hardly covered | Wealth inequality "Might affect rating" | Covered | Gender, income, wealth |
| | Communities | Not covered | - | Partly covered | Public services, |
| | Security | Hardly covered | "Might affect rating" | Covered | Crime statistics |
| | Violence | Covered | Violent conflicts | Covered | Violent conflicts, human rights |
| Governance | Institutions | Partly covered | Governance efficiency | Partly covered | Governance efficiency |
| | Fiscal | Covered | Spending, debt, ... | Partly covered | Debts |
| | Allocation balance | Hardly covered | "Might affect rating" | Partly covered | Balance of gov. budget allocation |
| | Budget balance | Covered | Spending discipline | Partly covered | Spending balance related to economic phase |
| | Corruption | Partly covered | External indexes | Partly covered | External indexes |
| | Infrastructure | Hardly covered | Indexes | Partly covered | Investments, coverage, quality |
| | Freedom | Hardly covered | "Might affect rating" | Partly covered | Press freedom, Human rights |
| Economy | Education | Not covered | - | Covered | Performance indicators |
| | Innovation | Not covered | - | Covered | Performance indicators |
| | Economic development | Partly covered | Sector balance | Covered | Sector balance, business developments |
| | Financial markets | Partly covered | Banking sector, others "Might affect rating" | Partly covered | Exposure to financial market risks, bubbles |
| | GDP performance | Covered | GDP absolute, per capita, trend, ... | Partly covered | GNI absolute, per capita, trend |



Not covered



Covered



Hardly covered



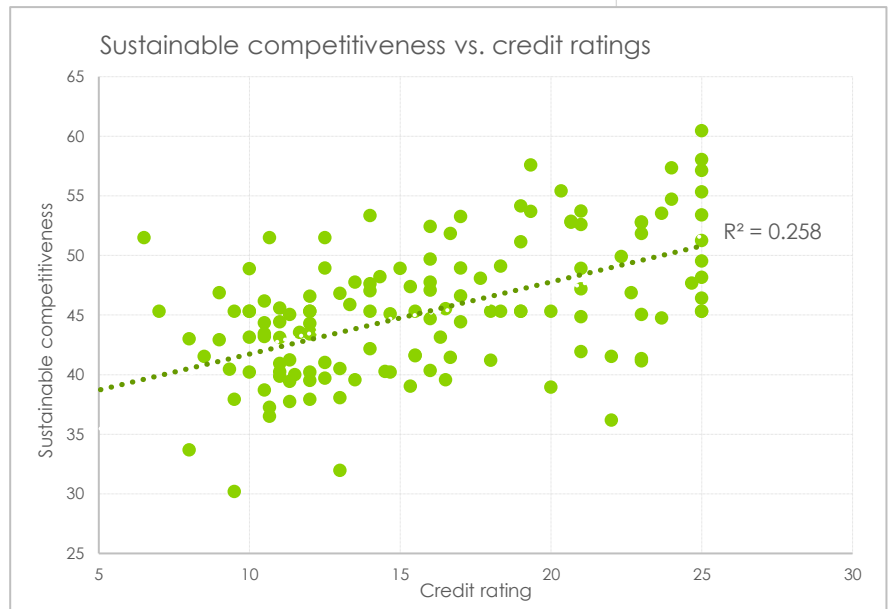
Partly covered

Under the assumption that a country-evaluation and credit rating should integrate sustainability, i.e. the non-financial performance that makes or prevents financial performance, then the coverage of conventional sovereign bond ratings only cover a small part of the full performance.

2.1.4 Empiric Correlations: conventional & sustainable ratings, GDP

Correlations: GSCI and Sovereign Bond ratings

While there seems to be a slight initial correlation between credit ratings and GSCI ratings, (higher sustainability equals positive credit rating) on first sight, there are too many exceptions to be considered correlating. The empiric correlation is 25%. For some countries there is a fairly visible correlation – e.g. the wealth nations of Scandinavia, where credit ratings correlate strongly with GSCI ratings. However, for too many economies, in particular of developed countries, high credit rating is not reflected in high sustainable competitiveness score. The lack of correlation strongly suggest that **sovereign bond ratings do not fully reflect risks** and opportunities of and associated with individual nation-economy, in particular long-term risks.

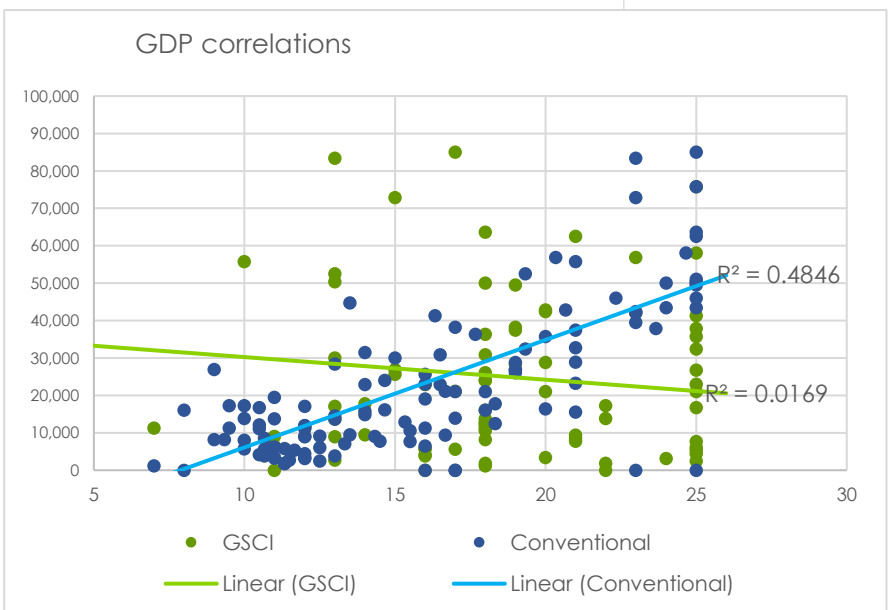


GSCI vs sovereign credit ratings show no correlation, indicating insufficient coverage of sustainability risks in current methodologies

Correlations to GDP performance

Correlation analysis shows that conventional ratings are to nearly 50% tied to GDP performance – not surprising given the weight allocated to GDP-based indicators in sovereign bond ratings. GSCI ratings on the other hand show a very limited correlation to GDP levels.

The high correlation to GDP levels of conventional sovereign bond ratings indicate that sovereign bond ratings do not reflect the full extent of opportunities and risks associated with individual country performance. It also means that poor countries generally receive lower ratings: **poor countries have to pay higher interest rates than rich countries.**



Conventional ratings show strong correlation to GDP: poor countries have lower ratings

2.2 Significant differences in ratings

Some countries would see significant credit ratings upgrades, other downgrades when comparing the current credit rating with a fictional credit rating based on the Sustainable Competitiveness Index. The GSCI has not been developed to reflect credit and default risks, and therefore cannot be a direct comparison. We therefore have created a virtual sustainability-adjusted sovereign bond rating. The sustainability adjusted rating is equally based on the GSCI rating and the average of Fitch, Moody's, and S&P.

The US and Australia would be significantly downgraded, while countries that have low credit ratings mostly due to political reasons (Greece, Argentina), would receive more favourable ratings. A significant number of lesser developed, poorer countries (measured in GDP) would receive higher ratings due to future potential in non-tangible aspects.

Rating differences for selected countries:

| Country | Credit rating (average of Moody's, S&P; Fitch) | GSCI rating | Level Difference | Sustainability- adjusted rating | Level difference |
|----------------|---|-------------|---------------------|---------------------------------------|---------------------|
| Australia | AAA | A+ | -4 | AA | -2 |
| Bolivia | BB- | A- | 6 | BBB- | 3 |
| Brazil | BB | A+ | 7 | BBB+ | 4 |
| Canada | AAA | AA+ | -1 | AAA | 0 |
| China | A+ | AA- | 1 | AA- | 1 |
| Ethiopia | B | BBB+ | 7 | BB+ | 4 |
| France | AA | AAA | 2 | AA+ | 1 |
| Germany | AAA | AAA | 0 | AAA | 0 |
| India | BBB- | BB- | -3 | BB+ | -1 |
| Iraq | B- | 0 | -7 | CC | -4 |
| Japan | A+ | AAA | 4 | AA | 2 |
| Kuwait | AA | BB | -9 | A- | -4 |
| Latvia | A- | AAA | 6 | AA- | 3 |
| Morocco | BBB- | BBB+ | 3 | BBB | 2 |
| Pakistan | B | B- | -1 | B- | -1 |
| Poland | A- | AA+ | 5 | AA- | 3 |
| Saudi Arabia | A+ | BB+ | -6 | BBB+ | -3 |
| United Kingdom | AA | AAA | 2 | AA+ | 1 |
| United States | AAA | A+ | -4 | AA | -2 |
| Vietnam | BB- | AAA | 13 | A- | 7 |

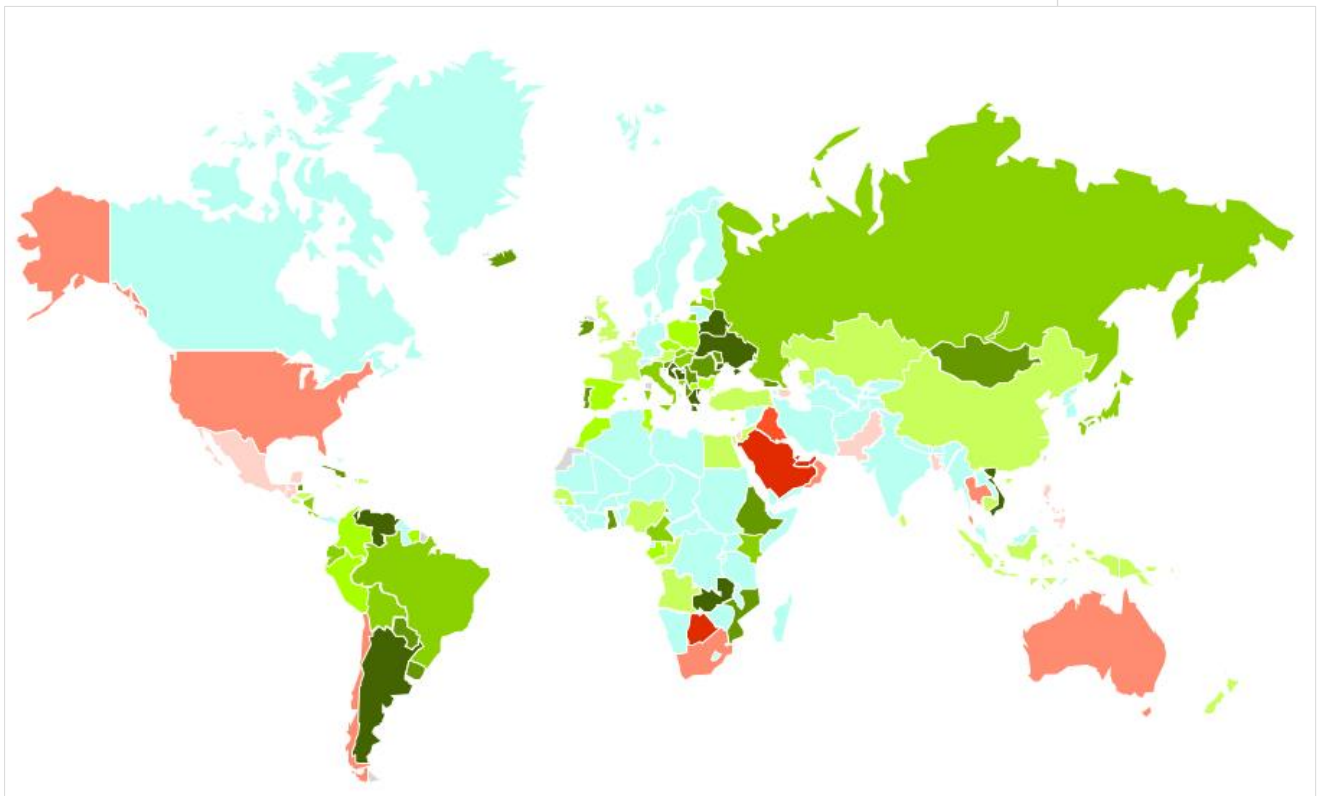
Current, sustainability and sustainability-adjusted ratings of selected countries

Please [refer to the tables](#) for all county rating comparisons.

2.3 Sustainability-adjusted rating differences world map

However, what is most interesting is the World map of upgrades and downgrades of individual countries based on the virtual sustainability-adjusted credit rating (see World map below): oil-rich Middle Eastern countries (Saudi Arabia, Kuwait, etc.) would be significantly downgraded several levels, while most countries in South America, Eastern Europe and Central Africa would receive a credit rating upgrade.

The Global Map – which countries would benefit from sustainability-adjusted credit ratings, and which countries would have to pay higher interest rates



Differences between current credit ratings and sustainability-adjusted credit ratings: green indicates higher rating (i.e. lower interest rates), red lower rating (i.e. higher interest rates); blue indicates no difference between current rating and sustainability-adjusted credit rating

Differences of current conventional ratings and sustainability-adjusted ratings: red is lower, green higher rating; blue is neutral

The World map shows a distinctive trend – mostly countries whose current financial wealth is based to a significant part on the exploration of non-renewable resources have a lower rating, i.e. would have to pay higher interest rates on their debts, in particular the oil-rich nations in the Middle East. Eastern Europe as well as South America (except Chile) would do better under sustainability-adjusted credit ratings and occur lower interest rates. A number of African countries, mainly in sub-Saharan tropical Africa, would also see their credit rating increase.

3 Conclusions

Sovereign bond ratings define the interest rates a country has to pay on credits and debt. The ratings therefore have a high impact on country finances.

In the asset management world, it is now near-standard to integrate some form of “ESG” into investment risk/opportunity evaluation. The major credit rating agencies have only recently started to take steps in integrating ESG considerations in their ratings, namely for project risk evaluation and corporate ratings. However, the limited availability of information suggest that these processes and frameworks are, at least for the time being, limited, and applied case-by-case rather than systematically: it seems the credit rating agencies are lagging behind the financial industry. By roughly 20 years.

Sovereign bond ratings, which define interest rates that countries have to pay on credits, loans and debt – still do not integrate ESG considerations, because “social and environmental aspects are considered too weak” in influencing government capability and willingness to meet financial demands.

The comparison of current sovereign bond ratings and a sustainability-adjusted county ratings shows significant differences. Countries whose wealth is based on exploitation of natural resources would receive a significant lower credit rating. May developing nations would receive higher ratings (and therefor lower interest rates) based on their development potential.

- Sovereign bond ratings show a high correlation to GDP/capita levels. **Poor countries have to pay higher interest rates than rich countries.**
- **Sovereign bond ratings do not reflect the non-tangible risks** and opportunities associated with nation economies
- **Sustainable adjusted ratings and conventional ratings show significant difference.:** Under a sustainability-adjusted credit rating, countries with high reliance on exploitation of natural resources would be rated lower, while poor country with a healthy fundament (biodiversity, education, governance) would receive higher ratings.

The economic output is not produced in a bubble. It is the result of thousands of little pieces in a puzzle – including “intangibles” - that credit rating agencies do not consider in their evaluation. Credit ratings have to reflect the underlying factors that define the future development and capability of a country to generate and sustain wealth. It is high time that credit ratings include sustainability in their risk calculations.

4 Country list: sovereign bonds vs. sustainable adjusted ratings

| Country | Credit rating (average of Moody's, S&P; Fitch) | Sustainability- adjusted rating | Level difference |
|------------------------|--|---------------------------------------|------------------|
| Albania | B+ | BBB- | 4 |
| Andorra | BBB | A+ | 4 |
| Angola | B | BB- | 2 |
| Argentina | B | BB+ | 4 |
| Armenia | B+ | BB | 2 |
| Aruba | BBB | CCC+ | -8 |
| Australia | AAA | AA | -2 |
| Austria | AA+ | AAA | 1 |
| Azerbaijan | BB+ | BB | -1 |
| Bahamas | BBB- | BB+ | -1 |
| Bahrain | BB | BB- | -1 |
| Bangladesh | BB- | B+ | -1 |
| Barbados | CCC | CCC | 0 |
| Belarus | B- | BBB- | 6 |
| Belgium | AA- | AA | 1 |
| Belize | B- | BB- | 3 |
| Bolivia | BB- | BBB- | 3 |
| Bosnia and Herzegovina | B | BB+ | 5 |
| Botswana | A | BBB- | -4 |
| Brazil | BB | BBB+ | 4 |
| Bulgaria | BBB- | BBB+ | 2 |
| Cambodia | B | B+ | 1 |
| Cameroon | B | BB | 3 |
| Canada | AAA | AAA | 0 |
| Cape Verde | B | B+ | 1 |
| Chile | A+ | A | -1 |
| China | A+ | AA- | 1 |
| Colombia | BBB | A- | 2 |
| Congo | B- | B- | 1 |
| Costa Rica | BB | BBB | 3 |
| Croatia | BB | A | 6 |
| Cuba | CCC | B+ | 4 |
| Cyprus | BB | BB+ | 1 |
| Czech Republic | A+ | AA | 2 |
| Denmark | AAA | AAA | 0 |
| Dominican Republic | BB- | BB | 1 |
| Ecuador | B | BB- | 3 |
| Egypt | B | B | 1 |
| El Salvador | CCC+ | B | 2 |
| Estonia | A+ | AA | 2 |
| Ethiopia | B | BB+ | 4 |
| European Union | AA | A+ | -2 |

| Country | Credit rating (average of Moody's, S&P; Fitch) | Sustainability- adjusted rating | Level difference |
|---------------|--|---------------------------------------|------------------|
| Fiji | BB- | BB- | 1 |
| Finland | AA+ | AAA | 1 |
| France | AA | AA+ | 1 |
| Gabon | B | BB- | 3 |
| Georgia | BB | BBB | 4 |
| Germany | AAA | AAA | 0 |
| Ghana | B | BB | 4 |
| Greece | CCC+ | BB+ | 6 |
| Guatemala | BB+ | BB | -1 |
| Honduras | B+ | B+ | 0 |
| Hong Kong | AA+ | A+ | -3 |
| Hungary | BBB- | A- | 3 |
| Iceland | A- | AA- | 3 |
| India | BBB- | BB+ | -1 |
| Indonesia | BBB- | BBB | 1 |
| Iraq | B- | CC | -4 |
| Ireland | A | AA | 3 |
| Isle of Man | AA | AA+ | 1 |
| Israel | A+ | A+ | 0 |
| Italy | BBB | A | 3 |
| Ivory Coast | BB- | BBB | 5 |
| Jamaica | B | B- | -1 |
| Japan | A+ | AA | 2 |
| Jordan | B+ | BB- | 1 |
| Kazakhstan | BBB | BBB+ | 2 |
| Kenya | B+ | BB+ | 3 |
| Kuwait | AA | A- | -4 |
| Latvia | A- | AA- | 3 |
| Lebanon | B- | BB | 4 |
| Lesotho | B+ | BB+ | 3 |
| Liechtenstein | AAA | AA- | -3 |
| Lithuania | A- | A- | 0 |
| Luxembourg | AAA | AA- | -3 |
| Macedonia | BB | BBB- | 2 |
| Malaysia | A- | A- | 0 |
| Malta | A | A- | -1 |
| Mauritius | BBB+ | BBB+ | 0 |
| Mexico | BBB+ | BBB+ | 0 |
| Moldova | B- | BB | 4 |
| Mongolia | B- | BB | 5 |
| Montenegro | B+ | BB+ | 3 |
| Morocco | BBB- | BBB | 2 |
| Mozambique | CCC- | BB- | 6 |
| Namibia | BBB- | BB+ | -1 |
| Netherlands | AAA | AA+ | -1 |
| New Zealand | AA+ | AA+ | 0 |
| Nicaragua | B+ | BB | 2 |
| Nigeria | B | BB- | 2 |
| Norway | AAA | AAA | 0 |

| Country | Credit rating (average of Moody's, S&P; Fitch) | Sustainability- adjusted rating | Level difference |
|-------------------------------|--|---------------------------------------|------------------|
| Oman | BBB- | BBB- | 0 |
| Pakistan | B | B- | -1 |
| Panama | BBB | BBB | 0 |
| Papua New Guinea | B+ | B+ | 1 |
| Paraguay | BB | BBB+ | 4 |
| Peru | BBB+ | A | 2 |
| Philippines | BBB | BB+ | -2 |
| Poland | A- | AA- | 3 |
| Portugal | BB+ | A- | 4 |
| Puerto Rico | D | 0 | -1 |
| Qatar | AA- | A- | -3 |
| Republic of the Congo | CCC+ | B+ | 4 |
| Romania | BBB- | A | 4 |
| Russia | BB+ | BBB+ | 3 |
| Rwanda | B | B+ | 1 |
| San Marino | BBB- | A+ | 5 |
| Saudi Arabia | A+ | BBB+ | -3 |
| Senegal | BB- | BB- | 1 |
| Serbia | BB- | BBB | 4 |
| Seychelles | BB- | CCC+ | -4 |
| Singapore | AAA | AA- | -3 |
| Slovakia | A+ | AA | 2 |
| Slovenia | A- | AA- | 3 |
| South Africa | BB+ | BB | -1 |
| South Korea | AA | A+ | -2 |
| Spain | BBB+ | A- | 1 |
| Sri Lanka | B+ | BB- | 1 |
| St Vincent and the Grenadines | B- | B+ | 2 |
| Suriname | B | BB | 3 |
| Sweden | AAA | AAA | 0 |
| Switzerland | AAA | AAA | 0 |
| Taiwan | AA- | BBB- | -6 |
| Thailand | BBB+ | BBB- | -2 |
| Trinidad and Tobago | BBB | BB+ | -2 |
| Tunisia | B+ | BB+ | 3 |
| Turkey | BB+ | BBB- | 1 |
| Uganda | B | B | 0 |
| Ukraine | CCC+ | BB- | 4 |
| United Arab Emirates | AA | A- | -4 |
| United Kingdom | AA | AA+ | 1 |
| United States | AAA | AA | -2 |
| Uruguay | BBB | A+ | 4 |
| Venezuela | CCC- | BBB- | 10 |
| Vietnam | BB- | A- | 7 |
| Zambia | B | BBB+ | 7 |

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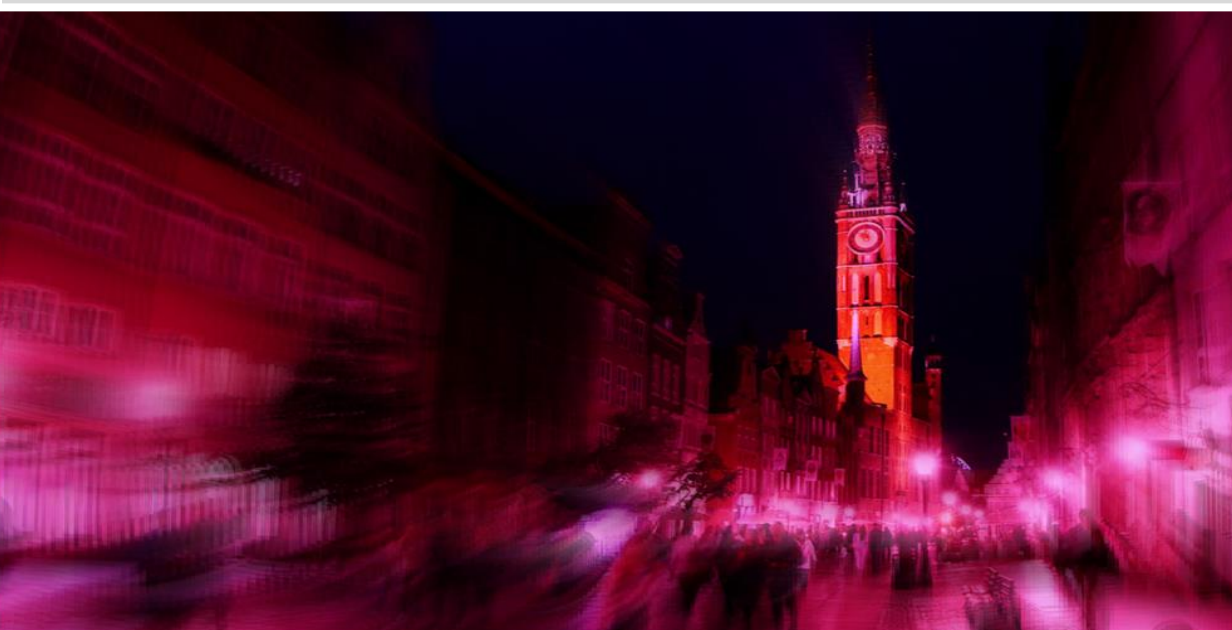
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