Climate Risks & Sovereign Issuers:

Sailing into an Environmental Storm?

FROM THE YARDARM
MARKET COMMENTARY & ANALYSIS

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About Saturna Capital

Saturna Capital, manager of the Amana, Saturna Sustainable, and Sextant Funds, uses years of investment experience to aid investors in navigating today's volatile markets. Founded in 1989 by professionals with extensive experience, Saturna has helped individuals and institutions build wealth, earn income, and preserve capital.

We are long-term, values-based, and socially responsible investors. We view consideration of environmental, social, and governance (ESG) factors as essential in forming portfolios of high-quality companies that are better positioned to reduce risk and identify opportunities. We believe that companies proactively managing business risks related to ESG issues make better contributions to the global economy and are more resilient.

At Saturna, we believe in making your investment dollars work hard for you and that your interests always come first. Saturna strives to not only offer the best investment opportunities from mutual funds to IRAs, but to match those sound investments with superior customer service.

About Saturna Sdn. Bhd.

Saturna Sdn. Bhd. is the wholly-owned Malaysian subsidiary of Saturna Capital Corporation, resulting from the 2010 purchase by Saturna Capital of Alpha Asset Management located in Kuala Lumpur. Saturna Sdn Bhd holds an Islamic Fund Management Licence (IFML) with the Malaysian Securities Commission. Saturna is the first conventional asset manager to be converted to an Islamic asset manager.

Climate Risks & Sovereign Issuers:
A Sea Change on the Horizon

When choosing investments based on their attributes, environmental, social, and governance factors (ESG) represent one of the largest sub-asset classes on the planet. Recently, ratings firms that rank securities on their ESG and sustainable characteristics have turned their attention to sovereign debt — securities that are issued by national governments to raise capital.

This edition of *From The Yardarm* examines how effectively ESG ratings firms assess sovereign ESG factors, especially concerning the environment. We will discuss climate initiatives formed by the United Nations and examine how sustainability regulations and investors' behavioral biases are potentially increasing risk rather than reducing it.

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We believe the recent rollout of ESG/sustainable scoring frameworks for sovereign issues by ESG ratings firms does not capture the underlying and evolving environmental risks appropriately. This may cause investors to assume far greater risk then they would have otherwise. The possible and unintended consequences of the current ratings firms' ESG frameworks could direct capital toward those sovereign nations most likely to face greater challenges and costs in making the transition to a low-carbon economy, while potentially directing capital away from countries that have significantly more time to make the same low-carbon transition.

Investors may have to modify how they evaluate sovereign debt, as these issues can typically offer liquidity and relative safety — both of which may be less valid in the future. In its ninth annual sovereign investors survey, Invesco Asset Management found that "57% of sovereign investors believe that the market has not yet factored in the long-term effects of climate change." [1] This survey included 82 sovereign investors and 59 central banks, representing $19 trillion.

How sovereign issuers are addressing environmental issues and climate-related risks could have widespread effects. The sheer size of the global bond market is staggering, dwarfing all other asset classes. At year-end 2020, the global bond market topped $281 trillion, with government debt accounting for more than half of the year's $24 trillion in new issuance. Current estimates see another $10 trillion being added in 2021, which would drive global government debt to surpass $92 trillion outstanding.[2] Contrary to expectations, global interest rates have largely fallen in response to burgeoning debt loads and fiscal deficit levels not seen since World War II, all the while obscuring ominous risks. Unbeknownst to most, the three major credit rating agencies lowered the ratings of a fifth of the countries they cover in response to the pandemic, even more than the 16% they lowered during the Great Financial Crisis over a decade ago.[3]

Conference of Parties:

A Budget is Imposed

The United Nations Framework Convention on Climate Change was established in 1994, with the goal of preventing dangerous human interference with the climate system by reducing and stabilizing worldwide greenhouse gases. On December 15, 2015, the 21st annual UN Climate Change Conference (COP21) was held in Paris, where the participants formalized a framework to reduce carbon emissions. This framework, widely known as the Paris Climate Agreement, was ratified on October 5, 2016, by 192 countries. The Paris Climate Agreement is a plan to combat climate change by limiting global warming to less than 2° C worldwide, with the further goal of limiting the rise to 1.5° C. The Agreement also seeks to support nations dealing with the effects of climate change.

In its latest report, the Intergovernmental Panel on Climate Change (IPCC) examined hypothetical future global warming scenarios in which global temperatures increase by 2° C and 4° C. In the 2° C scenario, agricultural and ecological droughts in drying regions would be 2.4 times more likely to occur, and periods of extreme temperatures would increase by 5.6 times over a 10-year period. In the 4° C scenario, agricultural and ecological droughts in drying regions would be 4.1 times more likely to occur, and the frequency of extreme temperatures is projected to increase 9.4 times.[4] The Paris Climate Agreement was created to prevent these global warming scenarios, introducing a "carbon budget"— the permissible amount of carbon a country can emit without causing a temperature increase that exceeds their 1.5° C limit.

Climate Risks & Sovereign Issuers:

A Lighthouse with a Cracked Lens?

At an increasing rate, professional investment managers are choosing to use ESG ratings firms as a resource to ascertain which companies are most sustainable among their peer group. These firms analyze companies using quantitative and qualitative assessment. Given the increased scrutiny of regulatory bodies in both the EU and the US, these firms will only gain greater prominence among the investment community.

Typically, ESG ratings firms employ a scoring process. It is common to see a company with sustainable characteristics obtain an "A" rating, while companies with lower sustainability scores or ratings receive a "B," "C," or "D." Likewise, numeric scores may also be used, with companies being rated on a score of 0 to 100. ESG ratings firms have essentially simplified a complex and interwoven set of material considerations across a diverse set of operating and stakeholder issues. Unfortunately, these simplified metrics can obfuscate important underlying issues or developing trends that can only be ascertained in a qualitative assessment.

Climate Risks & Sovereign Issuers:

An Unusual Consensus?

Complicating matters further, each of these ratings firms use their own unique criteria and weightings to assess a company's ESG score or rating – oftentimes blurring the intangible assessment of what makes a company sustainable. This is contrary to practices employed by the major credit rating agencies used to rate the creditworthiness of an issuer. For example, ratings assigned by credit rating agencies S&P and Moody's are closely aligned, with a correlation of 90%. The correlations between ESG ratings firms have been much lower; MSCI and Sustainalytics correlate 32%, according to research by CSRHub, another ESG data provider in the sustainable industry.[5]

In a separate study, the World Bank evaluated corporate ESG scores from five different ESG providers — Sustainalytics, Robeco, VE, KLD, and ASSET4 — to find that the average correlation among their ratings was 61%, ranging from 42% to 73%. On the corporate level, environmental providers showed a slightly higher average correlation in ratings than their social and governance counterparts. However, in assessing the ESG rating score among sovereigns, the average correlation among providers is quite high at 85%.[6]

ESG scores of Companies versus Sovereigns (Percentage)

Provider	Corporate ESG	Sovereign ESG	Delta
ESG	61%	85%	39%
Environmental	65%	42%	-35%
Social	49%	85%	73%
Governance	38%	71%	87%

Source: World Bank Group: Demystifying Sovereign ESG

In the World Bank's report, they state:

> "Our results further highlight that there is little agreement on how to measure the sovereign 'E' pillar among ESG providers. In contrast to the relatively high level of correlation for aggregate ESG scores, there is a markedly lower level of correlation among 'E' pillar scores. The E pillar has an average correlation of 42 percent with aggregate ESG scores and ranges from -14 percent to 88 percent."

They found the approaches employed included significant lags with the metrics. Social and governance data had a three-year median lag, and environmental data had a five-year median lag. The authors do note that:

> "The academic literature on the financial materiality of environmental factors on sovereign debt is nascent, and studies tend to use different data, making them difficult to compare… studies such as these use data sources that are likely to be affected by ingrained income bias, predominantly reflecting countries' level of development, or national income, rather than underlying materiality of ESG-related factors."[7]

This begs the question: why is consensus higher among ESG ratings for sovereign issuers?

The World Bank study found that sovereign ESG scores are dominated by one specific variable: a country's level of development, identified by its national income. ***Essentially, the wealthier and more developed the country, the better the ESG score or rank that sovereign issuer obtains.***

The "Sustainalytics' Top 20 Most Sustainable Countries Rankings" table shows how the greater ESG ratings community scores sovereign issues – developed economies, particularly Western European and North American countries, are deemed more sustainable than those found in the emerging markets. But is this correct? Does a country's wealth truly mean it has better ESG characteristics? Furthermore, how does wealth affect growing environmental risks?

Sustainalytics' Top 20 Most Sustainable Country Rankings

Rank	Country	Sovereign Region	Risk Score (/100)	Risk Category
1	Norway	Europe and Central Asia	8.82	Negligible
2	Switzerland	Europe and Central Asia	9.31	Negligible
3	Luxembourg	Europe and Central Asia	9.51	Negligible
4	Sweden	Europe and Central Asia	10.61	Low
5	Australia	East Asia and Pacific	10.69	Low
6	Iceland	Europe and Central Asia	10.98	Low
7	Denmark	Europe and Central Asia	11.32	Low
8	Canada	North America	11.59	Low
9	Finland	Europe and Central Asia	12.23	Low
10	Austria	Europe and Central Asia	12.41	Low
11	New Zealand	East Asia and Pacific	12.42	Low
12	United States	North America	12.46	Low
13	Netherlands	Europe and Central Asia	12.75	Low
14	Germany	Europe and Central Asia	12.76	Low
15	Ireland	Europe and Central Asia	12.84	Low
16	United Kingdom	Europe and Central Asia	12.89	Low
17	France	Europe and Central Asia	13.49	Low
18	Singapore	East Asia and Pacific	13.89	Low
19	Belgium	Europe and Central Asia	14.42	Low
20	Japan	East Asia and Pacific	14.44	Low

Source: Sustainalytics.com

ESG ratings firms tend to focus on a country's income and wealth status rather than considering underlying ESG characteristics, particularly as they relate to the environment.

Nonetheless, ESG ratings firms have established their criteria and respective ranks and scores. These ratings, in turn, are likely to encourage investors to allocate capital among the higher ESG-rated sovereign nations, which also aligns with the EU's preference that investment managers "go green." The potential and disappointing outcome is that global capital could be directed away from the regions of the world that desperately need financing to transition to a low-carbon economy. While more than 85% of the world's population lives outside of North America and Europe,[8] with the United States representing only 4.25% of the world's population, the US has the largest share of debt outstanding at $41.2 trillion, 38.9% of global fixed-income securities outstanding as of year-end 2019.[9]

Is such an allocation among sovereigns with high ESG ratings really reducing investors' exposure to anticipated climate-related risks? Will market participants be willing buyers of sovereign debt to finance the enormous amount of capital needed to pay for their transition to a low-carbon economy? Do these developed countries provide the appropriate risk-return profiles, given their excessive levels of indebtedness at these current historically low yields?

ESG ratings firms tend to focus on a country's income and wealth status rather than considering underlying ESG characteristics, particularly as they relate to the environment.

Financing Sovereign Issuers' Transition Toward a Low-Carbon Economy:

A Risky Proposition?

The "Debt Characteristics of Selected Sovereign Countries" table shows that developed countries exhibit some of the highest levels of indebtedness, as measured by debt-to-GDP. Developed countries also appear more indebted when measured on a per capita basis. As of year-end 2020, US total debt was $84,800 per capita while its GDP was $63,400, reflecting a per capita deficit of $21,500. Canada has a similar profile, although they are quite not as indebted as the US. The margin of safety in the table measures the excess earnings that remain after taking the country's GDP into consideration. Emerging market countries retain a much larger margin of safety when compared to their developed market peers.

Debt Characteristics of Selected Sovereign Countries

Country	Total Debt (USD $ Millions)	Debt-to-GDP	Total GDP (USD $ Millions)	Population	% of World's Population	Debt per Capita (in USD)	GDP per Capita (in USD)	GDP v Debt per Capita	Margin of Safety per Capita
Australia	648,926	46.6%	1,359,370	25,687,041	0.33%	25,390	52,905	27,515	52.0%
Canada	1,935,423	117.5%	1,644,040	38,005,238	0.49%	50,912	43,295	-7,617	-17.6%
United States	27,980,860	133.9%	20,893,700	329,484,123	4.25%	84,850	63,358	-21,492	-33.9%
Indonesia	388,925	36.6%	1,059,640	273,523,621	3.53%	1,439	3,922	2,483	63.3%
Malaysia	227,768	67.4%	337,008	32,365,998	0.42%	6,951	10,231	3,280	32.1%
Mexico	656,877	61.0%	1,073,920	128,932,753	1.66%	5,140	8,404	3,264	38.8%
UAE	113,012	27.1%	358,869	9,890,400	0.13%	11,891	38,661	26,770	69.2%
Uruguay	38,591	68.1%	56,577	3,473,727	0.04%	11,109	16,287	5,178	31.8%
Global				**7,752,840,547**					

Debt Source: CountryEconomy.com. Population Source: The World Bank

For more information about how we chose the list of countries in this table and those that follow, please see page 17.

We provide carbon emission information at the country level, as well as on a per capita basis, in the "Carbon Emission Characteristics of Selected Sovereigns" table to further examine potential ESG risks, specifically under the environmental pillar. Developed countries report much higher carbon emissions when measured on a per capita basis. Australia emits 5.1 times more carbon than Mexico and 7.2 times more than Indonesia. Australia also generates 4.9 times the GDP of Mexico and 17.6 times the GDP of Indonesia. However, developed economies have a potential weakness; it is unlikely they would be able to transition to a low-carbon economy in a timely fashion relative to emerging market economies. Developed countries will face higher costs and complexity in the transition to a low-carbon economy, compared to emerging market countries.

If we integrate the Paris Climate Agreement's goal of limiting global temperature increases to 2° C by staying under 1.5° C, we can use the carbon budget in our analysis. Here, we will find that environmental considerations should be a much larger priority for ESG ratings firms.

Carbon Emission Characteristics of Selected Sovereigns

Country	Amt. of Carbon Emitted ($Gt\ CO_2$ in 2020)	Contributor to Global Carbon Emissions (as a %)	Contributor to Global Carbon (3-yr Avg.)	Amt of Carbon Emitted per Capita	Amt of Carbon Emitted per Capita (3-yr Avg.)
Australia	386.4	1.07%	1.09%	15.2	16.1
Canada	542.8	1.51%	1.57%	14.4	15.5
United States	4,535.3	12.61%	13.50%	13.7	14.9
Indonesia	568.3	1.58%	1.61%	2.1	2.3
Malaysia	262.2	0.73%	0.68%	8.0	8.1
Mexico	407.7	1.13%	1.33%	3.0	3.5
UAE	203.1	0.56%	0.58%	20.7	21.7
Uruguay	5.9	0.02%	0.02%	1.7	1.9
Global	**35,962.9**			**4.6**	**4.8**

Source: European Commission - EDGAR - Emissions Database for Global Atmospheric Research

The IPCC estimates the remaining carbon budget offers 67% and 50% likelihoods of keeping global warming under 1.5° C to be 400 $GtCO_2$ and 500 $GtCO_2$ respectively.[10] The IPCC's estimated carbon budgets were as of the beginning of 2020, while this analysis incorporates carbon emission metrics as of year-end 2020. Note that the information provided may underestimate the time left for each country's carbon budget; the data only includes carbon emissions from fossil fuels and cement, which means it excludes emissions due to land changes, which at this time lacks reliable data for our use. Lastly, carbon budgets are typically calculated on a per capita basis rather than on how much of its allocation a country uses. Developed countries could view this as incentive to raise their emissions, dismissing climate justice-related arguments. Emerging countries have claimed that the high carbon emissions of developed world economies are a prime factor behind the need to reduce the world's carbon budget.

In "Projected Carbon Budget Under Different Emission Targets for Selected Sovereigns," there are two different carbon budgets; the 67% chance of success if emissions stay under 400 $GtCO_2$ (in green) and the 50% chance of success if emissions stay under 500 $GtCO_2$ (in blue). The table shows that developed countries have much less time remaining on their carbon budget. Under the 67% scenario, Australia has 3.4 years remaining on their carbon budget, and Canada and the US are estimated to have 3.6 and 3.7 years remaining, respectively. This implies that climate-related transition risks should be anticipated in the short- or medium-term, rather than in the long-term future.

Projected Carbon Budget Under Different Emission Targets for Selected Sovereigns

Country	1.5°C with 67% Chance (400 Gt CO_2)			1.5°C with 50% Chance (500 Gt CO_2)		
	Remaining Carbon Budget	Years Remaining	Calendar Year Ending Carbon Budget	Remaining Carbon Budget	Years Remaining	Calendar Year Ending Carbon Budget
Australia	1.3	3.4	2025	1.7	4.3	2026
Canada	2.0	3.6	2025	2.5	4.5	2026
United States	17.0	3.7	2025	21.2	4.7	2026
Indonesia	14.1	24.8	2046	17.6	31.0	2052
Malaysia	1.7	6.4	2028	2.1	8.0	2029
Mexico	6.7	16.3	2038	8.3	20.4	2042
UAE	0.5	2.5	2024	0.6	3.1	2024
Uruguay	0.2	30.5	2052	0.2	38.1	2059
Global	**400.0**	**11.1**	**2032**	**500.0**	**13.9**	**2035**

Source: EDGAR, Saturna Capital analysis

Under the 50% scenario, the timeline extends only one additional year on average. This does not add much wiggle room for developed countries. However, regarding the carbon budgets for the emerging market countries, we see that they have a much greater amount of time before they consume their respective carbon budgets. Under the 67% scenario, Malaysia has 6.4 years and Indonesia has 24.8 years. Under the 50% scenario, Malaysia has 8.0 years and Indonesia has 31.0 years.

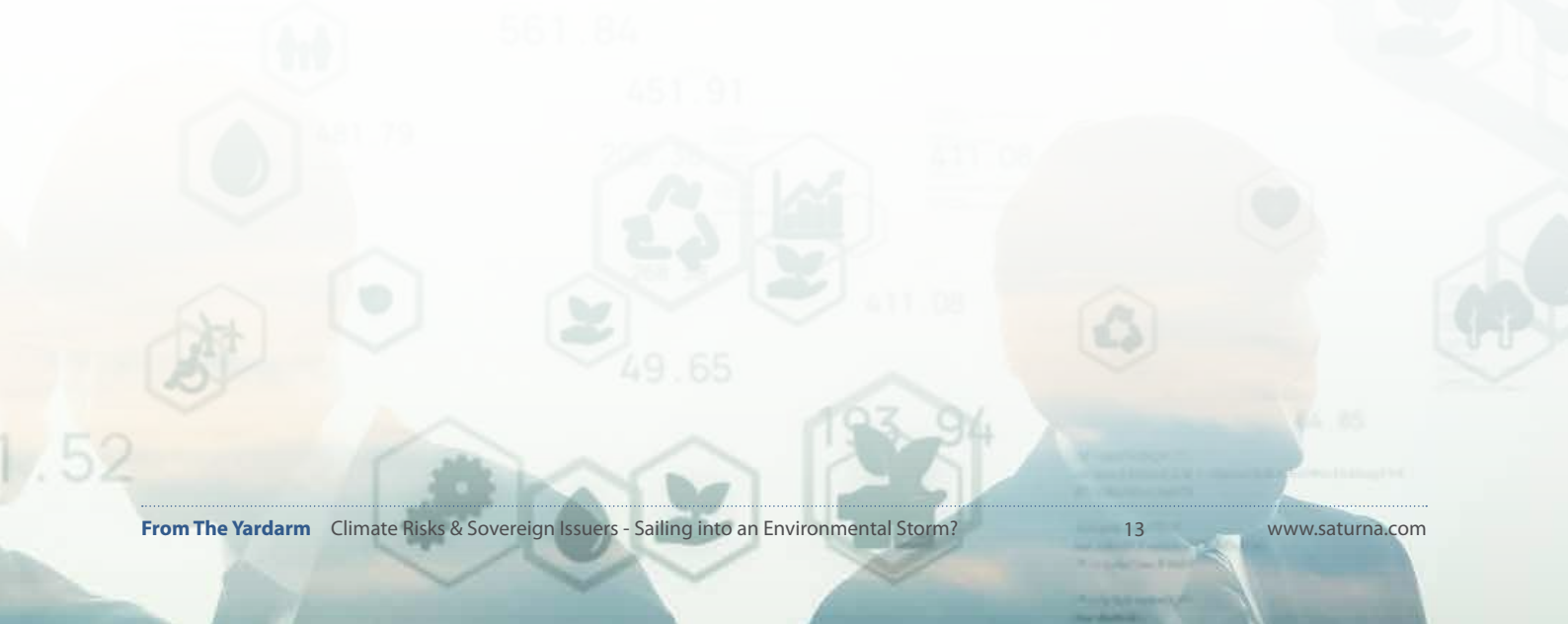
This is what is known as a "disorderly transition," a term used among the climate science community. In a report by the Financial Stability Board titled "The Implications of Climate Change for Financial Stability," a disorderly transition to a low-carbon economy:

> "… could therefore leave banks and other investors bearing large losses on fossil fuel-related assets (i.e., credit and market risk). It could also have a broader impact on government revenues and creditworthiness, particularly in those countries whose governments rely heavily on revenues from fossil fuels. At the same time, some [emerging market and developing economies] are expanding their reliance on fossil fuel assets, which could also expose those who finance these activities to transition risks."[11]

The report also notes:

> "The studies discussed above assume that increased physical risks will materialize gradually over time, with the impact on asset prices occurring in the latter half of the 21st century. Such a reduction in asset prices may, however, occur suddenly and be more likely to have a destabilizing effect on the financial system."[12]

It's clear that developed countries face potentially foreboding consequences and a limited amount of time to act.



A report from the Network for Greening the Financial System (NGFS), an organization of 100 central banks and 16 supervisory observers with its secretariat hosted by the Banque de France, can help determine what carbon prices will be in the future. The NGFS was created in 2017 with a mission to accelerate the growth of green finance and develop recommendations for central banks' role in climate change. The report identifies that a "carbon price of around $160/tonne would be needed by the end of the decade to incentivize a transition toward net zero by 2050." [13] $160 per tonne represents a 117% increase in the price of carbon since September 30, 2021. There are many other scenarios that point to a much higher carbon price, but this information is highly dependent upon a host of assumptions.

By assessing the financial value of a country's remaining carbon budget and its potential impact on its debt-to-GDP, we can see how climate change could affect a sovereign's fiscal standing under a disorderly transition. In "Equitable Carbon Budget Examples," we can see how debt levels could possibly increase for all the listed countries. In the United States' case, the incremental value of these carbon offsets adds $1.2 trillion in debt when carbon is priced as of September 30, 2021, and $1.7 trillion in debt at the $160 per tonne marker.

We can also observe that emerging market countries experience a much more pronounced increase, particularly Indonesia. The US and other developed nations face the challenging objective to reduce their large emission output in a much shorter period. ***As a result, it is reasonable for investors to place greater weight on environmental considerations in their ESG/sustainable framework than what is being employed by ESG ratings firms.***

Equitable Carbon Budget Examples

Country	Debt-to-GDP (FY 2020)	Equitable Carbon Budget at 1.5°C for 67% (400 $GtCO_2$)	Revised Debt-to-GDP Carbon Price at $160/$tCO_2$	Equitable Carbon Budget at 1.5°C for 50% (500 $GtCO_2$)	Revised Debt-to-GDP Carbon Price at $160/$tCO_2$
Australia	46.6%	1.33	61.8%	1.66	65.6%
Canada	117.5%	1.96	136.5%	2.45	141.3%
United States	133.9%	17.00	146.9%	21.25	150.2%

Source: CountryEconomy.com, EDGAR, Saturna Capital analysis

If we were to measure the revised debt metrics on a per capita basis, we see that the margins of safety for the US and Canada, both in a deficit at year-end 2020, exhibit steep declines under both scenarios.

This hypothetical exercise is meant to show that a country's environmental considerations relate to its debt profile and potential trajectory. These trajectories can also adversely weaken a country's fiscal standing in other environmental situations, such as physical damage from climate change. In 2020, natural disasters caused $76 billion in insured losses in the US, representing over 90% of the $83 billion in total industry losses, a large rise from the $54 billion reported in 2019.[14] Given these staggering rates, it's hard to see the insurance industry continuing to operate under the existing business model, and those seeking flood insurance will instead have to rely on the US government through its National Flood Insurance Program.

Market participants are beginning to assess ESG considerations in market assets, such as sovereign credit default swaps – a financial derivative used to offer insurance for bondholders. In his research paper titled "Do Markets Value ESG Risks in Sovereign Credit Curves?" Benjamin Hübel finds that a market relationship exists after taking income and wealth-related data, or macro-variables, into account. Hübel writes,

> "Our empirical results suggest a significant and negative relationship between ESG and sovereign credit spreads, pointing toward CDS markets pricing a risk-mitigating effect of ESG improvements. Interestingly, the risk-reducing effects of the E- and G-pillars remain significant even after controlling for S&P credit ratings. Markets and credit rating agencies therefore seem to largely agree on how to value the social components of credit spreads, while markets assign additional spread premia for environmental and governance risks compared to credit ratings."[15]

Debt per Capita Metrics Under a 1.5° C Scenario with a 67% and 50% Chance of Success (per Capita, in USD)

Country	GDP	Debt-to-GDP (FY 2020)	GDP less Debt	Margin of Safety	Debt ($160/tonnes carbon Price) for 1.5°C and 67% Probability	Margin of Safety	Debt ($160/Tonnes Carbon Price) for 1.5°C and 50% Probability	Margin of Safety
Australia	52,905	25,390	27,515	52.0%	19,387	36.6%	17,323	32.7%
Canada	43,295	50,912	-7,617	-17.6%	-15,885	-36.7%	-17,949	-41.5%
United States	63,358	84,850	-21,492	-33.9%	-29,820	-47.1%	-31,884	-50.3%

Source: CountryEconomy.com, EDGAR, Saturna Capital analysis

ESG Ratings Firms' Sovereign Ratings:

Likely to Increase Sovereign Risk Rather Than Mitigate

The current sovereign ESG/sustainable frameworks employed by ESG ratings firms, emphasizing a country's income and wealth status, are not the best benchmarks to use because they fail to capture significant, material ESG considerations. As a result, asset managers wanting to appear green and attract investors' capital may unknowingly increase their risk profile. The current sustainable frameworks align investors with sovereign nations that face the greatest challenges and costs in transitioning to a low-carbon economy, while directing capital away from other countries that have significantly more time to make the transition, which may be a better fit for investors.

Aligning sustainable-minded investors with developed nations may cause significant repricing risk. This could lead to a rise in interest rates that would impair a developed nation's ability to service existing debt levels, and could also deter investments needed for climate-related financing. This could cause a circuitous, negative feedback loop, further affecting other asset classes due to a sharp rise in risk premiums.

Ultimately, ESG ratings firms need to review, analyze, and incorporate better frameworks for evaluating sovereign debt. This could provide investors with better insight into the potential risks faced by both developed and emerging countries with respect to climate change and the transition to low-carbon economies. In turn, better insight into risks could potentially help investors identify which sovereign debt issues have greater potential for excess returns.

Footnotes

[1] *Invesco Asset Management Co., Ltd. Press Release: Invesco Announces Global Survey of Sovereign Investors. PR Times, July 12, 2021. https://prtimes.jp/main/html/rd/p/000000030.000005698.html*

[2] *Emre Tiftik, Khadija Mahmood, and Sonja Gibbs. Global Debt Monitor: COVID Drives Debt Surge—Stabilization Ahead? Institute of International Finance, February 17, 2021. https://www.iif.com/publications/global-debt-monitor*

[3] *Jones, Marc. COVID-19 has caused rich-poor split in sovereign rating cuts, study shows. Reuters, March 17, 2921. https://www.reuters.com/article/us-ratings-sovereign/covid-19-has-caused-rich-poor-split-in-sovereign-rating-cuts-study-shows-idUSKBN2B92OY*

[4] *Climate Change 2021: The Physical Science Basis. Intergovernmental Panel on Climate Change, August 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf*

[5] *Wigglesworth, Robin. Rating Agencies Using Green Criteria Suffer From "Inherent Biases," Financial Times, July 20, 2018. https://www.ft.com/content/a5e02050-8ac6-11e8-bf9e-8771d5404543*

[6] *Ekaterina M. Gratcheva, Teal Emery, and Dieter Wang. Demystifying Sovereign ESG. World Bank Group, 2020. https://documents1.worldbank.org/curated/en/842671621238316887/pdf/Demystifying-Sovereign-ESG.pdf*

[7] *Ibid.*

[8] *Al Gergawi, Mishaal, and Afshin Molavi. The 85 World. Emerge85, October 3, 2016. https://emerge85.io/Insights/the-85-world/*

[9] *Kolchin, Katie, Ali Mostafa, and Justyn Podziemska. Capital Markets Fact Book, 2020. SIFMA. September 29, 2020. https://www.sifma. org/resources/research/fact-book/*

[10] *Gigatons of carbon dioxide. A gigaton is equal to 1 billion metric tons.*

[11] *The Implications of Climate Change for Financial Stability. Financial Stability Board, November 23, 2020. https://www.fsb.org/wp-content/uploads/P231120.pdf*

[12] *Ibid.*

[13] *NGFS Climate Scenarios for central banks and supervisors. Network for Greening the Financial system, June 2021. https://www.ngfs.net/sites/default/files/media/2021/08/27/ngfs_climate_scenarios_phase2_june2021.pdf*

[14] *Natural disasters cost insurance industry $76 billion in 2020 — Swiss Re. Reuters, December 15, 2020. https://www.reuters.com/article/swissre-disasters/natural-disasters-cost-insurance-industry-76-billion-in-2020-swiss-re-idUSKBN28P12K*

[15] *Hübel, Benjamin. Do Markets Value ESG Risks in Sovereign Credit Curves? Quarterly Review of Economics and Finance, Forthcoming, July 2, 2020. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3501100*

Country Selection Rationalization

Regarding the debt characterization charts on pages 10, 11, and 12, the countries presented were selected based on a number of criteria: markets in which Saturna participates, developed markets deemed "low risk" by ESG ratings firm Sustainalytics, economies dependent upon hydrocarbons, geographic diversification, and susceptibility to climate change risks. Further information on each country follows.

- **Australia:** In addition to ranking highly on Sustainalytics' "Most Sustainable Countries" list with a risk level of "low," Australia's dependence on hydrocarbons provides a relevant comparison to the US.
- **Canada:** One of the US's largest trading partners, Canada's dependence on hydrocarbons provides a contrast to the US, particularly as the Canadian government ranks among the most progressive in terms of addressing climate-related risks outside of the EU member countries.
- **United States:** In addition to being Saturna's primary market, the US is a hydrocarbon-dependent economy facing significant risks from climate change.
- **Indonesia:** In selecting market countries to include, we sought to use countries where we have strong business relationships, which includes Indonesia.
- **Malaysia:** Saturna's asset management and research subsidiary, Saturna Sdn. Bhd., operates in Malaysia, making it one of our home markets.
- **Mexico:** Similar to Canada, Mexico is a large trading partner of the US and has a hydrocarbon-dependent economy.
- **UAE:** The UAE is one of the more progressive governments in the Gulf Cooperation Council (GCC) region when it comes to policies related to climate change.
- **Uruguay:** While Uruguay is generally not on the radar for most investors, it perhaps offers a means to expand the universe of favorably positioned countries. Uruguay exhibits positive ESG characteristics; it ranks in the second quintile of MSCI's ratings and in the first quintile of Sustainalytics' ratings.

About The Author

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Patrick T. Drum, Senior Investment Analyst and Portfolio Manager, joined Saturna Capital in October 2014. He is a former adjunct professor of Finance for the Sustainable MBA Program at the Bainbridge Graduate Institute (BGI), currently known as Presidio Graduate School. Mr. Drum holds a BA in Economics from Western Washington University and an MBA from Seattle University Albers School of Business. He is a Chartered Financial Analyst (CFA) charterholder and a Certified Financial Planner®.

Prior to joining Saturna Capital, Mr. Drum led environmental, social, and governance (ESG) research and was director of fixed income portfolio management since 2007 with a private account group at UBS Institutional Consulting Services, specializing in investment management for global conservation and national wildlife park endowments as well as sustainable-social screened client portfolios. He is a former Chair of the United Nation's Principles for Investment (UNPRI) Fixed Income Outreach Subcommittee and a current member of the UNPRI's Bondholder Engagement Working Group (BEWG), an advisory committee working to elevate important ESG considerations and best practices among issuers and investors. Mr. Drum's past experience also includes business valuation at Moss Adams and portfolio management at Washington Mutual Bank.

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Diversification does not assure a profit or protect against a loss in a declining market.

A Few Words About Risk

Investing involves risk, including possible loss of principal. Generally, an investment that offers a higher potential return will have a higher risk of loss. Stock prices fluctuate, sometimes quickly and significantly, for a broad range of reasons that may affect individual companies, industries, or sectors. When interest rates rise, bond prices fall. When interest rates fall, bond prices go up. A bond fund's price will typically follow the same pattern. Investments in high-yield securities can be speculative in nature. High-yield bonds may have low or no ratings, and may be considered "junk bonds."

Fund share prices, yields, and total returns will change with market fluctuations as well as the fortunes of the countries, industries, and companies in which it invests. Foreign investing involves risks not normally associated with investing solely in US securities. These include fluctuations in currency exchange rates; less public information about securities; less governmental market supervision; and the lack of uniform financial, social, and political standards. Foreign investing heightens the risk of confiscatory taxation, seizure or nationalization of assets, establishment of currency controls, or adverse political or social developments that affect investments.

The Saturna Sustainable Funds limit the securities they purchase to those consistent with sustainable principles. This limits opportunities and may affect performance.

While diversification does not guarantee against a loss in a declining market, it can help minimize the risk of the decline of a single market.

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