BRAZIL

ROADMAP TO SUSTAINABLE SOVEREIGN BONDS

Nature-based challenges, opportunities and solutions

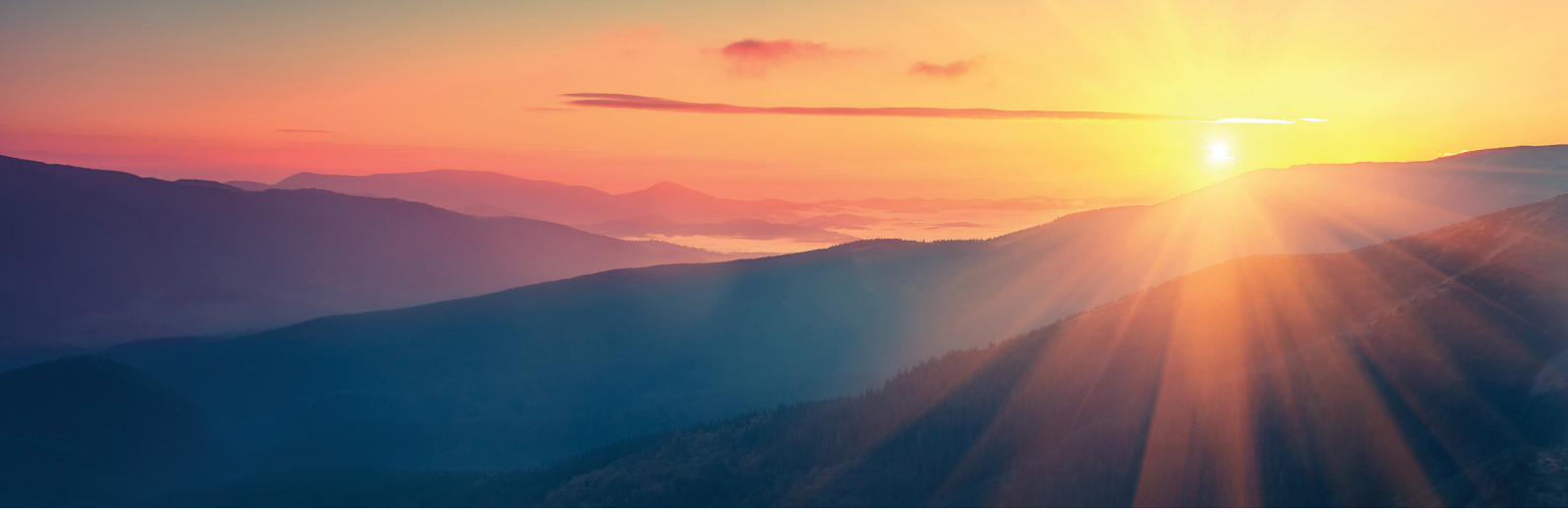
TRACKER **REPORT** JULY 2021

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Grantham Research Institute on Climate Change and the Environment

Planet Tracker

Deforestation remains the biggest threat to **Brazil's** natural capital base, accelerating **global warming**, harming **biodiversity**, and impacting Brazil's **rainfall** and **temperature** patterns.



ABOUT PLANET TRACKER

Planet Tracker is a non-profit financial think tank aligning capital markets with planetary boundaries. It was created primarily for the investor community to analyse the risk of market failure related to environmental limits which, other than climate change, are often not aligned with investor capital. Planet Tracker generates breakthrough analytics to redefine how financial and environmental data interact with the aim of changing the practices of financial decision makers to help avoid both environmental and financial failure.

ABOUT THE GRANTHAM RESEARCH INSTITUTE

The Grantham Research Institute on Climate Change and the Environment was established in 2008 at the London School of Economics and Political Science. The Institute brings together international expertise on economics, as well as finance, geography, the environment, international development and political economy to establish a world-leading centre for policy-relevant research, teaching and training in climate change and the environment. It is funded by the Grantham Foundation for the Protection of the Environment, which also funds the Grantham Institute on Climate Change and the Environment at Imperial College London. www.lse.ac.uk/grantham

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Authors: Peter Elwin, Nick Robins, John Willis, Giorgio Cozzolino

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WHY READ THIS REPORT ?

This report updates and builds on the award- winning paper **'The Sovereign Transition to Sustainability'** jointly written by Planet Tracker and the Grantham Research Institute[1]. It provides sovereign investors with an updated case study of Brazil demonstrating **how to incorporate the state of a country's natural capital into the assessment of the financial strength of its sovereign bonds.** Credit ratings are currently missing this aspect.

Nature underpins Brazil's economic strength. This report provides **a summary of Brazil's sovereign health and sets out a roadmap for enhancing it,** showing the opportunities for sovereign investors to benefit from this green recovery

We recommend **an innovative Deforestation-Linked Sovereign Bond,** linking coupon payments to Brazil's success in reducing deforestation.

This report sets out the **priority actions** that investors can take to promote Brazil's sovereign health and reduce systemic risk to their portfolios across asset classes.

[1] The London School of Economics Grantham Research Institute on Climate Change and the Environment (https://www.lse.ac.uk/granthaminstitute/about/about-the-institute/)

EXECUTIVE SUMMARY

- **We recommend that Brazil issues a Deforestation-Linked Sovereign Bond. This would align the government's fiscal and sustainability incentives, boost Brazil's sovereign health, and build on the country's long experience issuing inflation-linked bonds**
- **Market and policy pressures on Brazil are set to intensify. Investors and lenders are adopting 'net zero' policies with interim targets set for 2030 in many cases and the Inevitable Policy Response[2] forecasts significant policy changes by that date (or before).**
- **Our updated assessment of Brazil's sovereign health shows that it remains on an environmentally unsustainable path to 2030 and beyond (despite encouraging moves by the Brazilian central bank over the past year), bringing systemic risks to its sovereign bonds, particularly to investors holding the USD 113 billion of Brazil's debt repayable after 2030.**
- **If structural changes are not made, Brazil risks being left behind by the market transition to net zero, with potentially negative implications for the cost and availability of sovereign and commercial capital. Credit ratings are not providing investors with sufficient warning of the risks created by Brazil's depletion of its natural capital – see Figure 1.**

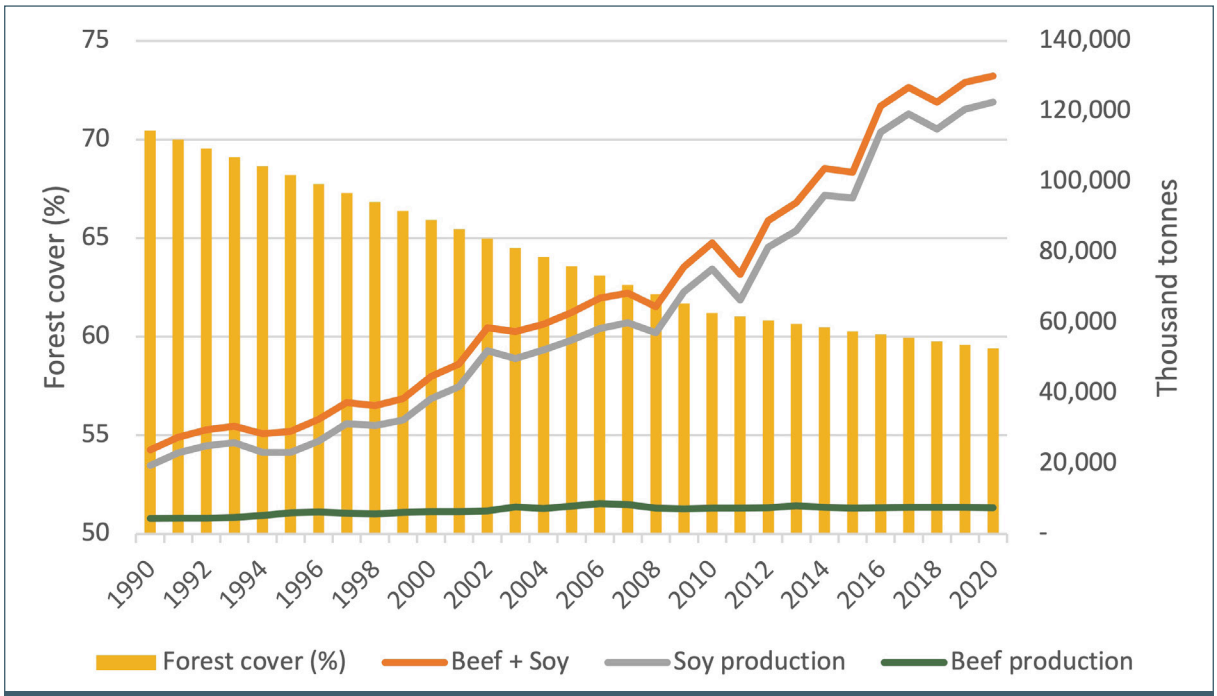


Figure 1: Brazil's Natural Capital Depletion (Forest Cover) Compared to Outputs from Exploiting Natural Capital (Beef and Soy). (Source: Globalforestwatch, OECD, Planet Tracker analysis).

[2] The Inevitable Policy Response is a research project commissioned by the PRI to lay out 'the policies that are likely to be implemented in the 2020's' to put the world on a path towards the Paris Aligned outcome

Brazil's sovereign health challenges are mounting

In 2020, Planet Tracker and the Grantham Research Institute set out a framework[i] for assessing the 'sovereign health' underpinning Brazil's sovereign bonds. Since then, investor focus on the long-term sustainability risks facing the country has intensified, notably through the Investor Policy Dialogue on Deforestation. In September 2020 Brazil's Central Bank (BCB) launched its sustainability agenda, signalling to investors that sustainability factors are strategically important for the country's financial system.

Overall, however, Brazil's sovereign health has not improved (the deforestation trend is rising not falling), and the policy outlook is not encouraging - Brazil's government has recently cut funding for the Ministry of the Environment by 35%. Increasing deforestation remains the biggest threat to Brazil's natural capital base, accelerating global warming, harming biodiversity, and impacting Brazil's rainfall and temperature patterns.

As a result, Brazil's current climate trajectory is rated 'highly insufficient' by ClimateActionTracker.org (on a path to 3-4°C by 2050 compared to the Paris target of 2°C).

Market and policy pressures are set to intensify

A number of market and policy factors are set to intensify the pressure on Brazil to align its policy regime, public finances and sovereign issuance with sustainability.

Over 160 investors with assets worth over USD 73 trillion are targeting 'net zero portfolios'[3] by 2050 (with interim targets for 2025 and 2030).

Alongside this capital market signal, other pressures are mounting (as identified by the Inevitable Policy Response project) that have the potential to negatively impact Brazil between now and 2030 unless changes are made:

- Carbon Border Adjustment Mechanisms (CBAMs)[4] could price in the carbon impact of deforestation raising the cost of importing Brazilian goods into countries with CBAMs.
- International food and agribusiness supply chains could shift away from Brazil to avoid controls on goods linked to deforestation reducing demand for Brazilian agricultural goods.
- Brazil's international trade negotiations will potentially be hampered by deforestation (the EU/Mercosur agreement is one example).[5]

These market and policy pressures are expected to focus investor attention on Brazil's macro-economic fundamentals and the extent to which its sovereign bonds align with their sustainability objectives.

We expect an uptick in pressure in 2023 and 2025 (in line with the Inevitable Policy Response forecast),[ii] as well as in the years leading up to the pivotal 2030 deadline for the Sustainable Development Goals. Investors holding the USD 113 billion of Brazilian sovereign bonds expiring after 2030 are particularly exposed to the impact of these seismic shifts in the capital markets which were not priced in when the bonds were issued.

[3] Net zero in terms of greenhouse gas emissions to align portfolios with a 1.5^0 climate target based on the revised Paris Agreement.

[4] CBAMs are taxes imposed by countries on imports from countries that do not have equivalent carbon pricing mechanisms to the importing country. They are designed to level the playing field between imports and domestically produced goods (where the latter include the price effect of domestic carbon tax). The EU is one region considering CBAMs.

[5] The ratification of the EU/Mercosur trade agreement has been delayed by (among other reasons) lobbying within some EU member states relating to concerns regarding Brazil's approach to combatting deforestation

A four-step roadmap to boosting Brazil's sovereign health

Brazil has an opportunity to avoid these sustainability pressures and invest to increase its sovereign health in four steps:

1. Strengthen government policies relating to climate and nature
2. Reform public spending to end perverse subsidies and incentivise sustainable agribusiness practices
3. Invest in a green recovery from the COVID 19 pandemic (e.g., natural-capital[6] enhancing infrastructure; green technologies and productivity improvements; sustainable and more efficient agriculture)
4. Issue a Sovereign Bond linked to ending illegal deforestation

Investors holding Brazilian bonds (particularly those expiring after 2030) have a strong incentive to support the rapid adoption of such a roadmap by Brazil, both in terms of benefitting from an improvement in its sovereign health, and also to avoid any selling pressure they might otherwise experience in relation to Brazilian bonds as they align their portfolios with net zero commitments.

A Deforestation-Linked Sovereign Bond

The ESG-labelled bond market has grown significantly in 2020 and demand remains strong, creating an opportunity for Brazil to gain access to cheaper finance by linking its bond issuance to sustainability KPIs - deforestation is the obvious priority.

We recommend that Brazil issues a Deforestation-Linked Sovereign Bond (DSLB) with a KPI based on its original Nationally Determined Contribution (NDC) Paris target of zero illegal deforestation in the Brazilian Amazonia by 2030. Brazil's extensive experience of issuing inflation-linked bonds demonstrates its debt issuance capabilities, and experience with bonds linked to an external measure. We believe a DLSB will allow Brazil to take advantage of the growing market demand for sustainable investments while also benefitting from its efforts to reduce deforestation (and indirectly aligning the interests of its citizens and businesses with these efforts).

Investors will have an attractive investment with sustainable characteristics and cash flows that offer some diversification benefits compared to more traditional government bonds.

More broadly, the process of setting up the required framework to support the issuance of a DLSB will enable Brazil to build out a Brazilian ESG-labelled bond benchmark curve, thereby facilitating further acceleration in growth in the Brazilian ESG-labelled non-government debt market, encouraging significant investments into the Brazilian economy.

[6] The stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people

INVESTOR CALL TO ACTION

There are a number of actions investors can take to respond to the environmental harms we discuss in this report; some relate specifically to Brazil, but others have wider relevance.

Actions specific to Brazil

Engage with the Brazilian government, policy makers and regulators (bilaterally or collaboratively with other stakeholders), to:

1 **Promote a green and just recovery from the COVID-19 pandemic**, which aligns Brazil with a 1.5° (Paris Aligned) climate change target and embeds a transition from nature-negative outcomes to nature-positive outcomes into this action plan.

2 **Push for the elimination of illegal deforestation by advocating for:**

a Reversal of cuts to the Ministry of Environment (and related enforcement agencies), and pressuring for more government investment in people and technology to prevent illegal deforestation;

b Strengthening of current domestic policies, laws and multistakeholder initiatives focused on preventing illegal deforestation;

c Ratification of the Escazu Agreement which Brazil signed in September 2018 (strengthening environmental democracy and protection for Indigenous peoples and those protecting the environment) but has yet to adopt.

3 **Promote significant reduction of legal deforestation and actions to reduce the risk of fires in or near forest areas.**

4 **Establish a credible framework for the issuance of Deforestation-Linked Sovereign Bonds.**

Wider actions applicable across portfolios

Beyond our specific recommendations relating to Brazil, there are several actions investors can take to help reduce natural capital risks in their portfolios and facilitate identifying opportunities:

1 **TNFD.** Support the Taskforce for Nature-related Financial Disclosures (TNFD) initiative in driving standardisation of quality public disclosure of nature related risks (by companies and sovereign issuers).

2 **Nature-related data.** Engage with Credit Rating Agencies (CRAs), as well as ESG information providers, to more effectively capture nature-related risks (and opportunities) in their products and services.

3 **Deforestation-free portfolios.** Commit to working towards deforestation free portfolios (with a focus on illegal as a starting point, and net zero deforestation as an end goal).[7]

[7] We discussed the challenges for investors of avoiding deforestation risk in two recent reports: Exchange Traded Deforestation and Online Retail Investors: Can't see the wood for the trees!

BRAZIL'S SOVEREIGN HEALTH CHALLENGES ARE INCREASING

In 2020, Planet Tracker and the London School of Economic (LSE)'s Grantham Research Institute on Climate Change and the Environment laid out a strategic framework for assessing the health of Brazil's sovereign bonds that included its reliance on natural capital.

Over the past year the pressures on Brazil's sovereign health have intensified as its natural capital has continued to be depleted, but credit ratings have not reflected these mounting risks for sovereign investors.

Brazil's recently updated Nationally Determined Contribution (NDC) was assessed as 'Highly Insufficient'[8] and its current climate trajectory (driven in large part by deforestation) is 3-4ºC (well above the 2ºC Paris target).

The COVID-19 pandemic has had a serious impact on Brazil's population[9] and its economy,[10] but these issues have been widely covered already and are therefore not covered in this report which takes a longer-term perspective on Brazil's sovereign health.

The Planet Tracker and Grantham Research Institute 'sovereign health' framework

This report defines 'sovereign health' as the capacity of countries to issue debt and repay it in alignment with the UN's 2030 Sustainable Development Goals (SDGs). For countries like Brazil, where the income from exporting soft commodities makes up a significant proportion of their national income (43%[iii] of Brazil's exports[11] depend upon natural capital), alignment with the SDGs benefits sovereign health by preserving the natural capital assets that underpin the production of the soft commodities in question.

In our previous report, Planet Tracker and the Grantham Research Institute set out a framework for incorporating the links between natural capital and sovereign health into a traditional credit rating methodology - see Figure 2.

Brazil is heavily dependent upon its natural capital assets for its export income. It ranks second among G20 countries in this respect - see Figure 3.

[8] By ClimateActionTracker.org - see discussion later in this report

[9] Brazil currently ranks 3rd in the world for the total number of Covid 19 cases (16 million) and has suffered over 500,000 deaths (second behind the USA)

[10] Brazil's economy has bounced back in 2021 like many of its peers although there are concerns that inflation is now rising

[11] We include animal and vegetable products/bi-products, plus foodstuffs, animal hides, wood products, paper goods, and textiles (including footwear and headwear)

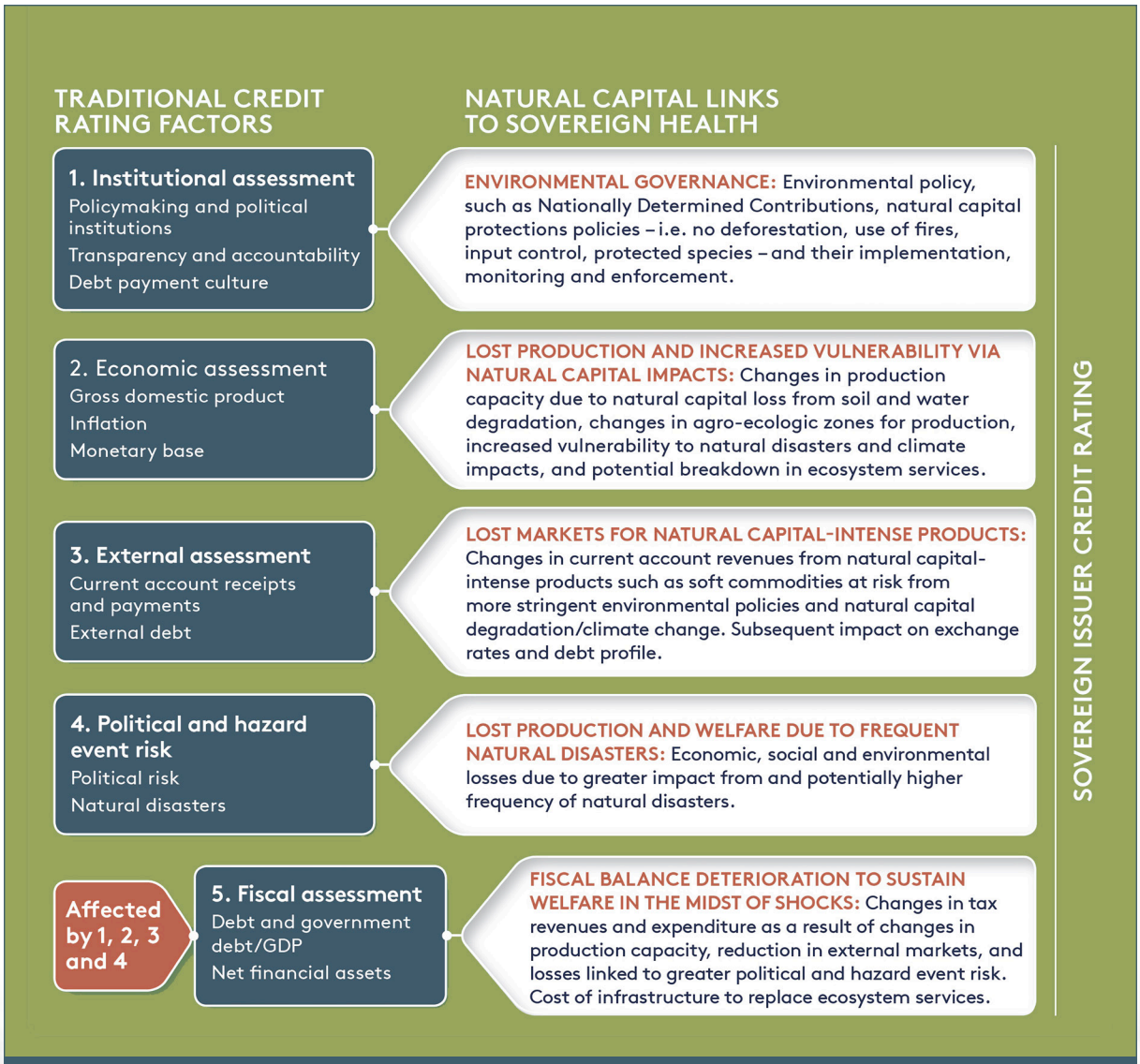


Figure 2: The Natural Capital and Sovereign Health Framework (Source: Planet Tracker Planet Tracker and the London School of Economic (LSE)'s Grantham Research Institute on Climate Change and the Environment).

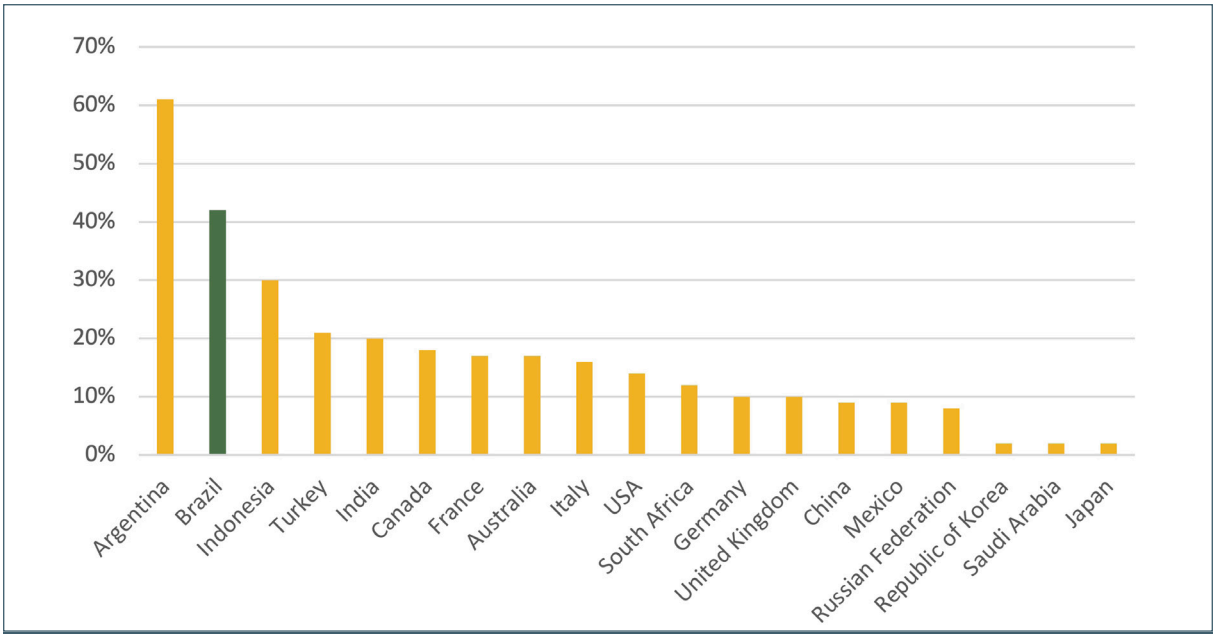


Figure 3: Comparison of G20 Countries Based on Exports Dependent on Renewable Natural Capital 2010-2019 (Source: COMTRADE, Planet Tracker analysis).

In 2019, Brazil's exports dependent upon renewable natural capital[12] totalled USD 230 billion. Soybeans are Brazil's most important nature-dependent export (14% of Brazil's total exports total: 11.4% raw, with an additional 2.56% processed) - see Figure 4.

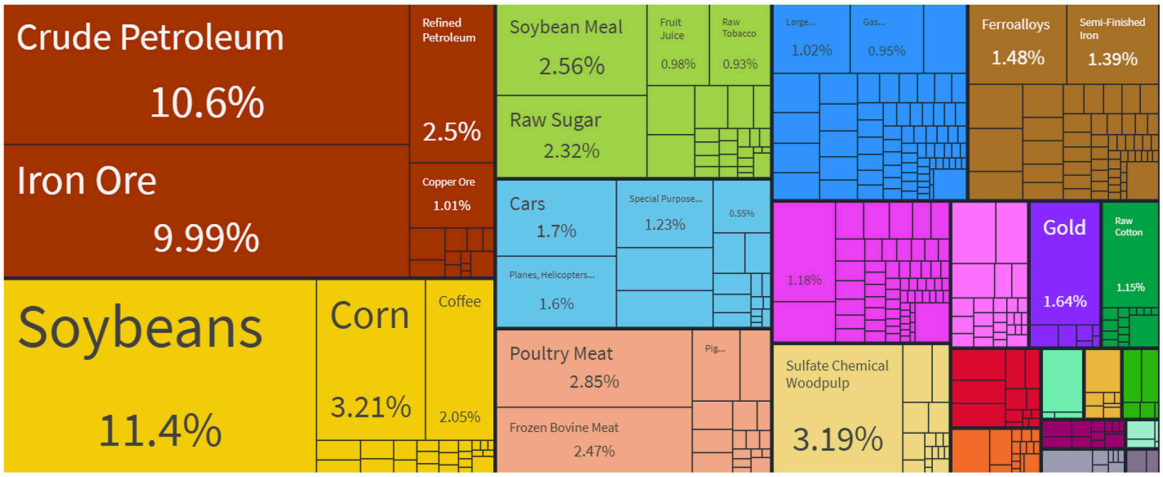


Figure 4: Brazil's Export Profile (2019 data) (Source: https://oec.world/en/profile/country/bra).

[12] 'Renewable natural capital' means renewable natural resources such as soil, forests, water, etc. 'Natural capital' would normally include non-renewable natural resources such as oil, minerals, etc.

OUR ASSESSMENT OF BRAZIL'S SOVEREIGN HEALTH IN 2021

Brazil's sovereign health has deteriorated in recent years and in relation to deforestation is worse than when we last assessed it in March 2020. The key points are summarized below and discussed in more detail later in this report.

Environmental governance

- Brazil has failed to prevent illegal deforestation and the deforestation rate has increased in recent years (reversing previous successes). 11,000 square kilometres of the Brazilian Amazon were deforested in 2020, the highest figure since 2008.
- Brazil's revised Nationally Determined Contribution no longer includes a commitment to stop illegal deforestation by 2030.[13]
- Funding for the Ministry of Environment was cut by 35% in the Bolsonaro government's 2021 budget.[iv]

Macro-economic shocks via natural capital impacts

- Evidence is growing that deforestation is impacting rainfall patterns in Brazil threatening the potential for double-cropping[14] of soy and maize. One estimate is that gross revenue could be USD 3.8 billion lower by 2050 (vs 2016).[v]
- Losing the ability to double-crop and grow maize after soy could cost an average farm in Mato Grosso one third of its income.[vi]
- A 2016 report by the Centro de Gestão e Estudos Estratégicos (CGEE)[vii] estimated that 75%-80% of Brazil's pastures were 'heavily' or 'moderately' degraded, suggesting that achieving continued crop yield improvements in the future will be progressively more challenging.
- Brazil is currently experiencing the 'worst drought for 91 years', impacting crop yields and hydroelectric power generation.[viii]

Lost markets for natural capital-intense products

- Brazil's exports are under threat as a result of its failure to prevent deforestation;
- The EU/Mercosur trade deal has been delayed by some EU Member States, partly due to concerns about Brazil's deforestation policies and actions;[ix]
- EU food retailers in the Soy Retail Group recently wrote to the Brazilian National Congress to express concerns that proposed land use legislation would increase deforestation risks (and noting that they would consider withdrawing their custom if this happened).[x]

[13] Although Brazil's President Bolsonaro wrote to the US President Biden on 14 April 2021, restating Brazil's commitment to eliminate illegal deforestation in Brazil by 2030.

[14] Growing a second crop on the same piece of land after the first crop has been harvested

Lost production and welfare due to frequent natural disasters[15]

- Brazil's continued depletion of its natural capital assets is increasing the risk of disease. Brazil's economy is not well placed to cope with another epidemic;
- A 2019 study suggested a 10% increase in deforestation leads to a 3.3% increase in malaria incidence;[xi]
- Another study[xii] has shown a link between deforestation and new diseases being transmitted from animals to humans.[16]

Fiscal balance deterioration due to natural capital effects

- The agribusiness sector accounts for 27% of Brazil's 2020 GDP[xiii] and employs an estimated 10%[xiv] of the workforce, making the country vulnerable to any deterioration in the natural capital base underpinning this industry.

Brazilian Central Bank Sustainability Agenda

The Brazilian Central Bank (BCB) launched three initiatives in 2020 which represent a step towards improving Brazil's sovereign health (although not sufficient to outweigh the negatives noted above):

- **Network of Central Banks and Supervisors for Greening the Financial System** In March 2020, the BCB joined the NGFS, a group of central banks that was established in December 2017 *'to share best practice and contribute to the development of the environment and climate risk management in the financial sector and to mobilize mainstream finance to support the transition toward a sustainable economy'.*
- A **'new sustainable agenda'** was launched by the BCB in September 2020.[xv] It 'aims at promoting the allocation of resources towards the development of a more sustainable, dynamic and modern economy, in order to foster a sustainable and inclusive growth in Brazil.' The key elements of the sustainable agenda are:
  - Strategic and dynamic agenda for socio-environmental (S&E) sustainability
  - Promotion of sustainable finance
  - Proper management of S&E and climate risks within the National Financial System (SFN)
  - Incorporation of sustainability variables in the BCB decision-making process
- The BCB signed an **agreement with the Climate Bonds Initiative to develop a sustainable finance agenda** in September 2020.[xvi] They described this as a *'new partnership to share technical knowledge on climate and the financial sector',* aimed at *'promoting the exchange of experiences and best practices regarding sustainable finance instruments and mechanisms, such as the incorporation of international criteria and taxonomies into the systems used by the Central Bank'.*

[15] Obviously the COVID pandemic has had a significant impact on Brazil's economy but this effect has already been adequately captured in Brazil's sovereign rating (and does not relate to Brazil's natural capital base).

[16] The study compared palm oil deforestation with zoonotic and vector-borne diseases so did not specifically investigate Brazil but concluded that its climate and geography ('intertropical zone with high forest cover') fit the criteria for a country at risk of this effect.

Brazil's credit rating does not reflect its natural capital risks

All three of the main Credit Rating Agencies rate Brazil similarly - see Table 1.

Table 1: Brazil's Credit Rating (Long-Term Debt)
(Source: http://www.worldgovernmentbonds.com/credit-rating/brazil/)

Rating Agency	Rating	Outlook	Last Update	Action
Standard & Poor's	BB-	Stable	7 Apr 2020	outlook downgrade
Moody's Investors Service	Ba2		15 May 2020	outlook upgrade
Fitch Ratings	BB-	Negative	6 May 2020	outlook downgrade

Although there are recent signs that the ratings agencies are beginning to factor ESG into their ratings methodology to a greater extent than before **(see Appendix A - Credit Rating Agencies approach to ESG)**, we have yet to see clear evidence that this is impacting their assessment of countries such as Brazil.

In 2020, all three of the main credit rating agencies announced changes to the way they handle ESG issues when determining their credit ratings **(see Appendix A - Credit Rating Agencies approach to ESG),** but the focus of their ratings remains creditworthiness (i.e. the ability of the issuer to repay its debts in full on time).

As a result, sovereign investors that place too much emphasis on credit ratings in their investment process will be missing key risks associated with how a country is managing its natural capital because sovereign credit ratings:

1. place greater emphasis on near-term risks, discounting the impact of longer-term problems such as climate change and biodiversity loss;[17]
2. do not easily allow investors to differentiate between countries with strong ESG credentials and those with weaker credentials;[18]
3. include a complex array of environmental, social and governance factors (alongside many other considerations based upon the strength of the economy and the expectation of repayment) where the weight attributed to each component is the subject of significant subjectivity with the result that, for example, a poor environmental score can be masked by a high score for education when determining the overall credit rating.[19]

Brazil provides a very good example of the mismatch between the narrow (near-term cash flow) focus embedded in credit ratings and the wider (longer-term) perspective required when considering a country's management of its natural capital base.

This is disappointing given the clear challenges that Brazil faces with respect to its management of its natural capital resources (particularly as reflected in its poor recent performance with respect to deforestation) and the risks we believe this presents to investors.

[17] As Fitch puts it: 'most of the more severe impact from climate change is not expected to occur until 2050-2100, while current ratings decisions will typically place more weight on current developments than uncertain long-term projections'.

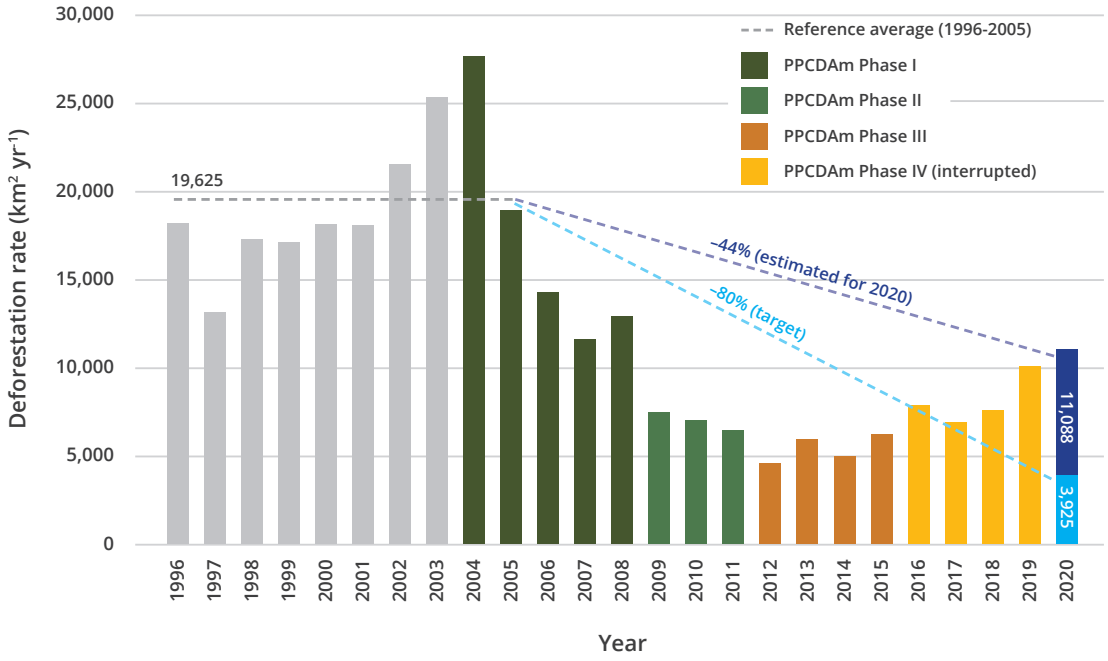
[18] Although the ratings themselves give no indication of the ESG score investors with access to the detailed ratings analysis will be able to access separate ESG scores and information on the impact they have had on the credit rating itself.

[19] We are encouraged by the steps the main ratings agencies are taking to provide greater transparency regarding the impact of different ESG factors on the overall credit rating. Moody's is particularly advanced in this regard - see Appendix A for further discussion.

DEFORESTATION REMAINS THE BIGGEST THREAT TO BRAZIL'S SOVEREIGN HEALTH

Brazil's deforestation has been worsening since 2012

Brazil's recent record regarding deforestation has been disappointing - see Figure 5.



Official deforestation rates for the Brazilian Amazon, taken from PRODES. The target 80% reduction from the 1996-2005 average is also shown. Bar colours represent phases of the Brazilian government's Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm).

Figure 5: Brazilian Deforestation (1998 - 2020)
(Source: Silva Junior, C.H.L., Pessôa, A.C.M., Carvalho, N.S. et al , 2021 [xvii]

It is clear that deforestation in Brazil has been on a rising trend since 2012.[20] In March 2021, according to Imazon[21] 810 km² was deforested in the Legal Amazon, an increase of 216% over March 2020,[xviii] when deforestation totalled 256 km².

Deforestation in the Cerrado has often been worse on an annual basis. Since 2004 over 200,000 km² has been deforested in the Cerrado. Over the same period the area deforested in the Amazon was over 170,000 km² giving a combined total area deforested of nearly 375,000 km² - see Figure 6.

[20] Brazil's National Policy on Climate Change (established in 2009) committed to reducing the deforestation rate in Amazonia by 80% by 2020, a maximum forest loss of 3,925 km2 compared to the baseline of 19,625 km2 (the average for the 1996–2005 period). Instead, Brazil has only succeeded in halving the deforestation loss (comparing the actual 2020 figure with the baseline).

[21] Instituto do Homem e Meio Ambiente da Amazônia is a Brazilian research institution whose mission is to promote conservation and sustainable development in the Amazon.

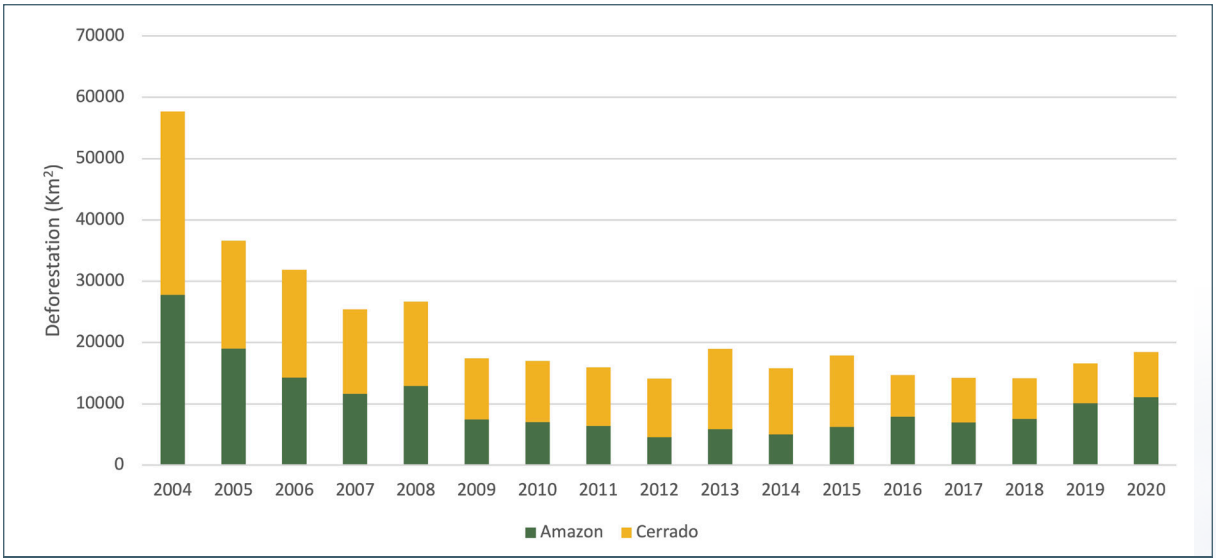


Figure 6: Deforestation in the Amazon and Cerrado (2004-2020) (Source TerraBrasilis / PRODES)

The trend of increased deforestation since 2012 is largely the result of changing government policies and tactics. Both the Temer government (elected in 2016) and the Bolsonaro regime, which replaced it in 2019, imposed strong cuts on the enforcement regime[22] and in the case of President Bolsonaro also made statements that appeared to endorse deforestation by farmers.[xix] Figure 6 suggests that unless the monitoring and enforcement regime is fully supported by the Brazilian government deforestation will not be reduced and may even increase.

Deforestation also threatens biodiversity and impairs Brazil's natural capital

In addition to releasing greenhouse gases, deforestation threatens biodiversity and impairs a variety of ecosystem services which are essential to Brazil's sovereign health including:

- **Water regulation.** The Amazon is a key source of water through evapotranspiration, pumping an estimated 20 billion tonnes of water into the air every day.[xx] This provides rainfall for Brazil's crop production and feeds a number of rivers that are essential for Brazil's hydroelectric power production.
- **Provisioning services.** As well as providing food the Amazon is an important source of genetic materials and resources for natural medicines and pharmaceuticals.
- **Biological control.** A number of studies have identified a link between deforestation and zoonotic diseases.[xxi]

[22] The budget for the Ministry of Environment has declined from BRL 4.4 billion in 2013 to BRL 2 billion in 2021- a 55% reduction.

The deforestation outlook is not encouraging

From a policy perspective the signs are not encouraging. Brazil's original 'intended Nationally Determined Contribution' (iNDC), filed in 2016 under the terms of the Paris Agreement, contained a number of firm commitments with respect to land use change and forests:

- strengthening and enforcing the implementation of the Forest Code, at federal, state and municipal levels;
- strengthening policies and measures with a view to achieve, in the Brazilian Amazonia, zero illegal deforestation by 2030 and compensating for greenhouse gas emissions from legal suppression of vegetation by 2030;
- restoring and reforesting 12 million hectares of forests by 2030, for multiple purposes;
- enhancing sustainable native forest management systems, through georeferencing and tracking systems applicable to native forest management, with a view to curbing illegal and unsustainable practices.

However, these commitments are not mentioned in the revised NDC filed in December 2020[xxii] (which fails to mention deforestation at all).

In April 2021, President Bolsonaro was reported to have written to US President Biden recommitting Brazil to eliminate illegal deforestation by 2030.[xxiii] However, that month he also signed off on the nation's 2021 budget which included a cut of almost BRL 240 million (USD 44 million) for the Ministry of Environment, reducing environmental monitoring expenditures to BRL 83 million (USD 15 million).[xxiv]

Further evidence that the current Brazilian government does not intend to change its approach to deforestation in the near future is provided by the fact that Brazil has failed to ratify the Escazu Agreement[23] - doing so would require Brazil to enact domestic legislation to promote 'environmental democracy' and the protection of environmentalists monitoring and preventing deforestation.[xxv]

[23] Agreed between members of the Economic Commission for Latin America and the Caribbean (ECLAC); took effect on 22nd April 2021 with 12 countries ratifying. The aim of the Escazu Agreement is to promote freedom of environmental information, public participation in environmental decision making, access to justice in environmental matters and Protection for those defending the environment and environmental human rights.

BRAZIL'S CLIMATE PATH IS WELL ABOVE THE 2ºC TARGET

Brazil's NDC target is 2060 (and weaker than the previous version)

Brazil's revised NDC reiterated its previous iNDC[24] commitment to reduce its greenhouse gas emissions in 2025 by 37% compared with 2005 and included a new commitment to reduce its emissions in 2030 by 43%, compared with 2005.

The Brazilian government noted that this NDC is 'compatible with an indicative long-term objective of reaching climate neutrality in 2060', 10 years after the Paris Agreement target of 2050.

Brazil's revised NDC was criticized immediately after its publication by WWF Brazil as a 'textual manoeuvre'[xxvi] based on the fact that Brazil had revised up the 2005 baseline but retained the original percentage reduction targets. The effect of this was to revise the previous absolute target levels of net emissions of 1.3 GtCO2e[25] in 2025 and 1.2 GtCO2e in 2030 to 1.8 GtCO2e in 2025 and 1.6 GtCO2e in 2030 - see Figure 7.

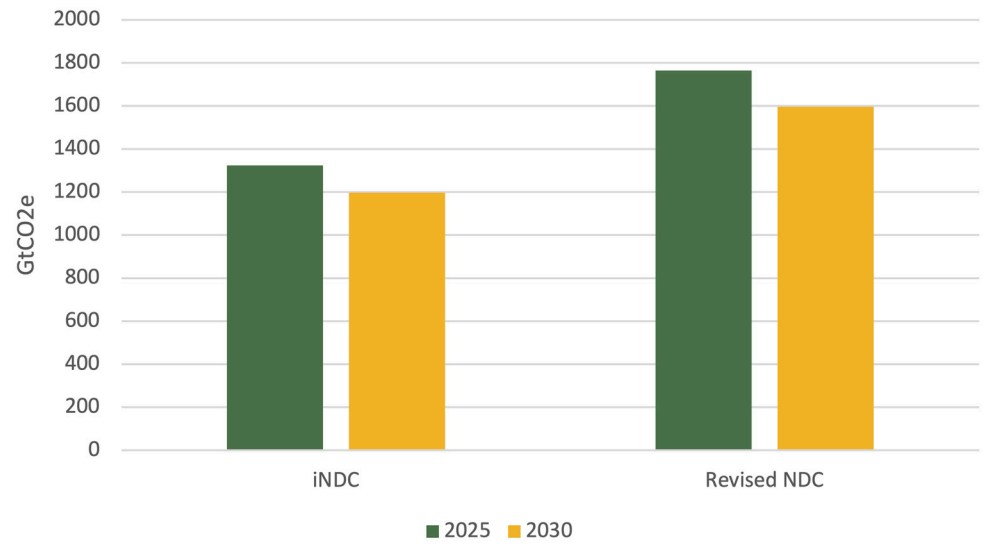


Figure 7: Comparison of Intended National Determined Climate targets and revised Nationally Determined Climate targets.[xxvii]

[24] In the lead up to the Paris Agreement (2015) on climate change, countries submitted their own plans to address climate change, known as Intended Nationally Determined Contributions (INDCs). These INDCs were converted to Nationally Determined Contributions (NDCs) when the country formally joined the Paris Agreement

[25] Gigatonnes, CO2 equivalent

Brazil's current climate trajectory is 'highly insufficient' (3-4º by 2050)

Analysis published by ClimateActionTracker.org assesses Brazil's NDC as 'highly insufficient', implying a global warming outcome in 2050 in the 3-4º range - well above the 2º Paris Agreement target.

As discussed in the previous section, Brazil's record of controlling deforestation is poor, and the current government's approach does not suggest that achieving zero illegal deforestation by 2030 is likely to be achieved.

Because deforestation has such a material impact on Brazil's GhG (greenhouse gas) emissions, we believe failure to control deforestation is likely to mean that it will miss its NDC targets - see Figure 8.

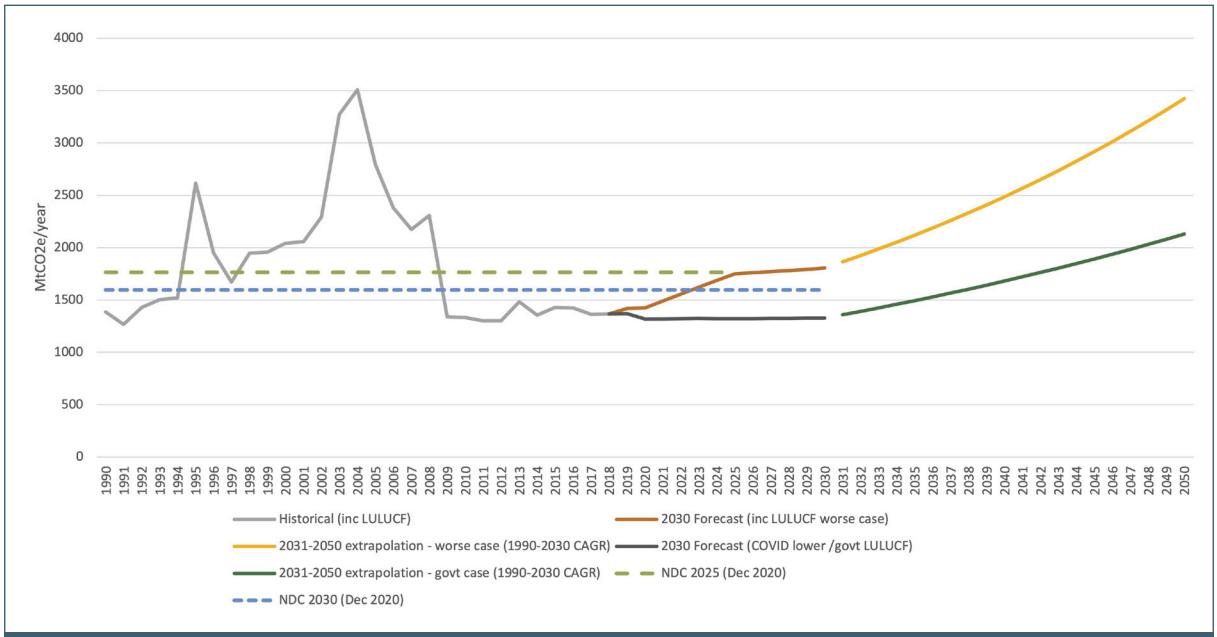


Figure 8: Brazil's Climate Pathways (CO2-equivalent emissions).[xxviii]

MARKET AND POLICY PRESSURES ARE INCREASING

Broader 'net zero' investment themes will impact Brazil

Brazil is exposed to the broad 'net zero' theme which is rapidly gathering pace in capital markets, and also to the actions taken by foreign governments and organisations like the EU as part of their policy responses to climate change.

The Inevitable Policy Response project's updated forecast and the strong trend towards Net Zero investment and lending portfolios highlight the seismic shifts occurring across the finance and policy landscapes that will increase the risks for sovereign bond investors holding Brazilian debt, and beyond them, to investors exposed to Brazilian company equity and debt, real estate, and soft commodities.

From a sovereign bond investor perspective, we believe these are potentially significant risks which are likely to crystalise if Brazil continues to deplete its natural capital resources.

We discuss these themes of government policy responses and net zero investment strategies in the following sections.

INEVITABLE POLICY RESPONSE

The Inevitable Policy Response is a research project commissioned by the PRI to lay out 'the policies that are likely to be implemented in the 2020's' to put the world on a path towards the Paris Aligned outcome (although achieving 1.5ºC would require more aggressive policy responses than forecast currently) - see Figure 9.[26]

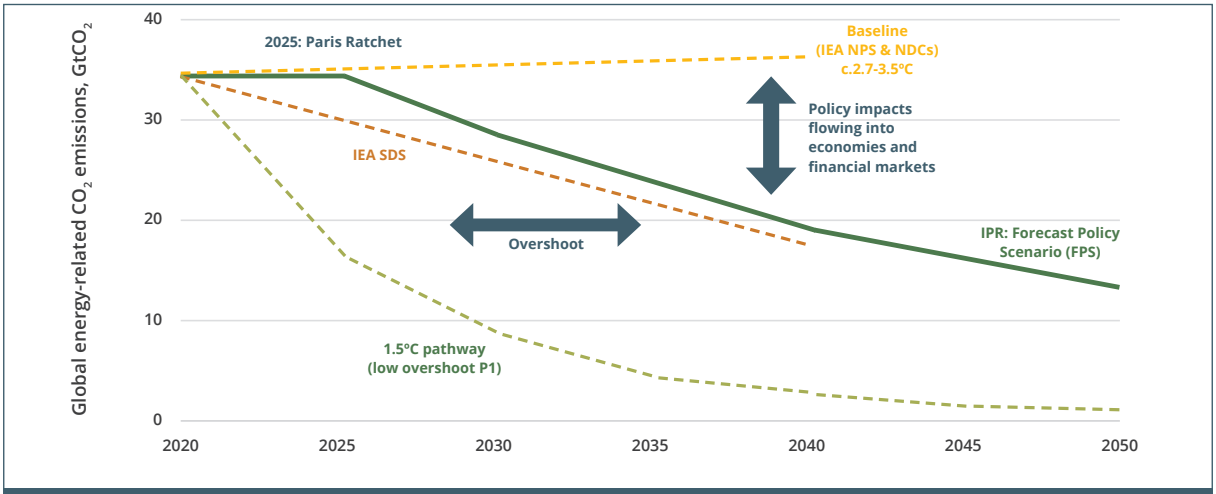


Figure 9: Alternative Climate Change Pathways (Source: IPR). IEA (International Energy Agency) SDS (sustainable development scenario) and NPS (new policy scenario)

The theory underpinning the IPR project is that the 'ratchet process' set out in the Paris climate agreement will trigger a cumulating policy response by governments around the world by 2025, and that this accelerating trend makes a sudden, forceful, policy shift more likely - see Figure 10.[27]

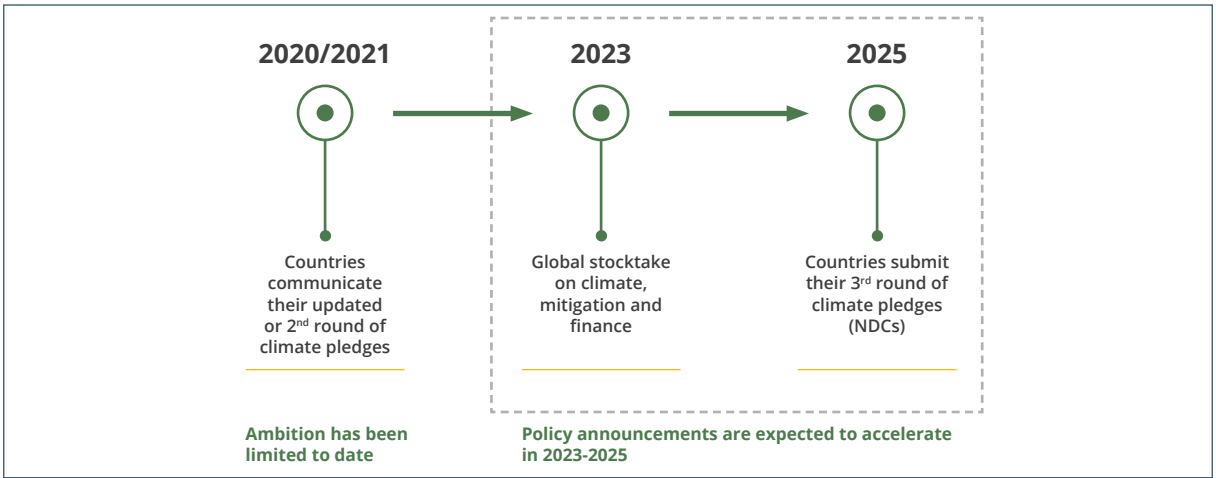


Figure 10: Paris Agreement 'Ratchet' Mechanism (Source: IPR).

The objective of the IPR project is to warn investors of the risks associated with this sudden policy shift and to encourage them to begin structuring their portfolios accordingly to avoid the potential losses (and capture the potential gains) associated with a sudden reallocation of capital from high- to low-carbon activities.

[26] Taken from the IPR's 2019 model which is being updated to reflect increased policy ambition since then

[27] Policy momentum over the last two years supports this thesis

IPR March 2021 forecast

The IPR project updated its Forecast Policy Scenario[xxix] in March 2021. Table 2 sets out the IPR's main policy forecasts.

Table 2: IPR Forecast Policy Scenario (updated) (Souce: UNIPR.org).		
Carbon pricing	1	Carbon Border Adjustments Mechanisms (CBAMs) for carbon will become increasingly a policy option. This could lead the United States to announce a national carbon pricing system as early as 2023, and we forecast by 2025, and signal a strong carbon price path to reach a backstop of USD 65 by 2030.
	2	The European Union's evolving commitments will deliver substantial carbon prices. By 2030, we expect EU policy to backstop an EU ETS carbon price of USD 75/tCO2 to ensure long-term action toward decarbonisation in heavy emitting sectors.
Coal	3	In India, rapidly evolving Indian policy and prospects for market reforms and pricing has already ended further investment in new coal.
	4	China will end construction of new coal fired power production after 2025, driven by new policies to facilitate its 2060 net zero target and ongoing market liberalisation.
	5	The United States will end all coal-fired power generation by 2030, through a combination of emission performance standards and carbon pricing at the Federal and State levels, combined with market forces.
Clean power	6	The United States will implement a binding and credible 100% clean power standard for 2040, ending unabated fossil electricity generation.
Zero emission vehicles	7	China, France, Germany, Italy and Korea will end the sale of fossil fuel cars and vans in 2035. Jointly these large markets will accelerate the auto industry transition to electric drive, and precipitate further policy action internationally.
Industry	8	All major industrial economies including the US, Germany, Japan and China will require all new industrial plants, led by steel and cement, to be low-carbon by 2040, through a combination of emissions performance standards and carbon pricing.
Agriculture	9	The US, Canada, Australia and other major agricultural producers will have comprehensive mitigation policy in place by 2025 to reduce emissions from production of crops and livestock.
Land use	10	Major tropical forest countries will end deforestation by 2030, with domestic policy responding to international climate finance and corporate supply chain pressures.

The revised IPR forecast has implications for Brazil and its bond investors in a number of respects.

Preventing deforestation - an effective Nature-Based Solution

The IPR is forecasting that countries will need to implement Nature Based Solutions to sequester carbon as a key component of their Paris 2050 plans and this will drive a greater focus on stopping deforestation than has been the case before.

The reason is simple - not cutting down trees is a far more effective way to reduce carbon emissions than planting new trees (a new tree takes time to sequester carbon whereas cutting down an old tree often results in all the carbon being released immediately).[28]

[28] The IPR assumes a total NBS market value potential to be US$7.7 trillion (present value of carbon sequestration between now and 2050). Natural forest restoration (PV: US$2.8 trillion) is easy to implement so is expected to be taken up first ; Avoided deforestation represents an additional US$4.8 trillion to 2050, but is more complex to implement (source: https://www.unpri.org/inevitable-policy-response/the-inevitable-forest-finance-response-investor-opportunities/5906.article).

As discussed in this report, Brazil's recent record on stopping deforestation is poor but it has demonstrated much greater success in the past, so it is clear that Brazil has the capability to succeed in the future.[29]

Carbon Border Adjustment Mechanisms (CBAMs) will price in deforestation

The IPR is forecasting substantial increases in the carbon price as a result of changing government policies. To protect domestic businesses suffering a high carbon price they suggest that the inevitable policy response will be to impose a carbon tax on imports (CBAM).[30]

The EU Commission launched a public consultation to consider a CBAM in July 2020.[xxx] In February 2021 several EU Parliamentary committees proposed a resolution for MEPs to debate supporting the introduction of CBAMs.[xxxi]

Brazilian exports to the EU and other countries could be rendered less competitive if CBAMs were applied that counted the carbon cost of Brazil's deforestation.

International supply chains will shift to avoid deforestation

In 2017 France passed the Duty of Vigilance law requiring large companies to take responsibility for the human rights and environmental impacts of their supply chains.[xxxii] The EU is considering introducing similar supply chain due diligence legislation,[xxxiii] as are Germany[xxxiv] and the Netherlands,[xxxv] and there is a growing trend for companies to be sued for harms that have happened in their supply chains (beyond their direct legal responsibility).[xxxvi]

Deforestation will be high on the list of environmental harms that companies will be concerned about if such legislation takes effect and this will further increase the pressure on Brazilian companies and Brazilian exports (particularly beef and other soft commodities such as soy).[xxxvii] The recent letter from the Retail Soy Group (mentioned on page 14 of this report) is an example of such pressure.

International trade negotiations will be hampered by deforestation

A further implication of the IPR's forecasts is that Brazil's stance on climate change and deforestation may create difficulties when it comes to negotiating trade agreements.

This will obviously depend upon the internal politics of its counterparty(ies) but the EU's delay over ratifying the Mercosur trade agreement, due (in part) to concerns about Brazil's ability and willingness to cut deforestation, is an obvious example. [xxxviii]

As a result, we expect Brazil to come under much greater pressure to stop deforestation over the coming decade.

The IPR project is focused on governments and their policy responses to the threat of climate change, but the financial sector, in particular, has also become very active in this area.

[29] Figure 5 shows the dramatic reduction in deforestation achieved by Brazil between 2004 and 2012.

[30] It is worth noting that the adoption of CBAMs is one of their more contentious forecasts.

THE FINANCIAL SECTOR GOES NET ZERO

Since 2019 there has been a growing focus across the financial sector regarding the need to ensure that capital is being allocated in a way that supports the Paris Agreement to ensure a global temperature rise of no more than 1.5°C by 2050.

Various sector-wide initiatives have been launched, all with this common objective (see **Appendix B - Financial Markets Net Zero initiatives**) and all setting interim targets for 2030 or earlier that have implications for capital allocation.

In March of this year, the Institutional Investors Group on Climate Change (IIGCC) launched the 'Net Zero Investment Framework',[xxxix] with the aim of encouraging investors to align their investment portfolios with net zero emissions to keep global warming below 1.5°C.

This has important implications for sovereign bond investors and thus for Brazil.

Net Zero Investment Framework – Brazil's sovereign bonds will be affected

The Net Zero Investment Framework requires investors to develop a 'net zero investment strategy' built around five core components[31] of the Framework.

From the perspective of Brazil, the key component of the Framework relates to sovereign bonds. The Framework sets two sovereign bond targets for portfolio construction:

1. Increase weighting, or use tilted benchmarks, towards higher climate performing issuance to the maximum extent possible
2. Increase allocation to green or SDG climate bonds, if possible

The Framework also requires a sovereign bond investor to engage with governments and to 'consider exclusion of continued poor performers'.

GhG emissions influence 60% of the Climate Change Performance Index

The Framework suggests that sovereign bond investors should assess the GhG performance of the issuing country and its climate-related policies using the Germanwatch Climate Change Performance Index[xl] ('an independent monitoring tool for tracking countries' climate protection performance'[xli]).

GhG emissions count for 40% of the CPPI score, with climate policies adding another 20% - see Figure 11.

[31] Objectives and targets, strategic asset allocation and asset class alignment, policy advocacy, investor engagement activity, and governance.

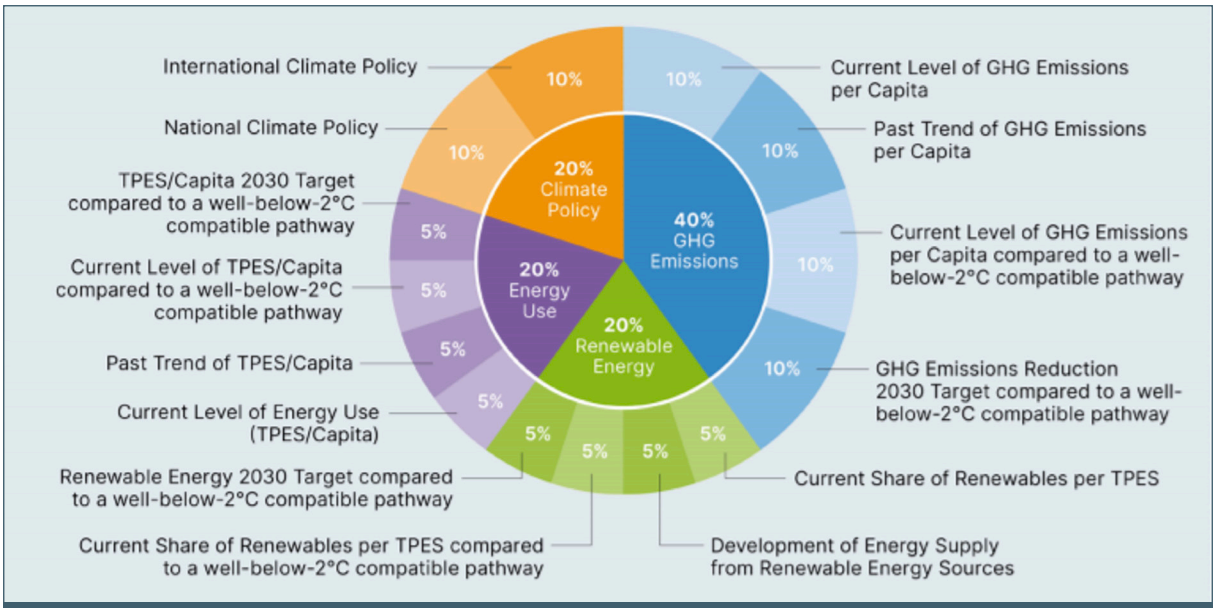


Figure 11: Components of the CPPI (Source: CPPI).
GHG = Greenhouse Gases, TPES = Total Primary Energy Supply

Brazil's CPPI rank has fallen to 25/58 in 2020

In the 2021 edition of the CPPI [xlii] Brazil is ranked 25th out of 58,[32] down four places compared to last year with a score of 53.26 (rated 'Medium' on the CPPI's scale).

In relation to its current GhG emissions (including those from LULUCF[33]), Brazil ranks 32nd (42nd on a per capita basis).

In relation to its 2030 target, the CPPI scores Brazil better, ranking it 18th, but this rank was based on Brazil's first NDC which committed to 'zero illegal deforestation by 2030'.

The revised version of this NDC (filed in December 2020 after the CPPI had been calculated) was noticeably silent on this point. We believe this would negatively impact Brazil's ranking if it were factored in.

If the effects of deforestation could be ignored, then Brazil's current GhG emissions rank would be 18th and it would be rated 'High' on the CPPI's scale,[34] highlighting the extent to which deforestation is impacting Brazil's standing.

The 2020 CPPI report also expresses concerns about Brazil's climate mitigation efforts and a 'significant lack of transparency in the country's climate policymaking,' leading them to rate its performance on the international level 'very low'.

[32] 57 countries and the EU

[33] Land Use, Land Use Change and Forestry

[34] Assuming all the GhG emissions relating to LULUCF are caused by deforestation – in reality, a small portion will come from other causes.

NET ZERO COMMITMENTS AND BRAZILIAN BONDS

We believe the trend for asset managers to adopt the 'Net Zero Investment Commitment' will continue and given Brazil's poor score, there is a risk that sovereign bond investors will begin to reduce their holdings in Brazil's bonds unless Brazil adjusts its course.

We have identified a number of investors holding Brazilian sovereign bonds that are signatories to one or more of the net zero commitments (refer to Table 6 in Appendix D for the list of investors).

Investors want Brazil to reduce deforestation

There are several investor initiatives focused specifically on reducing (and ultimately eliminating) deforestation. We expect pressure on Brazil from these initiatives to continue to grow.

Investor Initiative for Sustainable Forests (PRI/Ceres) - deforestation as a systemic risk

The Principles for Responsible Investment (PRI) has been working with Ceres since 2011 co-ordinating the Investor Initiative for Sustainable Forests aimed at tackling deforestation arising from the production of palm oil, beef and soy. In May 2021, the PRI announced plans to relaunch these engagements within a centralised stewardship initiative accompanied by a Practitioners Group of up to 50 investors under the overall theme of 'Deforestation as a systemic risk: an opportunity for investors' collective action',[xliii] providing clear evidence that investor engagement with Brazil and Brazilian companies regarding deforestation can be expected to increase in 2021 and 2022.

Investidores Pelo Clima (IPC) - Investors for Climate Initiative

Multinational initiatives such as the PRI include Brazilian investors alongside their international counterparts but pressure for change is also coming from domestic Brazilian investor initiatives.

The IPC is a Brazilian investor group co-ordinated by SITAWI, a Brazilian consulting and research firm, and funded by the Instituto Clima e Sociedade (iCS), a philanthropic organization that promotes prosperity, justice and low carbon development in Brazil. The IPC's main objective is to engage and train local professional investors to advance the portfolio decarbonization agenda, while seeking better risk-adjusted returns.

The IPC, which started in the second half of 2019, currently has 22 members, including asset managers, pension funds, insurance companies and family offices, with assets under management of more than BRL 3 trillion (USD 593 billion).[xliv]

Investors Policy Dialogue on Deforestation (IPDD)[xlv]

The Investors Policy Dialogue on Deforestation (IPDD) is a collaborative investor initiative set up in July 2020 to engage with public agencies and industry associations in selected countries on the issue of deforestation.[35]

30 members of the IPDD[36] wrote to the Brazilian government in June 2020 expressing their concerns regarding deforestation and asking the government to *'demonstrate clear commitment to eliminating deforestation and protecting the rights of indigenous peoples.'* [xlvi]

Brazil responded positively to this letter with a series of meetings with the governor of the BCB, the Brazilian Vice President and members of the Brazilian Congress including the Speaker of the Lower House.[xlvii]

However, the talk has not been followed by sufficient action and so the IPDD followed up with another letter in April 2021 stating that *'policies over the last couple of years have moved Brazil further away from the goal of reducing illegal deforestation. Forest loss in 2020 hit a 12-year high. … we believe that tackling illegal deforestation requires enforcement of the existing legislation, including by prosecuting illegal activity; firm steps to stop legislation that might encourage deforestation, such as granting property rights to illegal occupiers of land; and transparent traceability of supply chains that might be contaminated by illegal deforestation.'* [xlviii]

IPDD co-chair, Bluebay Asset Management, stated in February 2021 that *'Our goal is to … bring to the Brazilian government's attention the fact that failure to tackle this issue represents a systemic risk for investors'*,[xlix] and flagged the risk for Brazil that failure to address the issue might ultimately result in higher sovereign and corporate funding costs if investors become more reluctant to supply capital.

The IPDD plans to continue its engagement with Brazil, as well as expanding to engaging with other countries where deforestation represents a potential systematic investment risk. In relation to Brazil, it has set out five outcomes:

1. Significant reduction in deforestation rates, i.e. showing credible efforts to comply with the commitment set down in Brazil's Climate Law, article 19;
2. Enforcement of Brazil's Forest Code;
3. Reinforcement of Brazil's agencies tasked with implementing environmental and human rights legislation and avoidance of any legislative developments that may negatively impact forest protection;
4. Prevention of fires in or near forest areas, in order to avoid a repetition of fires like in 2019;
5. Public access to data on deforestation, forest cover, tenure and traceability of commodity supply chains.

[35] The IPDD has a membership of over 50 international and Brazilian financial institutions with approximately USD7 trillion in assets under management. It is co-chaired by Storebrand Asset Management and BlueBay Asset Management, with the Tropical Forest Alliance (TFA) providing secretariat support, and is a UN PRI supported initiative.

[36] The IPDD 'seeks to ensure long-term financial sustainability of investments in the countries they are invested in by promoting sustainable land use and forest management and respect for human rights, with an initial focus on tropical forests and natural vegetation. It will work with key stakeholders to encourage adoption and implementation of regulatory frameworks that ensure protection of such natural assets and human rights'.

FOREIGN INVESTORS HOLD USD 113 BILLION OF BRAZILIAN SOVEREIGN BONDS

Brazil's debt curve extends to 2055

USD 795 billion[37] (88%) of Brazil's bonds expire by 2030, with USD 113.1 billion (12%) expiring in 2031 and beyond - see Figure 12.

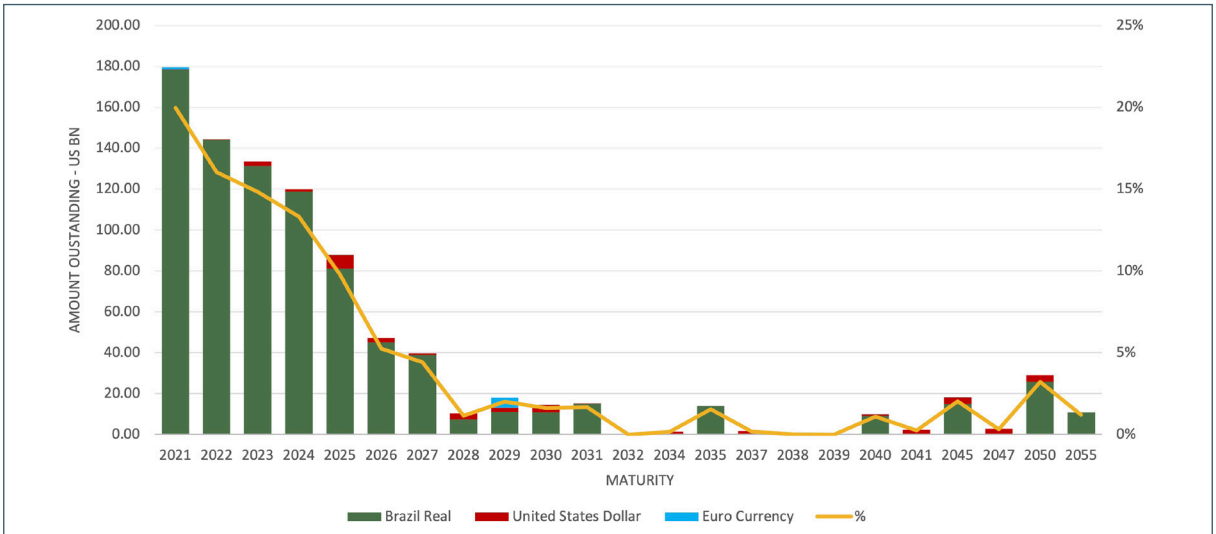


Figure 12: Maturity Distribution of Brazilian Debt (all amounts converted to USD) (Source: Bloomberg)

Policy changes before 2030 will impact longer-dated bonds the most

In line with the IPR forecast, we expect policy 'ratchet' effects to impact Brazil between now and 2030:

- 2021 - COP 26 climate conference in Glasgow (one of the goals is 'curtail deforestation');
- 2023 - global stocktake of the Paris Agreement (with the aim to assess the world's collective progress towards achieving the purpose of the agreement and its long-term goals);
- 2025 - countries submit their 3rd round of climate pledges (NDCs) and the interim targets set under many of the financial sector 'net zero' initiatives take effect (stimulating changes to portfolios).

There is a risk that these events will increase selling pressure on Brazilian sovereign bonds as the market begins to anticipate the decisions that might be made before they happen. Attempting to predict the impact on particular parts of the Brazilian bond curve is beyond the scope of this paper, but in general longer-dated bonds are more volatile in response to changes in the market's assessment of risk.

[37] Priced at 17 March 2021

Investors holding Brazilian sovereign bonds expiring in 2030 or earlier will obviously be exposed to the impact of changing bond prices as a result of these effects but their shorter duration means any price changes are likely to be more muted (and investors always have the choice of holding their bonds until they are redeemed at par).

As a result, we believe investors in longer-dated bonds are particularly exposed to the impact of changes in Brazil's sovereign health and the market response to this and the associated changes in the policy environment (including moves to net zero portfolios).

Foreign investors are exposed to long-dated Brazilian debt

In common with many sovereign bond markets, the majority (88%) of Brazil's sovereign bonds are held by domestic institutions, however that still leaves a significant sum (USD 112.6 billion, 12%) controlled by non-domestic institutions.[38]

Analysis of Brazil's long-dated debt (expiring after 2030) shows that foreign investors hold 10% (USD 11 billion) of the USD 113 billion of Brazil's debt which expires after 2030 (compared to their 13% holding of shorter-dated bonds) - see Figure 13.

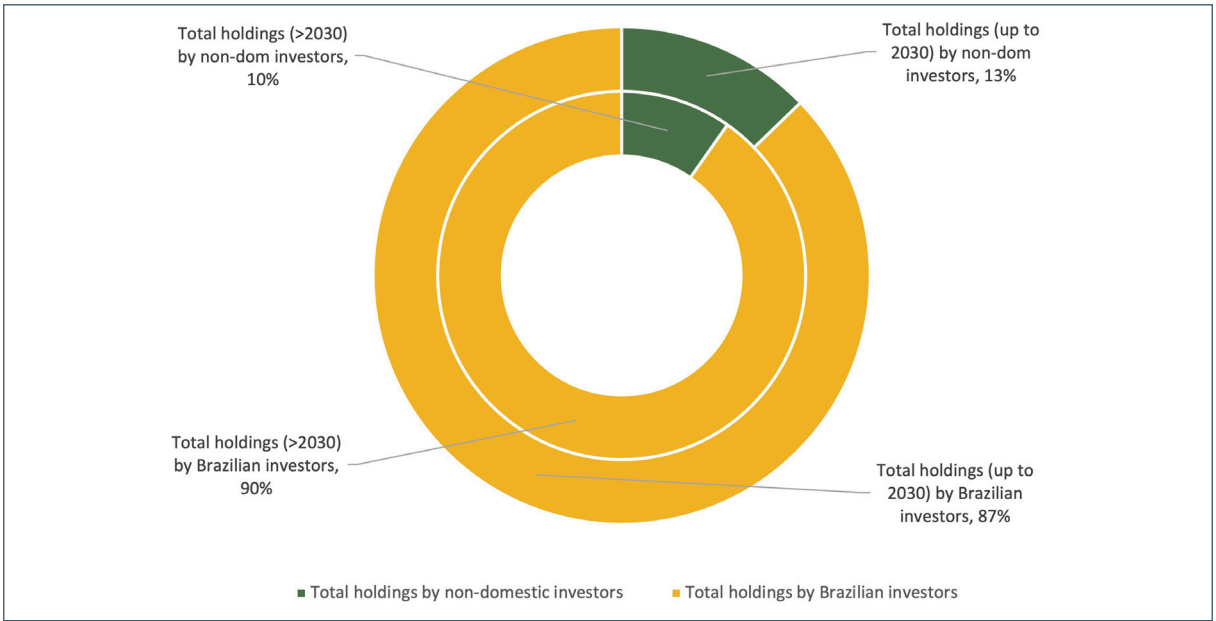


Figure 13: Proportion of Brazilian Debt Held by Domestic and Foreign Investors (Source: Bloomberg, Planet Tracker analysis).

However, that statistic hides the fact that some foreign investors are heavily weighted towards the longer end of the Brazilian debt curve. This is not surprising when one considers that international investors are likely to favour the Brazilian government bonds issued in US dollars and Euro - the majority (90%) of Brazilian government bonds denominated in local currency (Brazilian Real) expires in/before 2030, as does 100% of the Euro-denominated bonds, whereas 40% of the Brazilian government's US dollar-denominated bonds expire after 2030 - see Figure 14.

[38] Brazil's Federal Public Debt Monthly Report published by the National Treasury Secretariat shows non-residents held 9.54% at the end of March 2021. Our figure is higher because we include holdings of Brazilian subsidiaries of foreign holding companies.

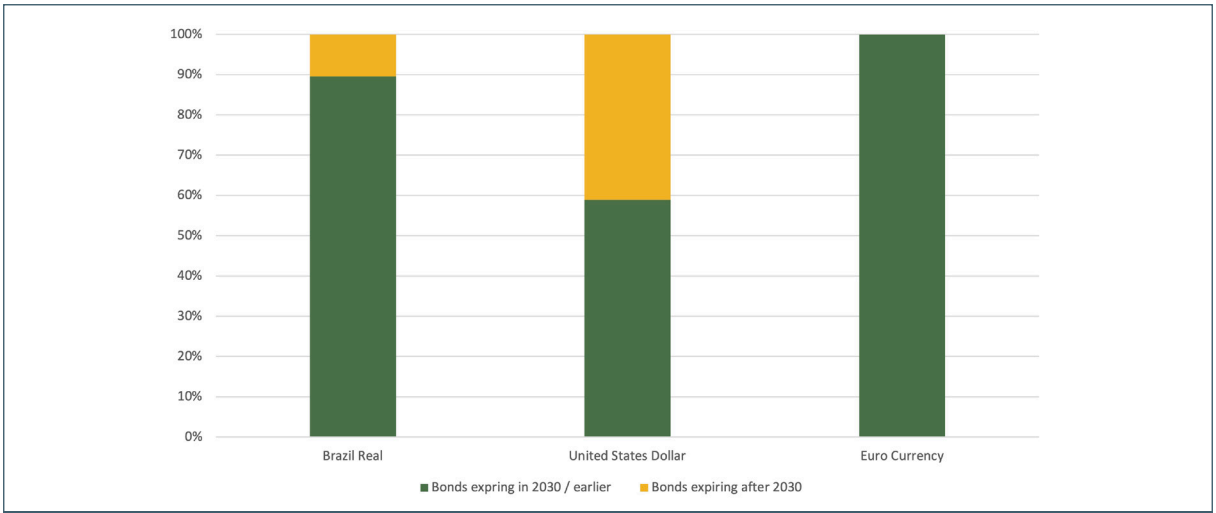


Figure 14: Short and Long-Dated (>2030) Brazilian Government Bonds by Currency.

The Government of Japan Pension Fund is the largest foreign investor in relation to longer-dated Brazilian debt, holding 8% (US$ 2 billion) of the bonds expiring after 2030 (accounting for 69% of its total holding of Brazilian bonds) - see Figure 15.

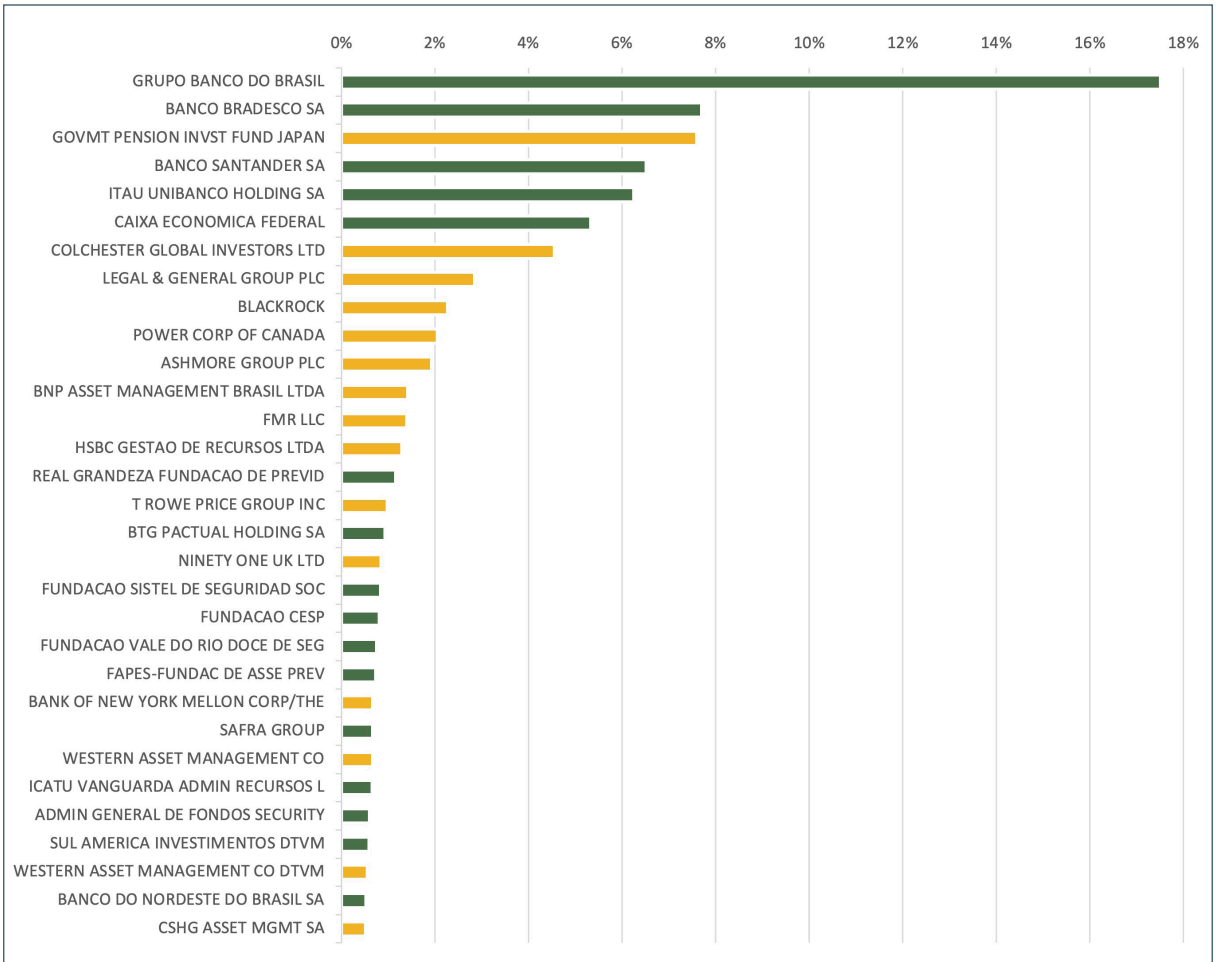


Figure 15: Distribution of Long-Dated (>2030) Brazilian Debt Holdings Showing Foreign Investors (Orange Bars) and Domestic Investors (green bars) (Source: Bloomberg, Planet Tracker analysis).

A number of investors have a significant proportion of their funds invested in longer-dated bonds highlighting the extent to which they are exposed to Brazil's long-term policies regarding deforestation-related climate risk (see Table 6 in **Appendix C - Investors with a high proportion of longer-dated Brazilian bonds**, for the full list).

Table 6 also shows that **three investors with particularly high exposure to long-dated Brazilian bonds have also made some form of net zero commitment**. Invesco is a signatory to the Net Zero Asset Managers Initiative and BNP is a signatory to the Net Zero Banking Alliance (see A**ppendix B - Financial Markets Net Zero initiatives** for more details).

The third investor is BNP Asset Management which is not a member of any net zero initiatives itself but we have grouped it with BNP. Strictly speaking, the fact that BNP has signed up to the Net Zero Banking Alliance does not affect how BNP Asset Management runs its portfolios (and BNPAM will need to decide separately if it wishes to sign up to, for example, the Net Zero Asset Managers Initiative), but we believe it is a good indicator of the attitude of senior management in the organization towards climate-related risks.

Table 7 (see **Appendix D - Investors with Net Zero Commitments**) shows the full list of investors we identified that hold Brazilian sovereign bonds and are signatories of one or more net zero commitments (or linked to a holding company that is).

Investors holding longer-dated bonds stand to gain from improvements to Brazil's sovereign health

Although investors holding Brazilian bonds expiring after 2030 are more exposed to the risks arising from Brazil's current path than investors holding shorter-dated bonds, they will also capture more of the rewards from any changes that Brazil makes in response to the market and policy pressures we have discussed in this report since the positive effects have the potential to benefit Brazil's economy and natural capital base for decades to come.

As such there is a strong incentive for these investors to engage with the Brazilian government to encourage it to take rapid steps to strengthen Brazil's sovereign health.

A FOUR-STEP ROADMAP TO BOOSTING BRAZIL'S SOVEREIGN HEALTH

1. Strengthen core climate and nature policies with a clear pathway to net zero by 2050 in line with the recent retailer/investor letter and the IPDD
2. Reform public spending to end perverse subsidies and incentivise sustainable agribusiness practices
3. Invest in a green recovery
4. Issue a Sovereign Bond linked to eliminating illegal deforestation to fund the investment required

Step one: Strengthen core climate and nature policies

Brazil should strengthen its policies and its institutional framework, particularly with respect to deforestation in line with the requests from the IPDD and the Soy Retail Group discussed earlier in this report.

There are a number of encouraging signs emerging which should be built upon.

Brazilian Central Bank Sustainability Agenda

As discussed earlier in this report, in 2020 the Brazilian Central Bank (BCB):

- Joined the Network of Central Banks and Supervisors for Greening the Financial System;
- Launched a 'new sustainable agenda';
- Signed an agreement with the Climate Bonds Initiative to develop a sustainable finance agenda.

In April this year the BCB launched two consultation processes showing that it intends to act on its sustainability agenda and embed climate change into the Brazilian financial system.

BCB Public Consultation 82 – greening rural finance

The BCB is considering two draft regulations that define sustainability criteria to be applied to rural credit operations and will give the BCB greater control over lending by Brazilian banks.[i] Rural credit programmes provide subsidised loans to Brazil's agriculture and livestock producers.

The proposal would provide criteria to classify potential projects for funding as:

- **Illegal** - projects that may not be financed with rural credit due to the existence of regulatory provisions regarding overlap with indigenous areas, illegally deforested areas in the Amazon Biome, or administrative sanctions for slave-like work conditions. It follows existing norms issued by the National Monetary Council in the 2000s and 2010s.
- **High risk** - projects that the BCB regards as carrying social or environmental risks for the financial institution. In such cases, the financial institution shall check whether the operation is in accordance with rural credit regulations before proceeding with the credit granting process.
- **Sustainable** - projects that comply with social and environmental sustainability parameters - such as a low-carbon agriculture, the existence of grants for water usage, or the employment of renewable energy generated at the property. The aim is to create conditions for the development of a 'green bureau' for rural credit and provide better incentives to sustainable activities in a near future.

99% of deforestation is illegal so these proposals could be significant

Since an estimated 99% of deforestation in Brazil is illegal[li] this proposal would mark a significant shift in the Brazilian financial system if it were adopted and would add weight to the pressure being exerted to prevent illegal deforestation.[39] At the same time, it would help to alleviate the problem for small and medium producers who adopt sustainable practices but who face challenges to access affordable credit. As previously discussed, the Brazilian government has proposed legislation (Provisional Legislation 510/2021) which would 'regularise land tenure' by granting legal occupation rights to settlers who had occupied public lands in the Amazon (and elsewhere), including lands that had been illegally deforested.[40] If passed, this law would legalise historic deforestation, significantly reducing the impact of the proposed rural finance changes.

BCB Public Consultation 85 – embedding climate risk into financial institutions' risk management systems and policies

The BCB is proposing to explicitly include 'issues related to climate change' in the Brazilian regulatory framework for financial institutions.[lii]

The proposal seeks to integrate climate and other social and environmental risks into the risk management framework alongside other traditional risks (credit, market, liquidity and operational), and establishes minimum criteria for identification, measurement, evaluation, monitoring, reporting, control and mitigation of adverse effects arising from the interaction of these risks.

The proposal also requires the inclusion of social, environmental and climate-related risks (both physical and transition) in the Risk Appetite Statement (RAS), the management of business continuity, the risk governance structure and the stress testing programmes of financial institutions. Additionally, more complex institutions will be required to perform scenario analyses considering hypotheses of climate change and the transition to a low-carbon economy.

[39] It is worth noting that the Brazilian Forest Code allows farmers outside the Amazon region (e.g. in the Cerrado) to deforest up to 80% of their land so preventing illegal deforestation will not stop deforestation entirely.

[40] European retailers wrote to the members of the Brazilian National Congress in May 2021 urging them not to pass this legislation https://www.retailsoygroup.org/wp-content/uploads/2021/05/Letter-from-Business-on-Amazon_2021.pdf.

Financial institutions will be required to prepare and disclose a Social, Environmental, and Climate Responsibility Policy (PRSAC), focusing on their positive contribution on social, environmental, and climate issues, as well as disclosing their actions aimed at ensuring the effectiveness of PRSAC and the criteria adopted to evaluate such effectiveness.

This proposal represents a significant move by the BCB, since it takes the TCFD approach to risk management and applies it not only to climate, but also to social and broader environmental issues. However, these proposals will depend upon the active support and engagement of the local Brazilian banks to be effective.

Existing structures should be used to accelerate change

The Financial Innovation Laboratory (LAB) is an example of the structures already existing in Brazil which the government could leverage to accelerate improvements in the country's sovereign health.

The LAB was launched in August 2017 as a forum which brings together Brazilian government and society representatives to promote sustainable finance and to contribute to the fulfillment of the UN Sustainable Development Goals and Paris Agreement commitments in Brazil. It was created by the Brazilian Development Association (ABDE), the Inter-American Development Bank (IDB) and the Securities and Exchange Commission (CVM), in partnership with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.[41] In 2020 it became the first South American member of the International Network of Financial Centres for Sustainability (FC4S).[liii]

The LAB is currently working in Brazil with four thematic working groups focused on Green Finance, Impact Investment, Fintech and Environmental, Social and Governance factors.[liv]

In 2021, the LAB and the GIZ Brazilian Sustainable Finance project (Fibras) launched a roadmap for sustainable finance regulation in Brazil. The report *('Mainstreaming Sustainability in Brazil's Financial Sector')* was prepared with inputs from Brazil's Ministries, regulators and civil society organizations and provides a set of recommended policy actions for accelerating the development of sustainable finance practices within Brazil's financial sector including:[lv]

- Develop a position on establishing an economy-wide environmental and social (E&S) taxonomy
- Harmonising the legal framework for E&S risk management and reporting
- Strengthen E&S monitoring, prudential supervision, and guidance
- Make ESG reporting by financial and non-financial companies mandatory and provide aggregated and publicly accessible E&S data

Strengthen existing forest restoration initiatives

The Brazilian government should work to support and strengthen existing forest restoration initiatives such as the Atlantic Forest Restoration Pact and the Alliance for Restoration in the Amazon and invest in the Ministry of Environment (MMA) and other government agencies[42] to enhance monitoring and enforcement activities relating to deforestation. As previously discussed, the MMA has been subject to stringent cuts in recent years – reversing these would be an obvious first step.

[41] A development agency owned by the German state.

[42] Such as the Environmental agencies (IBAMA and ICMBIO) and the Public Prosecutors office.

Step two: reform agribusiness subsidies to encourage nature-positive investment

In 2015 the Overseas Development Institute reported that the total value of Brazilian subsidies supporting the production and consumption of beef and soy was USD 25 billion[lvi] (roughly a fifth of this goes to farmers[43]). In contrast, the Brazilian government was reported to be budgeting USD 0.38 billion for the Ministry of Environment for 2021 (50% less than 2020).[lvii]

Brazil's subsidy regime is complex (like many other countries) so identifying areas for reform is challenging but we recommend subsidies are redirected to incentivise investment in the following areas:

a Encourage more efficient use of land by increasing cattle per hectare and converting pasture to cropland [lviii]

b Expand the availability of rural credit to enable farmers to invest in machinery and support the education of farmers and the wider community about sustainable agricultural and forestry practices[44]

c Cut bureaucracy associated with land transactions and access to public services.[lix]

Step three: invest in a green recovery

In our previous report we set out a 'High Road' pathway for Brazil to strengthen its sovereign health - see Figure 16

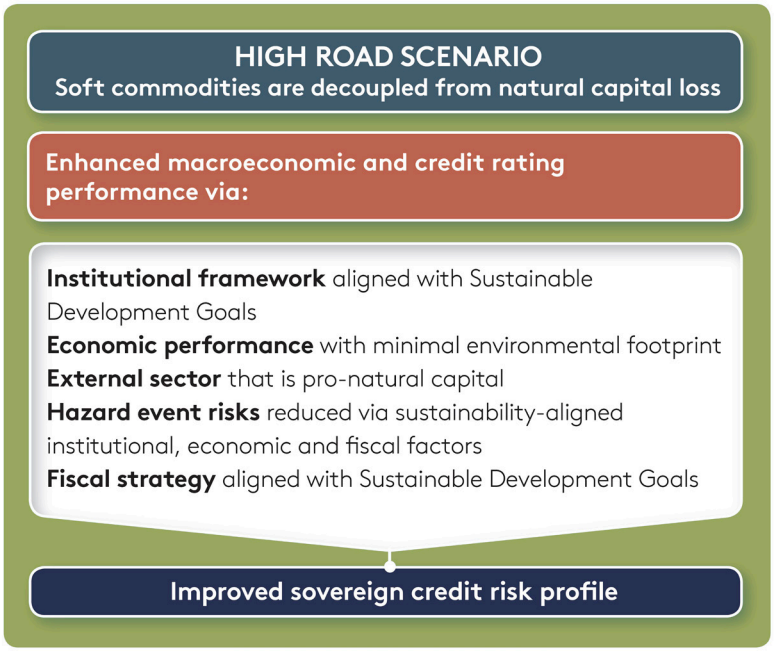


Figure 16: Planet Tracker's 2020 Recommended High Road Scenario for Brazil (Source: Planet Tracker and the Grantham Research Institute)

[43] the OECD estimated that Brazil's 'Total Budgetary Support Estimate' for farmers in 2019 was equivalent to 0.3% of GDP (USD 5.5 billion), noting that 'Brazil provides a relatively low level of support to its farmers, despite maintaining an extensive range of price and credit policies'. (https://www.oecd.org/brazil/brazil-agriculturalpolicymonitoringandevaluation.htm).

[44] The World Bank estimated that agriculture labor productivity in the most productive country is 21.7 times higher than in Brazil. (http://documents1.worldbank.org/curated/en/268351520343354377/pdf/123948-WP-6-3-2018-8-39-22-AriasetalAgriculturalgrowthinBrazil.pdf).

We are not alone in identifying the potential for Brazil if it invested in a green recovery. In 2020, WRI Brasil and New Climate Economy published a report[45] advocating a low carbon growth strategy for Brazil, including ending illegal deforestation. The WRI report aligns with The Planet Tracker/ Grantham Research Institute High Road scenario and highlights the benefits for Brazil's economy as well as the significant reduction that could be achieved in its carbon emissions.[lx]

In line with the framework we set out in Figure 16, WRI Brasil makes three overall recommendations:

- **Quality infrastructure** - promoting integrated planning of projects consistent with the maintenance of natural capital, thus enabling the mobilization of private investments and improving economic and societal resilience to increasingly common extreme climate events.
- **Industrial innovation** - adopting green technologies and approaches to drive innovation and productivity improvements for the industrial sector based on Brazilian knowledge.
- **Sustainable agriculture** - implementing measures to increase efficiency in agricultural production. This will bring several benefits: more efficient land use, increased production and productivity, reduced pressure to deforest and renewed confidence of consumers and national and international markets increasingly concerned with environmental and climate issues.

In 2021, the LAB and the GIZ Brazilian Sustainable Finance project (Fibras) launched a roadmap for sustainable finance regulation in Brazil. 'Mainstreaming Sustainability' makes similar recommendations with respect to the financial sector:[lxi]

- **Foster sustainable infrastructure development** - Foster sustainable infrastructure development by building a pipeline of sustainable infrastructure projects and encouraging private investment to support this (potentially with state support as well) using ESG-linked finance; and
- **Foster sustainable agriculture investments** - Foster sustainable agriculture investments by (among other things) raising investor awareness, encouraging the provision of green[46] and sustainability-linked finance, and enforcing the Forest Code.

The WRI Brasil analysis shows that sustainable and low-carbon practices can lead to significant GDP growth, with a total accumulated gain of BRL 2.8 trillion (USD 553 billion) and a net increase of 2 million jobs by 2030 compared to Business as Usual (BAU).

Their report forecasts that the measures they recommend would also lead to a reduction in GhG emissions exceeding Brazil's current commitment for 2025 under the Paris Agreement – see Figure 17.[47]

In line with our framework, these recommendations would create jobs, strengthen Brazil's economy, and enhance its sovereign health, improving its sovereign credit risk profile (and reducing its cost of capital).

[45] A New Economy for a New Era: Elements for Building a More Efficient and Resilient Economy in Brazil.

[46] i.e. funding which restricts the use-of-proceeds to specific sustainable projects.

[47] The WRI sets out two 'High Road' scenarios that could play out, depending on the extent to which Brazil implements the WRI's recommendations.

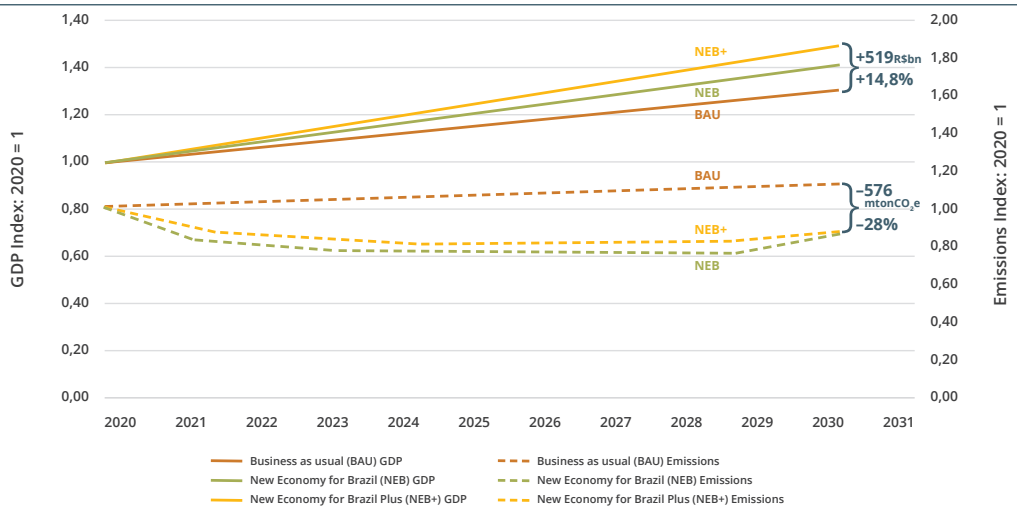


Figure 17: GDP Growth and CO2e Reduction under NEB Scenarios[lxii] Romeiro, V. et al. 2020. "A New Economy for a New Era: Elements for Building a More Efficient and Resilient Economy in Brazil. Working Paper. São Paulo, Brasil: WRI Brasil.

1. New Economy for Brazil (NEB) - encompassing a series of low carbon measures including increased use of hybrid and electric vehicles, increased use of charcoal in the iron and steel industry and reducing food loss while maintaining the same level of agricultural production. These measures result in a decrease in cropland area and an increase in natural vegetation, through restoring degraded lands and they also reduce the pace of deforestation.

2. NEB+, similar to NEB, but half of the land that would return to native vegetation in the NEB scenario is instead used for high productivity agriculture, increasing agricultural production over BAU. This scenario also leads to reduced pressure for deforestation compared with BAU.

The final step - a Deforestation-Linked Sovereign Bond

Given the nature of the proposals contained in this report, the fourth step on Planet Tracker's recommended roadmap to sovereign health for Brazil is to issue a Deforestation-Linked Sovereign Bond (i.e. a sovereign bond with coupons linked to eliminating illegal deforestation).

The opportunity

The market for ESG-labelled bonds[48] has grown at an extraordinary pace over 2020 and is expected to continue growing through 2021 as the types of bonds issued expands - see Figure 18.

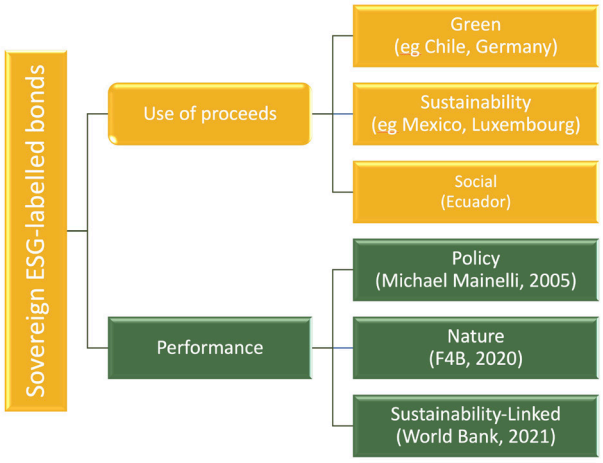


Figure 18: Sovereign ESG-Labelled Bonds (Source: Planet Tracker).

[48] Bonds where the use of the proceeds or the payment of the coupon is connected in some way to an environmental, social, or governance-related purpose or key performance measure.

Governments have been slow to join this trend, but issuance is now accelerating. At the end of March 2021, the Climate Bonds Initiative reported that 'twenty-four national governments have issued SGSS[49] bonds totalling cumulative USD 111 billion'. To date, all the ESG-labelled sovereign bonds issued have been 'use of proceeds' bonds - no country has issued a 'performance' bond (although, as Figure 18 shows, the concept has been around for some time).

There is some evidence that ESG-labelled bonds can result in a lower cost of debt to the issuer as a result of this demand i.e. a higher price for the government issuing the bond, referred to as a 'greenium' over the price for a similar non-green bond (a bond trading in line with the non-green equivalent immediately after being issued is referred to as 'pricing on the curve'). However, attributing all this effect to the bonds' ESG characteristics might be unwise[50] and the evidence is mixed - see Table 3.

Table 3: Sovereign Green, Social, and Sustainability (SGSS) Bond Issuance to 31-12-2020 (Source: Climate Bond Initiative 2021 Sovereign Green, Social, and Sustainability Bond Survey).

Country	Pricing date	Original size (USD bn)	Currency	Pricing outcome
Belgium 2033	26/02/2018	5.5	EUR	On the curve
Chile 2031	25/06/2019	1	EUR	On the curve
Chile 2032	22/01/2020	0.75	USD	Greenium
Chile 2040	21/01/2020	1.4	EUR	On the curve
Chile 2050	17/06/2019	1.4	USD	Greenium
Egypt 2025	29/09/2020	0.75	USD	Greenium
France 2039	24/01/2017	7.5	EUR	Greenium
German BOBL 2025	04/11/2020	5.9	EUR	Greenium
German Bund 2030	02/09/2020	7.7	EUR	Greenium
Hungary 2035	02/06/2020	1.7	EUR	On the curve
Indonesia 2023	22/02/2018	1.25	USD	On the curve
Indonesia 2024	12/02/2019	0.75	USD	On the curve
Indonesia 2025	16/06/2020	0.75	USD	Greenium
Ireland 2031	10/10/2018	3.5	EUR	On the curve
Lithuania 2028	30/04/2018	0.02	EUR	New issue premium
Luxembourg 2032	07/09/2020	1.8	EUR	New issue premium
Mexico 2027	09/14/2020	0.9	EUR	On the curve
Netherlands 2040	21/05/2019	6.7	EUR	Greenium
Poland 2021	12/12/2016	0.8	EUR	New issue premium
Poland 2026	31/01/2018	1.2	EUR	On the curve
Poland 2029	28/02/2019	1.7	EUR	On the curve
Poland 2049	28/02/2019	0.6	EUR	New issue premium
Thailand 2035	13/08/2020	0.975	THB	Greenium

[49] Sovereign Green, Social, and Sustainability.

[50] Other factors at play could include liquidity, technical factors relating to the structure of the bond, market sentiment at the time of issue, etc.

We believe there is an opportunity for Brazil to take advantage of this movement – potentially attracting new investors while also strengthening its sustainability credentials.

Brazil has USD 0.8 trillion of debt maturing in/before 2030, with the majority (USD 0.7 trillion) maturing in/before 2025 - see Figure 19.

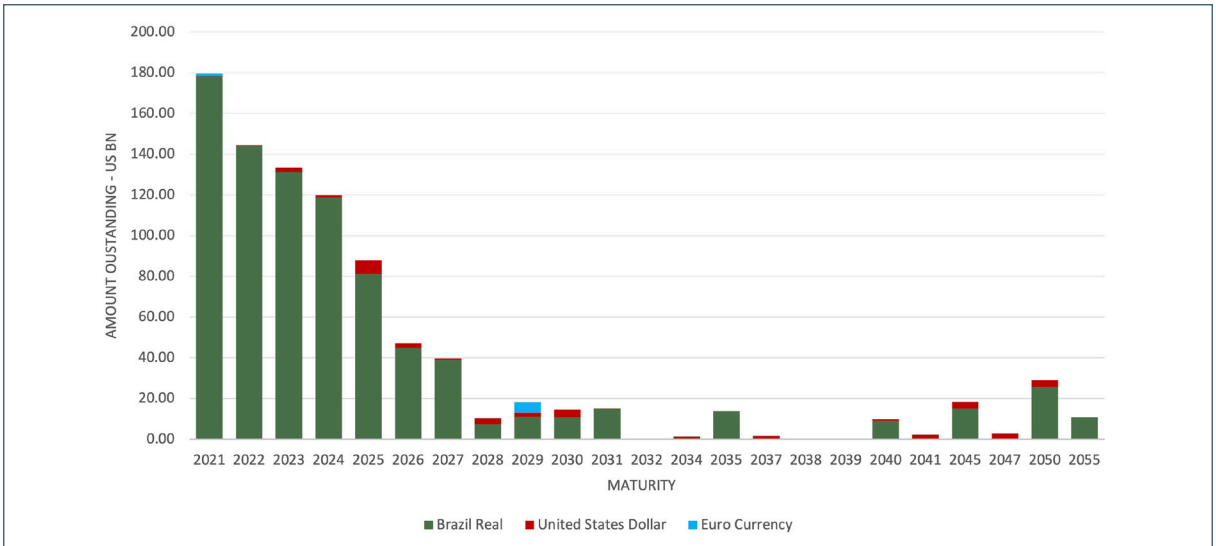


Figure 19: Brazilian Sovereign Debt - Maturity Distribution by Currency.

Brazil's total debt is equivalent to 87.2% of GDP which is high by historical standards (and compared to many of its peers),[lxiii] however most of Brazil's debt is in Brazilian Real, avoiding the foreign currency debt problems that a number of other countries have faced, while still attracting a high proportion of non-domestic investors.

This creates an opportunity for Brazil to refinance a proportion of its debt falling due in/before 2025 at (potentially) cheaper rates by tapping the increasing appetite among international investors for bonds with specific ESG characteristics.

The challenges

The majority of ESG-labelled issuance to date has been 'use of proceeds' bonds which bind the issuing government to ensure that the funds raised from investors are spent on specific 'green' projects.

The Brazilian government announced a plan to issue ESG-labelled bonds like this to fund infrastructure projects[lxiv] but no bonds have been issued to date. The Financial Times reported that Brazil's constitution currently prevents 'use of purpose' green bonds from being issued since it restricts the government's ability to borrow for specific purposes[lxv] (but the same article quoted Ricardo Salles, environment minister, as saying that green bonds were *"something Brazil can do. We have all the conditions".)*

Planet Tracker/Grantham Research Institute believe a Sustainability-Linked Bond could provide the solution to this potential problem.

The solution - Sustainability-Linked Sovereign Bond

Unlike GSS bonds, a Sustainability-Linked Bond (SLB) does not bind the issuer to use the proceeds from issuing the bond for a particular (green, social or sustainable) purpose, thus avoiding the challenges apparently presented by Brazil's constitution.

A Sustainability-Linked Bond is a debt instrument where the coupon and/or final repayment varies depending on whether the issuer achieves predefined Sustainability/ESG objectives.[lxvi] The issuer is committing explicitly in the bond documentation to future improvements in sustainability outcome(s) within a predefined timeline.

A number of companies have already issued SLBs,[51] but governments have not. Planet Tracker/ Grantham Research Institute urge Brazil to consider this option (as part of its debt issuance programme).

Inflation-linked bonds provide a precedent

The concept underpinning a Sustainability-Linked Sovereign Bond is far from new. Countries have been issuing inflation-linked bonds (linking coupons and repayment to an inflation index) for many years - Brazil was one of the pioneers[52] and its inflation-linked bond market now ranks third behind the US and UK in terms of size.[lxvii]

In addition to inflation-linked bonds, in 2005 Michael Mainelli proposed 'Policy Performance Bonds'[lxviii] linking coupons and/or repayment to specific government commitments (initially as an instrument to incentivize governments to tackle climate change[53]). More recently, the Finance for Biodiversity Initiative built on this concept and proposed '**Nature Performance Bonds**' - see Figure 20 - offering the issuer reductions in coupon payments and principal adjustment in return for the achievement of nature-based outcomes,'[lxix] and the World Bank followed this in a blog recommending Sustainability-Linked Sovereign Bonds in February 2021.[lxx]

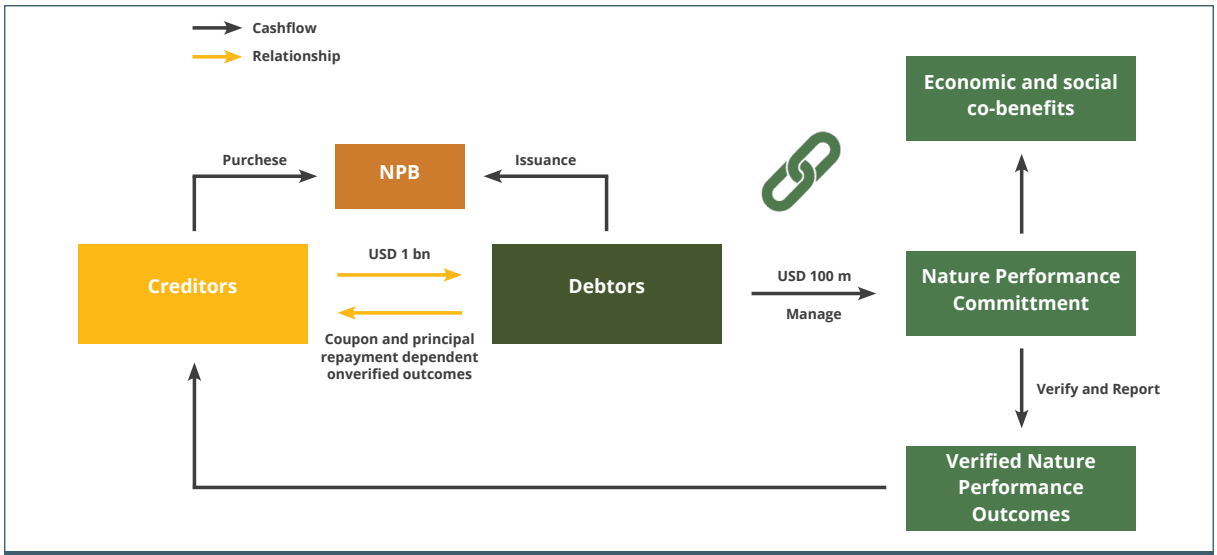


Figure 20: Nature Performance Bond Explanation (Source: Finance For Biodiversity Initiative).

[51] For example, H&M, discussed in a Planet Tracker blog https://planet-tracker.org/ethical-debt-is-the-new-bespoke-fashion/.

[52] Brazil's first inflation-linked bond was issued in 1964. (https://investorfunds.us.hsbc.com/resources/documents/articles/EMD/AMUS_Article_EM%20ILB_May19_FINALCopy.pdf).

[53] Interest payments would be linked to the actual greenhouse gas emissions of the issuing country against published targets.

Brazil has extensive experience of issuing inflation-linked (NTN-B[54]) bonds. At the end of March 2021, inflation-linked bonds constituted 26% of Brazil's federal public debt - see Figure 21.

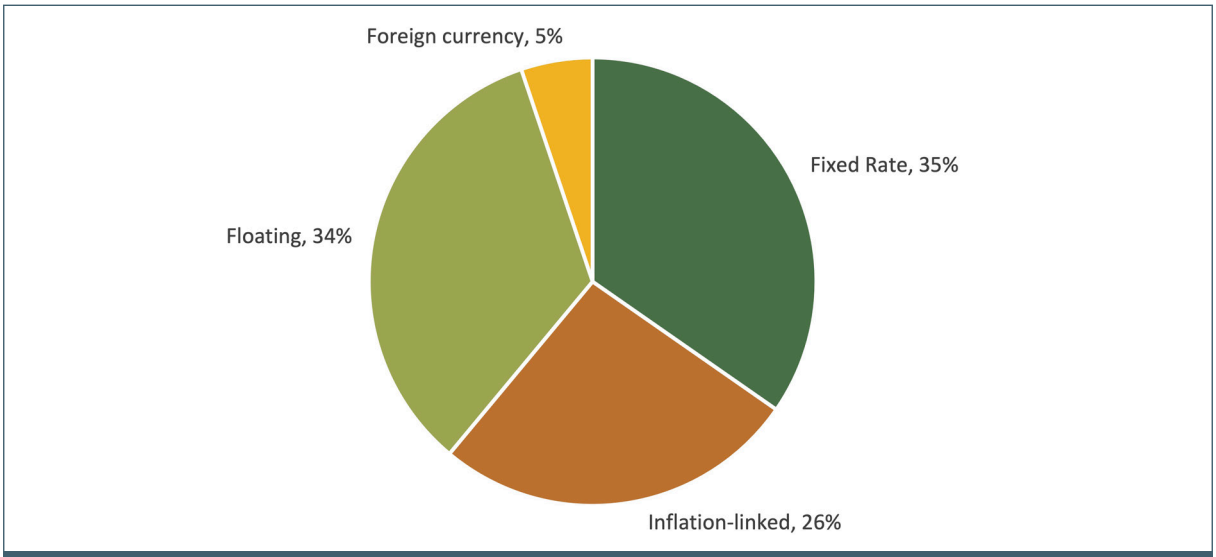


Figure 21: Brazil's Federal Public Debt Mix at 31 March 2021 (Source: Brazilian National Treasury Secretariat).

We believe the fact that such an extensive inflation-linked bond market has been supported for so long by Brazil's constitution and Treasury indicates that Brazil could issue a Sustainability-Linked Sovereign Bond (SLSB),[55] linking coupons and repayment to some form of nature-based benchmark.[56]

[54] NTN-B bonds are linked to the National Index of Consumer Prices (IPCA) and replaced the NTN-C bonds which were linked to the IGP-N inflation index in 2003.

[55] Terminology is not consistent but the World Bank used this term (as opposed to Nature Performance Bond) so we have followed their lead.

[56] The legal structure of an inflation-linked bond is likely to be different to an SLSB but the depth and longevity of the Brazilian inflation-linked market indicates that the Brazilian Treasury is used to the concept (and practice) of future coupon payments being based upon an index.

STRUCTURING A BRAZILIAN DEFORESTATION-LINKED SOVEREIGN BOND

Planet Tracker/Grantham Research Institute recommend that Brazil issue a Deforestation-Linked Sovereign Bond (DLSB), with coupon payments linked to its performance against a deforestation benchmark.

We discuss below the key points that would need to be considered in structuring such a bond, but the essence is simple: coupon payments would be linked to Brazil's success or failure in reducing illegal deforestation.

ICMA SLB Principles

The ICMA published principles for Sustainability Linked Bonds[lxxi] which provide a straightforward checklist of the points to be considered when structuring a DLSB for Brazil:

- Selection of Sustainability Performance Targets (SPTs)
- Calibration of SPTs
- Bond characteristics
- Reporting
- Verification

Deforestation is an obvious SPT for Brazil

As discussed in this report, deforestation is the material environmental harm and systemic risk that Brazil is committed to resolving, so this would be an obvious focal point for an SLSB and one that satisfies the ICMA's SLB guidelines regarding SPTs:

- 'relevant, core and material to the issuer's overall business and of high strategic significance to the issuer's current and/or future operations
- measurable or quantifiable on a consistent methodological basis
- externally verifiable
- able to be benchmarked, i.e. as much as possible using an external reference or definitions to facilitate the assessment of the SPT's level of ambition'

Calibrating a deforestation Sustainability Performance Target (SPT)

The ICMA suggests that the SPT should be 'ambitious, i.e. represent a material improvement in the respective SPTs and be beyond a "Business as Usual" trajectory' and 'be determined on a predefined timeline'.

Brazil has already set out an ambition to achieve zero illegal deforestation by 2030 in its original NDC so this would be an obvious choice of SPT and one that appears to satisfy the ICMA's criteria.

Credible verification and reporting is essential

Since investors in an DLSB will be accepting the fact that bond cashflows will be varied by Brazil under the terms of the DLSB, it is essential that there is a credible (transparent and regular) reporting and verification regime in place to establish the basis for performance against the Sustainability Performance Target.

The ICMA principles recommend that verification should be 'independent and external'.

It would be important for the Brazilian government and its advisers to work out what form of verification and reporting regime would be acceptable to investors.

Brazil already has an established satellite monitoring and reporting regime in the form of PRODES which provides the Brazilian government with internationally accepted deforestation data,[lxxii] so it is possible that investors would accept the PRODES data as a sound basis for calculating deforestation performance.

Deforestation index for coupons

The underlying index for the calculation could simply be based on changes in the total area of the Brazilian Amazon rainforest, providing an incentive towards reforestation as well as preventing deforestation.

A more complex version would include a value or quality assessment component in the forest index as well (providing a more direct link between the bond cash flows and the natural capital value of the Amazon).

The disadvantage of including a natural capital valuation component would be the challenges associated with deciding the value and ensuring the outputs were regarded as credible by investors. A 'forest quality' measure might be easier to get agreement on[57] and would achieve the objective of incentivizing the Brazilian government to focus on enhancing the state of the Amazon as well as simply preventing further deforestation, but on balance, we believe a simple focus on deforestation is likely to provide the best starting point.

[57] This is probably an optimistic view – at present there is not a universally agreed or even commonly accepted measure of forest degradation.

STRUCTURING THE DLSB COUPONS AND REPAYMENT

It will be up to the Brazilian government to decide how to structure the DLSB in terms of its cash flows.

In theory the DLSB could be structured with a variable coupon and a variable capital repayment (similar to the structure used for an inflation-linked bond) but none of the corporate Sustainability-Linked Bonds issued to date have adopted this structure and we believe having a variable repayment is likely to result in the DLSB being excluded from bond market indices, so we believe a simple variable coupon structure is more likely to be successful.

Variable coupon, fixed repayment

If 'zero illegal deforestation by 2030' were selected as the target it would be reasonably simple to construct deforestation benchmarks running at 6-monthly intervals from the bond issue date so that a particular coupon could be calculated as higher or lower than the underlying interest payment based on the deforestation performance at that point.

Corporate issuers of SLBs generally avoid frequent coupon adjustments and have a single step-up/step-down point in the bond's life (often around the half-way mark), so an alternative structure for a potential DLSB would follow this pattern and set a specific date when progress relating to deforestation would be measured.

The challenge will be to decide how much higher or lower coupons should be. The details will need to be worked out by Brazil and its advisers in consultation with potential investors, but several Brazilian companies have issued SLBs so these could provide a useful reference point.

Corporate SLB examples of coupon step-ups

A number of Brazilian companies have issued Sustainability-Linked Bonds or loans providing a potential reference point for a Deforestation-Linked Sovereign Bond - see Table 4 for examples.

Table 4: Coupon Adjustments Agreed by Brazilian SLB issuers (Source: companies).

Sustainability-Linked Bond issuer	Coupon adjustment
Iochpe-Maxion Austria GmbH	A one-time coupon step-up of 25bps[58] if the Sustainability Performance Target is not met in the agreed timeline
Klabin	A coupon adjustment if Klabin's performance does not achieve the stated Sustainability Performance Targets: (i) 12.5 bps coupon step-up if KPI #1 (water consumption intensity) does not meet its stated KPI target (ii) 6.25 bps coupon step-up if KPI #2 (waste reuse) does not meet its stated KPI target (iii) 6.25 bps coupon step-up if KPI #3 (reintroduction and/or reinforcement of wild species into the ecosystem) does not meet its stated KPI target
Natura	The penalty if both environmental performance indicators are not reached is an increase of 65 basis-points in the interest rate
Simpar	A one-time coupon step-up of 25bps if Simpar's performance does not achieve the stated Sustainability Performance Target.
Suzano [59]	If Suzano does not reach its 2025 intermediary goal (SPT), to be measured by the average years ended 2024 and 2025, there will be a one-time step-up coupon adjustment of 25bps

25bp has become quite a common coupon step-up but, as Table 4 shows, there have been several Brazilian examples where this was not the case. We believe Brazil would need to consider a larger step change to provide a meaningful indicator to the market that its intentions were serious (although the publicity surrounding a step-up being triggered is likely to be a bigger incentive than the cash cost).

Who should receive 'penalty' payments?

A Deforestation-Linked Sovereign Bond could be structured very simply so that any coupon step-up ('penalty' for missing the SPT) was paid directly to bond investors. However, some Sustainability-Linked Bonds have been structured so that the extra coupon payments are paid into a separate fund which is then used for a related purpose.[60]

It would be possible for Brazil to structure the bond so that the step-up component was paid into an independent fund dedicated to mitigating illegal deforestation (e.g. by providing extra resources towards monitoring and enforcement).

This would have the added benefit of building in a deforestation feedback element into the bond, increasing the potential for deforestation to be controlled (since a missed target would increase funding for efforts to reduce illegal deforestation in future).

This would be attractive to investors wanting an 'impact' investment opportunity.[61] However, other investors might not be attracted by such a complex structure (and the requirement to forego the extra cash flows that would otherwise provide a hedge against the negative effects of failing to meet the deforestation target).[62]

A step-down structure might be more acceptable within Brazil

Although coupon step-ups are by far the most common structure used by corporate issuers in their SLBs, there have been a few examples of step-down or two-way structures[63] and other issuers have included the possibility of such a structure in their SLB issuance framework, so could use it in future.

Politically, a coupon step-down is likely to be an easier sell within Brazil since the government will save money if it meets its deforestation targets (and this could be an argument used to justify the extra investment required to achieve the reduction in deforestation, or at least to protect the Ministry of Environment, and related agencies, against further cuts).

However, the fact that so few corporate SLBs have been issued with step-down coupon structures suggests that investors are more likely to favour a step-up structure, at least for the first issue.

[58] Basis points (25 x 0.01%) so the coupon rate will step-up by 0.25% (from, say, 3.00% to 3.25%).

[59] Suzano was highlighted as one of the largest SLB issues in 2020 raising USD 1.25 billion (Source: Environmental Finance Sustainable Bonds Insight 2021).

[60] LafargeHolcim's SLB financing framework requires 'A payment of up to 75bps of notional to a research institute or NGO, of international standing, active in the fields of climate research or climate change mitigation, or the LafargeHolcim Foundation for Sustainable Construction'.

[61] Impact investors look for investment opportunities that will help to achieve the 'impact' set out in their investment policy (examples might include reducing child poverty, reducing deforestation, etc).

[62] If Brazil failed to meet its deforestation target, the value of its sovereign bonds might fall if such a failure led to a perception of increased risk. In such a case the coupon step-up would provide investors holding the DLSB with some protection.

[63] Korian, the European care provider, issued an 8-year 173 million Sustainability-Linked Euro Private Placement in July 2020 with a +/- 20bp coupon adjustment. In December 2020, Albioma, a European renewable energy producer, issued a 100 million 7 and 8-year Sustainability-Linked Euro Private Placement with a +/- 25bp coupon adjustment.

WHAT ARE THE INCENTIVES FOR THE BRAZILIAN GOVERNMENT?

Given the increasing deforestation trend we have discussed in this report it might seem odd for the Brazilian government to link coupon payments to deforestation, particularly if one takes the view that the challenge relates to prevention rather than governance.

However, we believe there are a number of potential reasons why issuing such a bond could be an attractive proposition.

A package deal (aid plus a DLSB)

Brazil is already discussing the possibility of receiving international aid (e.g., from the US) to support its efforts to limit deforestation and there is an opportunity to restart donations from Norway and Germany into the existing Amazon Fund.[64] Any such aid package would probably be contingent on Brazil committing to specific deforestation targets.

Issuing a DLSB in parallel with such an aid agreement would be a way for Brazil to demonstrate its commitment since a DLSB would provide a strong market-based indicator of its success (or failure) to limit deforestation going forward, and (depending on the bond structure) potentially get an extra financial benefit from undertaking commitments that were linked to the aid package.

If a DLSB were issued as a component of an aid package, it would also be possible to incorporate an external fund into the payment mechanism so that a coupon step-down would be funded by the external (aid) fund and not by sovereign bond investors.

Since such a structure would remove the need for bond investors to consider a coupon step-down in their assessment, it would probably make the DLSB easier to market to investors while still preserving the incentive structure for the Brazilian government.

[64] Amazon Fund was set up in 2008 to channel international aid into reducing deforestation. Since 2008, Norway has contributed more than USD1.2 billion, with USD68 million from Germany. Both countries suspended donations in August 2019 after the Brazilian government changed the Fund's governance structure.

Protection against the inevitable policy response

As we have discussed in this report, Brazil faces a number of challenges as a result of its failure to prevent illegal deforestation.[65] Issuing a Deforestation-Linked Sovereign Bond would be a significant signal that it was committed to tackle this issue (and confident of achieving a positive result) and would address these challenges head on.

The mechanisms required to achieve the target already exist

Brazil has the laws in place and the monitoring and enforcement mechanisms required to reduce (and ultimately eliminate) illegal deforestation. The effectiveness of these mechanisms was clearly demonstrated between 2004 and 2012 when Brazil reduced annual deforestation by 78% (see Figure 5 on page 17), suggesting that the key ingredient is political will. In effect a Deforestation-Linked Sovereign Bond would reward the Brazilian government for exercising its political muscles.

A step-down structure would offset the costs of acting against deforestation

If the DLSB was structured to include a coupon step-down, the costs to the Brazilian government of investing in deforestation monitoring and enforcement would be funded (at least to some extent) by reduced coupon payments (and there will be a strong incentive to protect these departments from future budget cuts since such cuts might result in coupons rising).

Protecting its natural capital assets will increase Brazil's sovereign health

As discussed in the report, Brazil has a lot to gain from protecting and enhancing its natural capital assets (including, for example, exploiting the growing demand for nature-based climate solutions that the Amazon and Cerrado forests could offer) so a DLSB would align with these interests.

[65] The move towards net zero portfolios, the increasing investor engagement regarding deforestation, the potential challenges for Brazilian businesses from supply chain due diligence legislation and CBAMs, the risk that ratings agencies will price in deforestation and the associated GhG emissions, and the impact deforestation is having on the Mercosur/EU trade deal.

ADVANTAGES OF A DEFORESTATION-LINKED SOVEREIGN BOND

In addition to the obvious benefit of incentivising Brazil to reduce deforestation, there are a number of other benefits that we see arising from issuing a Deforestation-Linked Sovereign Bond.

1. Brazilian governments will be financially incentivised to ensure subsidies and regulations encourage businesses and citizens to support the path to zero deforestation (and to restructure any subsidies and regulations that work against this policy).
2. Brazilian citizens and businesses will have an indirect stake in the success of the deforestation policy since higher coupon payments resulting from underperformance will ultimately come from tax revenues.
3. Investors will have an attractive investment with sustainable characteristics and cash flows that offers some diversification benefits compared to more traditional government bonds.
4. The DLSB will provide evidence of Brazil's clear intention to tackle illegal deforestation, increasing the credibility of any deforestation commitments Brazil makes as part of a deforestation-related international aid package.

More broadly, the process of setting up the required framework to support the issuance of a DLSB will enable Brazil to begin to establish a Brazilian ESG-labelled bond benchmark curve thereby facilitating ESG-labelled bond and loan issues by Brazilian companies. This would help to further accelerate growth in the Brazilian ESG-labelled non-government debt market, encouraging significant investments into the Brazilian economy.[66]

[66] In 2020, the Climate Bonds Initiative in partnership with the Brazil Agriculture Subcommittee (a technical working group under the Brazil Green Finance Initiative), published 'Unlocking Brazil's Green Investment Potential for Agriculture' which identified projects and assets eligible for green financing worth USD 163 billion to the end of 2030.

A STRONG GOVERNANCE FRAMEWORK AND POLITICAL WILL ARE ESSENTIAL FOR SUCCESS

Despite all the potential advantages of a Deforestation-Linked Sovereign Bond, investors will be unlikely to buy into it unless they are convinced that the Brazilian government is fully committed to a target of ending illegal deforestation by 2030.

Failure to establish a strong governance structure to support a DLSB would expose investors to the risk that the Brazilian government could use the launch of a DLSB as a form of greenwashing.[67]

Although we would expect the bond terms themselves to include the deforestation SPT, that in itself will probably not be enough to convince investors. They would need to see clear steps being taken by the government to demonstrate that this ambition had its full political support (and that this could be expected to persist into the future, beyond the next election in 2022 and following, and with full support across the political spectrum).

Establishing a governance structure that gives investors confidence that a subsequent government will not simply ignore the terms of the DLSB (or find more subtle ways to default on its obligations) will not be easy.

One potential solution would be linking the bond to some form of aid package (as discussed previously). This would open the way to developing a bond governance structure that included foreign donor governments and allowed for independent oversight with respect to Brazil's performance against the SPT.

Linking the DLSB to an aid package would also create a bigger incentive for Brazil to meet or beat the SPT than could be achieved by the coupon step-up alone.

[67] i.e. use the positive publicity associated with issuing a DLSB to persuade investors and the wider public that strong steps were being taken to eliminate illegal deforestation when in reality the bond's undemanding SPTs and the weak supporting governance regime did not justify that conclusion.

CONCLUSION

We believe that Brazil can enhance its sovereign health by following the 4-step roadmap we recommend:

1. Strengthen core climate and nature policies with a clear pathway to net zero by 2050;
2. Reform public spending to incentivise sustainable agribusiness practices;
3. Invest in a green recovery;
4. Issue a Deforestation-Linked Sovereign Bond to fund the investment required.

Taking these steps will begin to restore Brazil's natural capital resources, leading to financial, environmental, and social benefits for the country, and positive investment returns for holders of its sovereign bonds.

INVESTOR CALL TO ACTION

There are a number of actions investors can take to respond to the environmental harms we discuss in this report; some relate specifically to Brazil, but others have wider relevance. We believe these actions will mitigate risks for investors and also have the potential to increase investment returns.

Actions specific to Brazil

Engage with the Brazilian government, policy makers and regulators (bilaterally or collaboratively with other stakeholders), to:

1 **Promote a green and just recovery from the COVID-19 pandemic**, which aligns Brazil with a 1.5° (Paris Aligned) climate change target and embeds a transition from nature-negative outcomes to nature-positive outcomes into this action plan.

2 **Push for the elimination of illegal deforestation by advocating for:**

a Reversal of cuts to the Ministry of Environment (and related enforcement agencies), and pressuring for more government investment in people and technology to prevent illegal deforestation;

b Strengthening of current domestic policies, laws and multistakeholder initiatives focused on preventing illegal deforestation;

c Ratification of the Escazu Agreement which Brazil signed in September 2018 (strengthening environmental democracy and protection for Indigenous peoples and those protecting the environment) but has yet to adopt.

3 **Promote significant reduction of legal deforestation and actions to reduce the risk of fires in or near forest areas.**

4 **Establish a credible framework for the issuance of Deforestation-Linked Sovereign Bonds.**

Wider actions applicable across portfolios

Beyond our specific recommendations relating to Brazil, there are several actions investors can take to help reduce natural capital risks in their portfolios and facilitate identifying opportunities:

1 **TNFD.** Support the Taskforce for Nature-related Financial Disclosures (TNFD) initiative in driving standardisation of quality public disclosure of nature related risks (by companies and sovereign issuers).

2 **Nature-related data.** Engage with Credit Rating Agencies (CRAs), as well as ESG information providers, to more effectively capture nature-related risks (and opportunities) in their products and services.

3 **Deforestation-free portfolios.** Commit to working towards deforestation free portfolios (with a focus on illegal as a starting point, and net zero deforestation as an end goal).

APPENDIX A – CREDIT RATING AGENCIES APPROACH TO ESG

In theory Credit Ratings Agencies are taking greater account of ESG

Since we published our initial report on the link between sovereign bonds and nature, the major credit rating agencies (CRA) have strengthened the influence of ESG factors on their assessment of sovereign bond ratings.

Figure 22 shows the approach that Moody's was taking in 2019 and earlier, whereas Figure 23 shows the new approach adopted in December 2020.

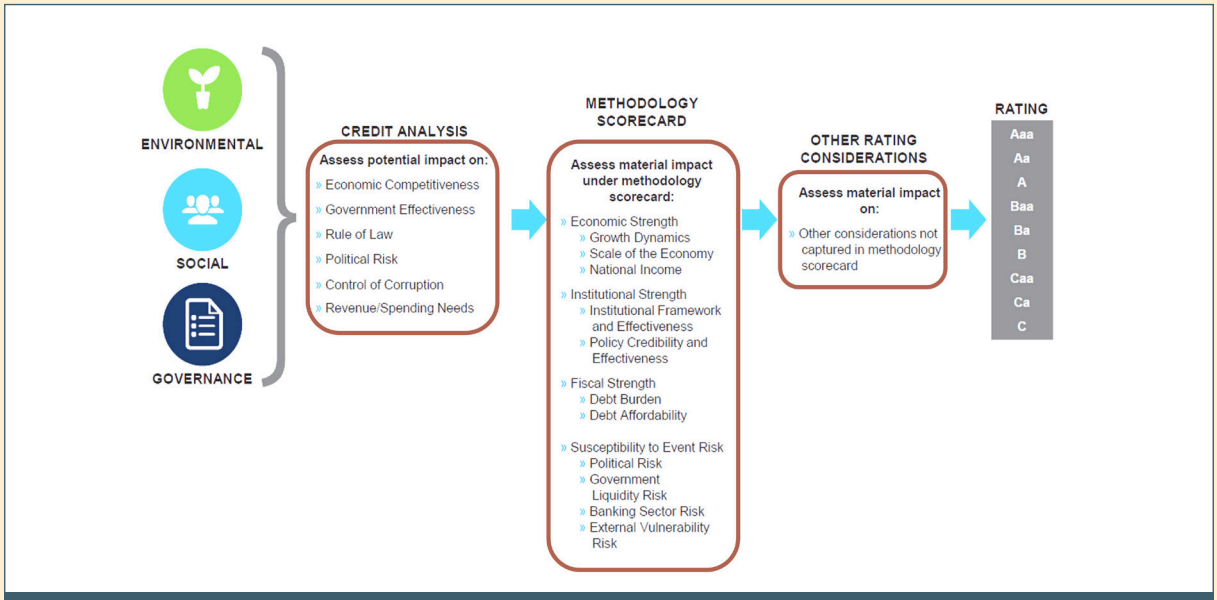


Figure 22: Moody's - Previous Approach to Incorporating ESG into Sovereign Ratings (2019)

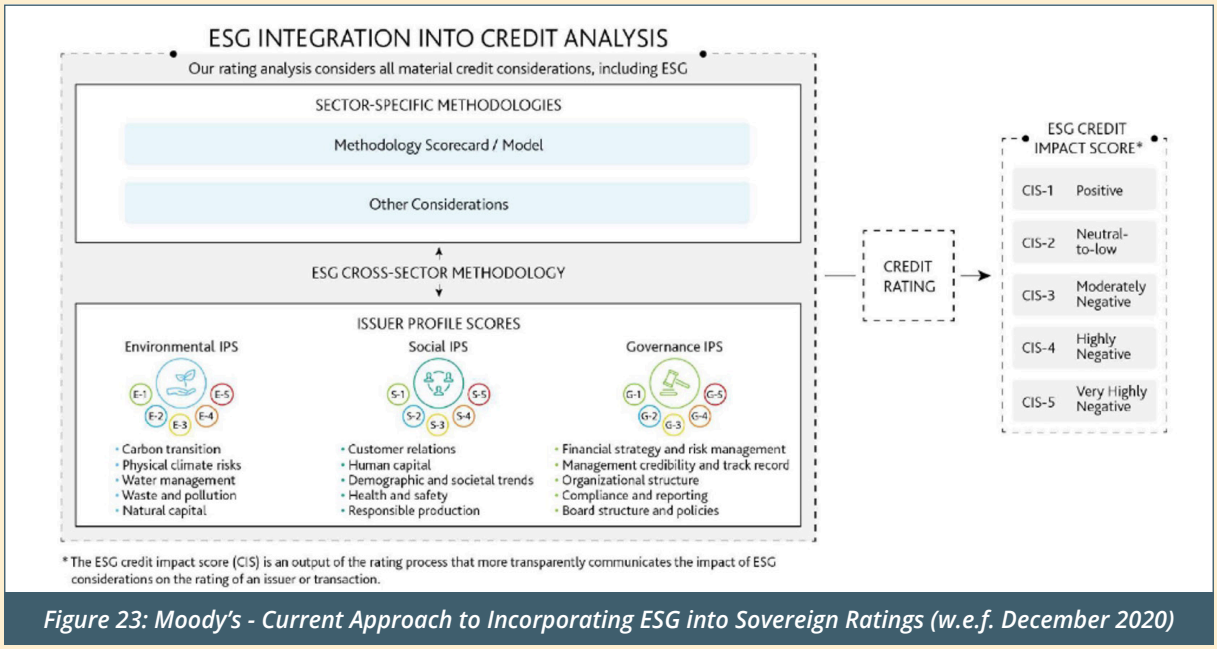


Figure 23: Moody's - Current Approach to Incorporating ESG into Sovereign Ratings (w.e.f. December 2020)

As can be seen from Figure 23, the approach set out by Moody's in December 2020 is more granular in its consideration of the various factors captured by its ESG process, and now includes two supplementary indicators in its sovereign bond assessments:

- ESG Issuer Profile Scores (IPS) - measure an issuer's exposure to environmental, social and governance considerations respectively and serve as inputs to the rating process. They incorporate mitigants specifically tied to the risks
- ESG Credit Impact Scores (CIS) - gauge the extent to which ESG factors influence the credit quality of an issuer or transaction and are determined following the assignment of the rating

While this does not amount to a fundamental reconfiguration of Moody's approach to calculating sovereign credit ratings and is still a long way from the sovereign health framework we advocate, it does provide investors with greater visibility regarding the extent to which ESG factors have been taken into account in the rating.

It is encouraging to note that Moody's updated approach makes explicit reference to natural capital in the context of its Environmental assessment and includes it as a factor in the determination of the Environmental Issuer Score (its previous approach published in January 2019 did not mention 'natural capital' at all). However, what this actually encompasses is unclear as Natural Capital has a multitude of components.

Moody's published a 13-page report in June 2021[lxxiii] assessing the natural capital risk of 28 sectors and a number of countries. In their report[68] Moody's considers an issuer's impact - as well as dependency - on natural capital but does not attempt to incorporate this into the credit ratings they ascribe to those issuers.

Fitch and S&P have also published reports setting out their approach to credit ratings and ESG.[69] In both cases it is clear that ESG issues are taken into account when working out what rating to ascribe to an issuer. However, in our view, they appear to be taking a less granular approach to ESG issues and have not yet adopted anything similar to Moody's to indicate the extent to which a credit rating has been impacted by ESG issues.

In practice ESG issues are not impacting credit ratings materially

In practice, credit ratings rarely appear to be impacted by ESG issues. More specifically, we believe the ways in which sovereigns manage their natural capital assets as reflected by environmental factors such as climate change and biodiversity loss, are given less weight than the "Social" and "Governance" factors.

To take one example, Fitch Ratings summarises its approach as follows (our emphasis):

'Fitch seeks to reflect relevant environmental, social and governance (ESG) factors into its sovereign ratings, as it does for all factors that it believes are relevant and material for creditworthiness. Governance has always been an integral part of Fitch's sovereign credit analysis, underscored by the World Bank's Governance Indicators having the highest weight of any variable in the SRM [Sovereign Rating Model].

[68] Only available to subscribers

[69] S&P is currently consulting on a further development to its approach to including ESG factors in its credit ratings. PT is basing its assessment on these proposals.

Many social factors also directly or indirectly affect many of the SRM variables and QO [Quality Overlay] factors. In general, ***for sovereign issuers environmental factors are typically a lesser influence on current ratings****. As climate change becomes more material, it is likely to become a more important influence on sovereign ratings.'*

Credit Ratings are still missing natural capital effects

Although the recent changes to methodologies adopted by the main ratings agencies now incorporate ESG factors to a greater extent (and in the case of Moody's, even make explicit reference to 'natural capital'), sovereign investors that rely solely on credit ratings will be missing key risks associated with how a country is managing its natural capital.

In the authors' view, sovereign credit ratings have a number of important failings when it comes to helping investors assess natural capital risks:

- They place greater emphasis on near-term risks, discounting the impact of longer-term problems such as climate change and biodiversity loss. As Fitch puts it: 'most of the more severe impact from climate change is not expected to occur until 2050-2100, while current ratings decisions will typically place more weight on current developments than uncertain long-term projections'.[lxxiv]
- They do not provide investors with a clear and simple way to differentiate between countries with strong ESG credentials (including management of their natural capital assets) and those with weaker credentials. However, as discussed in this Appendix, the approach taken by Moody's does provide investors with a clearer framework and more granular information for investors prepared to look beyond the credit rating itself.
- Sovereign credit ratings incorporate a complex array of environmental, social and governance factors where the weight attributed to each component is the subject of significant subjectivity with the result that (for example) a poor environmental score can be masked by a high score for education when determining the overall credit rating, particularly if the particular ratings agency concerned judges that the education factor (incorporated into the S of ESG) is more significant to the future economic success of the country than the environmental factor in question. Again, it is only fair to note the approach now being adopted by Moody's as an example of the extra information now being provided by the ratings agencies to those who are prepared to dig for it.

Ultimately, the purpose of a credit rating is still currently focused on the creditworthiness of the borrower and its ability to repay its debts as they fall due.

As S&P puts it: *'Creditworthiness measures an obligor's capacity and willingness to meet its financial commitments as they come due. ESG credit factors that may be relevant and material to creditworthiness are a subset of all the factors that could be relevant to creditworthiness. Given this, entities with strong creditworthiness may not necessarily have strong ESG characteristics (and vice versa).'*

Until credit ratings agencies begin to fully incorporate how countries are managing their natural capital assets and the extent to which they are implementing sustainable plans for their economies, investors will need to look elsewhere for help evaluate these issues.

APPENDIX B – FINANCIAL MARKETS NET ZERO INITIATIVES

Table 5: Net Zero Initiatives (Financial Sector)			
Initiative	**Launched**	**Participation**	**Objective**
Paris Aligned Investment Initiative (PAII)	May 2019	110 investors representing USD 33 trillion	Launched by the Institutional Investors Group on Climate Change (IIGCC) with the aim of 'enabling investors to align their portfolios and activities to the goals of the Paris Agreement'.
Net Zero Asset Owner Alliance (NZAOA)	September 2019	42 investors representing USD 6.6 trillion	Bringing together the 'world's largest pension funds and insurers' to commit to 'carbon-neutral portfolios by 2050.'[lxxvi] In January 2021 the NZOAA published its 'Inaugural 2025 Alliance Target Setting Protocol'[lxxvii] which provides a framework for members to set interim targets for their portfolios to be achieved by 2025. The NZAOA had 42 members as at May 2021.[lxxviii]
Net Zero Asset Managers Initiative (NZAMI)	December 2020	87 signatories representing USD 37 trillion	Members are 'committed to supporting the goal of net zero greenhouse gas emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5° C; and to supporting investing aligned with net zero emissions by 2050 or sooner.'[lxxix] Members commit to set an initial target for the proportion of assets to be managed in line with a net zero commitment (to be reviewed every five years) and also commit to setting interim 'net zero' targets for 2030 for that portion of their portfolio. At the last count, the NZAM initiative had 87 signatories managing assets worth USD 37 trillion.
Net-Zero Banking Alliance (NZBA)	April 2021	Over 45 banks from 24 countries with over USD 29 trillion in assets	Bringing together over 45 of 'the world's leading banks with a focus on delivering the banking sector's ambition to align its climate commitments with the Paris Agreement goals with collaboration, rigour and transparency'.[lxxx] Members of the NZBA commit to (among other things): • Align emissions from their lending and investment portfolios with pathways to net-zero by 2050 or sooner. • Set 2030 science-based targets focused on the most GHG-intensive sectors within their portfolios.
Net Zero Insurance Alliance (NZIA)	Expected in 2021	7 insurance companies are working on this project	Being convened by the UN.[lxxxi]
Glasgow Financial Alliance for Net Zero (GFANZ)	April 2021	Over 160 firms responsible for nearly USD 73 trillion of assets	GFANZ brings together the NZAMI, the NZAOA, and the NZBA into one sector-wide strategic forum with over 160 financial firms with nearly USD 73 trillion of assets under management.[lxxxii] The NZIA will join GFANZ in due course. The GFANZ aims to coordinate the different approaches being taken and will ensure that commitments are backed by interim science-based targets (for 2030 or sooner) alongside robust transition plans consistent with a 1.5° C Paris target. The GFANZ will also work to coordinate commitments and actions across the financial system (including by credit rating agencies, auditors and stock exchanges) that will enable financial institutions to implement their net zero strategies.

APPENDIX C – INVESTORS WITH A HIGH PROPORTION OF LONGER-DATED BRAZILIAN BONDS

Table 6: Investors with at least 40% of their Brazilian Bond Holding Invested in Bonds Expiring after 2030 (Source: Bloomberg, Planet Tracker analysis), NZAMI: Net Zero Asset Managers Initiative, NZBA: Net Zero Banking Alliance

Rank	Initiative	Value of bonds >2030 (USD)	Beyond 2030 as proportion of Investor holding	Domestic or foreign[70]	Net Zero commitment (see Appendix B – Financial Markets Net Zero initiatives)
1	FAPES-FUNDAC DE ASSE PREV	188,562,100	97%	D	
2	COLCHESTER GLOBAL INVESTORS LTD	1,171,445,158	87%	F	
3	FUNDACAO VALE DO RIO DOCE DE SEG	192,583,049	78%	D	
4	FUNDACAO DOS ECONOMIARIOS	109,314,392	73%	D	
5	FUNDACAO DE ASSISTENCIA PREVI SO	75,058,700	73%	D	
6	FUNDACAO SISTEL DE SEGURIDAD SOC	214,214,051	71%	D	
7	REAL GRANDEZA FUNDACAO DE PREVID	297,413,142	70%	D	
8	GOVMT PENSION INVST FUND JAPAN	1,956,017,127	69%	F	
9	INVESCO LTD	90,790,959	67%	F	NZAMI
10	TELOS FUNDACAO EMBRATEL DE SEGUR	117,524,349	62%	D	
11	BANCO DO NORDESTE DO BRASIL SA	134,455,578	61%	D	
12	SERPROS FUNDO MULTIPATROCINADO	124,243,202	59%	D	
13	FUNDACAO PETROBRAS DE SEGURIDADE	122,875,119	56%	D	
14	ROYAL BANK OF CANADA	79,140,098	52%	F	
15	BANCO BTG PACTUAL SA	73,240,083	50%	D	
16	CAIXA BENEFICENTE DOS EMPREGADOS	88,315,165	48%	D	
17	BNP PARIBAS	52,979,710	47%	F	NZBA
18	PRUDENTIAL FINANCIAL INC	106,913,568	46%	F	
19	FMR LLC	357,528,721	45%	F	
20	MIZUHO FINANCIAL GROUP INC	44,196,000	43%	F	
21	TCW GROUP INC	101,585,597	43%	F	
22	CERES-FUNDACAO DE SEGURIDADE SOC	108,498,449	42%	D	
23	BNP ASSET MANAGEMENT BRASIL LTDA	363,086,026	42%	F	NZBA
24	ADMIN GENERAL DE FONDOS SECURITY	153,412,660	41%	D	
25	MAPFRE DTVM SA/BRAZIL	55,159,357	40%	F	

[70] We have labelled investors as domestic or foreign based on the residence of the group holding company not the specific legal entity

APPENDIX D – INVESTORS WITH NET ZERO COMMITMENTS HOLDING BRAZILIAN BONDS

Investor	2031 & Beyond (>2030) (USD)	Total (USD)	Market share (total)	Market share (>2030)	>2030 as proportion of of Investor holding	Country (ultimate holding company) proportion of Investor holding	Domestic or foreign	Net Zero signatory
ALLIANZ SE	120,053,033	4,403,820,491	2%	0%	3%	Germany	F	NZAMI
AVIVA GROUP	-	152,604,924	0%	0%	0%	United Kingdom	F	NZIA
BAILLIE GIFFORD AND COMPANY	1,629,068	304,158,164	0%	0%	1%	United Kingdom	F	PAII
BANCO CITIBANK SA	41,744,171	1,649,842,218	1%	0%	3%	Brazil	D	NZBA
BANCO J SAFRA SA	18,954,519	312,774,180	0%	0%	6%	Brazil	D	NZAMI
BANCO SANTANDER SA	1,678,474,000	7,922,918,380	3%	7%	21%	Spain	F	NZBA
BLACKROCK	582,778,291	2,419,455,294	1%	2%	24%	US	F	NZAMI
BNP ASSET MANAGEMENT BRAZIL LTDA	363,086,026	873,327,802	0%	1%	42%	France	F	NZBA
BNP PARIBAS	52,979,710	112,188,456	0%	0%	47%	France	F	NZBA
CREDIT SUISSE GROUP AG	69,751,184	264,279,321	0%	0%	26%	Switzerland	F	NZBA
DEUTSCHE BANK AG	21,758,000	609,566,269	0%	0%	4%	Germany	F	NZBA
GAM HOLDING AG	22,399,672	433,674,743	0%	0%	5%	Switzerland	F	PAII
HSBC	33,276,959	236,212,537	0%	0%	14%	United Kingdom	F	PAII/NZBA
HSBC BANK BRAZIL SA	-	101,633,141	0%	0%	0%	United Kingdom	F	NZBA
HSBC GESTAO DE RECURSOS LTDA	332,620,615	1,655,000,316	1%	1%	20%	United Kingdom	F	PAII
INVESCO LTD	90,790,959	135,039,640	0%	0%	67%	United Kingdom	F	NZAMI
LEGAL & GENERAL GROUP PLC	731,304,200	31,806,964,130	13%	3%	2%	United Kingdom	F	NZAMI
M&G PLC	-	227,347,071	0%	0%	0%	United Kingdom	F	NZAMI
NINETY ONE UK LTD	217,437,749	648,010,115	0%	1%	34%	United Kingdom	F	NZAMI
PICTET FUNDS	57,180,631	331,119,092	0%	0%	17%	Switzerland	F	PAII
SAFRA GROUP	170,686,413	3,379,796,634	1%	1%	5%	Brazil	D	NZAMI
SCHRODERS PLC	38,189,441	168,093,575	0%	0%	23%	United Kingdom	F	NZAMI
STANDARD LIFE ABERDEEN PLC	49,367,765	332,774,001	0%	0%	15%	United Kingdom	F	NZAMI
STATE STREET CORP	44,989,055	427,360,966	0%	0%	11%	US	F	NZAMI
T ROWE PRICE GROUP	251,716,206	1,013,447,338	0%	1%	25%	US	F	PAII
UBS	43,543,404	167,054,428	0%	0%	26%	Switzerland	F	NZAMI
VANGUARD GROUP	82,291,305	264,025,304	0%	0%	31%	US	F	NZAMI

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PLANET TRACKER SOVEREIGN BONDS PROGRAMME

The Planet Tracker Sovereign Bonds programme provides insights and thought leadership for sovereign bond investors and others who want to explore the relationship between sovereign bonds and sovereign health – the intersection of natural capital and sovereign bond risk. We evaluate sovereign health through the combined assessment of the state of a country's natural capital (including environmental risks and potential rewards), its macroeconomic situation, and the interaction between the two (including the human capital dimension). This is particularly important for countries that are heavily dependent upon nature for their economic and social wellbeing (often indicated by a high level of soft commodity exports). Our current focus is on key Latin American countries, including Brazil and Argentina but our methodology is universally applicable. Our research focuses on how changes in environmental health, such as soil degradation, deforestation and variability in extreme weather impact the underlying public treasury balances of these countries and their subsequent ability to service sovereign bond liabilities. We also explore potential funding solutions designed to enhance a country's natural capital and increase its resilience to climate and nature-based risks.

The Planet Tracker Sovereign Bonds Programme is part of our Food and Land Use Tracker Programme.