



Natural Capital Risk Exposure of the Financial Sector in Brazil

EXECUTIVE SUMMARY



Prepared by Trucost
December 2014



EXECUTIVE SUMMARY

Context

Brazil's financial sector is dependent on natural capital to support economic growth and ensure future returns for investors. Nature's assets are abundant in Brazil, from its farmland, forests and energy reserves to its ecosystem services such as the rainforest which helps regulate weather patterns.

However, there is mounting demand and supply side pressures on natural capital, including a rapidly growing population and deforestation. This renders natural capital increasingly scarce, leading to reduced crop yields, increasing input costs and disruption to supply chains. At the same time, there are financial and reputational risks for high-impact, high-dependence companies from the Brazilian government's strengthening legislation to make companies pay for their environmental impacts and make banks more accountable for their financing decisions.

Financial institutions are exposed to natural capital risks through their investment and lending activities. For example, bank loan portfolios are likely to face higher credit risks if lending occurs predominantly to sectors and regions with high natural capital impacts and dependencies. For equity investors, shareholder value reduces as companies face higher operating costs, increasing costs of capital and asset degradation. Investors and credit analysts are in need of better data and tools to integrate natural capital risks into investment and financing analysis in order to protect returns in the future.

At the same time, there exists an opportunity for the financial sector to capitalise on the growing market for more sustainable and resource efficient business models. It can do this through investing in 'best-in-class' companies which better manage their environmental impacts and by diversifying their portfolios to sectors that should benefit from changing consumer demand and environmental legislation.

Methodology

The following study by Trucost was commissioned by GIZ and CEBDS to provide Brazilian financial institutions with an understanding of the relevance and magnitude of the natural capital risks they are exposed to through their funding and investments. The aim is to identify high-risk sectors and geographies, and to show how the natural capital dependencies and impacts of companies translate into financial risks so that institutional investors and banks can integrate natural capital into their financing and investment decision making.

The study's approach was to build a model to quantify the natural capital costs of 45 business sectors in Brazil that intensively use natural capital and are relevant to the financial sector in terms of their share in equity and loan portfolios. These were mainly in primary production such as agriculture, mining, forestry, and oil and gas, as well as primary processing including petrochemicals, cement manufacturing, pulp mills, and iron and steel plants. For each sector, the natural capital costs associated with six key environmental impacts were calculated: greenhouse gases (GHGs), land-use conversion, water consumption, waste, water pollution and air pollution. For 10 of the business sectors, the study also calculated the different impacts in five regions of Brazil: North, North East, Central West, South East and South. The regions have different ecosystems, so the same activity can have different impacts.

The model was then populated with production information so that the natural capital costs of sectors and regions in Brazil could be quantified. The exposure of banks and pension funds to these natural capital costs was calculated by mapping the amounts of money invested or loaned to those sectors and regions. This can be used to assess the potential magnitude of the natural capital risk in an investment portfolio or loan book. To illustrate this, two case studies are included on the natural capital costs faced by two banks.

Natural capital costs represent the cost to society from a company's use or impact on unpriced natural capital. The cost is often not paid for by companies, but is picked up elsewhere in the economy and is known as an externality. In a functioning market, these externalities would be paid for by companies. The risk to companies comes from the overall magnitude of their unpriced natural capital costs, the amount that is currently externalised, and the strength of drivers which might internalise the costs such as 'polluter pays' regulation, resource depletion, removal of subsidies, reputational damage and changing consumer preferences. After quantifying the overall natural capital costs, a framework to identify the drivers was developed to show how they could internalise costs for a company.

Finally, the potential for a company's natural capital risk to be translated into a risk for an investor or financier was assessed. Different asset classes and financial instruments provide different levels of insulation to the risks faced by the underlying asset, over different timeframes. The study then explored how financial institutions could integrate natural capital considerations into equity valuation and corporate lending decisions to enable better risk management.

Key findings

- The Brazilian financial system is significantly exposed to natural capital risk because the sectors which banks and pension funds finance are heavily reliant on Brazil's natural capital asset base.
- The study finds that the unpriced natural capital costs of companies which Brazilian financial institutions are financing amounts to R\$1,646bn. Even if companies had to internalise only part of this cost, shareholder returns and loan repayments would be affected.
- Brazilian banks are more than twice as exposed to natural capital costs compared to pension funds. The study finds that banks, on average, had a natural capital exposure ratio (NCER) of 2.25 times. This ratio expresses the natural capital costs in relation to the financial value of the investment. For pension funds the NCER was 0.8. This indicates that the banks invest more in sectors with higher levels of unpriced natural capital cost which could translate into higher risk exposure.
- Banks are most exposed through their financing of cattle ranching, agriculture, fishing, and food and beverage, while pension funds are most exposed through their investments in food and beverage companies.
- Depending on the proportion of lending to different sectors and regions, the natural capital risk exposure of a financial institution can differ significantly. The study's comparison of the natural capital risks of two banks demonstrated that one has significantly greater exposure to sectors and regions with high natural capital costs (NCER: 5.5) than the other (NCER: 2.25). The first bank is twice as exposed as the banking sector average (NCER: 2.2).
- Sectors with the highest natural capital costs in Brazil are cattle ranching (R\$2,629,205m), soybean farming (R\$232,486m) and crude petroleum and natural gas extraction (R\$147,303m). This is due to the high production levels and natural capital intensities of these sectors.
- The sectors with the highest natural capital intensities (R\$m unpriced natural capital costs per R\$m of revenue) are: cattle ranching (R\$22.123m), fats and oil refining (R\$4.275m), aquaculture (R\$3.875m), animal slaughtering (R\$3.709m), cotton farming (R\$3.252m), soybean farming (R\$2.937m), sugarcane farming (R\$2.040m) and cement manufacturing (R\$1.347m). These sectors should be priority areas for further research and engagement activities by financial institutions (see table 1).
- Revenue at risk, which compares a sector's natural capital costs to its total revenue, is a useful indicator for investors to show the potential exposure of a sector. For instance, the animal slaughtering, rendering and processing sector in Brazil is exposed to natural capital costs that are 371% greater than the total revenue of the sector. The natural capital costs of the petroleum manufacturing sector account for 94% of its total revenue.
- Cattle ranching is the sector which has by far the highest level of unpriced natural capital costs and the highest natural capital intensity. Some 90% of the impact comes from the farming stage due to land-use conversion and methane emissions from livestock. Cattle ranching occurs in all regions of the country and therefore has different levels of natural capital intensity. Around 19% of production is in the highly valuable Amazon region in the North of Brazil, whereas 11% of production occurs in the South, which has the lowest natural capital intensity.
- The North of the country has the highest land-use conversion cost because it is principally made up of Amazon rainforest which has a high natural capital value. The iron ore sector has the highest proportion (one third) of its production in this region.
- There is a marked difference in the natural capital impacts of soy production in the two principal production zones. As much as 47% of soybean production is in the Central West region which has twice the land-use conversion cost as soybean production in the South where 37% of the crop is produced. This is driven by the high natural capital value placed on Brazilian Cerrado – the savannah which dominates the Central West.

Recommendations

- Integrating natural capital into financial analysis presents a number of challenges for financial institutions due to factors such as a lack of natural capital data from companies and the often long term and unpredictable nature of some natural capital costs. This means that the financial sector could be underestimating the natural capital costs it is exposed to. However, this study demonstrates that it is possible to quantify potential exposure at the level of the portfolio, sector and investment by using natural capital accounting techniques in combination with a natural capital risk driver framework and traditional financial analysis. This can help the financial sector reduce its risk and identify opportunities to capitalise on the transition to a more resource efficient and sustainable economy.
- Investors should quantify their portfolio-level natural capital exposure. They can use the data in this report on the natural capital intensities of key sectors and regions to map their investments and identify hotspots which require further assessment.
- Investors can use the risk framework outlined in this study to identify drivers for cost internalisation. They then need to analyse the potential scale, speed and strength of those drivers at the level of an individual investment, and integrate the results into their valuations under different scenarios. This will enable them to determine the potential value at risk from unpriced natural capital costs.
- There is a lack of good quality natural capital data from companies about their impacts. Investors can use their position to demand better data from companies, either through management engagement as an equity investor, or in the due diligence process for a corporate loan. It is important that data addresses risk throughout the whole value chain as natural capital costs can be passed on and internalised by companies not directly exposed.
- It is important for investors to consider the potential future natural capital risk that a company may face because it can impact on the current valuation of an investment. This may require creating environmentally adjusted internal rates of return for an investment based on expected future pricing of currently external costs – so-called shadow prices. It may also necessitate adjusting the cost of capital for those companies with greater risk exposure, and the enforcement of strict conditions of lending to high-impact companies.
- Companies can do a lot to reduce their natural capital risks and take advantage of increasing market demand for more sustainable goods and services. Investors can benefit from identifying these ‘best-in-class’ companies as they should deliver better returns.
- Banks have the opportunity to help customers develop more resource efficient and sustainable business models through project finance, working capital solutions or advisory services. In so doing, financial institutions can be central to supporting the transformation to a more sustainable and financially resilient economy.

TABLE 1: NATURAL CAPITAL INTENSITIES PER ENVIRONMENTAL INDICATOR AND SECTOR

SECTOR	NATURAL CAPITAL INTENSITY (R\$m / R\$m)						
	GHG EMISSIONS	AIR POLLUTANTS	WASTE	LAND USE	WATER USE	WATER POLLUTANTS	TOTAL
BEEF CATTLE RANCHING	3.865	0.228	0.065	16.951	0.504	0.510	22.123
FATS AND OILS REFINING AND BLENDING	0.218	0.078	0.051	1.560	0.064	2.304	4.275
AQUACULTURE	0.068	0.022	0.027	0.133	3.433	0.192	3.875
ANIMAL SLAUGHTERING, RENDERING, AND PROCESSING	1.091	0.111	0.052	0.226	1.958	0.271	3.709
COTTON FARMING	0.214	1.643	0.077	0.833	0.385	0.101	3.252
SOYBEAN FARMING	0.287	0.140	0.043	1.831	0.099	0.537	2.937
SUGARCANE FARMING	0.211	0.086	0.053	0.799	0.379	0.513	2.040
CEMENT MANUFACTURING	1.135	0.076	0.101	0.014	0.018	0.003	1.347
FERTILIZER MANUFACTURING	0.559	0.215	0.125	0.046	0.002	0.005	0.952
PETROCHEMICAL MANUFACTURING	0.485	0.095	0.183	0.112	0.003	0.061	0.939
PULP MILLS	0.313	0.458	0.083	0.036	0.009	0.028	0.926
IRON AND STEEL MILLS AND FERROALLOY MANUFACTURING	0.563	0.034	0.183	0.027	0.003	0.004	0.814
CRUDE PETROLEUM AND NATURAL GAS EXTRACTION	0.181	0.011	0.121	0.464	0.007	0.002	0.786
PAPER MILLS	0.190	0.360	0.077	0.036	0.007	0.034	0.703
PRIMARY SMELTING AND REFINING	0.244	0.070	0.295	0.039	0.026	0.005	0.679
PETROLEUM REFINERIES	0.095	0.019	0.382	0.171	0.001	0.000	0.668
BREWERIES	0.082	0.052	0.044	0.157	0.009	0.261	0.605
COFFEE AND TEA MANUFACTURING	0.084	0.070	0.039	0.163	0.024	0.204	0.582
LOGGING	0.077	0.018	0.031	0.311	0.008	0.056	0.502
IRON ORE MINING	0.103	0.085	0.098	0.186	0.008	0.008	0.487
NATURAL GAS DISTRIBUTION	0.096	0.007	0.219	0.099	0.001	0.002	0.424
COPPER ROLLING, DRAWING, EXTRUDING AND ALLOYING	0.085	0.030	0.169	0.022	0.001	0.004	0.312
PLATE WORK AND FABRICATED STRUCTURAL PRODUCT MANUFACTURING	0.178	0.027	0.073	0.014	0.001	0.004	0.298
AIR TRANSPORTATION	0.144	0.007	0.092	0.043	0.002	0.002	0.290
TRANSPORTATION EQUIPMENT MANUFACTURING	0.128	0.060	0.058	0.017	0.003	0.009	0.275
HYDROELECTRIC POWER GENERATION	0.041	0.022	0.105	0.040	0.063	0.003	0.273
MOTOR VEHICLE PARTS MANUFACTURING	0.122	0.046	0.056	0.015	0.005	0.007	0.250
FABRICATED METAL MANUFACTURING	0.133	0.031	0.064	0.014	0.001	0.004	0.246
ELECTRIC BULK POWER TRANSMISSION AND CONTROL	0.041	0.040	0.104	0.039	0.001	0.003	0.229
WATER SUPPLY AND IRRIGATION SYSTEMS	0.075	0.075	0.024	0.008	0.045	0.002	0.228
ELECTRIC POWER DISTRIBUTION	0.041	0.021	0.104	0.038	0.001	0.003	0.208
MISCELLANEOUS WOOD PRODUCT MANUFACTURING	0.062	0.039	0.047	0.027	0.012	0.016	0.203
MOTOR VEHICLE BODY MANUFACTURING	0.085	0.037	0.044	0.012	0.003	0.006	0.187
VALVE AND FITTINGS OTHER THAN PLUMBING	0.092	0.021	0.051	0.010	0.001	0.003	0.178
APPAREL ACCESSORIES AND OTHER APPAREL MANUFACTURING	0.041	0.031	0.021	0.016	0.030	0.017	0.156
ROLLING MILL AND OTHER METALWORKING MACHINERY MANUFACTURING	0.081	0.018	0.044	0.009	0.001	0.003	0.156
TOBACCO PRODUCT MANUFACTURING	0.022	0.032	0.014	0.028	0.005	0.055	0.156
INDUSTRIAL MACHINERY MANUFACTURING	0.078	0.022	0.038	0.009	0.001	0.004	0.152
RESIDENTIAL PERMANENT SITE SINGLE- AND MULTI-FAMILY STRUCTURES	0.050	0.022	0.034	0.012	0.002	0.005	0.125
PHARMACEUTICAL PREPARATION MANUFACTURING	0.039	0.019	0.016	0.015	0.013	0.015	0.116
SUPPORT ACTIVITIES FOR TRANSPORTATION	0.040	0.016	0.030	0.013	0.008	0.002	0.109
AIRCRAFT MANUFACTURING	0.043	0.019	0.025	0.006	0.001	0.002	0.095
REAL ESTATE	0.029	0.008	0.011	0.004	0.001	0.002	0.055
TELECOMMUNICATIONS	0.015	0.010	0.008	0.003	0.001	0.002	0.038
MOTOR VEHICLE AND PARTS DEALERS	0.013	0.004	0.006	0.003	0.000	0.001	0.028

CONTACT

Lauren Smart

E: lauren.smart@trucost.com

D: +44 (0) 20 7160 9814

AUTHORS

Researched and written by Danielle Carreira, Aaron Re'em and Miriam Tarin

Edited and designed by James Richens and Rebecca Edwards

ABOUT THE RESEARCH PARTNERS

GIZ - an innovative partner for the global challenges of tomorrow

The wide range of services offered by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH are based on a wealth of regional and technical expertise and on tried and tested management know-how. We are a German federal enterprise and offer workable, sustainable and effective solutions in political, economic and social change processes.

Most of our work is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). However, GIZ also operates on behalf of other German ministries and public and private bodies in Germany and abroad. These include governments of other countries, European Union institutions, such as the European Commission, the United Nations and the World Bank. We are equally committed to helping our clients in the private sector attain their goals.

GIZ operates throughout Germany and in more than 130 countries worldwide. Our registered offices are in Bonn and Eschborn. We have 16,510 staff members around the globe, almost 70% of whom are employed locally as national personnel.

The Emerging Markets Dialogue Programme

The goal of the Emerging Markets Dialogue Programme (EMD) on Green Finance is to increase capital flows to green investments and thereby enable the transformation towards sustainable economies. To achieve this aim, the EMD works with public and private actors from Emerging Markets and Europe to overcome barriers and gaps to increasing eco- and climate-friendly investments. For example, the EMD works with financial institutions from Emerging Markets and Europe to quantify environmental risks and opportunities in the financial sector and to jointly develop and test a set of asset class-specific tools to incorporate environmental considerations into lending and investment decisions.

GIZ is commissioned to implement the EMD by the German Federal Ministry for Economic Cooperation and Development (BMZ).

The Federal Ministry for Economic Cooperation and Development (BMZ)

BMZ develops the guidelines and the fundamental concepts on which German development policy is based. It devises long-term strategies for development cooperation with partner countries and international development organisations.

CEBDS

CEBDS is the representative of the World Business Council for Sustainable Development (WBCSD) in Brazil, an association founded by business leaders who realise the need to integrate corporate activities into the sustainable development scope.

Sustainable Finance Working Group – CTFin

The Sustainable Finance Working Group (CTFin) aggregates the largest financial institutions in Brazil. The CTFIN helps financial institutions to play their part in promoting sustainable development, encouraging discussion of principles and best practices.

Trucost

Trucost helps investors to understand the economic consequences of natural capital dependency in order to identify risk and opportunity from growing natural resource pressures and environmental costs.

Natural capital liabilities such as carbon, water, resource use, pollution and waste are threatening the ability of our natural ecosystems to deliver economic growth. The impact is already being felt through volatile commodity prices linked to extreme weather events, pollution impacts and natural resource constraints.

We provide the world's most comprehensive natural capital data representing 93% of global markets by market capitalisation to support the investment community in evaluating the environmental efficiency of companies and their supply chains, analysing portfolios against benchmarks, and creating new products. Key to our approach is that we not only measure natural capital risk in physical quantities, we also apply a financial value to provide an overarching metric for risk and opportunity analysis.

