



Sovereign Rating Methodology:

Governments/Sovereign States

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¹ Date on which the approved document takes effect.



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Introduction

The Sovereign Africa Ratings (Pty) Ltd, also known as SAR, has been given permission to conduct business as a credit rating agency. SAR is putting forth a methodology for rating the creditworthiness of sovereign governments and sub-sovereign governmental institutions. SAR is accredited.

Sovereign credit ratings refer to credit ratings where the entity being rated is a state, a provincial, or a local authority of a state, or the issuer of the debt or financial obligation, debt security, or other financial instrument is a state, a provincial, or a local authority of a state, or a special purpose vehicle of a state, or the issuer of the debt or financial obligation, debt security, or another financial instrument.

Ratings and other analyses are statements of opinion as of the day they are made, not facts. The suitability of any security is not addressed in SAR's opinions, analyses, or rating acknowledgment determinations, nor are they recommendations to buy, hold, or sell any securities or to make any investment choices.

This document details the scope and methodology for SAR's assignment of ratings to sovereign issuers and issues. The processes and methods used by SAR to establish sovereign credit ratings relies on both quantitative and qualitative data and information in arriving at the final rating. SAR also applies quantitative statistical models to ensure that the processes, procedures, and practices of its credit ratings does not become a subjective concept. Hence the methodology developed blend both quantitative and qualitative analysis.

SAR strongly subscribes to the principle that Peer Analysis is central to sovereign ratings practices. This principle is critical in terms of preventing a scenario whereby different criteria subsets are applied for different regions. Peer sovereigns must be defined in terms of rating considerations rather than geographic location.

Sovereign Rating Framework Overview

The SAR Sovereign Rating Framework consists of twenty attributes, ninety-two variables, and eight main pillars. The major pillars are used to highlight a number of risk factors with varied degrees of significance when evaluating sovereign risk. The pillars and variables include quantitative and qualitative characteristics for credit and economic risks.

Key Credit Rating Drivers

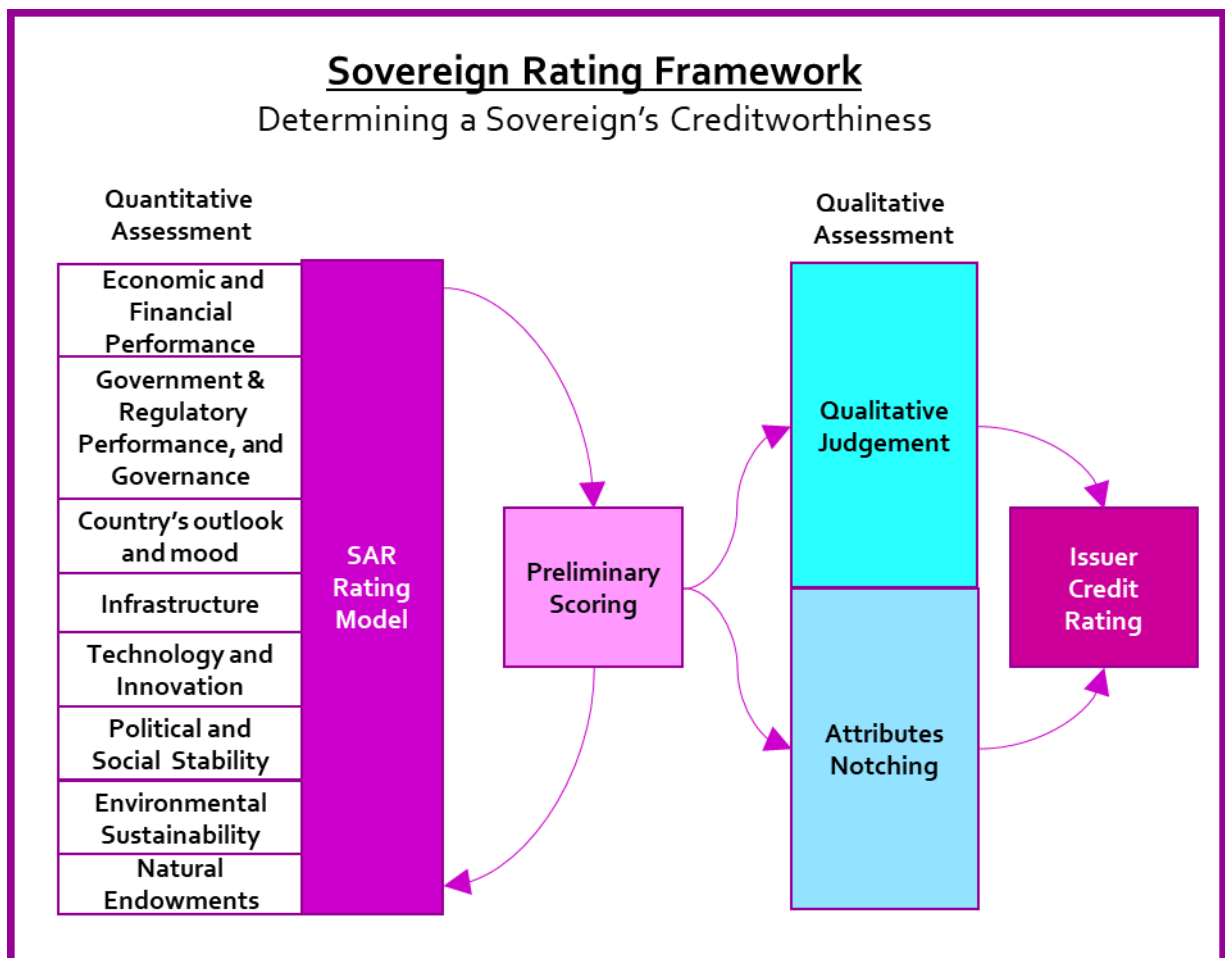
SAR's Credit Ratings reflect a sovereign's creditworthiness, that is its ability and willingness to meet its financial obligations. SAR takes a comprehensive approach at rating a sovereign's economic performance, and other quantitative factors such as natural endowments to make judgements on a sovereign's creditworthiness. Qualitative judgements are then used to adjust the quantitative scores. These include, but are not limited to governance, regulatory

performance, political, policy and social welfare stability, environmental sustainability, reforms, and economic performance potential.

Roll-up scores from variables and attributes are used to generate evaluation scores for the following Key Rating Pillars:

- Pillar 1: Economic and Financial Performance
- Pillar 2: Government and Regulatory Performance, and Governance
- Pillar 3: Country's outlook and mood
- Pillar 4: Infrastructure
- Pillar 5: Technology and Innovation
- Pillar 6: Political, Policy and Social Welfare Stability
- Pillar 7: Environmental Sustainability
- Pillar 8: Natural Endowments

Figure 1: Sovereign Rating Framework



Pillar 1: Economic and Financial Performance

The structure of a country's economy has a bearing on its growth prospects and resilience in its ability to generate sustainable revenues and service its debts obligations. A country's economic structure is therefore a key determinant of its risk level.

The Economic and Financial Performance pillar addresses the ability of a sovereign state to meet its financial obligations. This pillar as well as the attributes it encompasses enables both qualitative and quantitative evaluation of whether the sovereign state possesses the economic and financial capacity as well as willingness to repay and service its debt obligations (payment of the principal debt and interest payments). Assessing economic risk is a very critical consideration as this entails evaluating the macroeconomic fundamentals of a sovereign state in terms of economic resilience, economic policy stability, size and composition of savings and investment, patterns of economic growth, fiscal position, liquidity position and economic development.

The key risk factors considered are economic development, structure of the economy in terms of diversification, specialisation, and resilience.

Variables/ attributes included in the modelling framework:

- **Economic growth prospects**
 - Gross Domestic Product (GDP), Core Inflation, Economic Growth (Expressed in GDP / per capita), investment GDP Ratio.
- **Fiscal flexibility**
 - Tax revenue, Budgetary flexibility, General government expenditure, balance performance, fiscal balance/GDP.
 - Gross Loan Debt, General government interest burdens, balance sheet net debt/GDP, General government gross interest payments/Gross revenue.
 - Off-budget contingent liabilities, Estimated off-budget and contingent liabilities on sovereign balance sheet, contingent liabilities/GDP, local currency denominated debt, foreign currency denominated debt
- **Monetary Stability**
 - Core inflation, inflation control mechanism, independence of central bank
 - Broad Money Supply M₃

- **External Flexibility**

- Liquidity Reserves adequacy and Gross external financing market access requirement, Capital, and Total Reserves.
- Public sector net external debt/ net external debt external balance sheet, Current account receipts.
- Financial system net external private sector net external debt nonfinancial private sector debt / Current account receipts, external balance sheets.
- Nonfinancial private sector net external debt/Current account receipts.

The sustainability of a sovereign state's fiscal deficits and government debt is crucial to determine sovereign credit risk. The nature and composition of the government debt and overall tax revenue as well as debt affordability are highly considered variables in assessing and evaluating a country's vulnerability as well as probability of default. The Government / Debt to GDP ratio is one of the leading indicators in examining whether a country has a sizeable asset base (Tax revenue) that would lead to a concomitant reduction in risk of default.

Pillar 2: Government and Regulatory Performance, and Governance

Robust political institutions reduce risk of crises. Supportive, effective, and predictable policy responses should a financial stress situation emerge are viewed as positive measures in our analysis. Strong institutions, sound governance and credible regulatory frameworks in a country anchor a country during times of economic instability and mitigate concerns that a government might become unable or unwilling to service debt. Countries with a robust legal system, established mechanisms for fighting corruption, an effective government, well established and effective regulatory regime, political stability, and transparency poses lower risk in terms of probability of default on debt obligations.

The Government and Regulatory Performance, and Governance pillar and its related attributes aim to capture political event risks, along with some assessment of institutional depth, decision-making breadth, policy flexibility, global and regional integration, geopolitical stability, and in essence relations with official creditors.

Political event risk, specifically, refers to the probability of war, revolution, civil unrest, or extra constitutional regime change, all of which are closely correlated with sovereign debt default. Institutional and geopolitical considerations, in turn, attempt to gauge constraints on policy flexibility and resolve, and the weight of the government's stake in the world financial system, issues that are revisited in several subsequent ramp categories.

Key Risk Factors considered in the assessment include concentration of decision making; clarity of leadership-succession mechanisms; independence of the judiciary; freedom of the press; demographic breakdowns; human development indicators.

Pillar 3: Country's outlook and mood

Governments generally announce economic reforms, though at an uneven pace. More rapid implementation of these reforms, complemented by fiscal consolidation to provide a stable foundation for growth, will ease investor concerns about a country and support a faster recovery and higher levels of economic growth over the long term.

A country's economic outlook in terms of expected economic recovery, economic growth, fiscal performance (budget deficits), current account balances, net flows (direct investment), tax revenue collection, escalation of debt, debt management, exchange rate movements, inflation, economic policy stance is very critical in informing the SAR credit rating.

Key measurements in this regard include GDP per capita and trajectories in government debt/GDP, Tax Revenue / GDP, Inflation, government transfers and guarantees to state owned enterprises relative to GDP, contingent liabilities / GDP, Investment / GDP, and Savings/ GDP.

Pillar 4: Infrastructure

Investments in many priority areas of sustainable development, including sustainable infrastructure, can also materially enhance a country's future economic growth, sovereign creditworthiness, and debt carrying capacity. While these investments may increase levels of public debt in the short-term, they should stimulate growth and a country's ability to repay its debt obligations in the medium to long-term.

Constraints as well as inefficiencies related to transport, rail, ports, energy as well as water infrastructure quality and maintenance investment in infrastructure poses a greater risk on a country's economy to perform to its potential. For instance, poor quality of rail, transport corridors and ports infrastructure adversely affect the exports of key and strategic commodities with devastating effects on the country's current account, earnings potential for foreign currency, competitiveness with regard to trade (exports and imports) and tax revenues (excise duties). Shortfalls in water infrastructure leads to natural resource risks with adverse effects on economic sectors that require high assurance of water supply such as agriculture, mining and manufacturing ultimately eroding production, exports, revenues, and tax earnings potential (corporate taxes). Inadequate electricity supply also negatively impacts GDP growth.

On the other hand, the relationship between infrastructure and sovereign bond yields is also impacted by country-level macroeconomic and infrastructure characteristics. Sovereign bond yields have an effect on economic growth, trade, and sovereign risk.

The current control variables such as GDP (both as a measure of per capita and percentage growth), inflation, balance of trade, national debt (as a percentage of GDP), and the sovereign credit rating are impacted by the quality of infrastructure in a sovereign state. If a country is only meeting a fraction of its current and future expected requirements of

infrastructure based economic needs, then it is going to be at a disadvantage when implementing economic development strategies.

The key risk factors considered are the quality and shortfall of Rail Infrastructure, Roads Infrastructure, Port Infrastructure and logistics networks for exports, energy infrastructure and water infrastructure as well as logistics network infrastructure. Economic sabotage (deliberate damage to infrastructure) poses a major risk as well. They also constitute variables / attributes included in the modelling framework.

Pillar 5: Technology and Innovation

A negative impact on Research and Development (R&D) investment results in deterioration of patent output and the technology sector's performance. One of the most direct consequences of cutting R&D investment is a decline in the economic sectors' innovation output. Innovation output is based on patenting activities. Credit rating downgrades give rise to credit constraints and induce firms to cut R&D expenditures which will negatively impact economic sectors outputs and consequently, the sector's GDP growth.

The key factor measures considered are the investment rates, state of readiness for 4IR in the country and Patents filed and granted to a country's citizens and organizations. A key variable is R&D /GDP ratio. R&D expenditure is also one of the most widely used measures of the innovative efforts of firms and countries. It is directly linked to innovation via new products and new processes, and indirectly as investment in knowledge. The technology balance of payments measures disembodied international technology transfers: licence fees, patents, purchases, and royalties paid, know-how, research, and technical assistance.

Pillar 6: Political and Social Stability

Political risks and "willingness to pay" are critical to sovereign credit analysis. Sovereigns shape the country's macroeconomic conditions and make choices on tax revenue expenditures, which directly impact its ability to repay their debt.

Willingness to pay is a qualitative issue that distinguishes sovereigns from most other types of issuers. Partly because creditors have limited legal redress, a government can and sometimes does default selectively on its obligations, even when it possesses the financial capacity for debt servicing. In practice, political risk and economic risk are related. A government that is unwilling to repay debt is usually pursuing economic policies that weaken its ability to do so. Willingness to pay, therefore, encompasses a range of economic and political factors influencing government policy. Economic policy stability, monetary policy stability and fiscal policy stability are strongly related with political and social welfare policy. Sound policies and concomitant implementation provide a foundation for stable economic growth and reduces the risk of economic instability and uncertainty.

The key risk factors considered are institutions and governance, policy stability, political and economic policy uncertainty.

Variables/ attributes included in the modelling framework: Stability and legitimacy of political institutions, transparency in economic policy decisions and objectives, and independence of monetary authorities (Central Banks).

Pillar 7: Environmental Sustainability

Environmental sustainability if not well managed pose a threat to a country's financial, economic and socio – economic position. Greenhouse gases from human activities are the most significant driver of observed climate change since the mid-20th century. Behind the phenomena of global warming and climate change lies the increase in greenhouse gases. The devastating effects of global warming leads to droughts, floods, and other environmental disasters. These occurrences have far reached and adverse impacts on the fiscal position, specifically regarding off – budget and unplanned expenditure items such as contingent liabilities. Contingent liabilities place immense pressure on the debt situation of sovereign states, more especially because the impact of unplanned natural occurrences and disasters are usually financed from off-budget expenditure. Furthermore, the reconstruction and recovery interventions triggered by natural disasters involve budget expenditure outlays which can weaken the fiscal position of a government.

The increasing frequency and magnitude of climate shocks has highlighted the impact of longer-term factors on a country's debt sustainability. There should be recognition of the physical and transition risks arising from climate change, hence integrating climate into the ratings.

Addressing the risks that climate change poses to a country is costly, but more so is ignoring them altogether. There are two forms of climate risks considered, (i) physical risks and (ii) transitions risks. Physical risks include the natural ramifications of sustained global climate change, including the increased frequency of extreme weather events or natural disasters. Transition risks arise from the structural changes in an economy as it adjusts to a low carbon state and can be mitigated through investment into low carbon emitting infrastructure. Lack of clarity as well as environmental policy uncertainty in relation to aspects such as just transition also pose major economic risks especially in the mining, agriculture, and energy sectors.

The key risk factors considered are contingent liabilities in the national budget as well as the expenditure from emergency funds of the fiscus.

Variables/ attributes included in the modelling framework: climate risk attributed to greenhouse gas emissions.

Pillar 8: Natural Endowments

The sustainability of a country's natural resources, particularly mineral resources such as oil and gas, are key to enhancing tax revenue base, economic growth, economic development as well as enhancing fiscal position within a sovereign state. This could be achieved in cases where resource rents are optimized and the fiscal framework and fiscal regimes (i.e., royalty

rates, resource rents, company tax paid by multinational companies in sovereign states where resources are withdrawn) are prudently used and channelled towards local economic/industry development import substitution, reinvestment in other sectors of the economy and reduction of sovereign debt.

Natural Endowments are considered as a key credit rating determinant. The optimisation of resource rents and depletion of mineral or oil and gas reserves have a bearing on economic prospects in countries which are endowed with such resources in the medium to long term, more so if such a country is solely dependent on such natural endowments.

The key risk factors considered are resource levels and rents, efficiency of fiscal regimes and how they foster and attract foreign direct investment in host countries. Variables/ attributes included in the modelling framework: Resource levels and rents and industry developments.

Quantitative Assessment

SAR uses the Rating Model in order to determine the preliminary rating score, which carries the assessment of variables over to the assessment of attributes and then the assessment of pillars. As a place to start, the variables are used to rate sovereigns. The Multiple Regression Rating Model (the "Rating Model") uses both historical and modelled future data for its variables.

Weighting

Univariate linear regression was applied to all model variables to determine weights for the Pillars and Attributes. The following tables list the weights according to the regression:

Table 1: Weighting of Pillars

PILLARS	Allocated Weights
1-Economic and Financial performance	43,3%
2-Governmnet and Regulatory Performance, and Governance	10,7%
3-Country's Outlook and Mood	13,6%
4-Infrastructure	4,7%
5-Technology and Innovation	7,5%
6-Political and Social Stability	4,8%
7-Environmental Sustainability	5,2%
8-Natural Endowments	10,2%

Table 2: Weighting of Attributes

ATTRIBUTES	Allocated Weights
1.1 Fiscal Flexibility	18,6%
1.2 Economic Performance	11,5%
1.4 Domestic Industry Diversification	1,4%
1.5 Monetary Flexibility	9,7%
1.6 Monetary Stability	2,1%
2.1 Government Performance and Efficiency	0,3%
2.2 State-owned Enterprises Performance and Efficiency	2,1%
2.3 Quality of the Legal and Regulatory Environment	7,6%
2.4 Governance	0,7%
3.1 Perceived Quality of Life	1,7%
3.2 Country's Global competitiveness	4,0%
3.3 Work Force Productivity	3,4%
3.4 Standard of Living	4,6%
4.1 Quality of National Public Infrastructure	4,7%
5.1 Research and Technology Outputs	7,5%
6.1 Crime, Security and Health	4,8%
7.1 Energy Policy: Fossil Fuel Risks and Energy Independence	4,6%
7.2 Climate: Physical Risks and Transition Risks	0,5%
8.1 Resources: Natural Resources; Air; Water and Minerals	2,6%
8.2 Optimisations of the Natural Resources and Beneficiation	7,6%

Qualitative Assessment

Qualitative Judgements

SAR Analysts employ sound qualitative judgements to adjust the quantitative scores in the Attributes by up to 2 notches up or down.

Attributes Notching

SAR analyst(s) conduct attribute score notching to factor in their analytical assessments such as trend analysis and forecasting. The model output is adjusted using the notch-adjustment method, with a possible notching range of up to 2 notches for all the attributes mentioned above, please see the table 3 below. This improves the quality of the ratings by ensuring that adjustments informed by analytical assessments are conducted at attribute level instead of adjusting the final ratings directly.

Table 3: Attributes Notching Table

Very Strong (+2 notches)	Strong (+1 notch)	Average (0 notches)	Weak (-1 notch)	Very Weak (-2 notches)
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Issuer's Credit Rating

Probability of Default

The key measure in credit risk assessment is the measure of the Probability of Default (PD). SAR uses the Merton model to calculate the sovereign debt default probabilities. The Merton Model takes into consideration the following variables:

1. Reserves in Foreign Currency
2. Foreign Currency Debt
3. Money Supply in Foreign Currency.

This probability is used as the first validation technique. Using this model, SAR determines the probability of default by also considering both quantitative and qualitative factors outlined above to note whether the country will honour its debt obligations.

Converting Scores into Ratings

The SAR methodology generates a score calibrated on a scale given below, between 1000 to 0, ranging from AAA and D in comparison to traditional rating scales. The scores are convertible to letter-based rating scales.

A rating of AAA is assigned for scores of 800 points and above out of 1000, whilst the least rating of D is assigned to scores less than 200 points. These points are generated from the Variables and Attributes. The numbering system will be used as SAR's preferred rating scale and be published for SAR ratings to simplify interpretation of ratings for the benefit of public consumption.

The main objective of the scores is ultimately to classify countries in terms of their willingness and ability to honour their debt obligations. In calculating sovereign risk scores, use is made of a wide range of indicators identified and selected for their informational value and quality. Data for the various indicators is obtained from country central banks, treasury departments, local private and public research institutes, African Development Bank, IMF, and World Bank.

The table below is used to convert scores into ratings. The points are from 0 up to 1000 while the corresponding ratings are from D to AAA. Scores from 500 and above are investment grade while scores lower are in the speculative grades.

Sovereign Africa Ratings

Table 4: Converting Scores into Ratings

Sovereign Africa Ratings (SAR): Converting Scores into Ratings						
SAR Tier Grade		Points Allocation			Long Term	Short-Term
Investment Grade BBB- & Higher	1-Exceptional (Prime): $\geq 80\%$	Tier 1 – 800+	1	≥ 800	AAA	A+
	2-Very Good (High Grade): 70%-79%	Tier 2 – 700-799	2	767-799	AA+	
			3	734-766	AA	
			4	700-733	AA-	
	3-Above Average (Upper Medium Grade): 60%-69%	Tier 3 – 600 - 699	5	667-699	A+	A-
			6	634-666	A	
			7	600-633	A-	
	4-Average (Low Medium Grade): 50%-59	Tier 4 – 500 - 599	8	567-599	BBB+	B+
			9	534-566	BBB	
			10	500-533	BBB-	
Speculative Grade BB+ and lower	5-Below Average: (Non-Investment Grade Speculative) 40% -49%	Tier -5 – 400 - 499	11	484-499	BB+	B
			12	467-483	BB	
			13	451-466	BB-	
			14	434-450	B+	
			15	418-433	B	
			16	400-417	B-	
	6-Poor (Substantial Risks): 31%-39%	Tier 6 – 300-399	17	467-499	CCC+	C
			18	434-466	CCC	
			19	400-433	CCC-	
	7-Very Poor (Extremely Speculative): $\leq 16\%$ -30%	Tier 7 – 200-299	20	267-299	CC+	
			21	234-266	CC	
			25	200-233	CC-	
	8-Default: $\leq 15\%$	Tier 8 – 0-199	26	0-199	D	D

Integrity of the Rating Process

- SAR employees will comply with all applicable laws and regulations governing their activities in the jurisdictions in which they operate, without exception.
- SAR and its employees will, at all times, deal fairly and honestly with issuers, rated entities, investors, other market participants, and the public.
- SAR will hold its employees to high standards of integrity at all times.

Analysts

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