

# **Sovereign Credit Assessment Methodology**

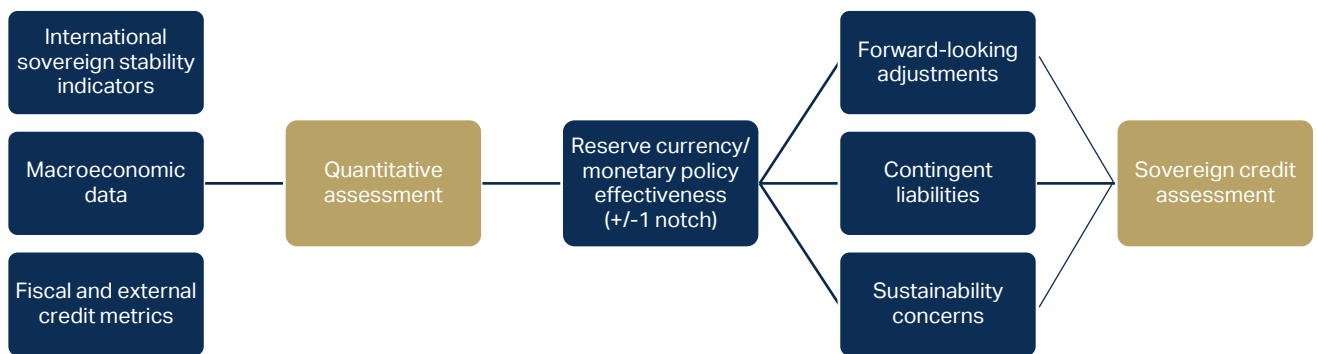
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## INTRODUCTION

1. This methodology describes the framework within which Nordic Credit Rating (NCR) evaluates creditworthiness for governments of sovereign states. The primary purpose of these criteria is to conduct relevant credit evaluations of the Nordic countries. The quantitative portion of the methodology has been derived using data for OECD countries and is designed to provide relevant credit assessments for OECD sovereigns.
2. The assessments are used by NCR as inputs for its issuer ratings of local and regional government entities, as well as evaluations of government support, domestic rating caps and other relevant areas according to NCR's rating methodologies.

## FRAMEWORK OVERVIEW

Figure 1. NCR sovereign credit assessment framework



3. In the first phase of the evaluation, we employ widely available metrics to conduct a quantitative evaluation of sovereign creditworthiness using coefficients derived from a regression analysis of OECD countries and their public ratings. The outcome of this quantitative evaluation is expected to produce a result within one or two notches of the final sovereign credit assessment, except in instances of significant financial distress, domestic political issues and/or geopolitical concerns.
4. In the second phase of the evaluation, we consider the role of a country's or monetary union's currency among global reserve currencies and the effectiveness of its monetary policy. Countries using the world's most important currencies, based on global foreign currency reserves, receive a one-notch uplift from the quantitative assessment to reflect the additional monetary and fiscal flexibility gained by economies with reserve currency status. However, a country's credit assessment can be adjusted down by one notch for an ineffective monetary policy.
5. In the final phase of the evaluation, we make qualitative adjustments to the indicative credit assessment to reflect exceptional strengths and weaknesses not captured by historical data, if necessary.
6. First, we consider whether the forward-looking trends for a sovereign are sufficiently reflected in the historical data points in order to reflect the onset of severe downturns, dramatic changes in institutional stability features or longer-term trends associated with weakening or improving credit metrics. Where a sovereign state has severe liquidity issues or meets our definition criteria for assessments from 'ccc' to default status, we would apply caps to the credit assessment at this stage.
7. Second, we consider forward-looking trends for each subfactor in the quantitative analysis, as well as applying an evaluation of contingent liabilities from the banking sector and an evaluation of concerns

regarding a country's sustainability profile. These qualitative adjustments to sovereign credit assessments are generally negative in nature to reflect exceptionally weak creditworthiness with weak correlation to financial metrics.

### QUANTITATIVE ASSESSMENT

8. The metrics considered in the quantitative evaluation are selected to provide objective input into the evaluation of the subfactors shown in Figure 2. The selected variables consider up to 10 years of historical data in volatility assessments or three-year averages as described in the table of variable inputs in Appendix 1.
9. The coefficients and data included for each variable are described in Figure 5.

Figure 2. Metrics included in the quantitative credit assessment

Institutional stability	Economic strength	Fiscal performance and debt profile	External assessment and economic diversity
World Bank Governance Indicators*	GDP per capita	Interest expenditure/GDP	Current account balance/GDP
	Inflation rate	Government debt/GDP	Economic complexity indicators**
	Real GDP growth volatility		
	Unemployment rate		

\*World Bank Worldwide Governance Indicators for "Government effectiveness", "Regulatory quality", "Rule of law", "Voice and accountability", and "Control of corruption". \*\*Economic complexity rankings from The Observatory of Economic Complexity for trade, technology and research.

### INSTITUTIONAL STABILITY

10. Institutional stability is the cornerstone of sovereign creditworthiness. Strong institutions and governance support generational goal-setting and social cohesion and ensure long-term reliability for a sovereign's constituents and creditors. Our analysis indicates that institutional factors are among the most highly correlated factors in establishing the creditworthiness of a sovereign.
11. Institutional stability is reflected in the quantitative assessment via the World Bank's Worldwide Governance Indicators for "Government effectiveness", "Regulatory quality", "Rule of law", "Voice and accountability" and "Control of corruption". We believe that the robustness and global nature of these scores provide a strong indication of the relative strengths and weaknesses for otherwise difficult to measure concepts.

### ECONOMIC STRENGTH

12. Our quantitative assessment of economic strength considers four macroeconomic variables that provide insight into the resilience of a national economy. Sovereigns with high income levels and stable economic development have historically maintained better creditworthiness during economic downturns. In addition, higher income levels indicate higher resilience to economic downturns and provide a solid and diverse tax base.
13. The primary component is gross domestic product (GDP) per capita. This measure provides an indication of the productivity of the national population compared with other countries. Higher GDP per capita also indicates a superior ability of households to manage downturns and economic cycles, reducing the need for government support.

14. Our assessment also considers the 10-year history of the volatility of real GDP growth at national level to reflect the relative stability of growth, with lower values indicative of more modest economic cycles.
15. Our assessment of economic strength also considers recent unemployment and inflation rates, which contribute additional information about the current state of the economy. Rising inflation and unemployment are strong indicators of economic stress that add further pressure to sovereign budgets and the ability to repay external commitments.

#### **FISCAL PERFORMANCE AND DEBT PROFILE**

16. Fiscal performance reflects a sovereign's current debt and interest burden, which reflect a country's ability to adapt its fiscal policies by maintaining low budget deficits, as well as providing a measure of past performance.
17. Our analysis also considers government debt levels in relation to GDP. Some countries have demonstrated that they are able to handle higher leverage, in particular those with reserve currency status and strong access to capital markets, while less creditworthy countries may not have had the means to increase debt levels. This measure provides an indication of the ability to maintain a balanced fiscal policy and the sensitivity of the sovereign to the economic cycle and spikes in interest costs.
18. The quantitative analysis also considers the recent interest burden in relation to GDP. While often correlated with overall leverage, the interest burden provides insight into countries with relatively higher financing costs, which we expect to be correlated with the overall creditworthiness of the sovereign.

#### **EXTERNAL STRENGTH AND ECONOMIC COMPLEXITY**

19. Our external strength and economic complexity assessment focuses on a country's current account balance, which reflects the net trade balance, including goods and services, as well as the level of economic complexity. Another key component of the external position considers the attractiveness of a country's currency. Given the binary nature of reserve currency status, we address the benefits of a country's reserve currency status in the next section.
20. Our quantitative assessment of external strength considers the three-year average of a country's current account balance in relation to GDP. Economies with stable current account surpluses are expected to be more stable and diverse and able to build foreign-exchange reserves, which is useful in stabilising their own currency. Conversely, economies with persistent current account deficits suffer from weaker competitiveness, especially where deficits are financed by external debt rather than more permanent foreign direct investment.
21. We also use Economic Complexity Index (ECI) figures from the Observatory of Economic Complexity to reflect the diversity and economic capacity of a sovereign. Studies show that more complex economies can generate more growth and typically have stronger institutions and broader income distribution. A complex economic profile provides resilience to changing demand for goods and services over time. In contrast, an economy that is highly exposed to few industries or with a low share of value-added services is more exposed to cyclicalities and loss of competitiveness.

#### **RESERVE CURRENCY AND MONETARY POLICY EFFECTIVENESS**

22. In addition to the largely quantitative factors considered above, a qualitative assessment of the following attributes is used to adjust the quantitative outcome:

## RESERVE CURRENCY STATUS

23. Countries with large and liquid currencies tend to benefit from increased fiscal and monetary policy flexibility, given the global attractiveness of assets denominated in their currency. In addition, these currencies tend to experience inflows during periods of financial stress. Countries with reserve currency status can afford higher debt levels and a higher reliance on foreign funding than countries with less attractive currencies. As of publication, we consider the US dollar, euro, Chinese renminbi, Japanese yen, pound sterling, Australian dollar and Canadian dollar as reserve currencies, given that they each comprise over 1% of global foreign currency reserves, based on the IMF COFER database.
24. Reserve currency status provides up to one notch of uplift for the currencies above. We include a one-notch uplift for all members of the eurozone. This reflects the common access to emergency financing via the European Stability Mechanism (ESM) and other common initiatives that have supported access to liquidity in the banking sector. However, we consider the appropriateness of the common monetary policy for all members of the eurozone in paragraph 25.

## MONETARY POLICY EFFECTIVENESS

25. Where a country has an ineffective monetary policy or an economy that is not driving its own monetary policy, we may lower the assessment by one notch, in some instances reversing the benefits of the reserve currency status. Within the OECD, this notching is applicable for less influential members of the eurozone with smaller economies (less than \$1 trillion in GDP), as well as economies that are materially weaker or more volatile than the average of the eurozone economies.

## ADJUSTMENT FACTORS

26. In addition to the largely quantitative factors considered above, a qualitative assessment of the following attributes is used to make adjustments to the quantitative outcome:
  - Adjustments for forward-looking trends;
  - Contingent liabilities; and
  - Sustainability concerns.

## ADJUSTMENT FOR SIGNIFICANT FORWARD-LOOKING TRENDS

27. Given the historical approach of the quantitative analysis, an evaluation of significant positive or negative trends could result in upward or downward notching to reflect as yet unmeasured strengths or weaknesses or expectations of material improvement or decline in credit metrics. The primary purpose of the analysis is to reduce unnecessary volatility in the credit assessments, and associated public credit ratings, through an economic cycle for modest breaches of assessment thresholds (see Figure 6). For example, we may reduce the impact of outlier metrics or we may reflect the potential impact of significant economic downturns associated with financial crises, geopolitical issues or institutional changes yet to be reflected in the quantitative assessment inputs.
28. Typically, in the event of a significant change, the first step in our approach is to use projected values for specific inputs into the quantitative model to determine the projection's potential impact on the credit assessment. For example, recent history of budgetary discipline gives an indication of the trajectory of government borrowing, the inflation rate, or unemployment or interest rates could impact the creditworthiness of the sovereign. Conversely, we maintain the ability to adjust for outlier periods to avoid significant swings in sovereign credit assessments due to short-term spikes in unemployment, inflation or other metrics in the past.

29. The next step in this analysis is to consider whether the quantitative outcome of the adjusted values compensates enough for the severity of the decline. Where necessary, to reflect more serious declines in sovereign creditworthiness, the quantitative model outcome may be adjusted down by up to three notches using analytical judgement, depending on the expected impact on sovereign creditworthiness. In addition, if there are acute liquidity concerns, we may cap the assessment at 'b-'. This step also considers whether our definition-based credit assessments in Figure 7 provide a better approach for the sovereign credit assessment.

### CONTINGENT LIABILITIES

30. The analysis of contingent liabilities reflects implicit or explicit guarantees that could add to a sovereign's debt burden or require changes to a country's fiscal policy, if realised. Where necessary, to reflect where contingent liabilities could have a serious impact in sovereign creditworthiness, the credit assessment may be adjusted down by up to three notches, depending on an analysis of the severity and likelihood of the contingent liability materialising.
31. The primary focus of our contingent liability assessment is related to the financial sector and the potential measures a country could be expected to take to support an ailing financial sector. In light of the Banking Recovery and Resolution Directive across Europe, which does not entirely prevent government support but demonstrates European Union member states' keen interest in avoiding taxpayer bailouts, NCR does not generally expect explicit government support for specific financial institutions. However, we could lower our credit assessment on a sovereign during periods of stress, if it is likely that the government will be required to provide broad extraordinary support for bank liquidity and take other measures that put a strain on government finances. The weakening of a country's banking sector is likely to be reflected in a decline in NCR's assessment of its financial institutions' operating environment, which is an important component of our Financial Institutions Rating Methodology.
32. In addition, the analysis considers whether there are material guarantees or other extraordinary support expected for corporations or specific segments. Where specific guarantees or support outside of the banking sector are expected to weigh on a government's finances, we may use our contingent liability assessment to reflect projections of weakening sovereign creditworthiness.

### SUSTAINABILITY CONCERNS

33. A number of sustainability concerns are already included in our quantitative assessment of sovereigns. For example, governance factors are largely captured in the World Bank Governance Indicators that we use to evaluate 'institutional stability'. Similarly, many social factors are addressed in 'economic strength' through the unemployment rate and GDP per capita. But where specific risks or characteristics relating to environmental, social or governance factors are not sufficiently addressed in the quantitative assessment, this can be adjusted for in the sustainability evaluation. We adjust for additional events or risks that we deem to have a material effect on the final assessment. Below are examples of factors that are relevant to the assessment.

Figure 3. Sustainability concerns for sovereigns

Factor	Description
<b>Environmental factors</b>	
Natural resource management	High reliance on unsustainable energy or materials sourcing will eventually put a strain on economic strength, economic diversity and public finances. This risk can be managed through a gradual transition away from unsustainable sourcing into lower-carbon alternatives or sustainable sectors.
Climate change	Natural disasters due to extreme weather can be costly and strain government spending on natural disaster relief or preventative infrastructure investments. In addition, gradual changes in climate can have longer-term implications (higher temperatures, more droughts and flooding) and eventually affect economic and industrial growth.
Infrastructure needs	The switch to a low-carbon society will put pressure on sovereigns' infrastructure needs in terms of increased electrification and alternative energy production. Higher sea levels might require substantial investment in land use.
<b>Social factors</b>	
Social unrest	Insufficient systems to cope with discriminatory practices, lack of social inclusion or high income inequality can lead to social unrest and have implications for political and social stability. This could, in turn, put pressure on public finances.
Human rights and political/religious freedoms	Lack of human rights and/or political or religious freedoms can lead to social unrest and put pressure on international relations.
Income distribution	Countries with poor income distribution, as measured by the GINI coefficient or similar, could face difficulties in managing economic cycles.
Demographic trends	A rapidly aging population can result in an imbalance between a country's workforce and those in need of support, both in terms of physical care (labour intensive) and financial requirements (increasing pension liabilities and outflows).
<b>Governance factors</b>	
Corruption	A high level of corruption and the prevalence or growth of a shadow economy could lead to less effective tax systems and, hence, weaker budgetary performance.
Political instability	Weakening democracy or a weak track record of implementing fiscal tightening could lead to political instability.
Geopolitical risks	Risks of conflict or security threats and violence can put a strain on a sovereign's finances.

- An above-average sustainability assessment does not mitigate structural weaknesses in the quantitative assessment, but it does contribute to the protection of an already strong credit profile. For this reason, the sustainability assessment has either a neutral or a negative impact on the final sovereign assessment.

Figure 4. Impact of the sustainability assessment

Assessment	Description	Impact
Adequate	There are no significant sustainability concerns	No effect
Negative	There are significant concerns relating to sustainability issues that could impair the sovereign's credit quality	Minus one notch



## APPENDICES

## APPENDIX 1: DETAILS OF THE QUANTITATIVE MODEL

Figure 5. Metrics and coefficients used in the quantitative credit assessment

Metric	Description	Coefficient
<b>Institutional stability</b>		
World Bank Governance Indicators*	Average of most recent scores for "Government effectiveness", "Regulatory quality", "Rule of law", "Voice and accountability", and "Control of corruption".	-1.97
<b>Economic strength</b>		
GDP per capita	Most recent three-year average of the natural logarithm of GDP per capita in US dollars.	-0.94
Inflation rate (%)	Most recent three-year average of consumer price index growth rates.	0.17
Real GDP growth volatility (%)	Most recent 10-year standard deviation of annual real GDP growth rates, excluding the years 2020 and 2021 due to impacts of the COVID-19 pandemic.	0.55
Unemployment rate (%)	Most recent three-year average unemployment rate, excluding the years 2020 and 2021 due to impacts of the COVID-19 pandemic.	0.10
<b>Fiscal policy and debt profile</b>		
Interest expenditure/GDP (%)	Most recent three-year average of the sovereign's interest expenditure as a percentage of GDP.	0.41
Government debt/GDP (%)	Most recent three-year average of the sovereign's public debt as a percentage of GDP.	0.02
<b>External assessment and economic complexity</b>		
Current account balance/GDP (%)	Most recent three-year average of the sovereign's current account balance as a percentage of GDP.	0.06
Economic complexity indicators**	Average of the most recent Economic Complexity Index scores for trade ("ECI trade"), patent data ("ECT technology") and research publication data ("ECI research").	-1.35
Intercept		14.18

\*Daniel Kaufmann and Aart Kraay (2023). Worldwide Governance Indicators, 2023 Update ([www.govindicators.org](http://www.govindicators.org)), accessed on 19/10/2023. \*\*Economic complexity rankings from The Observatory of Economic Complexity. AJG Simoes, CA Hidalgo. The Economic Complexity Observatory: An Analytical Tool for Understanding the Dynamics of Economic Development. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence. (2011)

**Choice of approach**

35. We have chosen this approach to establish the most relevant variables and weightings to include in the quantitative portion of the credit assessment. As of the publication of this methodology, NCR will proceed with its own analysis according to the variables in Figure 5, without reference to public sovereign ratings from other rating agencies. In addition to the quantitative model, NCR will incorporate qualitative elements and analytical judgement in setting a final sovereign credit assessment.

**Model summary**

36. A multiple linear regression was used to determine the most relevant variables in predicting of the average public credit rating of OECD sovereigns from the three largest credit rating agencies. The coefficients and variables are described in Figure 5. The coefficients were calibrated by regressing the variables against the average public credit rating for OECD sovereigns from the three major rating

agencies. The overall regression was statistically significant ( $R^2 = 0.96$ ,  $F(9, 17) = 71.4$ ,  $p = < 0.00$ ) with a standard error of 0.82, or less than one rating notch for OECD countries.

37. The model was back-tested historically and on a larger sample of sovereigns. While variation exists between public ratings for sovereigns, NCR believes that the average of the three major rating agencies' sovereign ratings provides a robust proxy for the relative creditworthiness of sovereigns.
38. The calibration process excluded 2020 and 2021 to avoid the influence of major changes in unemployment and GDP during the main years of the COVID-19 pandemic. The quantitative model is also calibrated to a lower expected outcome for countries with established reserve currencies, to increase the relative importance of the underlying variables for the quantitative model and maintain the reserve currency adjustment as a separate step in the credit assessment.
39. Sovereign data used in the model is collected from recognised national and international sources such as the World Bank, the Observatory of Economic Complexity, national statistical offices, central banks, as well as multinational sources such as the Organisation for Economic Co-operation and Development, EuroStat and similar services.
40. The numerical output of the quantitative assessment model is compared with the NCR assessment scale, as shown in Figure 6.

Figure 6. Quantitative credit assessment conversion to the assessment scale

Quantitative assessment	Weighted average score		
	Minimum	$\leq x <$	
aaa			2.0
aa+	2.0	$\leq x <$	3.0
aa	3.0	$\leq x <$	4.0
aa-	4.0	$\leq x <$	5.0
a+	5.0	$\leq x <$	6.0
a	6.0	$\leq x <$	7.0
a-	7.0	$\leq x <$	8.0
bbb+	8.0	$\leq x <$	9.0
bbb	9.0	$\leq x <$	10.0
bbb-	10.0	$\leq x <$	11.0
bb+	11.0	$\leq x <$	12.0
bb	12.0	$\leq x <$	13.0
bb-	13.0	$\leq x <$	14.0
b+	14.0	$\leq x <$	15.0

b	15.0	$\leq x <$	16.0
b-	16.0	$\leq x \leq$	Maximum

## APPENDIX 2: DEFINITION-BASED CREDIT ASSESSMENTS

Figure 7. Definitions of lowest credit assessments

Lowest possible credit assessments	
b-	We assign the 'b-' credit assessment where there are acute liquidity concerns and a material shortage is projected. In these instances, the sovereign is likely receiving external assistance from the IMF, the World Bank, ESM or other bilateral international support, but appears unlikely to meet the thresholds required for future support.
ccc	We assign the 'ccc' credit assessment in specific scenarios if we assess that a sovereign is distressed to the extent that we think there is a strong likelihood of a conventional default or distressed exchange on its external debt obligations, although this might not materialise within the next 12 months. At the 'ccc' level, the sovereign might have the liquidity to meet short-term obligations, but we believe there are severe doubts over the long-term sustainability of the financial situation.
cc	We assign the 'cc' credit assessment if we think it highly likely that a sovereign will default on its external debt obligations in the near term, i.e. within the next 12 months.
c	We assign the 'c' credit assessment if a sovereign has announced that it will default on an external debt obligation, but the default has not yet materialised. This may be the case if a sovereign has announced a distressed debt exchange that has yet to take place.

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