Sovereign Credit Rating Method and Model

(PJFM-ZQ-2024-V1.0)

Table of Contents

I. Overview 1
II. Scope of Application 1
III. Basic Assumptions 2
1. Assumption of Debt Repayment Environment Stability 2
2. Assumption of Data Authenticity 2
IV. Characteristics of Credit Risk 2
1. Financial Stability and Debt Repayment Capability 2
2. Economic Risk 2
3. Policy Changes and Regulatory Environment 3
4. Governance Capability, National Integrity, and Information Transparency 3
5. Political and Social Risk 4
6. Natural Disasters and Emergencies 4
V. Rating Methodology and Model Structure 4
1. Pre-SRAF Rating Levels 7
2. Sovereign Risk Adjustment Factors 16
3. Rating Criteria 18
4. Self-Adjustment Factors 18
5. BCA grade 20
6. External Support 20
7. Final Credit Rating 22
VI. Limitations of This methodology and model 22
Copyright and Statement 24

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Rating Methodology

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I. Overview

AnRong (Hong Kong) Credit Ratings Company Limited (ARHK) has developed the "Sovereign Credit Rating Method and Model (PJFM-ZQ-2024-V1.0)" (referred to as "this methodology and model") to enhance the consistency, accuracy, and stability of rating methodologies, models, and rating results, in accordance with relevant laws, regulations, and the provisions of ARHK's rating business-related management systems.

This methodology and model determines the rating benchmark for rated entities by combining sovereign risk adjustment factors, which, along with inherent adjustment factors, lead to the BCA rating for the rated entity. The BCA rating, combined with external support, produces the final credit rating of the rated entity. Specifically, ARHK first constructs a "Government Administrative Capacity" dimension by fully considering the government's mobilization ability and governance capability. Then, it constructs a "Government Strength" dimension by fully considering the rated entity's economic strength, fiscal strength, and debt sustainability. The Pre-SRAF rating level of the rated entity is derived from a two-dimensional matrix mapping of "Government Administrative Capacity" and "Government Strength". The rating benchmark for the rated entity is determined by incorporating sovereign risk adjustment factors, followed by deriving the BCA rating through inherent adjustment factors. Finally, the rated entity's credit rating (Model Result Grade) is obtained by considering external support.

In terms of grade symbols, the BCA grades are represented by a sequence of symbols ranging from "aaa" to "c." Except for "aaa" and grades below "cc" (inclusive), each credit grade can be fine-tuned with "+" or "-" symbols to indicate a slightly higher or lower credit level than the base grade. The final credit grade symbols correspond to a sequence from "AAA" to "C." Similarly, except for "AAA" and grades below "CC" (inclusive), each credit grade can be fine-tuned with "+" or "-" symbols.

This methodology and model becomes effective from the date of announcement.

II. Scope of Application

This methodology and model applies to countries with independent Sovereign or jurisdictions that, while not fully sovereign, possess relatively independent monetary and fiscal policy-making rights.

This methodology and model is based on the analysis of factors affecting a country's repayment capability, such as GDP growth trends, foreign trade, international balance of payments, foreign

exchange reserves, total foreign debt, the structure of foreign debt, fiscal revenues and expenditures, policy implementation, and the fiscal burden caused by financial system reformation, state-owned enterprise reformation, and social security system reformation by ARHK. It is a judgment on the central (jurisdiction) government's willingness and ability to fulfill its debt repayment obligations as a debtor.

III. Basic Assumptions

1. Assumption of Stability in Debt Repayment Environment

ARHK assumes that the macroeconomic environment, regulatory environment, legal environment, and financial market environment will not undergo unexpected changes, or face irresistible factors such as natural disasters or wars.

2. Assumption of Data Authenticity

ARHK assumes that the information disclosed by sovereign countries or jurisdictions is true, accurate, and complete. The rating model relies on information provided by other regulatory-recognized professional institutions, and we assume that such information is true, legal, complete, and does not contain any major misleading statements.

IV. Characteristics of Credit Risk

ARHK considers that the credit risk of sovereign countries mainly involves the following aspects:

1. Fiscal Stability and Debt Repayment Capability

A sovereign country's fiscal revenue and expenditure directly affect its debt repayment capability. If fiscal revenue is insufficient or expenditures are excessive, leading to an increase in fiscal deficit, the credit risk of the sovereign country will rise. The size and structure of debt can also directly affect the country's creditworthiness. An excessive debt burden or an unreasonable debt structure, such as a high proportion of short-term debt or mismatched debt maturities, can heighten the repayment pressure on sovereign countries. If a sovereign country cannot repay its debt on time, it may cause losses for its creditors, triggering financial market turmoil as well as severely affecting its international image, reputation, and financing ability, reducing its ability to attract foreign investment, and thereby triggering credit risk.

2. Economic Risk

Economic issues, such as economic recession, inflation, and rising unemployment rate, may affect a sovereign country's fiscal revenue and expenditure, leading to a decline in the country's debt repayment ability, thereby triggering credit risk. Fluctuations in financial markets may

affect the sovereign country's financing channels and costs, especially for sovereign countries that rely on external financing. Instability in financial markets will directly threaten the sovereign country's creditworthiness. In addition, the deterioration of the international trade environment, foreign exchange shortages, and other external economic factors may also affect the country's creditworthiness.

3. Policy Changes and Regulatory Environment

Adjustments in government policies may affect the sovereign country's debt management, fiscal revenue, and fiscal expenditure, and unfavorable policy changes may increase the sovereign country's credit risk. For instance, changes in economic policies such as tax rates, interest rates, and exchange rates may affect the country's creditworthiness. If policy changes are too frequent or unpredictable, they will increase counterparty risk, thereby affecting the country's reputation and financing costs.

An imperfect or changing legal and regulatory environment may also lead to credit risk. An incomplete legal system or weak regulation may lead to frequent debt default behaviors, thereby damaging the country's creditworthiness. In addition, changes in the international legal environment may also affect the country's credit and financing costs, such as strengthened regulations that may limit the sovereign country's financing channels and debt size, thereby affecting its creditworthiness.

4. Governance Capability, National Integrity, and Information Transparency

National governance capability is a reflection of a country's ability to use its institutional system to govern the country and society in all aspects, which largely determines the country's stability and development, thereby affecting the country's credit risk. The strength of national governance capability determines the stability and continuity of its policymaking and execution, relates to the efficiency and effectiveness of risk response, and the degree of improvement and effectiveness of the institutional system, directly affecting its fiscal management and debt management effects, thereby affecting its credit risk.

The level of national integrity is an important indicator to measure a country's political ecology. A clean government can reduce corruption risks, thereby reducing government credit crises caused by corruption. It can increase public trust and support, thereby enhancing government credibility. It can also create a fairer and more transparent market environment, attracting more

investment and promoting economic development, and the prosperity of the economy can help to enhance the overall credit level of the country.

The level of information transparency directly affects the decisions of market participants and the country's credit risk. A country with high information transparency can reduce information asymmetry among market participants, helping investors make more informed decisions and reducing credit risk caused by information opacity. A country with a high level of information transparency can enhance the confidence of market participants, assist in stabilizing market expectations, and reduce panic and credit risk caused by uncertainty. A country with high information transparency enables regulatory authorities to conduct more effective supervision and timely detect and correct irregularities in the market, thereby reducing credit risk.

5. Political and Social Risk

Political turmoil and social instability may also lead to credit risk. Events such as political conflicts, wars, and riots may cause a country to be unable to fulfill its debt obligations, thereby triggering credit risk. In addition, social instability may also affect the country's economic and social development, reducing its debt repayment ability.

6. Natural Disasters and Emergencies

Natural disasters, such as earthquakes, floods, and other natural disasters, may have a serious impact on a sovereign country's fiscal revenue and expenditure, especially when these disasters cause infrastructure damage or economic activity interruption. Similarly, emergencies, such as public health events, political turmoil, and other emergencies, may also adversely affect the sovereign country's creditworthiness. These events could result in lower fiscal revenue, increased expenditure, or limited financing channels.

V. Rating Methodology and Model Framework

"Government Administrative Capacity" reflects the comprehensive ability of a sovereign country to organize, determine, execute, coordinate, and supervise during the process of fulfilling its managerial responsibilities and promoting national and social development. "Government Strength" reflects the comprehensive national power and governance capability of a sovereign country.

The rating methodology and model development path for sovereign credit rating by ARHK are as follows:

Step 1: Establish an evaluation indicator system, defining the names, meanings, scoring, and weighting of evaluation indicators.

Step 2: Determine the corresponding grades for "Government Administrative Capacity" and "Government Strength".

Step 3: Based on the grades from the two dimensions, determine the Pre-SRAF rating grade for the rated entity using a two-dimensional matrix.

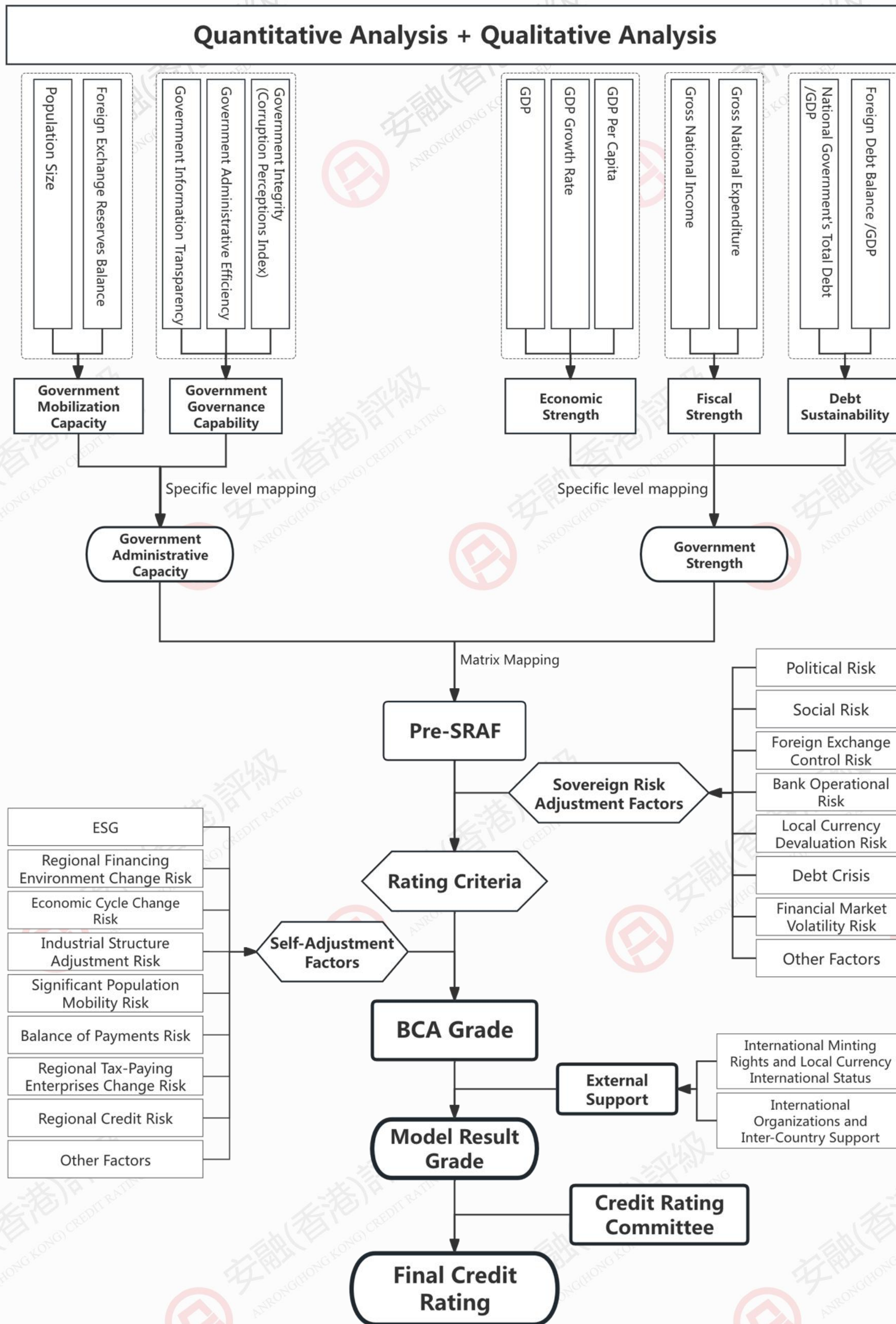
Step 4: Determine the rating benchmark for the rated entity by incorporating sovereign risk adjustment factors.

Step 5: Derive the BCA grade for the rated entity by considering its specific adjustment.

Step 6: Consider external support to obtain the rated entity's credit rating (Model Result Grade).

Considering that the "three-tier, nine-grade system" is widely used in the rating industry both domestically and internationally, where "three-tier" refers to "A", "B", and "C", and "nine-grade" refers to "AAA", "AA", "A", "BBB", "BB", "B", "CCC", "CC", "C", and considering that the difference in default probabilities among "CCC", "CC", and "C" is not significant, mainly reflected in differences in loss given default (LGD) which is not the focus of ARHK's assessments and forecasts, ARHK combines "CCC", "CC", and "C" into one grade when setting evaluation indicators and grades. Except for external support indicators and dimensions, which are set to three grades, all other indicators and dimensions are set to seven grades. Additionally, the symbol "D" (determined by the Credit Rating Committee) is used to indicate that the rated entity is unable to fulfill its obligations, and default is confirmed.

Grade Meanings: Grades range from the lowest (Grade 1) to the highest (Grade 7, or Grade 3 if only three grades are used). Higher grades indicate a more positive assessment and forecast of the rated entity's debt repayment ability and willingness.


Quantitative Analysis + Qualitative Analysis
Population Size
Foreign Exchange Reserves Balance
Government Information Transparency
Government Administrative Efficiency
Government Integrity (Corruption Perceptions Index)
GDP
GDP Growth Rate
GDP Per Capita
Gross National Income
Gross National Expenditure
National Government's Total Debt /GDP
Foreign Debt Balance /GDP
Government Mobilization Capacity
Government Governance Capability
Economic Strength
Fiscal Strength
Debt Sustainability
Specific level mapping
Specific level mapping
Government Administrative Capacity
Government Strength
Matrix Mapping
Pre-SRAF
Political Risk
Social Risk
Foreign Exchange Control Risk
Bank Operational Risk
Local Currency Devaluation Risk
Debt Crisis
Financial Market Volatility Risk
Other Factors
Sovereign Risk Adjustment Factors
Rating Criteria
ESG
Regional Financing Environment Change Risk
Economic Cycle Change Risk
Industrial Structure Adjustment Risk
Significant Population Mobility Risk
Balance of Payments Risk
Regional Tax-Paying Enterprises Change Risk
Regional Credit Risk
Other Factors
Self-Adjustment Factors
BCA Grade
International Minting Rights and Local Currency International Status
International Organizations and Inter-Country Support
External Support
Model Result Grade
Credit Rating Committee
Final Credit Rating

1. Pre-SRAF Rating Levels

ARHK analyzes “Government Administrative Capacity” mainly from two factors: government mobilization capacity and government governance capability. For "Government Strength", the analysis mainly focuses on three factors: economic strength, fiscal strength, and debt sustainability. A total of twelve indicators are set, each given a corresponding weight, and each indicator is divided into seven levels. Through level mapping, the final Pre-SRAF rating level of the rated entity is determined using a two-dimensional matrix mapping table.

ARHK evaluates government administrative capability primarily through government mobilization capacity and government governance capability. Government mobilization capacity generally refers to the government’s ability to quickly mobilize resources, organize forces, and effectively execute actions in response to emergencies, major projects, or policy implementation. This includes fiscal resources, human resources, material resources, and support and cooperation from all sectors of society. A government with strong mobilization ability can respond rapidly in critical situations, effectively overcome various challenges, and ensure the stability and development of the economy and society. Government governance capability is a broader concept, encompassing the functions and utilities of the government in applying and utilizing its administrative system in the process of governance, adapting to the needs of the “governance environment”, adjusting the relationship of “government-market-society”, and achieving positive interaction. This includes various aspects such as policy development and execution, public service provision, social management, and supervision. A government with good governance capability can effectively manage national affairs, promote economic and social development, and improve the quality of life of residents.

(1) Government Administrative Capacity

ARHK mainly considers government mobilization capacity and government governance capability to assess government administrative capacity.

Government Administrative Capacity Indicators are as follows:

Primary Indicator	Secondary Indicator	Tertiary Indicator
Government Administrative Capacity	Government Mobilization Capacity	Population Size
		Foreign Exchange Reserves Balance
	Government Governance Capability	Government Information Transparency
		Government Administrative Efficiency
		Government Integrity (Corruption Perceptions

		Index)

A. Government Mobilization Capacity

Government mobilization capacity is mainly considered from the aspects of population size and foreign exchange reserves balance.

Population is an important carrier and primary engine of economic development. The larger the population size, the larger the market size and consumption potential, the richer the labor resources, the higher the requirements for the industrial structure of consumption markets such as real estate, automobiles, home appliances, and service industries such as the internet and tourism, and the more conducive to technological innovation and knowledge accumulation. The higher the population size indicator value, the greater the potential for national economic development, the more it can create more business opportunities and attract more corporate investment, thereby contributing significantly to the country's economic growth and government fiscal strength, lowering the sovereign credit risk. Therefore, ARHK assigns higher ratings to sovereign countries with higher population sizes.

Foreign exchange reserves are a direct reflection of a country's economic strength and payment ability. A country with a large amount of foreign exchange reserves can demonstrate its stable economic status in the international market, which is conducive to cooperation and exchanges with other countries. Foreign exchange reserves can enhance a country's debt repayment ability. When a country faces external debt repayment pressure, sufficient foreign exchange reserves can ensure timely and full repayment of debt, avoid default behavior, and reduce financing costs, further reducing national credit risk. Foreign exchange reserves are an important barrier against financial risks. In times of international financial market turmoil, large fluctuations in currency exchange rates, or financial crises, foreign exchange reserves can be used to intervene in the foreign exchange market, stabilize the domestic currency exchange rate, and avoid excessive exchange rate fluctuations impacting the domestic economy. Foreign exchange reserves can provide strong credit guarantees for the country's economic development, enhance the confidence of domestic and foreign investors in the sovereign economy, attract more foreign capital inflows, and promote the upgrading and development of domestic industries. Therefore, ARHK assigns higher ratings to sovereign countries with higher foreign exchange reserve balances.

ARHK's specific level mapping standards for "Government Mobilization Capacity" are as follows:

Indicator	7	6	5	4	3	2	1
Population Scale (10,000 people)	≥100000	[12000,100000)	[7000,12000)	[3000,7000)	[1000,3000)	[500,1000)	<500
Foreign Exchange Reserves (100 million USD)	≥30000	[4000,30000)	[1500,4000)	[400,1500)	[200,400)	[30,200)	<30

B. Government Governance Capability

The main indicators used by ARHK to measure government governance capability are government information transparency, government administrative efficiency, and government integrity (Global Corruption Index).

Government information transparency mainly considers the disclosure content, form, timeliness, scope, and public participation of information in areas such as society, economy, finance, and debt in sovereign countries. The higher the transparency of government information, the stronger the government's credibility and trust, which in turn promotes social harmony, stability, and sustainable development.

ARHK classifies government information transparency into 1 to 7 levels based on the completeness, timeliness, and accuracy of information disclosure in areas such as society, economy, finance, and debt. The higher the completeness, timeliness, and accuracy of information disclosure in these areas, the more conducive it is to maintaining market transparency, ensuring the public's right to know, promoting healthy economic development, and preventing financial risks. Therefore, ARHK assigns higher ratings to sovereign countries with higher information transparency.

The specific level mapping standards for ARHK "Government Information Transparency" are as follows:

Indicator	7	6	5	4	3	2	1
Government Information Transparency	Very High	High	Relatively High	Average	Relatively Low	Low	Very Low

ARHK refers to the Chandler Good Government Index (CGGI) evaluation value for government administrative efficiency. The Chandler Good Government Index (CGGI) is an index published

by the Chandler Institute of Governance to evaluate the capabilities and efficiency of governments in various countries. The index evaluates the governments of 113 countries, which account for about 90% of the global population, using public data.

Government administrative efficiency is considered from seven aspects, including leadership and foresight, laws and policies, national institutional capacity, financial stewardship, market attractiveness, global influence and reputation, and improving people's livelihood.

Ⅰ. Leadership & Foresight

Leadership is measured mainly in the following areas: first, in maintaining the country's core interests, including territorial integrity, sovereign independence, economic development, and social stability; second, in establishing friendly and cooperative relationships with other countries; third, in promoting global economic prosperity and stability through economic globalization, improving the international economic order, and strengthening international cooperation; and finally, in responding to domestic and international crises and challenges, such as financial crises, natural disasters, and social unrest, and whether effective measures can be taken to ensure the safety of people's lives and property and social stability. Foresight is mainly reflected in whether the country has deep strategic vision and foresight, can perceive changes in domestic and international situations, predict future development trends and potential risks; whether it can actively promote technological innovation, industrial upgrading, and transformation of economic development methods to adapt to future social needs and development trends; and whether it can establish a sound risk assessment and early warning mechanism to timely identify and respond to various potential risks and challenges.

Ⅱ.Robust Laws & Policies

Evaluate whether national laws and policies comply with national legal regulations, whether they are formulated and promulgated through legal procedures; evaluate whether policies align with national development strategies and policy directions, conform to the laws of social and economic development, and meet the interests and demands of the people; evaluate the outcomes and impacts of policy implementation, including economic, social, and environmental benefits; assess the resources and costs required for policy implementation, including financial input, human and material costs; evaluate whether policies are operable and implementable, and whether they can gain support and participation from all sectors of society; assess whether policies can exert long-term effectiveness and continuously generate positive socio-economic

benefits; evaluate whether policies can fairly meet the needs of different groups and promote social fairness and justice; assess whether the policy-making and implementation process can fully mobilize the enthusiasm and participation of all sectors of society and form a broad social consensus and support.

Ⅲ.Strong Institutions

Evaluating the capacity of national institutions mainly considers policy formulation and execution capacity, resource management and allocation capacity, supervision and feedback capacity, crisis response and risk management capacity, innovation capacity, and adaptability.

Ⅳ.Financial Stewardship

Evaluate the financial governance capability of sovereign countries mainly from the following aspects. First is the stability of the financial system, mainly including the robustness of financial institutions, the volatility of financial markets, and the ability of the financial system to prevent and control risks. Generally, the more robust a sovereign country's financial system, the stronger its ability to withstand external shocks, ensuring the normal operation of financial markets and providing stable financial support for the real economy. Second, the effectiveness of financial supervision, mainly including the completeness of the supervisory system, the effectiveness of supervisory means, and the strength of supervisory execution. Effective financial supervision can timely detect and correct financial institutions' violations, prevent financial risks, and protect the legitimate rights and interests of financial consumers. Third, the activity of financial markets, mainly including the scale of financial markets, the diversity of financial products, and the liquidity of financial markets. The more active the financial market, the more it can attract investors and financiers to participate, improve the efficiency of financial resource allocation, and promote the development of the real economy. Finally, the inclusiveness of financial services, mainly including the coverage of financial services, the convenience of financial services, and the cost of financial services. Inclusive finance mainly considers whether finance provides comprehensive, convenient, and affordable financial services to all social classes and groups to promote a balanced allocation of financial resources and harmonious social development.

Ⅴ.Attractive Marketplace

Market attractiveness refers to the degree of attraction a country's or region's market holds for investors, consumers, or businesses. It reflects the market's potential, opportunities, and profit

space. The attractiveness of a country's market is mainly rated by considering market size, market growth rate, political stability, economic stability, competition intensity, legal environment, regulatory environment, and infrastructure.

Ⅵ. Global Influence & Reputation

Evaluating a country's global influence and reputation mainly considers economic strength, military strength, technological innovation capability, resource control, political influence, international image, social responsibility and sustainable development, and cultural soft power.

Ⅶ. Improving People's Livelihood

Evaluating a country's improvement of people's livelihood mainly covers aspects such as the equalization of educational resources and the development of vocational education, the coverage and quality of medical insurance and services, entrepreneurship support and employment capability enhancement, the construction of elderly service systems and improvement of elderly welfare, environmental pollution control and promotion of green development, and the construction of cultural facilities and encouragement of artistic creation.

ARHK classifies government administrative efficiency into 1 to 7 levels based on its degree. The higher the government administrative efficiency, the more significant its impact on regional economic and social development. High administrative efficiency means that the government can quickly and accurately respond to social needs and problems in decision-making, execution, supervision, and other aspects, effectively utilize public resources, and provide better and more efficient services to the public. Therefore, ARHK assigns higher ratings to governments with higher administrative efficiency.

The specific level mapping standards for ARHK "Government Administrative Efficiency" are as follows:

Indicator	7	6	5	4	3	2	1
Government Administrative Efficiency (Ranking)	[1,5)	[5,10)	[10,20)	[20,55)	[55,70)	[70,90)	≥90

Government integrity is considered and analyzed by the Corruption Perceptions Index. The Corruption Perceptions Index (CPI) is an assessment report released annually by Transparency International (TI) since 1995, used to measure the subjective perception of corruption by the public in various countries worldwide. This index reflects the integrity and bribery status of

government officials in a country, hence also known as the "Corruption Perceptions Index". The integrity index scores the corruption status of countries and regions by collecting perception data from entrepreneurs, risk analysts, and the general public. The index uses a percentage system, with higher scores indicating lower corruption levels, i.e., more integrity; conversely, lower scores indicate higher corruption levels. Therefore, ARHK assigns higher ratings to governments with higher integrity (Corruption Perceptions Index).

The specific level mapping standards for ARHK "Government Integrity" are as follows:

Indicator	7	6	5	4	3	2	1
Government Integrity (Corruption Perceptions Index) (Score)	[95,100]	[90,95)	[80,90)	[50,80)	[25,50)	[5,25)	[0,5)

(2) Government Strength

ARHK mainly considers government economic strength, fiscal strength, and debt sustainability to assess government strength.

The government strength indicators are as follows:

Primary Indicator	Secondary Indicator	Tertiary Indicator
Government Strength	Economic Strength	GDP
		GDP Growth Rate
		GDP Per Capita
	Fiscal Strength	Gross National Income
		Gross National Expenditure
	Debt Sustainability	National Government's Total Debt/GDP
		Foreign Debt Balance/GDP

A. Economic Strength

The main indicators used by ARHK to measure the economic strength of sovereign countries are GDP, GDP growth rate, and GDP per capita.

GDP is an important indicator for measuring the economic scale, development level, and comprehensive strength of a country or region. The larger the GDP of a country or region, the larger the economic scale and the stronger the economic strength, demonstrating stronger competitiveness and influence in multiple aspects. Therefore, ARHK assigns higher ratings to countries or regions with higher GDP.

The GDP growth rate is an important indicator for measuring the speed and vitality of economic development in a country or region. It reflects the changes in the total economic volume of the country or region over a certain period and is an important basis for evaluating the effectiveness of economic work and formulating economic policies. The higher the growth rate, the faster the economic growth and the stronger the economic vitality. Therefore, ARHK assigns higher ratings to countries or regions with higher GDP growth rates.

GDP per capita is an important indicator for measuring the economic development level and average economic welfare of residents in a country or region. GDP per capita is calculated by dividing the total GDP by the resident population, directly reflecting the average economic value created by residents in the country or region. The higher the GDP per capita, the higher the level of economic development and the higher the average economic activity level of residents. Therefore, ARHK assigns higher ratings to countries or regions with higher GDP per capita.

B. Fiscal Strength

The main indicators used by ARHK to measure the fiscal strength of a country or region are gross national income and gross national expenditure.

Gross national income is an important indicator for measuring the economic strength and living standards of a country or region. It reflects the total income obtained by a country or region through production activities and other channels over a certain period and has guiding significance for evaluating the economic development status, formulating economic policies, and conducting international comparisons. Gross national income is obtained by adding the factor income from abroad to the gross domestic product (GDP) and subtracting the factor expenditure from abroad. The "factor income" here mainly refers to primary income such as labor remuneration, production taxes, subsidies, fixed asset depreciation, operating surplus, and property income. Therefore, gross national income is the result obtained on the basis of GDP after considering the international flow of factor income. Therefore, ARHK assigns higher ratings to countries or regions with higher gross national income.

Gross national expenditure mainly refers to the total expenditure of nationals on consumption, investment, and government spending over a certain period. This indicator reflects the total demand level in the national economy. The higher the gross national expenditure indicator value, the stronger the government’s continuous payment strength, and the increase in gross national

expenditure indicates active economic activities and enhanced consumption capacity. Therefore, ARHK assigns higher ratings to countries or regions with higher gross national expenditure.

C. Debt Sustainability

The main indicators used by ARHK to measure government debt sustainability are the national government's total debt/GDP and foreign debt balance/GDP.

The national government's total debt/GDP is the percentage of the national government's total debt to the national or regional gross domestic product. It is an important indicator for measuring the debt situation of a country or region. This indicator reflects the degree of borrowing by the country or region, and the lower the indicator value, the smaller the debt repayment pressure, the stronger the debt sustainability, and thus the lower the credit risk. Therefore, ARHK assigns higher ratings to regional governments with lower national government total debt/GDP ratios.

The ratio of foreign debt balance/ GDP represents the percentage of a country's or region's external debt balance relative to its gross domestic product. It is a crucial indicator for assessing a country or region's debt repayment capacity, fiscal health, and external debt risk level. Specifically, it reflects the ability of a country or region to bear external debt within the scope of its fiscal resources and the sustainability of its external debt burden. A lower external debt balance to GDP ratio indicates stronger fiscal resilience to external debt and lower credit risk for the country or region. Therefore, ARHK assigns higher ratings to regional governments with lower external debt balance/GDP ratios.

The specific mapping standards for ARHK's "Government Strength" levels are as follows:

Indicator	7	6	5	4	3	2	1
GDP (100 million USD)	≥150000	[30000,150000)	[15000,30000)	[5000,15000)	[2000,5000)	[200,2000)	<200
GDP Growth Rate (%)	≥6.5	[4.75,6.5)	[3,4.75)	[1,3)	[0.25,1)	[-1,0.25)	<-1
GDP Per Capita (USD)	≥80000	[50000,80000)	[12000,50000)	[6000,12000)	[3000,6000)	[2000,3000)	<2000
Gross National Income (100 million USD)	≥250000	[35000,250000)	[20000,35000)	[4000,20000)	[2000,4000)	[150,2000)	<150
Gross National Expenditure (100 million USD)	≥100000	[22000,100000)	[12000,22000)	[4000,12000)	[2500,4000)	[1000,2500)	<1000
National	<10	[10,30)	[30,45)	[45,70)	[70,120)	[120,170)	≥170

Government's Total Debt/GDP (%)							
Foreign Debt Balance/GDP (%)	<10	[10,25)	[25,40)	[40,120)	[120,200)	[200,300)	≥300

(3) Pre-SRAF Rating Level Mapping

Based on the aforementioned indicators and weights for government mobilization capacity and governance capability, a mapping tier for "government administrative capacity" can be obtained. Similarly, based on the aforementioned indicators and weights for economic strength, fiscal strength, and debt sustainability, a mapping tier for "government strength" can be obtained.

By combining the mapping tiers of the above two dimensions, through the Pre-SRAF rating level two-dimensional matrix, ARHK can obtain the two-dimensional matrix Pre-SRAF rating level mapping for sovereign countries.

The Pre-SRAF rating level mapping is as follows:

Pre-SRAF Rating Level		Government Administrative Capacity						
		7	6	5	4	3	2	1
Government Strength	7	aaa	aaa/aa+	aa+/aa	aa/aa-	aa-/a+	a+/a	a-/bbb+
	6	aaa/aa+	aa+/aa	aa/aa-	aa-/a+	a+/a	a-/bbb+	bbb/bbb-
	5	aa+/aa	aa/aa-	aa-/a+	a+/a	a/a-	bbb+/bbb	bbb-/bb+
	4	aa/aa-	aa-/a+	a+/a	a/a-	a-/bbb+	bbb/bbb-	bb+/bb
	3	aa-/a+	a+/a	a/a-	a-/bbb+	bbb/bbb-	bb+/bb	bb-/b+
	2	a/a-	a-/bbb+	bbb+/bbb	bbb/bbb-	bb+/bb	bb-/b+	b/b-
	1	a-/bbb+	bbb+/bbb	bbb/bbb-	bb+/bb	bb-/b+	b/b-	Below ccc

2. Sovereign Risk Adjustment Factors

Sovereign risk adjustment factors are crucial considerations for entities undergoing international credit ratings. ARHK uses sovereign risk adjustment factors such as "Political Risk", "Social Risk", "Foreign Exchange Control Risk", "Bank Operational Risk", "Local Currency Devaluation Risk", "Debt Crisis", "Financial Market Volatility Risk", and "Other Factors" to conduct international credit adjustments for urban investment enterprises, resulting in the international rating benchmark for the rated entity. Since the factors affecting sovereign credit risk are numerous and dynamically change with international relations, economic, and industry developments, the sovereign credit risk adjustment items listed in this method may not cover all

adjustment elements, and continuous accumulation, summarization, and optimization in practical rating work are needed.

(1) Political Risk

If the rated entity has significant domestic political risk and geopolitical risk, its credit rating may be downgraded.

(2) Social Risk

If the rated entity has significant social conflicts, ethnic conflicts, or cultural or religious conflicts, its credit rating may be downgraded.

(3) Foreign Exchange Control Risk

If the rated entity has a significant risk of restricted capital flow, its credit rating may be downgraded.

(4) Bank Operation Risk

If the rated entity has a significant risk of funds not being exchanged in time, its credit rating may be downgraded.

(5) Local Currency Devaluation Risk

If the rated entity has significant local currency devaluation risk, its credit rating may be downgraded.

(6) Debt Crisis

If the rated entity has a significant international external debt crisis, its credit rating may be downgraded.

(7) Financial Market Volatility Risk

If the rated entity has significant international financial market volatility risk, its credit rating may be downgraded.

(8) Other Factors

Other factors refer to all possible sovereign factors beyond the aforementioned ones that may affect the debt repayment capability and willingness of urban investment enterprises. ARHK will make appropriate adjustments to its credit rating based on specific circumstances.

The specific sovereign risk adjustment factors are as follows:

Primary Factor	Secondary Factor
Political Risk	Domestic Political Risk
	Geopolitical Risk

Primary Factor	Secondary Factor
Social Risk	Social Conflict
	Ethnic Conflict
	Cultural or Religious Conflict
Foreign Exchange Control Risk	Restricted Capital Flow
Bank Operation Risk	Operation Risk
Local Currency Devaluation Risk	Local Currency Devaluation Risk
Debt Crisis	Debt Crisis
Financial Market Volatility Risk	Financial Market Volatility Risk
Other Factors	Other Factors

3. Rating Criteria

ARHK derives the rating criteria for the rated entity based on the Pre-SRAF rating level, combined with sovereign risk adjustment factors.

4. Self-Adjustment Factors

Self-adjustment is a supplementary analysis conducted on the basis of evaluating common characteristics of sovereign countries, focusing on the individual characteristic elements of the evaluated sovereign country. The evaluation result after adjusting for individual characteristics is the foundational credit rating that can fully reflect the credit level of the sovereign country itself. It is noteworthy that only factors that affect the credit risk of sovereign countries and occur only in individual sovereign countries will be examined in the adjustment items. ARHK uses self-adjustment factors such as “ESG”, “regional financing environment change risk”, “economic cycle change risk”, “industrial structure adjustment risk”, “significant population mobility risk”, “balance of payments risk”, “regional tax-paying enterprises change risk”, “regional credit risk”, and “other factors” to adjust sovereign countries. Due to the numerous factors affecting credit risk and their dynamic changes with economic and industry development, the adjustment items listed in this method may not cover all adjustment elements, requiring continuous accumulation, summarization, and optimization in the practice of rating work.

(1) ESG

ESG is the abbreviation for Environment, Social Responsibility, and Corporate Governance, which is an important factor influencing the sustainable business development potential of the rated entity. If the rated entity performs poorly in ESG, it may affect the stability of the rated entity, thereby increasing its credit risk. ARHK focuses on the negative impacts of various ESG factors. If the rated entity has relevant risk factors, its credit rating may be adjusted.

(2) Regional Financing Environment Change Risk

If the rated entity has significant financing risk due to changes in the regional financing environment, its credit rating may be downgraded.

(3) Economic Cycle Change Risk

If the rated entity has significant fiscal revenue fluctuation risk or infrastructure investment risk due to economic cycle changes, its credit rating may be downgraded.

(4) Industrial Structure Adjustment Risk

If the rated entity has significant market demand fluctuation risk, technological innovation risk, capital chain risk, or policy execution risk due to industrial structure adjustment, its credit rating may be downgraded.

(5) Significant Population Mobility Risk

If the rated entity has significant domestic population mobility risk or cross-border population mobility risk due to significant population mobility, its credit rating may be downgraded.

(6) Balance of Payments Risk

If the rated entity has a significant risk of a balance of payment deficit, a risk of structural vulnerability in the balance of payments, or a risk of accumulation of domestic economic problems due to the balance of payments risk, its credit rating may be downgraded.

(7) Regional Tax-Paying Enterprises Change Risk

If the rated entity has significant tax-paying enterprises change risk due to changes in regional tax-paying enterprises, its credit rating may be downgraded.

(8) Regional Credit Risk

If the rated entity has significant debt default or fiscal crisis and other credit risks, its credit rating may be downgraded.

(9) Other Factors

Other factors refer to any factors other than those mentioned above that may affect the debt repayment ability and willingness of sovereign countries. ARHK will make appropriate adjustments to its credit rating based on specific circumstances.

Specific self-adjustment factors are as follows:

Primary Factor	Secondary Factor
ESG	E
	S

Primary Factor	Secondary Factor
	G
Regional Financing Environment Change Risk	Financing Risk
Economic Cycle Change Risk	Fiscal Revenue Fluctuation Risk
	Infrastructure Investment Risk
Industrial Structure Adjustment Risk	Market Demand Fluctuation Risk
	Technological Innovation Risk
	Capital Chain Risk
	Policy Execution Risk
Significant Population Mobility Risk	Domestic Population Mobility Risk
	Cross-Border Population Mobility Risk
Balance of Payments Risk	Balance of Payments Deficit Risk
	Balance of Payments Structure Vulnerability Risk
	Domestic Economic Problem Accumulation Risk
Regional Tax-paying Enterprise Change Risk	Tax-paying Enterprise Change Risk
Regional Credit Risk	Debt Default
	Fiscal Crisis
Other Factors	Other Factors

5. BCA Grade

ARHK derives the BCA grade of the rated entity based on the rating benchmark, combined with self-adjustment factors.

6. External Support

External support adjustment factors are as follows:

Primary Factor	Secondary Factor
International Minting Rights and Local Currency International Status	International Minting Rights
	Local Currency International Status
International Organizations and Inter-Country Support	International Monetary Fund (IMF) and World Bank (WB) Support
	Other Support

If the rated entity can still obtain stable external support when facing a liquidity crisis and having difficulty fulfilling debt commitments, it will help stabilize the expectations of relevant parties, thereby reducing the likelihood of the rated entity experiencing an actual liquidity crisis. At the same time, specific rescue measures taken by external supporters when the rated entity

encounters a liquidity crisis will help increase the likelihood of debt repayment at maturity or reduce the default loss rate.

ARHK mainly considers the external support received by sovereign countries from two aspects, including International Minting Rights and Local Currency International Status, and International Organizations and Inter-Country Support.

(1) International Minting Rights and Local Currency International Status

For international minting rights, the main considerations are whether a sovereign country or institution has the power to issue and manage currency globally, its supporting role in economic, political, financial, and strategic aspects, and the strength of its influence on the global economy.

For local currency international status, the main considerations are the position of the sovereign country's local currency in the international monetary system, and its influence in enhancing international trade competitiveness, strengthening international financing capabilities, promoting stable economic growth, and maintaining financial stability and security.

The mapping of International Minting Rights and Local Currency International Status is as follows:

International Minting Rights and Local Currency International Status		International Minting Rights		
		3	2	1
Local Currency International Status	3	3/2	2/1	1/0
	2	2/1	1/0	0
	1	1/0	0	0

(2) International Organizations and Inter-Country Support

International organizations and inter-country support is primarily assessed based on two dimensions: support from the International Monetary Fund (IMF) and the World Bank (WB), and other support. By comprehensively evaluating these two dimensions, the level of international organizations and inter-country support received by the rated sovereign country is determined.

The support from the International Monetary Fund (IMF) and the World Bank (WB) mainly considers the strength of the support provided to the rated sovereign country by the IMF's Special Drawing Rights (SDR), long-term loans from the World Bank (WB), and the World Bank's (WB) technical support and capacity building (such as supplementing international reserve assets, balancing international payments, promoting international trade and investment,

buffering external economic shocks, maintaining financial market stability, enhancing the IMF's lending capacity, long-term loan amounts, technical support, and capacity building, etc.).

Other support mainly includes diplomatic support and economic aid, support from other international organizations and non-governmental organizations (NGOs), and the support of multinational corporations and foreign direct investment (FDI) to the rated sovereign country's funds and resources (through loans, grants, technical assistance, poverty reduction, education, and health aid, etc.).

The mapping of International Organizations and Inter-Country Support is as follows:

International Organizations and Inter-Country Support		International Monetary Fund (IMF) and World Bank (WB) Support		
		3	2	1
Other Support	3	3/2	2/1	1/0
	2	2/1	1/0	0
	1	1/0	0	0

7. Final Credit Rating

ARHK comprehensively considers external support to obtain the credit rating of the rated entity (Model Result Grade).

The credit rating derived from this methodology and model serves as a reference credit rating for the rated entity and is only used as a reference for analysts to recommend credit ratings and for the credit rating committee to determine credit ratings. The final credit rating is determined by the credit rating committee, and there may be differences between the final credit rating and the model rating.

VI. Limitations of This Methodology and Model

1.ARHK's judgment of various rating elements for sovereign countries or jurisdictions is based on their historical situations. However, the impact of relevant elements and their future development on repayment ability may vary due to changes in the external environment. Therefore, this methodology and model cannot guarantee accurate prediction of the actual future default risk of sovereign countries or jurisdictions.

2.This methodology and model only list the key rating elements that need to be examined when rating sovereign countries or jurisdictions. It does not cover all the elements that need to be considered when evaluating the credit risk of sovereign countries or jurisdictions, such as non-systematic risks and major unexpected events in sovereign countries or jurisdictions in the future.

3.There are human factors in the selection of indicators in this methodology and model. The weight of elements in the rating model represents the relative importance of rating elements based on human assessment. The rating model includes critical qualitative assessment factors, which may lead to this methodology and model's inability to fully and accurately reflect credit risk. At the same time, each member of the credit rating committee may consider more factors beyond the scope of this methodology and model when making their judgment conclusions. Therefore, the final credit rating always carries a subjective influence. ARHK will periodically or occasionally review this methodology and model and revise it as appropriate.

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