Lianhe Ratings' Sovereign Credit Rating Methodology (2017 Revised)

MAY 2017

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(This report is the English version of Lianhe Ratings' '联合资信主权信用评级方法（2017 年修订）'. In case of any discrepancy between Chinese and English versions, the original version in Chinese shall prevail.)

I. Fundamentals of Sovereign Credit Rating

China Lianhe Credit Rating Co., Ltd. (hereinafter referred to as 'Lianhe Ratings') believes that sovereign credit rating refers to the evaluation of sovereign government's (in a country or region) credit quality, rather than a ranking of comprehensive national strengths. On the perspective of credit rating, sovereign credit rating reflects Lianhe Ratings' evaluation opinion on a sovereign government's ability and willingness to service its financial obligations in full and on time, to nonofficial (commercial) creditors, which is also a prospective assessment of sovereign's probability of default.

For local currency or foreign currency bonds or notes issued by a sovereign government, if the issuer failed to repay its debt on maturity date, or undertake a debt restructuring, or any other action that damages the interests of creditors, such acts are identified as credit default. Failure to serve obligations to governments, official creditors, supranational organizations (such as the International Monetary Fund or the World Bank) or other public sectors, or failure to serve guarantee obligations, shall not be identified as credit default. However, failure to serve these obligations would be considered as signals of political or fiscal crisis, as well as signals of lacking of ability and willingness to service its other obligations, all of which need to be taken into consideration during sovereign rating.

Sovereign credit rating includes local currency and foreign currency credit ratings (both short-term and long-term), which are assessments on the sovereign government's short-term and long-term debt repayment ability and its willingness to service debts, and the rating results are illustrated with designated and concise rating symbols. Generally, vast majority of income generated by the sovereign countries are in the form of their local currencies, and their domestic capital financing capacity are usually strong;However, the funds used to repay foreign debt could only be purchased or borrowed from the foreign exchange market. Therefore, the ability to repay foreign debt depends on the foreign currency earning capacity of domestic enterprises, the willingness of market participants to exchange foreign currency and the ability of the government to levy or allocate foreign currency reserves. If the sovereign government is unable to repay the debt in full, it will prioritize the repayment of local currency debt in order to maintain the stability of the country. Therefore, generally speaking, a sovereign country's local currency credit rating is no lowerthan foreign currency credit rating.

II. Sovereign Rating Categories and Rating Definitions

Lianhe Ratings' long-term local currency or foreign currency sovereign rating is classified into 3 grades and 10 categories, which are AAA_i, AA_i, A_i, BBB_i, BB_i, B_i, CCC_i, CC_i, C_i and D_i. The ratings from 'AA_i' to 'CCC_i' may be modified by the addition of a plus (+) or minus (-) sign to show relative standing within the major rating categories.

Table 1 Lianhe Ratings' sovereign rating symbols and definitions

Grades	Categories	Definitions
Investment Grade	AAA_i	The lowest expectation of credit risk. The obligor's capacity to meet its financial commitment on the obligation is extremely strong. This capacity is highly unlikely to be adversely affected by foreseeable events.
	AA_i	Expectations of very low credit risk. The obligor's capacity to meet its financial commitment on the obligation is very strong. This capacity is not significantly vulnerable to foreseeable events.

	A_i	Expectations of low credit risk. The obligor's capacity to meet its financial commitment on the obligation is considered strong. This capacity may, nevertheless, be more vulnerable to adverse business or economic conditions.
	BBB_i	Expectations of credit risk are currently low. The obligor's capacity to meet its financial commitment on the obligation is considered adequate but adverse business or economic conditions are more likely to impair this capacity.
Speculative Grade	BB_i	An elevated vulnerability to credit risk, particularly in the event of adverse changes in business or economic conditions over time; however, business or financial flexibility exists which supports the servicing of financial commitments.
	B_i	Material credit risk is present, but a limited margin of safety remains. Financial commitments are currently being met; however, capacity for continued payment is vulnerable to deterioration in the business and economic environment.
	CCC_i	Expectations of credit risk are high. The obligor's capacity to meet its financial commitment on the obligation is limited. Default is a real possibility, with increasing indication occurring credit risk.
	CC_i	Expectations of credit risk are very high. Default of some kind appears probable.
	C_i	Expectations of credit risk are extremely high. Default is imminent or inevitable, or the issuer is in standstill.
Default Grade	D_i	Has experienced an uncured payment default on a bond, loan or other material financial obligation, or entered into bankruptcy filings

III. Sovereign Credit Rating Methodology

Through qualitative and quantitative analysis, Lianhe Ratings' sovereign rating mainly evaluate five aspects of a sovereign (a country or region), which are country governance, macroeconomic policies and performance, structural features, public financing strengths, and external financing strengths.

1. Country governance

Evaluation of country governance factors in country profile, political system, national security, and governance capacity.

(1) Country profile

Country profile includes four aspects: fundamentals, natural condition, historical performance, and international influence. Benefits of natural resources to the country's economic development, frequency of natural disasters and their impacts on government finance are evaluated when assessing natural condition. Richness in natural resources would be beneficial to country's economic development, while natural resources shortage is unfavorable to the economic development and results in high dependence on importing of natural resources. As the frequency of natural disasters is associated with geographic environment of the country, its economic development and government finance would be adversely affected if it suffers natural disasters like earthquake, typhoon, or tsunami more frequently. Historical performance is a summary of a country's past political and economic performances, as well as its international influence and sovereign default history (if any). Historical performances may reflect future trends, and we believe that a long-term prosperous and stable economy would be of better credit quality than economies where economic or political crisis frequently occurs. A sovereign with international influence may have more sources of finance, and may be more likely to be assisted by international financial organizations when suffering a crisis. Furthermore, sovereigns with default records are usually of lower credit quality.

(2) Political system

Political system is an important factor to evaluate the legality and stability of regime. An appropriate and effective political system of a sovereign would be the determinant of better governance. Legality of regime refers to an elected and accredited government, while stability refers to governing party would constantly implement and achieve its administrative targets, and complete its administration on schedule without improper struggles inside the party or among parties.

(3) National security

War, terrorism and ethnic tension are more related to national security and social stability. Generally, a country at war or threatened by war may have increasing military expenses, as well as heightening government fiscal pressure, which have negative impact on the stability of economic development. Moreover, terrorism and ethnic tension may also undermine social stability and economic development.

(4) Governance capacity

Sovereign's governance capacity includes political stability, government's governance capacity and maturity of institutional system. A stable and efficient government usually has better governance capacity with stronger ability and willingness to serve its debts, and is less vulnerable to instability factors by resisting negative shocks. Governance can be evaluated via World Bank Governance Indicators, including political stability, government effectiveness, rule of law, control of corruption, voice and accountability, and regulatory quality.

Political stability

Political stability refers to assessment of the likelihood of political instability and/or politically-motivated violence, including terrorism. Risks caused by political instability include weaken ruling ability, incapacity to serve debts through domestic financing, etc., which have negative impact on sovereign's credit profile. A stable political environment or a stable ruling body is the determinant of a country or region's economic or social stability, policy implementation, and payment of debts.

Government's governance capacity

Government effectiveness is the most important indicator to assessing governance capacity, which reflects the quality of public or civil services, the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. An efficient government performs well in providing public services, implementing policies, and managing public finances, which is beneficial to stability of society and economic development. Regulatory quality reflects the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Control of corruption reflects the extent to which public power is exercised for private gains, including both petty and grand forms of corruption, as well as "capture" of the state by elites and for private interests. Governments that are of high transparency with perfect accountability system usually perform well in controlling of corruption; however, serious corruption problems may undermine local economic development and government finance, and even result in political instability.

Maturity of institutional system

A mature legal system plays a significant role in protecting the legal rights of individuals and maintaining social order. Rule of law reflects the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Voice and accountability reflects the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Voice is the basic rights of citizens to express opinions or ideas, but high centralized country or region is more likely to produce bureaucracy privilege to affect social justice, and more likely to discontent citizens to affect the stability of ruling body.

Table 2 Country governance quantitative indicators

Sub-factors	Indicators	Descriptions
Political stability	Political stability	Worldwide Governance Indicators published by the World Bank.
Government's governance capacity	Government effectiveness	
	Control of corruption	
	Regulatory quality	
Maturity of	Rule of law	

institutional system	Voice and accountability	

2. Macroeconomic policies and performance

To assess a sovereign government's ability to ensure a health and stable economic development, we mainly analyze the appropriateness of macroeconomic policy. We evaluate the economy's level of development through the assessments a sovereign's medium- and long-term economic performances, including four aspects: economic performance, economic sentiment, inflation level, and employment.

(1) **Macroeconomic policies**

The appropriateness and sustainability of economic policies is an essential factor in ensuring stable and sustainable economic development. Macroeconomic policies include fiscal policy, monetary policy, and exchange rate policy. It is believed that the coordination of fiscal and monetary policies, aiming to achieve production maximization and minimization of inflation, would be the most appropriate macroeconomic policy framework to ensure stable economic growth. Sovereigns with long period of sound macroeconomic policies are likely, other things being equal, to enjoy stable and higher non-inflationary growth, leading to higher income levels and greater resilience to shocks.

(2) **Economic performance**

Large economies that sustained a long period of sound economic growth generally have greater resilience to shocks, lower volatility in public finance and higher growth rate in household income and wealth. Such economies often have higher credit ratings. For economies with high growth volatility, its banking industry development, their public finance revenue and expenditure are relatively unstable. Such economies have lower resilience to shocks and may lead to a suspension of foreign debt repayment. Quantitative indicators of economic performance include Gross Domestic Product (GDP), economic growth rate and economic volatility.

(3) **Economic sentiment**

The change in economic sentiment index reflects the economic cycle of relevant economic activities and overall growth or decline of industries. It is a dynamic indicator to illustrate the current macroeconomic condition. It is usually measured by the comprehensive purchasing managers' index of manufacturing and service industries.

(4) **Inflation level**

Price stability is an important condition for a stable economic growth and prosperity**.** Sovereigns that have benefited from a track record of low inflation and stable economic growth will tend to be rated higher than those that have experienced chronic inflation and severe economic cycles. The deterioration in inflation level is usually an indicator of political and economic instability, as high inflation may seriously undermine market confidence in the local currency and cause its real value to decline, even leading to substantial capital outflow or international payments crisis. Deflation also has a negative impact on the economy. The decline in prices may led to a drop in product prices and corporate profits, as well as a negative impact on corporate production and investment. It will also limit the growth of social demand, which led to an increase in government debt burdens. The volatility of inflation is due to the uncertainty of monetary policy. It reflects that the monetary authority (central bank) unable to fully control the inflation level, which may negatively affect the long-term stable economic development.

(5) **Employment**

Unemployment rate is a quantitative indicator to measure the degree of unemployment of a sovereign as well as its economic development status. Long-term unemployment rate and unemployment rate of younger generation are important indicators in analyzing labor market. For long-term credit rating, structural unemployment is also taken into account, as sovereigns with high unemployment rate over a long period may have structural problems that would increase government fiscal pressure. Higher unemployment rate of younger generation might be a sign of sluggish economic growth or economic recession.

Table 3 Macroeconomic performances quantitative indicators

Sub-factors	Indicators	Descriptions
Economic performance	GDP Volume	To measure the scale of economy
	Economic Growth Rate	Real GDP growth rate
	Economic Volatility	Standard deviation of real GDP growth rate
Economic sentiment	Service sentiment	Purchasing Managers Index of service sector
	Manufacture sentiment	Purchasing Managers Index of manufacture sector
Inflation level	Consumer Price Index	CPI growth rate (annual)
	Price Index Volatility	Standard deviation of CPI growth rate (annual)
Employment	Unemployment Rate	Total unemployment rate, long-term unemployment rate and youth unemployment rate

3. Structural Features

Structural features of the economy, including economic structure, industrial structure, demographic structure, economic and financial openness, effectiveness of banking system, etc., are important factors to estimate the economic growth potential and identify certain risks in the economy, primarily utilizing quantitative analysis. Economies with more stable and flexible performances in responding to shocks are generally those with relatively optimal and rational economic and industrial structures, effective and sound financial system, openness to international investment flows and trade, attractive business environment, and flexible labor market. This kind of sovereign would be rated higher than those with relatively inflexible structural features and incapable in responding and resisting to shocks.

(1) Economic structure

In terms of economic structure, consumption driven is an important indicator for a mature economy. This type of economy usually grows more stable than investment or trade-driven economies, and are more resilient to external risks.

This is because consumption can support and stabilize the investment cycle, guide the efficiency of resource allocation and prevent economic fluctuations. In terms of industrial structure, compared with other industries, tertiary sector driven economy is more stable and is less affected by the external environment. To certain extend, it represents the level of the economic development, as the tertiary sector has better advantage in absorbing labor force, activating consumption and stimulating domestic demand.

(2) Level of national development

The level of national development is primarily indicated by the nation's GDP per capita, the degree of social development and business environment. High GDP per capita is an indication of a highly developed nation, because it implies that the labor force is engaged in high-value-added activities and hence the economy is less vulnerable and better able to absorb adverse shocks. Nation with high degree of development also indicated by high social development. The human development index in the Human Development Report published by the United Nations Development Program (UNDP) published the life expectancy, educational level and quality of life of the countries' population. It is a measure of social development. Economies with better business environment are usually more competitive in the world, especially in attracting foreign investments and providing opportunities for local businesses.

(3) Stability in banking sector

Stable and efficient financial and banking system could not only distribute social savings effectively to improve economic efficiency, but also provide funding support to government to resist risks to some extent. This also means governments and central banks are highly likely to intervene to prevent a systemic banking failure. This intervention can be through supervision and regulation, but can also take the form of financial support, including socialization of bank liabilities to ensure the solvency of the banking system. Thus, in most cases risks in banking sector may impute to sovereign, thereby to affect sovereign credit quality.

(4) Degree of external dependency

For an economy, a higher degree of dependence on foreign trade and foreign investment reflects a higher degree of openness to the outside world. It is conducive to technological progress and international competitiveness, but it also makes the economy vulnerable to external environment changes, thus leading to possible economic difficulties.

(5) Demographic structure

Population aging would aggravate government fiscal pressure, therefore high level of government debt is a common feature of aging countries and those debts are unlikely to be cut. Moreover, as the percentage of laboring population reduces, these economies also face more growth pressure.

(6) Other factors

Different sovereign structures have different characteristics. There may be specific risks to each sovereign, which should be specifically addressed.

Table 4 Structural features quantitative indicators

Sub-factors	Indicators	Descriptions
Economic structure	Economic structure	Contributions of final consumption expenditure to GDP
	Industrial structure	Proportions of tertiary industries in GDP
Level of National Development	GDP per capita	A measure of economic development
	Human Development Index	A measure of economic and social development
	Ease of Doing Business Index	A measure of business environment, comparable to rating peers
Degree of external dependency	Total trade volume/GDP	A measure of economy's dependency on international trade
	Foreign direct investment/GDP	A measure of economy's dependency on foreign direct investment
Stability in banking sector	Gross national saving Rate	Ratio of national savings to GDP, a measure of national or regional saving level
	Capital adequacy ratio of banks	A measure of banks' capital position
	Non-performing loan ratio of banks	A measure of banks' asset quality
	Return on equity of banks	A measure of banks' profit performance
Demographic structure	Proportion of aging population	Aging population (population ages 65 and above) in total population

4. Public Financing Strengths

As one of the most significant parts in sovereign local currency credit rating, analysis of public finances includes appropriateness of fiscal policy, fiscal balance position, government debt burden and debt structure, government's ability to pay debts and refinancing capacity.

(1) Fiscal policy

Effective fiscal policy could benefit government revenue growth by creating a good environment for economic growth. Under an active fiscal policy, when government investment and public spending increases, or tax rate reduces, the average household income will increase, therefore creating macroeconomic expansion effect. However, it will also create fiscal deficit, resulting in the increase of government debt. Financial retrenchment will have a macroeconomic austerity effect. The effectiveness and appropriateness of the fiscal policy is primarily depending on the orientation of fiscal policy and whether it meets the current economic situation and development needs. At the same time, analyses of impacts of the future government budget deficit and changes in government debt on its debt repayment ability shall be evaluated based on current fiscal policy direction.

(2) Fiscal balance position

Government fiscal balance position is the most direct indication of a government's financial strength. Major indicators include the size of fiscal revenue, the pace of revenue growth, the structures of government revenue and expenditure, and the surplus or deficit of fiscal position.

Large size of the government's fiscal revenue reflects strong government financial strength, measured by fiscal revenue/GDP. However, the ratio is not always better when it is high. If the ratio is too high or the size of fiscal revenue is too close to the size of GDP, the fiscal revenue is not sustainable and the future growth potential is limited.

The stable and consistent growth of fiscal revenue indicates a healthy growth of government's financial situation and the healthy development of the economy. It helps to reduce the fiscal deficit or increase the fiscal surplus, enhance government solvency. As tax income serves as a main composition of government revenue, wider tax base and lower tax rate could improve the elasticity of government revenue. On the other hand, narrow tax base usually results in more volatile government revenue.

Fiscal expenditure includes recurrent expenditure and non-recurring expenditure. Government recurrent expenditure items include expenditures in public services, infrastructure, medical service and education, which all have positive effects to support economic development but these expenditures are rigid expenditures. The larger the government's recurrent expenditure, the greater the burden of fiscal fixed costs, the smaller the financial expenditure flexibility and the ability to repay debt. In addition, effectiveness of these expenditures are also taken into account, because effective recurrent expenditure contributes to satisfying public service demand, providing infrastructure and education to support economic growth.

Governments with higher levels of long-term fiscal deficits face greater financial expenditure pressures and debt burden. When the government trying to reduce the deficit by reduce spending, it will have a negative impact on the economic development.

(3) Debt burden

The core indicator to measure sovereign indebtedness are the ratio of gross general government debt to GDP. Although high level and increasing trend of general government debt would negatively affect sovereign's solvency, the extent of negative impact would depend on sovereign's degree of economic development. Thus, credit rating and level of government debt is generally uncorrelated. However, when other things are equal, smaller debt/GDP ratio indicates lighter debt burden and lower sovereign credit risk. General government net debt to GDP is also an important indicator to measure sovereign indebtedness. Generally, lower ratio of government net debt to GDP ratio indicates lower level of debt burden. The negative net government debt to GDP means the financial assets held by the government is higher than its debt, which indicates strong local-currency debt paying ability.

(4) Debt Structure

Effective public debt management is also an important factor to assess debt risks. Generally, a weak debt structure can render public finances vulnerable to liquidity, interest rate or exchange rate risks. A reasonable structure of public debt refers to that the majority of debts are in local currency, fixed interest rate and long maturity. When other things are equal, credit rating of sovereigns with low financing costs and stable level of debt is higher than those with high financing costs and fluctuated debt trend. Stability of debt can be evaluated through sensitivity test of fluctuations in economic growth rate, exchange rate and interest rate. In these scenarios, lower debt fluctuation indicates higher debt stability. Further, when other things are equal, sovereigns are of lower debt risk when percentage of native debt holders' debts to total debts are higher.

(5) Debt affordability

Government revenue is the primary source of local debt repayment; therefore, the government's ability to generate revenue directly reflects its ability to repay debt. Lianhe Ratings uses the ratio of total government revenue against total government debt to measure the sovereign's debt repayment capacity. Higher ratio represents better ability to service government debt. Interest payment pressure, especially long-term interest payment pressure, would aggravate the government's fiscal pressure and reduce the elasticity fiscal expenditure. Thus, high level of interest payment would negatively affect the sustainability of public finances by limiting other government spending, thus undermining long-term economic stability and development.

(6) Government refinancing capacity

When the government's revenue growth potential is limited, we should evaluate the government's refinancing ability. Generally, government's sources of refinancing are mainly from domestic savings and external financing. Therefore, higher household and private-sector leverages are negative rating factors, which limits the feasibility of domestic refinancing, while strong external financing ability would be rating positive. Furthermore, countries with high domestic saving rates are, other things are equal, able to sustain higher fiscal imbalances and debt load than low-saving economies, where government borrowing can quickly absorb domestic savings, forcing the sovereign and the private sector to borrow externally.

Table 5 Public financing strengths quantitative indicators

Sub-factors	Indicators	Descriptions
Fiscal balance position	General government revenue/ GDP	A measure of fiscal revenue level
	Growth rate of general government revenue	A measure of fiscal revenue growth
	General government balance/ GDP	A measure of sovereign government's fiscal balance.
Debt burden	General government gross debt / GDP	A measure of public debt level
	General government net debt/ GDP	A measure of net public debt level
Debt affordability	General government revenue/ General government gross debt	A measure of coverage for public debt by fiscal revenue

(5) External Financing Strengths

As one of the most significant part in sovereign foreign currency credit rating, analysis of external finances includes international balance of payments, level of external debt, structure of external debt, external debt repayment ability, and exchange rate risk. Sovereigns that perform well in these factors usually have higher credit ratings.

(1) International balance of payments

Sovereign's external debt repayment is guaranteed by its ability to generate foreign exchange. As international trade serves as an important way to generate foreign exchange, foreign trade volume of a sovereign can reflect its external financing strength. Level of current account receipts (CAR) can reflect a sovereign's ability to generate foreign exchange. Sustainable growth of CAR illustrates that the sovereign has sustainable and stable ability to generate foreign exchange. Current account balance (CAB) to GDP can measure the possibility of foreign reserve accumulation. Current account deficit would result in increasing external debts or reducing external assets, therefore high level of current account deficit during a long period indicates the sovereign's poor ability to generate foreign exchange.

(2) External debt burden

The core indicators to measure sovereign external debt level are ratios of gross and net external debt to GDP. External debts are the total amount of external debts from general government, the central bank, banking sector and other sectors.

For sovereigns with internationalized currency or global financial centers (country or region), their banks may have a large amount of foreign deposits, and their enterprises also have strong external financing capacity, therefore external debts of general government and central bank are more important when assessing the external debt level of such sovereigns. To analyzing sovereigns with non-internationalized currency or weak external financing capacity in private sectors, assessment of banking sector or other private sectors' external debt is more important.

(3) External Debt Structure

Analysis of external debt structure includes debt holder structure, currency structure, maturity structure, interest rate structure, etc. Generally, well-distributed debt holders indicate lower payment risk of external debts; the higher level of foreign currency debts indicates more exchange and exchange rate risks sovereigns may face.

(4) External debt affordability

Adequate foreign reserves can improve a sovereign's international solvency, which could also improve its ability in dealing with emergency events and avoiding financial risks, especially for sovereigns with non-internationalized currency. For those sovereigns with open foreign exchange market and free floating exchange rate regimes, especially for sovereigns with internationalized currency, less foreign reserves are required than those with non-internationalized currency. Thus, these factors should be considered in evaluating a sovereign' coverage for external debts by foreign reserves.

Foreign assets and external net assets are indicators that reflect the adequacy of countries' foreign investment. Large foreign assets and positive net assets enhance and protect sovereigns' external debt repayment capacity.

(5) Exchange rate risk

Fluctuation in exchange rate affects a sovereign's external debt repayment ability. Devaluation of currency will weak the country's external solvency. And fluctuation in exchange rate will not only affect the country or region's trade volumes, price level, or international capital flow, but also result in volatility of foreign reserves.

Table 6 External financing strengths quantitative indicators

Sub-factors	Indicators	Descriptions
International balance of payments	Growth rate of current account revenue	A measure of changes in current account revenue
	Current account balance/ GDP	A measure of balance of payment position of current account
External debt burden	Gross external debt/GDP	A measure of gross external debt level
	Gross government external debt/ Total external debt	A measure of external debt structure
	Net external debt/GDP	A measure of net external debt level
External debt affordability	Foreign assets/gross external Debt	A measure of coverage for external debt by foreign assets
	Current account revenue/ Gross external debt	A measure of coverage for external debt by current account revenue
	International reserves/Gross external debt	A measure of coverage for external debt by international reserves

Exchange rate risk	Change in real exchange rate	A measure of changes in exchange rate and its impact on sovereign's external debt affordability
	Exchange rate volatility	A measure of stability of exchange rate