

Formation and Management Countermeasures of Local Government Debt: Theoretical and Empirical Analysis of Regional Economic Differences, Big Data Mining and AI Application

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Abstract

The purpose of this paper is to explore the local debt problem in the context of regional economic differences, and to analyze the formation mechanism of local debt in depth. The article carries out large-scale data analysis of economic indicators in different regions through the random forest algorithm, verifying the nonlinear relationship between local debt and regional economic differences, as well as the heterogeneity of the evolution path of local debt. At the same time, a dynamic debt risk assessment model based on Bayesian network is constructed using big data mining technology to quantitatively assess the risk level and development trend of local debt, with a view to providing decision support for local government debt management.

Keywords

Local debt; Regional economy; Random forest; Risk assessment; Bayesian network.

1. INTRODUCTION

In the current context of economic globalization and regional integration, the problem of local debt has become a key factor affecting regional economic development. With the profound change of China's economic structure, the complexity of local debt is increasing day by day. Its formation mechanism is no longer single, risk assessment faces many challenges, and the management mode is in urgent need of innovation and improvement. The problem of local debt is not only a purely economic phenomenon, but also a major issue concerning social stability, people's well-being and the sustainable development of the country.

In view of this, in-depth study of regional economic differences in the context of the local debt problem is of great practical significance. On the one hand, there are significant differences in the level of economic development, industrial structure, and policy environment of different regions, which will inevitably have a profound impact on the formation and evolution of local debt. On the other hand, accurately grasping the relationship between local debt and regional economic differences is crucial for formulating scientific and reasonable debt management strategies and promoting coordinated regional economic development.

This paper focuses on this key issue and deeply analyzes the formation mechanism of local debt. By using the random forest algorithm to analyze the large-scale data of economic indicators of different regions, we aim to verify the non-linear relationship between local debt and regional economic differences and the heterogeneity of the evolution path of local debt. At

the same time, with the help of big data mining technology, a dynamic debt risk assessment model based on Bayesian network is constructed to quantitatively assess the risk level and development trend of local debt, provide solid decision-making support for local government debt management, and contribute wisdom and strength to solve the local debt problem and promote the sustainable and healthy development of regional economy.

2. LITERATURE REVIEW

Local government debt, as a part of fiscal policy, is one of the most direct and effective policy tools for the government to implement macro-control and drive investment in the whole society, and is also an important means for regions to realize the strategic goals of economic and social development (Chen Jing, 2024) [1]. Therefore, previous studies have mainly focused on the debt itself as well as the risk, and more attention has been paid to the impact of local government debt on the economy of the region and its neighboring areas, while less research has been done on the impact of regional economic differences on the scale of local debt and government debt risk. In recent years, in order to promote economic recovery to stabilize economic growth, coupled with the arrival of the peak of local debt maturity, and the implementation of the debt package, the scale of local debt continues to expand rapidly (Lin Hongsheng and Lin Zhiyun, 2024) [2]. The expansion of local government debt scale has also increased the debt risk. Tracing the formation process of China's local debt risk, the local debt problem is the result of the combination of multiple reasons such as the soft budget constraint mechanism, the government competition mechanism, the political promotion system, and the stimulation of fiscal policy (Chen Zhiyong and Zhuang Jiaqiang, 2017) [3]. Although the current explicit debt risk of local governments in China is basically controllable, the type of implicit debt is more diversified and the potential risk is higher (Liu Qigui, Cheng Zhang, 2023) [4], and the top priority of resolving debt risk is to resolve implicit debt (Chen Baodong, Pan Qiao, 2023) [5]. The regional characteristics of local government debt risk are mainly manifested in large debt scale and fast growth rate (Xu Diwei, 2022) [6]; low efficiency of capital use, concentrated debt service period (Chen Jingyu, 2023) [7]; a wide variety of hidden debts, strong concealment, high risk concentration, and obvious regional differences (Ji Fuxing, 2018; Zheng Jie and Zan Zhitao, 2019) [8], [9]; as well as serious reliance on land finance (Zhang Li, et al. 2018) [10], while the unsustainability of land finance has led to the accumulation of local debt risks (Liu Shouying et al., 2022) [11] and so on.

The regional characteristics of local government debt risk are mainly characterized by large debt scale, fast growth rate, inefficient use of funds, concentrated debt repayment period and reliance on land finance. Differences in the level of economic development, financial situation and debt management capacity of different regions have led to regional imbalances in local government debt risk (Ouyang Shengyin, Wei Zhihong, Cai Meiling) [12]. With some economically backward regions having smaller debt sizes but, on the contrary, higher debt risks. Under the imperfect decentralization system, the downward shift of intergovernmental expenditure responsibility and the lack of corresponding financial security lead to passive indebtedness of local governments (Ji Yunyang, Fu Wenlin, Shu Lei, 2019) [13], at the same time, the fiscal gap of local governments in China can not only be financed through debt, but also be compensated by transfers from the higher level of government, which can stimulate the local government expenditure under certain conditions (Liu Hao and Chen Gong, 2019) [14]. As can be seen from the evolution of China's local government debt policy, the problem of local debt risk prevention has a long history (Wang D. H., 2024) [15]. The Decision of the CPC Central Committee on Several Major Issues on Comprehensively Deepening Reform adopted by the Third Plenary Session of the 18th CPC Central Committee puts forward that one of the objectives of fiscal reform is to establish a standardized and reasonable central and local government debt management and risk early warning mechanism [16] preventing and resolving the risk of local

debt has become one of the important tasks of comprehensively deepening reform. In order to prevent and resolve local government debt risks, scholars have also put forward many suggestions, and most scholars start from the perspective of fiscal institutional arrangements, such as promoting the reform of the modern fiscal system (Zheng Jie and Zan Zhitao, 2019) [17], reinforcing the budgetary constraint framework that matches the rights and responsibilities of local governments (Li Wei et al., 2019) [18], enhancing fiscal transparency (Deng Shulian and Liu Troublesome, 2019) [19], and perfecting the debt information disclosure mechanism (Xiao Peng and Fan Rong, 2019) [20], focusing on the coordinated operation of fiscal and financial policies, etc. (Zhao Quanhong and Zhao Zeming, 2021) [21], and establishing an institutional system for risk sharing and resolution (Xu Yude and Li Huarong, 2022) [22], Streamlining the central-local fiscal relationship, strengthening local fiscal discipline, and adopting differentiated debt financing mechanisms for different regional realities (Yin Jianfeng, Wang Jiangjiang, Mai Lisi, 2020) [23], etc.

Internationally, the experience of local government debt risk management shows that transparency, market discipline and legal framework are key factors. By comparing the debt management strategies of different countries, it can provide a reference for the regulation of local government debt risk in China. Goedecke (2018) [24] has conducted a specific study on Mexican banks, according to the results of the study effectively confirms that there is a spillover effect of the government's credit risk, and the threat to the debt is mainly the default behavior. Jeoll (2018) mainly explored the impact of income inequality on government borrowing and defaults, and used indicators such as the Gini coefficient, bond levels, and GDP data to analyze the impact of the combination of income inequality, inequality, and conflicts that occur in the local economy on the incidence of defaults on local government debt risk.

In summary, regional economic development imbalance has a complex impact on local debt risk. In order to effectively manage and control debt risk, diversified regulatory measures need to be taken, taking into account the level of regional economic development, financial situation and debt structure. At the same time, the transparency of local government debt should be strengthened and the efficiency of the use of debt funds should be improved in order to promote balanced regional economic development. Currently in the era of digital economy, the integration of digital technology, digital information into the local debt management system will help to change the debt risk monitoring from an after reaction to a pre-warning, and realize the timely prevention and effective dissolution of risks.

3. ANALYSIS OF REGIONAL HETEROGENEITY OF LOCAL GOVERNMENT DEBT IN CHINA

As the scale of local government debt continues to expand, the problem of local government debt risk in China has become increasingly prominent. The growth rate of local government revenue has been decreasing in recent years, and nearly two-thirds of the country's provinces rely on government debt for more than half of their fiscal expenditures, increasing the risk of local government debt default. According to data released by the National Bureau of Statistics, only 13 provinces and municipalities, including Beijing and Shanghai, have government revenue/expenditure above 0.5 percent, while 19 provinces and municipalities have government revenue/expenditure less than 0.5 percent.

Along with the climbing scale of fiscal expenditure, the gap between fiscal revenue and expenditure has shown an expanding trend, and according to the estimation of the China Academy of Fiscal Sciences, the gap between the scale of China's fiscal revenue and expenditure will reach 10.7 trillion yuan in 2025 (Liu Shangxi, 2021) [25]. As of the end of 2023, the balance of legal debt of local governments in China was 40.74 trillion yuan, of which the balance of general debt was 15.87 trillion yuan and the balance of special debt was 24.87 trillion yuan (Lan

Foan, 2024) [26]. Local government bonds have become the largest bond species in China's bond market, and are expected to exceed 45 trillion yuan by the end of 2024, accounting for a share of GDP or more than 30% (Mao Zhenhua, Sun Xiaoxia, Yan Yan, 2024) [27].

3.1. Historical evolution of local government debt in China

From the perspective of the development stage of China's local debt, from the early stage of reform and opening up to the 1990s, due to legal restrictions, local governments could not issue bonds, so the scale of the debt was small and the risk was low. 1994 after the reform of the tax system, the local government's fiscal revenue was restricted, and the increase in fiscal expenditure led to the widening of the gap between fiscal revenues and expenditures, and thus the local government began to raise debts in disguise through the establishment of financing platforms. Various types of local government financing platforms have shown rapid expansion as government financing tools (Ba Shusong, 2009) [28], Sharply growing local debt has raised the potential vulnerability of China's economic development while promoting rapid economic growth (MF, 2014) [29]. The scale of the debt continued to increase. In the period before the implementation of the new budget law in 2014, local financing platforms developed rapidly, the scale of debt increased significantly, and debt risks began to emerge. Since then, local government debt management has been gradually standardized, but there are still regional imbalances.

3.2. Empirical analysis of regional differences in local government debt in China

China's regional development is not balanced, and there are large differences in the level of economic development, financial situation, infrastructure, population growth, etc., thus the level of local government debt also shows regional imbalance characteristics. Higher debt per capita mainly includes eastern provinces such as Beijing, Shanghai, Tianjin, Jiangsu, Zhejiang, Guangdong, Shandong, Hainan, and Hebei, while central and western provinces such as Shaanxi, Shanxi, and Inner Mongolia, as well as northeastern provinces such as Heilongjiang, have relatively lower debt per capita levels.

Therefore, based on the regional perspective, this section constructs a random forest model to systematically examine the spatial characteristics and correlation mechanisms of China's regional economic disparities and local government debt risk using statistical data from 30 Chinese provinces and cities from 2011 to 2022.

3.2.1 Methodology

The random forest model is able to deal with multivariate nonlinear relationships and provide an assessment of the importance of characteristics, which helps us understand the complex relationship between local debt and regional economic differences.

3.2.2 Data collection and processing: describing data sources, data pre-processing and variable selection

According to the connotation of the setting of the random forest algorithm, the input data set is the relevant economic characteristic indicators of each region, and the output data set is the local debt burden ratio indicator (the ratio of the debt balance to the GDP), which is an important indicator of fiscal sustainability (Zhang Li and Wang Dehua, 2022) [30]. The specific indicators are shown in Table 1.

Table 1. Variables and descriptions of the model

	Variable	Variable Description
Output	Local debt burden ratio	Local debt balance per capita*/GDP per capita
Input	GDP per capita	Can reflect the economic level and development of the region.
	Local Fiscal Deficit	Local fiscal revenue - local fiscal expenditure, which can reflect the fiscal gap of local government.
	Degree of fiscal decentralization	Local fiscal expenditure per capita/national fiscal expenditure per capita, which can reflect the degree of fiscal freedom of local government.
	Infrastructure investment	The amount of fixed asset investment in the three major industries of transportation, storage and postal services, water conservancy, environment and public facilities management, and real estate. Since local debt is mainly used for infrastructure construction and public welfare projects, this indicator of the region's investment activity and development potential.
	Level of Economic Openness	Total foreign trade/GDP, which can reflect the active level of the region's foreign economy.
	Population Growth Rate	(current year-end resident population - previous year-end resident population)/previous year-end resident population, reflecting regional population growth pressure.

Note: * The current local government debt balance consists of three parts: first, the balance of local government bonds for the current year; second, the balance of local municipal bonds for the current year; and third, the revenue from the transfer of local government bonds for the current year. When dealing with provincial government debt, local and municipal bonds are summed up into provincial bond data according to the criteria for administrative regions and recorded as Provincial Bond 1. If the province has bonds for which the provincial government (including the Provincial State-owned Assets Supervision and Administration Commission, the Provincial Department of Finance, and the Provincial Department of Transportation, etc.) is the ultimate controlling party, these are also regarded as provincial bonds, and are recorded as Provincial Bond 2. In accordance with the above methodology, the balances of Provincial Bond 1 and Provincial Bond 2 are computed and summed as the current year's balance of the province's provincial government bonds, which is recorded as Provincial Bond 2. sum them up as the balance of government-issued debt and the balance of municipal bonds of the province for the year. On this basis, the provincial government debt balance for the year is calculated by adding the provincial government bond transfer revenue for the year.

The input indicators in the model can reflect the health and development potential of the regional economy from different perspectives, and at the same time reveal the formation mechanism and risks of local debt.

The above local government debt and related economic data are mainly derived from relevant information and data published in China Financial Yearbook, China Statistical Yearbook, China Fixed Asset Investment Statistical Yearbook, the website of the Ministry of Finance, China Bond Information Network, Hexun Bond Network, China Currency Network, and WIBS Statistics Network and Wind Database.

3.2.3 Data training and testing of random forest model

The above data are first pre-processed, including the treatment of missing values and outliers and the standardization of each data.

Then the dataset is divided into a training set and a test set with a ratio of 80% training set and 20% test set, in which the input data of 2011-2021 and the output data of 2012-2022 are selected as the training set, and the input data of 2021 and the output data of 2022 are used as the test set. Since the number of training datasets is relatively small, cross-validation is used to improve the level of information utilization.

Let $T(x)$ be the predicted value of the random forest model for the input sample x , which is given by the average of the predicted values of the B decision trees $T_b(x)$:

$$T(x) = \frac{1}{B} \sum_{b=1}^B T_b(x)$$

where $T_b(x)$ is the predicted value of the b th decision tree for the input sample x .

Each decision tree $T_b(x)$ is the first segmented constant function that divides the input space into regions and assigns a constant value to each region. For the b th decision tree, it can be expressed as:

$$T_b(x) = \sum_{k=1}^{K_b} c_{b,k} I(x \in R_{b,k})$$

In the equation, K_b is the number of regions (or leaf nodes) in the b th decision tree, $c_{b,k}$ is the average output value of the k th region in the b th decision tree, $R_{b,k}$ is the k th go also in the b th decision tree, and $I()$ is the indicator function, if x belongs to the region $R_{b,k}$, then $I(x \in R_{b,k}) = 1$, otherwise 0.

3.2.4 Analysis of results

Using the random forest algorithm to assess the extent to which regional economic characteristics influence local debt, the most critical factors can be identified. In the random forest model training, this paper at the same time selected lasso regression and decision tree model for reference, due to the use of cross-validation, each time to take 90% of the sample for training, 10% for testing, a total of ten times, you can get ten mse values for each model, the average of the ten mse values for each model can be obtained, lasso regression mse value is 0.1582, decision tree mse value is 0.1074, random forest model mse value is 0.0836. According to the training and testing results of random forest regression model, we get the importance of each feature in the following order: fiscal deficit, infrastructure investment, the degree of fiscal decentralization, the level of openness of the economy, the per capita GDP, population growth rate. It indicates that fiscal deficit and infrastructure investment, especially fiscal deficit, are the most important factors affecting the size of local debt, which is consistent with the findings of other scholars (Zhao Wenzhe, Yang Jidong, 2015; Chen Baodong, Deng Xiaolan, 2017; Zhu Qiantao, et al, 2024) [31], [32], [33].

Figures 1 and 2 reflect the impact of the number of decision trees and the depth of decision trees on the degree of model fit, respectively. As can be seen from the graphs, with the increase of the number of decision trees, the mse value of the training set decreases close to 0, and the corresponding mse value of the test set also decreases to a relatively stable level, without the inverse rise of the mse value, which precisely illustrates the good characteristics of the Random Forest that does not overfitting occurs. Similarly, as the depth of the decision tree increases, the mse values of the training set and test set 1 also drop to a stable level, and the mse values of the test set do not rebound, which again confirms that the Random Forest model does not overfit.

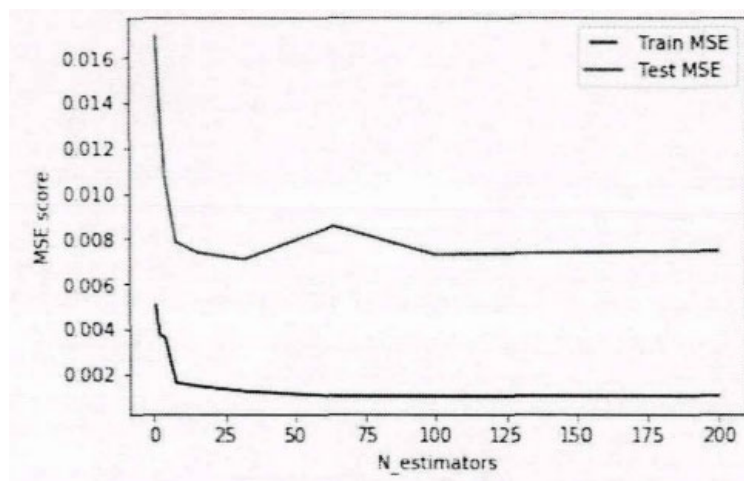


Figure 1. Plot of number of decision trees versus mse values

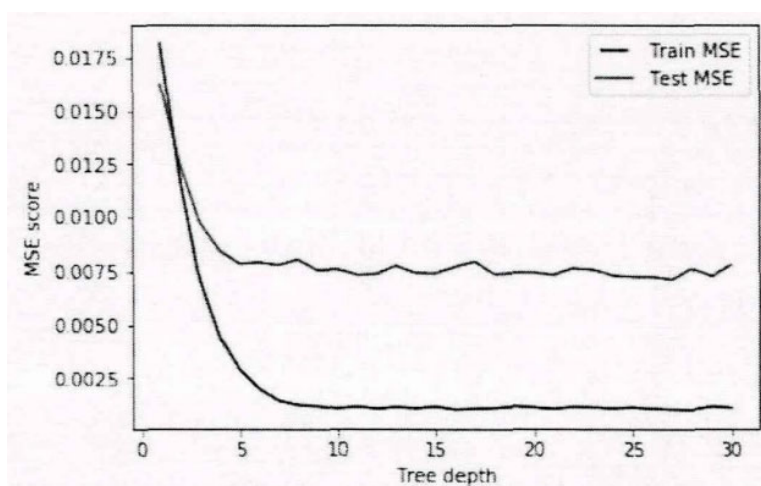


Figure 2. The relationship between the depth of decision tree and mse value

In regional economic characteristics, the interaction and influence of factors are complex, among which, fiscal deficits are the key factors affecting the risk of local debt, and they directly affect the ability of local governments to repay their debts. If fiscal revenues grow steadily while expenditures are effectively controlled, local governments have a stronger ability to repay their debts. In addition, infrastructure investment is also an important factor, and localities that rely excessively on debt-financed infrastructure investment will increase future debt-servicing pressure.

Overall, the local debt risk is relatively low in areas with a high level of economic development, such as developed areas on the eastern coast, including Shanghai, Beijing, Guangdong, Zhejiang, Jiangsu, etc., where the local government's debt servicing capacity is relatively high, with low debt ratios and controllable risks; the debt servicing capacity of the local government in provinces such as Tianjin, Fujian, Shandong, Shanxi, etc. is at a medium level; and in central and western regions, such as Guizhou, Inner Mongolia, Yunnan, Guizhou, Inner Mongolia, Yunnan, Qinghai, Ningxia and other provinces, due to the relatively lagging economic development and limited financial revenue, the debt ratio is higher, the pressure of debt repayment is greater, and the debt risk is more prominent.

4. RISK ASSESSMENT OF LOCAL GOVERNMENT DEBT IN CHINA

The core of preventing and resolving local government debt risks lies in deepening the assessment and early warning of debt risks (Zhou Shiyu, 2021) [34].

4.1. Methodology

With the development of computer technology, the use of Bayesian network methodology to build economic early warning models has been favored by the academic community. Bayesian networks can predict the probability of occurrence and the degree of impact of future debt risks based on historical data and available information. This helps to identify potential debt risks in advance so that preventive measures can be taken.

4.2. Debt risk assessment model based on Bayesian network

Local government debt has typical nonlinear characteristics, and Bayesian network is able to correct the parameters through the a priori probability and a posteriori probability, which can effectively describe the complex dependency relationship between a large number of variables, and has greater flexibility and applicability in dealing with nonlinear data.

To construct a Bayesian network model, it is first necessary to determine the relationship between the network nodes and nodes, and then use the Bayesian formula to derive the probability distribution between variables. Then, the conditional probability table (CPT) is obtained through learning or expert designation, and the dependence of the variables in the Bayesian network is utilized for inference calculation to derive the risk probability of each risk node.

4.2.1 Selection of local government risk early warning indicators

In this section, the credit spread of municipal investment bonds is used as a proxy variable for the credit risk of local government debt, and the indicators of debt dependence, debt burden ratio, GDP growth rate/debt growth rate and private investment growth rate/debt growth rate, and fiscal revenues/fiscal expenditures are selected to reflect the degree of dependence of local government expenditures on debt; and the three indicators of fiscal revenues, such as local transfer payments, land transfer revenues, tax revenues, reflect the dependence of repayment of government The three indicators of fiscal revenue, including local transfer payments, land grant revenue and tax revenue, reflect the degree of dependence on central transfer payments, land grant revenue and tax revenue for repayment of government debt.

Table 2. Summary of early warning indicators of local government debt risk

Category	Indicators
Debt situation	Debt dependence, debt burden ratio, GDP growth rate/debt growth rate, fixed asset investment growth rate/debt growth rate
Fiscal revenue and expenditure	Fiscal revenue/expenditure, share of local transfer payments, share of land transfer revenue, share of tax revenue
Economic Situation	GDP growth rate, GDP per capita

4.2.2 Construction of Bayesian network

Utilizing Granger non-causality test method, discern the interaction mode and influence path between the early warning indicators, and establish the Bayesian network, as in Figure 3 (See Table 3 for indicator symbols).

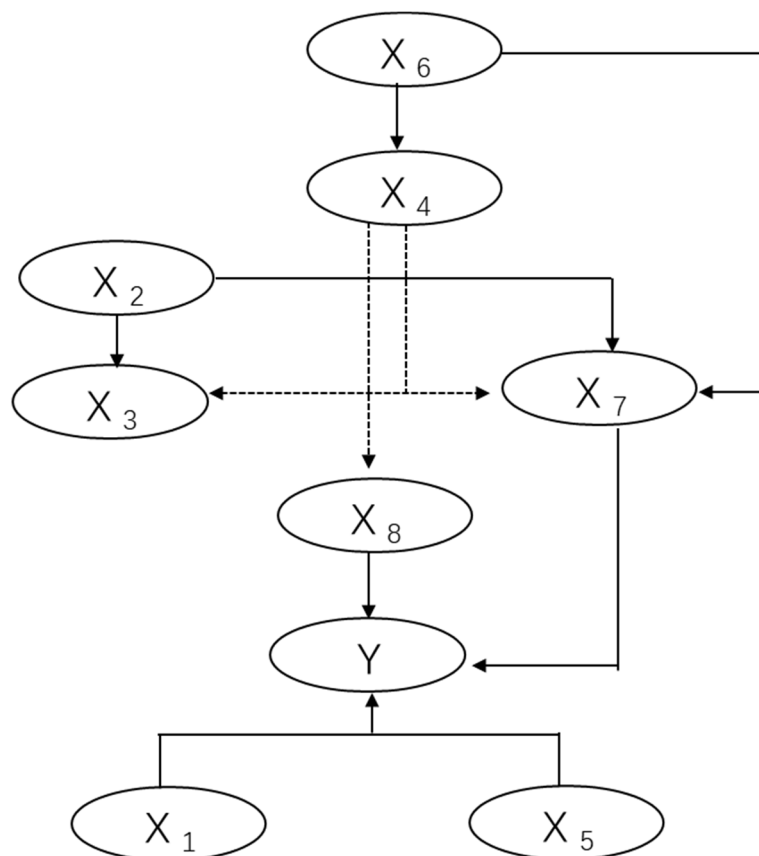


Figure 3. Bayesian network diagram of local government debt risk early warning model

The Bayesian network model constructed by Granger causality test results can be seen:

1. Central transfer payment is the last resort to solve the local government debt risk, one is to affect the local government debt default risk through the fiscal revenue/fiscal expenditure, and the other is to affect the local government debt default risk through the ratio of land transfer revenue to fiscal revenue. Central transfer is the most upstream indicator of local government debt risk.

2. Fiscal revenues/fiscal expenditures reflect the degree of local government fiscal deficits, which can explain not only the changes in tax revenues and land transfer revenues, but also the changes in the growth rate of private investment. Fiscal revenue/fiscal expenditure is the most important indicator for early warning of local government debt default risk.

3. GDP growth rate/debt growth rate reflects the degree of dependence of local governments' economic growth on debt, which can explain the changes of investment growth rate and land transfer revenue, and then affect the risk of local government debt default. gdp growth rate/debt growth rate is the most important indicator for early warning of the risk of local government debt default.

4. Debt dependence, private investment growth rate/debt growth rate, debt burden ratio and tax revenue/fiscal revenue, land transfer revenue/fiscal revenue directly affect the risk of local government debt default, is a direct indicator of early warning of local government debt default risk. Land transfer revenue/fiscal revenue reflects the degree of dependence on land for local government debt repayment. If the local government land transfer revenue decreases, the fiscal deficit pressure increases, and the local government debt default risk increases.

For the local government debt default risk y , set the boundary value $y = 0.5$. When the local government debt risk exceeds the boundary value 0.5, the local government fiscal revenue can

not reach the debt repayment demand, that is, on behalf of the default, which sets the default risk $y = 1$. When the local government debt risk is lower than the boundary value 0.5, the local government fiscal revenue can not reach the debt repayment demand, that is, on behalf of the default, which sets the default risk $y = 1$. When the local government debt risk is lower than the threshold value of 0.5, the local government revenue reaches the demand of debt repayment, and the local government is not in default, then $y = 0$ is set.

In order to achieve the best debt risk early warning effect, the Bayesian network parameters are estimated using the principle of minimizing the miscarriage of justice. The sample data are substituted into the model, and the optimal critical value of warning indicators (Table 3) is obtained after repeated adjustments, and then the Bayesian network with the lowest miscarriage of justice rate is constructed for local government debt risk warning. Finally, the local government debt risk warning model is utilized to assess the local government debt risk of 30 provinces and cities in China.

Table 3. Optimal thresholds for early warning indicators

Category	Symbolic	Optimal critical value
Debt dependence	X1	0.1
GDP growth rate/debt growth rate	X2	1
Fixed asset investment growth rate/debt growth rate	X3	2.1
Fiscal revenue/expenditure	X4	0.3
Debt burden ratio	X5	0.3
Share of local transfer payments	X6	0.28
Share of land transfer revenue	X7	0.15
Share of tax revenue	X8	0.75
Default risk	Y	0.5

4.3. Analysis of results

From the assessment results, the regional characteristics of China's local government debt is relatively obvious, the debt risk is above the warning line in 11 provinces and regions, mainly concentrated in the central and western parts of the country; and below the warning line in 19 provinces and cities, mostly in the coastal economically developed areas. Among them, the three provinces with the largest debt risk are Qinghai, Chongqing and Guizhou, whose probability of debt risk is 58.8%, 79.7% and 61.8% in turn; while the three provinces with the smallest debt risk are Jiangsu, Zhejiang and Fujian, whose probability of debt risk is 20.4%, 18.6% and 18.7% respectively.

In terms of average probability, the impact of each major indicator on local government debt risk is different, specifically:

First, the impact of debt dependence on local government debt risk shows obvious geographical characteristics, except for Guangdong and Jiangsu, the eastern coastal provinces and municipalities have a greater reliance on new government debt for government fiscal expenditure. When the debt dependence, less than the threshold value of 0.1, Sichuan, Guangxi and other more than twenty provinces and municipalities in the appropriate increase in government debt, not only will not cause an increase in the probability of default, but also greatly reduce the risk of default of the local government. As for the five provinces and municipalities whose debt dependence exceeds the threshold value of 0.1, the default risk of

government debt in provinces and municipalities such as Beijing, Tianjin, Zhejiang and Fujian, in addition to Tianjin, will be reduced when new debt is appropriately reduced.

Second, except for a few provinces and municipalities, there is a positive correlation between the local debt burden ratio, the proportion of land transfer revenues to fiscal revenues, and fiscal deficits with the probability of local government debt default risk, i.e., the larger the proportion of them, the greater the probability of debt default.

Thirdly, there is a certain disconnection between the growth rate of China's local government debt and the economic growth rate, and the risk of local government debt is less affected by the ratio between the local GDP growth rate and the debt growth rate.

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Conclusion

In terms of local government debt risk impact indicators, the central transfer payment is the most basic indicator, which indirectly acts on the debt risk by affecting the ratio of land transfer revenue to fiscal revenue and the ratio of fiscal revenue to fiscal expenditure. The ratio of fiscal revenues to fiscal expenditures, GDP growth rate and debt growth rate are the key indicators, which influence the risk by influencing the ratio of tax revenues to fiscal revenues and the ratio of land transfer revenues to fiscal revenues, respectively. Debt dependence, the ratio of private capital growth rate to debt growth rate, debt ratio, the ratio of tax revenue to fiscal revenue, and the ratio of land transfer revenue to fiscal revenue constitute the most direct factor indicator system, which has a direct impact on debt risk. In terms of the impact of variable changes on the risk of local government debt default, debt dependence has the highest degree of impact, followed by the debt burden rate, and the impact of the change in GDP growth rate and debt growth rate is the lowest. Therefore, debt dependence and debt burden rate should be emphasized in risk avoidance to better control default risk.

5.2. Policy Recommendations

In terms of local government debt risk prevention:

Firstly, the accounting standard system should be improved, and the statistical caliber of local debt should be unified, in order to improve the early warning model, enhance the effect of early warning, and increase the effectiveness of debt supervision;

Secondly, the legal and regulatory system should be improved, and the long-term mechanism of debt management should be established, in order to lay the legal foundation for regional debt management, clarify the government boundaries, and urge local governments to withdraw from operational and quasi-operational fields, and invest their funds in the construction of public facilities and public welfare projects.

Third, strengthen the governance of hidden debt risks of local governments: the lack of marketization of government investment and financing platforms has led to hidden debt risks, and it is necessary to establish a financial system focusing on its marketization, and to strengthen the debt risk classification and management and consolidated supervision. Utilizing big data and artificial intelligence to improve the integrated management mechanism of debt issuance, management and trading. For example, the debt risk indicator system is used to realize the comprehensive integration of multi-dimensional data such as economic data, enterprise data and external market environment, visualize the risk distribution, scientifically measure the risk level and conduct horizontal benchmarking and vertical evaluation of the effectiveness of inter-regional debt risk management (Yao Huiliang et al., 2024) [35].

Fourth, improve the transfer payment system, and focus on balancing the financial resources of the central government and local governments, and balance the financial resources of local

governments between regions through general transfer payments. Balance the financial power of local governments between regions, promote the balanced development of the national regional economy, and adopt diversified comprehensive indicators to strengthen the evaluation of the efficiency of the use of special transfer funds, so as to improve the efficiency of the use of funds.

Finally, improve the supervision and monitoring system of local debt, promoting debt governance toward intelligence: excessive indebtedness of local governments has led to the high level of debt in some areas, and it is necessary to establish a sound supervision and monitoring system. Improve the supervision and management system of local debt of the National People's Congress, the local people's Congress set up a debt warning line, strengthen the market constraints, increase transparency, commissioned a third-party assessment to enhance the efficiency of the use of funds.

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