

Research on the Influence Effect of Local Government Debt and Foreign Trade

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Abstract: After the formal entry into force of the Regional Comprehensive Economic Partnership (RCEP), China has further deepened and upgraded its multi-disciplinary cooperation with various regions. As there is a correlation between local government debt and local foreign trade, the study of the correlation effect between the two has a positive significance for local governments to plan relevant economic and financial policies. This paper firstly establishes an endogenous growth model considering local government debt and foreign trade, so as to analyse the impact of local government debt on foreign trade. Secondly we also estimate the size of local government debt by using different forms of local government debt funds, and at the same time adopt the break even method to measure and make comparisons. Finally, a regression model is established to empirically test the relationship between local government debt and total foreign trade. From the results of the empirical test, the coefficient of local government debt scale on total foreign trade is significantly negative, indicating that the increase of local government debt scale has a direct negative effect on local foreign trade.

1. Introduction

China and ASEAN started the dialogue process since 1991, and the relationship has been upgraded to a comprehensive strategic partnership over the past three decades, with increasingly close economic and trade ties. In October 2013, the major initiative of building the "21st Century Maritime Silk Road" was put forward. In the seven years since the Belt and Road Initiative was put forward, China and Southeast Asian countries have accelerated connectivity, deepened economic integration, accelerated economic and trade cooperation, and closer humanistic exchanges. On 1 January 2022, the Regional Comprehensive Economic Partnership (RCEP) came into force, marking the further deepening and upgrading of multi-disciplinary cooperation between China and ASEAN. In the first eight months of 2023, ASEAN was China's largest trading partner, and the total import and export value of China's trade in goods with ASEAN amounted to RMB 4.11 trillion, an increase of 1.6%, accounting for 15.2% of China's total foreign trade, maintaining a fast-growing trend.

While foreign trade is booming, China is also actively building a new development pattern of domestic and international double-cycle. To realise the double-cycle pattern, it is necessary to promote consumption upgrading, expand the domestic demand market, and reach a balanced development between consumption, investment, import and export. In this process, the government

plays a very important role, on the one hand, the government needs to further optimise the business environment, build a platform suitable for economic development, to achieve a combination of government guidance and market mechanisms; on the other hand, the government needs to be on the premise of financial affordability, reasonable public consumption expenditure, to promote consumption in all aspects, and at the same time to accelerate the construction of a new type of infrastructure, to expand the domestic investment space. That is to say, local governments not only play a role in building the market mechanism, but also participate in the market. After China's tax-sharing reform in 1994, local governments separated their financial and administrative rights, which caused the formation and continuous expansion of the gap between local governments' fiscal revenues and expenditures. Especially during the global financial crisis in 2008, the stock market crisis in the summer of 2015, and the New Crown Epidemic in 2020, the economic development is more dependent on the government's fiscal stimulus, which prompts local governments to seek to issue government debt, raise funds in local financing platforms, etc., and thus the level of local government debt also showed a trend of rapid growth.

Obviously, the investment and financing behaviour of local governments affects the local economic environment, which in turn affects the business behaviour of local enterprises, which further affects the local foreign trade, so there is a correlation between local government debt and local foreign trade. Academics have more studies on the impact of local government debt on regional economic effects, and there are also related studies on the drivers of foreign trade, but the literature on foreign trade from the perspective of local government debt is relatively small, so the study has a positive significance for understanding the impact of the two and for the planning of related economic and financial policies by local governments. This paper firstly reviews the relevant studies on local government debt and foreign trade, secondly measures the provincial scale of local government debt, and finally conducts empirical analyses and gives corresponding conclusions and recommendations.

2. Literature Review

In order to conduct effective research on local government debt, the first major difficulty lies in the effective measurement of the scale of local government debt. In the industry's research, due to the complexity of local debt statistics, local debt data sensitivity, the lack of accounting for the complexity of some of the local hidden debt forms, the complexity of the local financing structure, such as dispersion and other reasons[1], it is often difficult to achieve the refined statistics, the local government debt is generally used in a more rough method of estimation.

One is to use the relevant indicators as a measure for research, that is, using proxy indicators without specific scale statistics, the method has two kinds[2]: (1) the use of financing platform company liabilities as a proxy variable[3]; (2) the use of financing platform company publicly issued urban investment bond balance as an approximate indicator to measure the local government debt[2][4]. Second, the break even method can be used to estimate the scale of local government debt by counting the shortfall in infrastructure funding and applying the cash balance equation for the amount of investment in the municipal sector by local governments[5][6][7]. Thirdly, according to the different manifestations of local government debt funds, single-calibre or full-calibre measurement is carried out. Among them, the single-calibre measurement is similar to the first method, which usually adopts the scale of local financing platform debt and the scale of government and social capital cooperation financing for statistics, and some researchers have redefined the financing platform and municipal investment debt and established a database of municipal investment debt based on it [8]. Of course the use of a single-calibre method will underestimate the scale of local government debt to a considerable extent, so there are quite a number of scholars who try to carry out a full-calibre measurement [9].

Most of the studies on the impact of local government debt on economic operation are conducted for the domestic or province and city-based regions. Its main research direction is the overall relationship between the size of local government debt on economic growth, some believe that government debt will weaken economic growth through the crowding out effect, some researchers have found that the higher the government debt ratio is the lower the medium- and long-term growth rate of the economy, and the probability that the economy will fall into long-term stagnation is increased[10]; some studies based on the Ricardian equivalence theorem believe that the debt is neutral for economic growth; some based on Keynesian conception of debt argue that an increase in debt size stimulates economic growth, for example, by constructing a DSGE model, which argues that the impact of government debt on the effectiveness of fiscal policy is positive[11].

In addition, there are also studies on the impact of local government debt on the residential sector, the enterprise sector, the public sector, etc.[12], but they are all studies on the internal economy, and there are fewer literatures on the external economy. For this kind of theme, some studies point out that the scale of local government debt can significantly enhance the degree of economic openness of the region[13], and some studies believe that the expansion of the scale of local government debt will significantly inhibit China's FDI and the degree of financial development will also increase the inhibition effect through the interaction of the increase of financial development[14].

3. Theoretical Analysis

This paper analyses the impact of local government debt on foreign trade by improving existing studies [13][15] and developing an endogenous growth model that takes into account local government debt and foreign trade. The model is as follows:

$$Y = K^\alpha (AL)^\beta D^\gamma T^\theta \quad (1)$$

Where Y is total output, K is total capital, A is technological level, L is labor input, D is the scale of local government debt, T is the total amount of foreign trade, with $0 < \alpha, \beta, \gamma, \delta < 1$, and $\alpha + \beta + \gamma + \theta = 1$.

The growth rates of the variables are represented by

$$\dot{K} = sY - \delta K - T \quad (2)$$

$$\dot{A} = gA \quad (3)$$

$$\dot{L} = nL \quad (4)$$

Where s is the savings rate, δ is the capital depreciation rate, g is the rate of technological progress, and n is the population growth rate.

For equation (1), both sides are divided by AL to normalize on a per capita basis. Let $y = Y/AL$, $k = K/AL$, $d = D/AL$, $t = T/AL$.

$$y = k^\alpha d^\gamma t^\theta \quad (5)$$

$$\dot{k} = sk^\alpha d^\gamma t^\theta - (\delta + n + g)k - t \quad (6)$$

When the system is at the steady state, $\dot{k} = 0$, differentiating both sides of the equation with respect to d yields:

$$s\alpha k^{\alpha-1} d^\gamma t^\theta \frac{\partial k}{\partial d} + s\theta k^\alpha d^{\gamma-1} t^\theta \frac{\partial t}{\partial d} + s\gamma k^\alpha d^{\gamma-1} t^\theta - (\delta + n + g) \frac{\partial k}{\partial d} - \frac{\partial t}{\partial d} = 0 \quad (7)$$

We can get

$$\frac{\partial t}{\partial d} = \frac{(s\alpha k^{\alpha-1}d^{\gamma}t^{\theta} - (\delta+n+g))}{1-s\theta k^{\alpha}d^{\gamma}t^{\theta-1}} \frac{\partial k}{\partial d} - \frac{+s\gamma k^{\alpha-1}d^{\gamma-1}t^{\theta}}{s\theta k^{\alpha}d^{\gamma}t^{\theta-1}-1} \quad (8)$$

As can be seen from (8), the sign of $\frac{\partial t}{\partial d}$ is not certain, when $\frac{\partial t}{\partial d} > 0$, the growth of local government debt has a facilitating effect on foreign trade, when $\frac{\partial t}{\partial d} < 0$, the growth of local government debt has an inhibiting effect on foreign trade, but can be based on the hypothesis that the size of local government debt has a direct impact on the amount of foreign trade, but the direction of the effect needs to be further tested.

4. Measurement of the Scale of Local Government Debt

Measuring the scale of local government debt has always been an important issue in related research fields, and different scholars have used various methods to estimate it. This chapter estimates the local government debt scale according to the different forms of local government debt funds, and at the same time uses the break even method to make comparisons, and describes and analyses the annual trend of the debt scale.

4.1. Statistics by Debt Manifestation

According to the analysis of existing studies on the classification and specific manifestations of local government hidden debt[9][16], local government hidden debt is divided into hidden debt created by pension gap, local financing platform debt, government expenditure responsibility formed under the Public-Private-Partnership (PPP) in public infrastructure construction investment, government purchased services, non-performing loans of local commercial banks, and local state-owned enterprises liabilities.

1) Hidden debt created by the pension payment gap. Since the pension payment gap is directly paid for by the government treasury, it falls under the category of government debt. This paper adopts the more common practice of using a fixed percentage of 8% of the total wage bill of urban non-private sector employees in the CEI database to measure the pension shortfall for the year.

2) Local financing platform debt. Urban construction investment companies are set up by local governments and issue bonds in the name of the company to carry out investment and financing activities and raise funds for local government infrastructure construction projects. The actual controllers of urban construction investment companies are generally local governments at all levels, and their financing mainly relies on the credit guarantee of local governments, and also relies on local finances to repay most of the debts. Therefore, the debt formed by local financing platforms represented by urban construction investment companies is also an important part of the hidden debt of local governments. In this paper, we use Wind database to collect the debt data recorded as urban investment debt in the database by province and count them.

3) Government expenditure responsibility formed under the Public-Private-Partnership (PPP) in public infrastructure construction investment. PPP mode refers to the introduction of social capital to participate in infrastructure construction and public service project investment, through prior consultation with the social capital to determine the franchise, financial subsidies and other revenue rules of engagement, to broaden the investment channels of social capital, but also to a certain extent, to solve the problem of shortage of funds faced by the local government. But for the PPP mode whether the formation of local government debt is still controversial, the State Council of China issued the opinion letter, which clearly indicates that the formation of standardised PPP projects in the medium- and long-term financial expenditure matters do not belong to the local government's hidden debt, and illegal PPP projects are considered to be hidden debt. However, some scholars

believe that the government expenditure responsibilities arising from PPP projects should also be considered as local government debt implicit debt. Because in the project operational difficulties, failure, or project construction beyond the deadline, budget, project risk is often borne by the local government and underwriting, thus generating financial expenditure, so this paper will be PPP project counted as local government implicit debt, data from Wind database.

4) Government purchases services. This is mainly shantytown renovation project, and its source of funds is mainly the shantytown renovation special bonds issued by local governments, financial funds, and loans issued by policy banks. Some researchers believe that the implementation of the shantytown renovation project cycle is long, public welfare nature, and the scale is large, easy to form hidden debt risk, so the loan issued by policy banks partially included in the scope of statistics [9]. However, due to the shantytown renovation loan data only China Development Bank, Agricultural Development Bank of China and other policy banks, the total amount of data, missing provincial units of data, and in 2022, the two major policy banks shantytown renovation project loan amount of 4.52 trillion yuan¹, a relatively small proportion of the total amount, this paper is omitted from the statistics.

5) Non-performing loans of local commercial banks. Local commercial banks play an important role in serving local economic development, supporting small and micro enterprises and meeting the financial demands of small and medium-sized individual customers. If local commercial banks are in trouble, it will also affect the local economy and social stability, so local governments will often bail out the non-performing loans of local commercial banks, thus creating hidden debt.

6) Local state-owned enterprises liabilities. As local governments usually hold a large number of local state-owned enterprises shares, and even the actual controller of local state-owned enterprises, and local state-owned enterprises for local employment, fiscal revenue and other aspects of the contribution, so when the local state-owned enterprises losses, debt repayment difficulties, etc., the local government will often carry out a certain degree of relief or to assist in the payment of debt, so the local state-owned enterprise liabilities should be counted in the implicit debt. This paper uses the Wind database to count the debts of local state-owned enterprises such as corporate bonds, enterprise bonds, asset-backed securities, financing bonds, and directional instruments, and excludes the debts of urban investment companies included therein to avoid double counting.

After accounting for the explicit debt issued by local governments, the resulting data on local government debt is shown in the table 1 below.

Table 1: Scale of some local government debt through manifestation statistics

Prov/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Anhui	0.554	1.222	1.530	1.755	2.196	2.391	2.636	2.971	3.392
Beijing	0.716	1.489	1.688	1.702	1.781	2.089	2.434	2.762	2.979
Fujian	0.432	1.031	1.607	1.684	1.794	1.961	2.242	2.549	2.972
Gansu	0.177	0.399	0.995	0.880	0.760	0.918	1.072	1.247	1.417
Guangdong	0.787	1.668	2.040	2.377	2.850	3.286	3.959	4.765	5.552
Guangxi	0.215	0.735	1.063	1.079	1.281	1.445	1.799	2.302	2.570
Guizhou	0.190	1.192	2.967	3.315	3.291	3.500	3.770	3.956	3.950
Hainan	0.034	0.182	0.368	0.381	0.381	0.440	0.503	0.512	0.573
Hebei	0.329	0.991	1.803	1.968	2.130	2.374	2.672	2.846	3.072
Henan	0.429	1.117	2.169	2.856	2.853	3.040	3.383	3.613	4.013
Heilongjiang	0.178	0.520	0.743	0.815	0.804	0.835	0.898	0.965	1.058
Hubei	0.310	0.890	1.292	1.997	2.465	2.737	3.111	3.485	4.001
Hunan	0.475	1.306	2.141	2.907	2.852	3.005	3.309	3.663	4.109
Jilin	0.124	0.449	0.649	0.851	0.954	1.007	1.108	1.202	1.302
Jiangsu	1.675	3.201	4.419	5.458	5.909	6.182	6.543	7.675	9.238

¹ China Development Bank 2022 annual report shantytown renovation disbursed loan balance of 2.79 trillion, and Agricultural Development Bank of China 2022 annual report shantytown renovation disbursed loan balance of 1.73 trillion.

Jiangxi	0.300	0.797	1.094	1.272	1.489	1.705	2.087	2.547	3.100
Liaoning	0.479	1.267	1.893	1.843	1.721	1.711	1.676	1.614	1.678
Inner Mongolia	0.226	0.863	1.614	1.664	1.360	1.414	1.430	1.419	1.426
Ningxia	0.042	0.145	0.338	0.405	0.253	0.309	0.338	0.337	0.350
Qinghai	0.082	0.238	0.371	0.396	0.413	0.463	0.470	0.531	0.553
Shandong	0.866	1.975	3.478	3.702	3.971	4.215	4.727	5.375	6.186
Shanxi	0.394	0.765	0.937	1.182	1.438	1.628	1.930	1.992	2.061
Shaanxi	0.409	1.073	1.482	1.732	1.869	2.002	2.180	2.465	2.752
Shanghai	0.761	1.213	1.252	1.186	1.224	1.418	1.696	1.891	2.129
Sichuan	0.422	1.362	2.468	3.329	3.774	3.560	4.156	4.745	5.486
Tianjin	0.563	0.965	1.154	1.379	1.536	1.813	1.998	2.118	2.298
Yunnan	0.286	1.047	2.142	2.222	2.380	2.525	2.917	3.039	3.043
Zhejiang	0.925	1.723	2.484	2.975	3.535	3.906	4.675	5.662	6.911
Chongqing	0.448	0.959	1.347	1.518	1.497	1.656	1.924	2.263	2.783
Total	13.030	31.340	48.615	56.898	60.309	65.208	73.439	82.500	93.077

4.2. The Statistics Based on Break Even Method

The main idea of breakeven method stems from the fact that local government liabilities essentially arise from the investment in municipal infrastructure construction undertaken by local governments, which needs to be financed by local financing platforms when it cannot be fully covered by local public revenues, thus generating local government debt. Therefore, it is possible to estimate the local government's investment gap, i.e., the portion that needs to be covered by incurring liabilities, by counting the local government's investment expenditures and available revenues.

The method utilises a formula of local government liabilities = fixed asset investment in the municipal sector - input of budgeted funds - land grant revenues used for investment funds - profitable cash inflows from invested projects.

According to the National Bureau of Statistics National Economic Sector Classification Standard, the following seven municipal fields in which the construction of facilities is dominated by local governments are selected and summed up to calculate the fixed asset investment in the municipal field: (1) Electricity, gas, and water production and supply industry; (2) Transportation, storage, and postal services industry; (3) Scientific research, technological services, and geological survey industry; (4) Water conservancy, environment, and public facilities management industry; (5) education; (6) health, social security and social welfare; and (7) public administration and social organisations.

Fiscal expenditures can be divided into recurrent and capital expenditures, with capital expenditures mainly covering infrastructure construction with a long useful life, and relevant studies estimate their share of local budgeted fiscal expenditures to be about 11%.

Revenue from land grants is an important source of funding for local government infrastructure construction, and it is generally believed that 40 per cent of land grant revenue can be used for infrastructure investment.

It is generally believed that about 50 per cent of local governments' infrastructure investment projects are invested in projects that generate profitable cash inflows, such as electricity, heat, water, and road construction, while the other 50 per cent are invested in non-profit projects such as social security and welfare, scientific research, and water conservancy and environment. A number of papers have argued that government investment projects maintain zero profit, and that cash inflows come only from depreciation of fixed assets, and the depreciation rate is set here at 5%.

The result obtained through the above formula is the new local government debt added each year due to the investment gap, not the total debt assumed by the local government, so it is necessary to add up the local government debt that has been incurred in the previous years, and it is necessary to

consider the debt repayment problem. Referring to the Ministry of Finance's 2018 *Local Government Bond Issuance and Debt Balance Situation*, the average issuance period of local government bonds is 6.1 years, thus setting the annual local government debt repayment ratio at 16.4%.

The data of fixed asset investment and local budget revenue in the municipal sector come from the forward-looking database, and the land transfer revenue comes from *Fixed Assets Statistical Yearbook* and *Land and Resources Statistical Yearbook* of the past years, and the local government debt data obtained after statistical calculation is shown in the table 2 below.

Table 2: Scale of some local government debt through break even statistics

Prov/Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Anhui	0.556	0.652	0.750	0.947	1.186	1.470	1.779	1.936	2.123	2.312
Beijing	0.221	0.235	0.230	0.223	0.204	0.266	0.271	0.299	0.318	0.348
Fujian	0.681	0.825	0.988	1.238	1.586	2.011	2.453	2.662	2.911	3.121
Gansu	0.375	0.449	0.553	0.721	0.868	1.053	1.100	1.217	1.333	1.441
Guangdong	1.291	1.320	1.418	1.568	1.785	1.990	2.233	2.329	2.473	2.492
Guangxi	0.653	0.766	0.928	1.121	1.366	1.661	1.972	2.146	2.345	2.513
Guizhou	0.396	0.501	0.660	0.889	1.155	1.476	1.884	2.049	2.234	2.398
Hainan	0.105	0.120	0.142	0.180	0.217	0.271	0.333	0.362	0.395	0.423
Hebei	0.986	1.125	1.315	1.570	1.857	2.205	2.550	2.755	3.003	3.221
Henan	0.888	0.993	1.131	1.330	1.696	2.149	2.723	2.879	3.136	3.355
Heilongjiang	0.525	0.634	0.737	0.832	0.940	1.049	1.151	1.271	1.387	1.502
Hubei	0.862	0.989	1.141	1.352	1.647	2.094	2.548	2.720	2.972	3.220
Hunan	0.860	1.007	1.226	1.526	1.926	2.415	2.967	3.231	3.515	3.759
Jilin	0.486	0.575	0.657	0.762	0.898	1.061	1.194	1.308	1.424	1.521
Jiangsu	0.652	0.706	0.803	1.167	1.565	1.860	2.193	2.364	2.519	2.607
Jiangxi	0.496	0.532	0.576	0.707	0.879	1.101	1.308	1.371	1.479	1.546
Liaoning	0.751	0.962	1.177	1.445	1.575	1.410	1.297	1.474	1.611	1.747
Inner Mongolia	1.000	1.152	1.328	1.636	1.845	2.145	2.327	2.550	2.777	2.999
Ningxia	0.138	0.157	0.182	0.241	0.323	0.405	0.467	0.516	0.565	0.616
Qinghai	0.128	0.169	0.219	0.291	0.368	0.463	0.552	0.607	0.666	0.724
Shandong	1.111	1.280	1.517	1.836	2.333	2.890	3.514	3.741	4.047	4.281
Shanxi	0.608	0.727	0.861	1.014	1.229	1.427	1.337	1.470	1.602	1.718
Shaanxi	0.855	0.945	1.107	1.341	1.666	2.121	2.690	2.922	3.181	3.420
Shanghai	0.335	0.280	0.250	0.209	0.187	0.177	0.207	0.173	0.144	0.121
Sichuan	1.230	1.455	1.708	2.097	2.511	3.029	3.560	3.838	4.171	4.456
Tianjin	0.390	0.485	0.567	0.649	0.791	0.877	0.926	1.035	1.146	1.270
Yunnan	0.718	0.839	0.962	1.147	1.422	1.786	2.327	2.513	2.746	2.958
Zhejiang	0.550	0.592	0.687	0.961	1.372	1.795	2.023	2.026	2.128	2.088
Chongqing	0.511	0.577	0.643	0.761	0.946	1.232	1.511	1.628	1.787	1.934
Total	18.814	21.616	25.208	30.756	37.682	45.500	53.462	57.644	62.614	66.804

4.3. Descriptive Statistics on the Scale of Local Government Debt

The following figure 1 shows the trend chart of the change in the size of local government debt from 2014-2022 by the classification of debt manifestations, and from 2004-2020 by the excess of revenues over expenditures method. As a comparison is the measurement of China's local government debt for 2017-2022 in the 2022 Article IV Consultation Report issued by the International Monetary Fund (IMF). It can be seen that the results of this paper are closer to the IMF data, which can show that the results of this paper have a certain degree of scientific, and can be further analysed and researched. For the implicit debt of local governments in 2022, CCXI estimates that the scale is between 52-58 trillion yuan, Zhongtai Securities estimates that the national municipal investment interest-bearing debt is 51.96 trillion yuan, and UBS estimates that the debt balance of local financing platforms is 59 trillion yuan. After taking into account the explicit debt of local governments, all of

them are similar to the estimation results of this paper, which further supports that the results of this paper are reliable within a certain range.

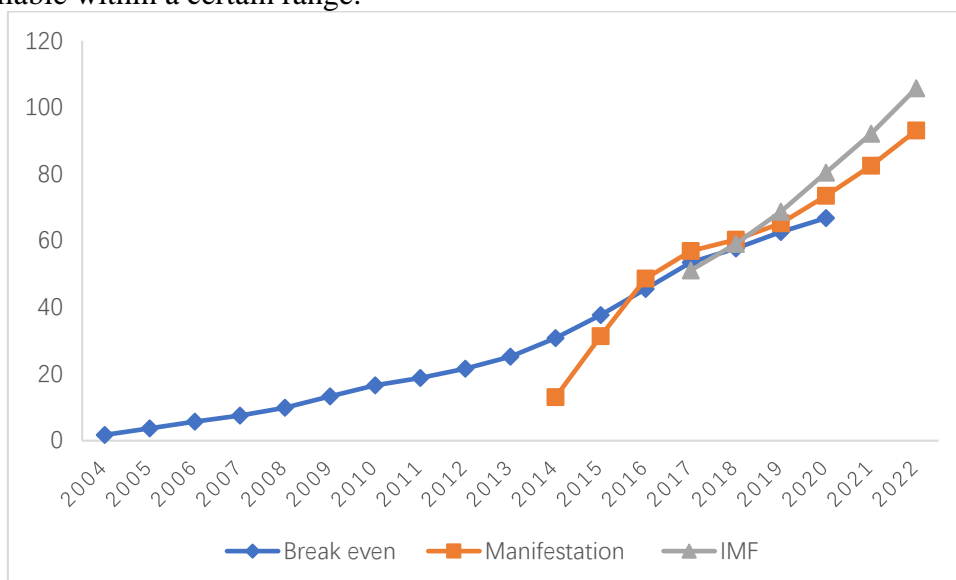


Figure 1: Trends in the scale of local government debt over 2004-2020

As can be seen from the figure, the local government's investment gap in infrastructure construction has been showing a relatively smooth growth trend, growing from 1.72 trillion in 2004 to 66.80 trillion in 2020, with an average annual growth rate of 24.0%, which also implies that the local government debt is likely to keep growing at a similar rate. Among the data obtained by the two statistical methods, it can be seen that local government debt in 2014-2015 showed a larger growth rate compared to the previous years, which was mainly due to the government's introduction of the new Budget Law in 2014, before which the Ministry of Finance issued debt for local governments as an agent, and after 2014, local governments were allowed to issue debt on their own, which prompted local governments to begin to gradually increase the visible debt issuance scale, growing from 4.2% in 2014 to 36.3% in 2022. Meanwhile, China began to promote the spread and application of PPP model in the whole country after 2015, which made the hidden debt caused by PPP projects also increase. However, the PPP projects were not widely used in China before 2015, causing that the scale of local government debt measured by manifestation was significantly lower than the shortfall of local government infrastructure investment measured by the break even method, which may indicate that the local governments had other means of financing before the promotion of the PPP model, or they suspended or postponed the relevant construction projects due to the shortages of financing methods. After the implementation of the new Budget Law in 2014, local governments began to choose more standard and transparent financing channels and methods. The growth rate of the scale of local government debt has slowed down significantly after 2018, mainly due to the fact that the central government has issued a number of measures during the period of 2017-2018 to improve the quality of the local government debt and to improve the quality of the local government debt. -2018 period the central government repeatedly issued policies to require the rectification of local government hidden debt, the implementation effect of these policies is also verified in the figure. And after the outbreak of the new crown epidemic in 2020, economic development was hampered and growth was hit, so the country began to relax the constraints on local government debt, and the growth rate of local government debt size rebounded, increasing from about 8% in 2018-2019 to more than 12%.

5. Empirical Test

According to the previous section, the impact of local government debt scale on foreign trade is uncertain, and it is possible to present two opposing effects interacting with each other, so this section uses the data of provincial local government debt in Chinese mainland measured in the previous section to conduct an empirical test on this.

5.1. Model Specification and Data Sources

Examining the magnitude and direction of the impact of the expansion of local government debt levels on local foreign trade, the following equation is constructed:

$$\ln Exin_{it} = \alpha + \beta_1 \ln Debt_{it} + \beta_2 X_{it} + u_i + v_t + \varepsilon_{it} \quad (9)$$

Where subscript i and t is various provincial-level administrative units in Chinese mainland and years, respectively. $\ln Exin$ is the explained variable representing the indicator offoreign trade, and the natural logarithm of the total import and export volume is chosen as the characteristic indicator in this paper. $\ln Debt$ is the logarithm of the core explanatory variable, the scale of local government debt. X_{it} is control variables. u_i, v_t and ε_{it} is provincial-level fixed effects, year fixed effects, and random disturbances, respectively.

The control variables include economic variables that may affect regional economic development and thus affect residents' consumption: the indicator representing the local consumption level is the logarithm of the local residents' consumption level $\ln Cons$; the indicator representing the local government's financial input is the logarithm of the general public budget expenditures $\ln Gov$; the indicator representing the level of local economic development is the logarithm of the total retail sales of consumer goods $\ln Sales$; and the indicator representing the level of local human resources and education is the logarithm of education expenditures $\ln Edu$. The value added of the tertiary industry as a percentage of GDP $third$ is an indicator of the level of local industrial structure; the urbanisation rate $urbanization$ is an indicator of the level of local urbanisation; and the Consumer Price Index CPI is an indicator of the level of inflation in the local economy at the time.

The above data are mainly from the Wind database and the CEI database, and some of the missing data are based on the public information on the Internet or made up by interpolation. Descriptive statistics for each variable are as follows Table 3.

Table 3: Descriptive statistics for each variable

Variables	N	Mean	Std	Minimum	Maximum
$\ln Exin$	279	8.034859	1.745561	3.060049	11.3266
$\ln Debt$	279	9.410986	1.170656	2.963788	11.43368
$\ln Cons$	279	9.820934	0.343838	8.897949	10.79711
$\ln Gov$	279	8.529783	0.590044	6.908205	9.826062
$\ln Sales$	279	8.950944	1.033938	6.046781	10.71181
$\ln Edu$	279	6.932284	0.72621	4.793096	8.640537
$Third$	279	51.46143	8.271079	36.17	83.8
$Urbanization$	279	0.610886	0.120215	0.2623	0.893
CPI	279	101.8762	0.645878	100.1	103.72

5.2. Descriptive Statistics of Local Government Debt Size

The regression results are shown in the following table 4 columns (1)-(4)

Table 4: Regression results

	(1)	(2)	(3)	(4)	(5)
lnDebt	-0.354***	-0.330***	-0.228***	-0.247***	-0.233**
	(-6.64)	(-6.04)	(-2.83)	(-2.98)	(-2.45)
lnCons	0.743***	1.129***	0.577*	0.161	-0.249
	(3.29)	(2.91)	(1.86)	(0.32)	(-0.29)
lnGov	0.749**	0.937***	0.929***	1.023***	0.815*
	(2.50)	(3.03)	(3.16)	(3.33)	(1.79)
lnSales	1.347***	0.424*	1.364***	0.911***	1.037***
	(8.56)	(1.73)	(7.66)	(3.74)	(3.20)
lnEdu	-0.370	-0.495*	-0.570*	-0.659**	-0.560
	(-1.36)	(-1.70)	(-1.91)	(-2.13)	(-1.36)
Third	0.0189**	0.021***	0.041***	0.044***	0.041***
	(2.58)	(2.74)	(5.50)	(5.60)	(3.24)
Urbanization	-1.472**	0.067	-0.954	1.001	2.010
	(-2.02)	(0.05)	(-1.31)	(0.72)	(0.97)
CPI	-0.035	-0.041	0.133***	0.112***	0.115**
	(-1.17)	(-1.46)	(3.00)	(2.62)	(2.03)
_cons	-8.344**	-4.96	-26.463***	-17.753***	-14.744
	(-2.49)	(-1.43)	(-5.14)	(-3.20)	(-1.62)
Prov	uncontrolled	controlled	uncontrolled	controlled	controlled
Year	uncontrolled	uncontrolled	controlled	controlled	controlled
N	279	279	279	279	186
R2	0.3886	0.4202	0.5168	0.5418	0.3355

As can be seen from the above table, the coefficients of local government debt scale are -0.354, -0.330, -0.228, -0.247, which are all negative and significant at 1% level, indicating that the increase in the scale of local government debt has a direct negative effect on the local foreign trade, with the following possible explanations: the expansion of the scale of local government debt is mainly invested in local infrastructure construction, and the increase of government investment squeezes out the private investment of local enterprises, which may affect the foreign trade business of local enterprises to a certain extent; on the other hand, the expansion of local government debt may also increase the local financial risk, which may cause foreign investors or enterprises engaged in foreign trade to take risk-avoidance measures and reduce their incentives to invest or engage in business of the local area. Therefore, the increase of local government debt weakens local foreign trade, which also confirms the previous hypothesis that the scale of local government debt has a direct impact on local foreign trade.

5.3. Robustness Test

In order to avoid the empirical test results will change with the change of sample data, consider the following ways to test the robustness of the regression results: shorten the sample period, the original data time range of 2014 to 2022, because the global outbreak of the new crown epidemic during the period of 2020 to 2022, so that international trade has been seriously affected, which may have an impact on the results of the test, is now considered to shorten the sample period to 2014 to 2019. Regression results from the above table column (5) can be seen, the local government debt size for the local foreign trade is still significantly negative, for the previous estimation results did not change.

6. Conclusion

This paper establishes an endogenous growth model that takes into account local government debt and foreign trade in order to analyse the impact of local government debt on foreign trade. The size of local government debt is estimated by using different forms of local government debt funds, and at the same time, the method of offsetting revenues and expenditures is used to measure and compare. Finally, a regression model is established to empirically test the relationship between local government debt and total foreign trade.

From the endogenous growth model, the scale of local government debt has a direct impact on the amount of foreign trade. From the point of view of the measurement data of local government debt, the local government debt in 2014-2015 compared with the previous years, the growth rate of the growth rate of local government debt has become larger, and after 2018, due to the central government's repeated introduction of policies to require the rectification of hidden local government debt, the growth rate of local government debt scale slowed down significantly, and after the outbreak of the 2020 New Crown Epidemic the country began to relax the constraints on local government debt, and the growth rate of local government debt scale growth rate rebounded. From the results of the empirical test, the coefficient of the local government debt scale on the total foreign trade is significantly negative at the 1% level, indicating that the increase of local government debt scale has a direct negative effect on the local foreign trade.

From the results of the above research, this paper puts forward suggestions for local governments on debt and foreign trade. (1) Local governments need to look at the debt problem rationally, scientific management, rational use, strengthen supervision, standardised financing, the local government debt problem may cause the risk of limiting the controllable range, to create a stable economic environment, so as to effectively attract domestic and foreign enterprises to invest in the government's participation in the investment of infrastructure construction at the same time, but also to stabilise the private investment channels not to be crowded out. (2) Entering the "Post-Epidemic Era" and riding on the wind of RCEP's formal entry into force, China needs to rely on its internal market advantages, take the domestic economic cycle as the main body, and promote the international and domestic double cycle, and build a double-cycle pattern to promote economic development, which is the main goal of China's current development strategy. As for Southeast Asia, China needs to take advantage of the geographical location of Southeast Asian countries, make use of the platform played by the mechanism of "Lan Mekong Co-operation", promote the early implementation of RCEP, build a higher level of new open economic system, and raise the level of economic and trade co-operation in the region.

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