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The Impact of Local Government Debt on Corporate Risk-taking

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Abstract: As the scale of local government debt continues to expand, it is necessary to explore the impact of local government debt on corporate micro-behavior.Based on the data of A-share listed companies from 2011 to 2021, this paper empirically examines the impact and mechanism of local government debt on corporate risk-taking, and the above conclusions are justified after a series of robustness tests.It is found that local government debt reduces firm risk-taking and that financing constraints partially mediate this effect.Further analysis reveals that the risk-taking level of mature firms is significantly affected by the negative impact of local government debt. The research in this paper provides empirical evidence for mitigating local government debt risk.

Keywords: Local government debt risk, Corporate risk-taking, Crowding-out effect, Financing constraints.

1. Introduction

In response to the impact of the international financial crisis in 2008, the Chinese Government adopted a series of measures to further expand domestic demand and promote stable and rapid economic growth, known as the "four trillion yuan" economic stimulus plan. Of the four trillion, one trillion comes from the central government's coffers, while the other three trillion need to be solved by local governments themselves, and as a result, the volume of local government debt is rising rapidly. After that, the central government gradually liberalized local government debt issuance since 2011 and expanded the pilot scope of local government debt issuance in 2014, and new local government debt has risen substantially. In 2020, in order to mitigate the impact of the epidemic, and in line with major national strategies such as "tax and fee reduction" and "poverty alleviation", the financial pressure on local governments has increased sharply, and the scale of debt has continued to grow. In December 2020, the Central Economic Work Conference also put forward the requirement of "to grasp the hidden debt of local governments to solve the work". The study of the impact of local government debt on the economy has become the focus of attention in the academic community.

Much of the existing research literature starts with the macroeconomic impact of local government debt, so does it have an impact on firms' micro-behavior? This leaves room for the research in this paper.

The level of risk-taking refers to the level of an enterprise's ability to adjust itself to changes in the external environment so that it can adapt to the changes and take risks. An increase in the level of corporate risk-taking helps to improve corporate competitiveness (Boubakri, 2013), which in turn increases the value of the firm (Zhao Chan et al., 2022), and even helps to promote the economic development of society as a whole (Zhang Min et al., 2015). However, there is little literature that systematically examines whether and how local government debt affects firm risk-taking. Therefore, this paper seeks to explore: does local government debt affect the level of corporate risk-taking? Is it a "crowding-in effect" or a "crowding-out effect"? By what path does local government debt affect them? The empirical results of this paper find that local government debt negatively affects corporate risk-taking and that financing constraints are a mediating mechanism for this effect. It is further found that the level of risk-taking of mature firms is significantly affected by the negative impact of local government debt. All of the above results indicate that local government debt has a significant impact on corporate risk-taking.

The innovation of this project lies in the following: First, based on the perspective of corporate risk-taking, it provides a new empirical verification of the "crowding-out effect" of local government debt in China, and makes a certain contribution to the study of local government debt economy in China. Second, to clarify the mechanism of local government indebtedness on microfirm behavior. This paper will reveal the micro-mechanism of local government indebtedness by increasing the external financing constraints of enterprises, thus inhibiting the risk-taking of firms, and provide a theoretical basis for better circumventing its negative effects in the future. Third, this project extends existing research at the macro level and adds usefully to the existing literature.

The research in this paper provides useful reference for government departments to formulate policies to prevent and resolve debt risks and to stimulate the vitality of enterprises.

2. Literature Review

2.1. Study on the Economic Consequences of the Expansion of Local Government Debt

There have been a large number of studies on the economic consequences of the expansion of local government debt, and there are mainly two views: the "crowding-in effect" and the "crowding-out effect". Scholars who hold the "crowding-in effect" view believe that local government debt can promote economic growth and is conducive to economic development. Funds raised by local government debt are mainly invested in infrastructure construction, which is conducive to promoting consumption and boosting economic growth (Tang Wei et al.,

2022), which in turn increases aggregate social demand and business investment opportunities (Eden and Kraay, 2014).Scholars who hold the view of the "crowding out effect" believe that local government debt has a negative impact on economic growth and that excessive debt will be detrimental to economic development. Intensified local government debt expansion may reduce the efficiency of capital utilization (Bai Chong'en and Zhang Qiong, 2014), intensify the pressure of government debt repayment, which will deteriorate the government's financial situation, lower the government's credit (Li Hongquan and Yin Panpan, 2019), aggravate inflation (Yin Shifen and Luo Zhiheng, 2013), and ultimately, will lead to systematic financial risks (Mao Rui et al., 2018), which will seriously damage the sustainable economic sustainable growth (Hao Yi and Li Zheng, 2017).In addition, some other scholars argue that the relationship between local government debt and economic growth is nonlinear. Han Jian and Cheng Yudan (2019) and other scholars found that an appropriate amount of local government debt expansion will promote economic growth and play the "crowding-in effect", but after reaching a certain threshold, it will harm economic growth and play the "crowding-out effect".

In short, there is no academic consensus on the economic consequences of local government debt expansion. And a large number of studies have focused on the macroeconomic impacts of local government debt expansion, while paying insufficient attention to microenterprises, not to mention the lack of research on the impact of local government debt on corporate risk-taking.

2.2. Study on Enterprise Risk-Taking

In recent years, research related to corporate risk-taking has changed significantly, from early studies based on individual managers to studies based on firm characteristics, and then to studies based on the macro-environment. This change has allowed researchers to analyze corporate risk-taking from a more comprehensive and objective perspective. On the individual manager side, managerial competence (Junhui Fu et al., 2022), entrepreneurial sentiment (Hanming Yang et al., 2022), and CEO's place of origin (Zhongqin Su and Biao Ge, 2022) all have an impact on firm risk-taking. With respect to firm characteristics, the nature of property rights (Niu Feng et al., 2022), digital transformation (Huang Dayu et al., 2022), and the nature of ownership (Li, Wengui, and Yu, Minggui, 2012) affect firm risk-taking. Macroeconomic environments, such as tax policy incentives (Zhao Chan et al., 2022), crude oil price shocks (Chen Xian et al., 2022), and regional institutional differences (Zhang Sanbao and Zhang Zhixue, 2012), may affect firm risk-taking through paths such as financing constraints (Zhao Chan et al., 2022), and agency costs (Zhang Huiling and Ni Xuiran, 2017).

Individual managers and firm characteristics jointly contribute to a firm's risk-taking behavior, while the macro-environment manifests itself as the impact of various macro-factors on a firm's risk-taking ability at the macro-level.

In recent years, more and more scholars have begun to pay attention to the impact of the macro environment on enterprise risk-taking, and the role and policies of local governments, as one of the important subjects in the macro environment, have also received more and more attention, however, the influence of the local government debt is still lacking in its due attention.

3. Theoretical Analysis and Research Hypotheses

3.1. Local Government Debt and Enterprise Risk-Taking

Local government debt is an important channel for local governments to influence the market. The source of funds raised by local government debt is mainly credit funds from financial institutions (Liang Qi and Hao Yi, 2019), which means that there is a more serious problem of competition for credit resources between local governments and enterprises in their jurisdictions. Fan Xiaoyun et al. (2017) found that government liabilities affect the financing scale of enterprises to a certain extent, as well as the competitiveness of the market. The increasing scale of local government indebtedness in China has led to an increase in the cost of financing for enterprises, a decrease in their willingness to invest, and a decrease in their ability to bear risks. And the liabilities of financing platform companies have a more pronounced effect on crowding out (Huang et al.,2020).In addition, as local governments face enormous repayment and financial pressures, they have more incentives to alleviate their financial woes by transferring debt pressures to enterprises through such means as strengthening tax regulation. It has been found that the higher the level of local government indebtedness, the higher the gross and net tax burden borne by firms in their region increases accordingly (Yang Huaxiang and Song Chang, 2015).High tax burdens and stringent tax controls reduce retained profits and cash flows and reduce a company's risk tolerance.

In addition, the current scale of local government debt in China is expanding dramatically, facing greater debt risk, the risk of default is increasing, and "sticking to the bottom line of no systemic financial risk" has been a high priority for the CPC Central Committee and the Government. The mismatch between the tenure of local government officials and the maturity of liabilities is the main reason for the separation of power and responsibility of local government debt (Miao, Xiaolin and Fu, Runmin, 2015), and there is a mutually affecting interaction between these two types of risk, which weakens the firm's risk tolerance. Based on the above analysis, this paper presents the hypothesis:

H1: Local government debt reduces corporate risk-taking.

3.2. Financing Constraints, Local Government Debt and Corporate Risk-Taking

The size of local government debt can affect enterprise financing by (1) limiting the sources of funding for enterprises. Local government debt is endorsed and issued by the government, with higher security and greater liquidity, compared to enterprises, banks and other financial institutions are more willing to lend to the government, taking up the credit funds of banks, making it difficult for enterprises to raise funds.(2) Increasing the cost of corporate finance. In order to compete with government debt, firms have to pay a higher cost of capital and accept harsher debt terms from banks. Based on the above analysis, this paper presents the hypothesis:

H2: Financing constraints mediate the role of local governments in reducing corporate risk-taking.

4. Research Design

4.1. Sample Selection and Data Sources

Since the central government has gradually liberalized the issuance of debt by local governments since 2011, and the data on local government debt has only been available since 2011, this paper takes the A-share listed companies in Shanghai and Shenzhen from 2011 to 2021 as the research sample and carries out the following screening:(1) excluding the samples of listed companies in the financial industry; (2) excluding the samples of ST and *ST listed companies; (3) excluding the samples with missing key data; and (4) in order to eliminate the influence of extreme values, this paper shrinks the tails of all the continuous variables at the level of 1% and 99%, and finally obtains a total of 27,062 samples from 3,822 listed companies. The data on local government debt is from the WAND (WIND) database, and the rest of the data is from the Cathay Pacific (CSMAR) database.

4.2. Definition of Variables

4.2.1. Explanatory variables: local government debt

Drawing on the research ideas of Li Hongquan and Yin Panpan (2019), the size of local government debt is measured by provincial local government debt balance/provincial GDP (GDP).And this is the basis for measuring the economic size of provinces and municipalities across the country on the carrying capacity of local government debt The balance of provincial local government liabilities is composed of the sum of the balance of local government bonds, the balance of local government bonds, and the proceeds of national bond transfers. The methodology takes into account both explicit liabilities and available data in its calculations.

4.2.2. Explained variable: corporate risk-taking

In this paper, an empirical study is conducted by examining earnings volatility (Boubakri et al., 2013), return on equity (Min Zhang et al., 2015) and gearing (Faccio et al., 2011). Because the higher the risk-taking, the more uncertain the company's future cash flows are, we use earnings volatility to measure a company's risk tolerance. Specifically, it is calculated by taking three years (year t-2 to year t) as the observation period, calculating the mean and variance of the return on all assets in each observation period through the rolling regression method, and using RISK1 and RISK2 to measure the company's risk tolerance level.

4.2.3. Mediating variables

On this basis, drawing on Hadlock and Pierce (2010), SA indicators are constructed to measure the financing constraints of listed companies, The measurements are as follows: SA = -0.737*Size2 - 0.040*Age.SA indicators have the advantage of being more exogenous and are now widely used in studies of Chinese contexts. The larger the absolute value of this indicator, the higher the level of financing constraints of the company.

4.2.4. Control variables

Based on the existing research results, this project selected the following control variables: firm size, gearing ratio, profitability, equity concentration, proportion of independent directors, firm age, and board size. At the CEO level, the relationship between CEO's gender, age, and dual-position one-dimensionality is investigated. In addition, we control for factors such as industry and year. Specific definitions of each variable are presented in Table 1.

Table 1. Definition of variables

variable symbol	variable name	Description of variables
Risk1	Risk Assumption	Standard deviation of profitability volatility per three years
Risk2	Risk-taking	Extreme deviation of profitability volatility per three years
LocalGov Debt	Local Government Debt	Ratio of local government debt to regional GDP
SA	Financing constraints	SA index, see text for specific algorithm
Size	Enterprise Size	Natural logarithm of total assets
Lev	Gearing Ratio	Ratio of total liabilities to total assets
Roa	Profitability	Ratio of net profit to total assets
ContrshrP roportion	Shareholding Concentration	Ratio of controlling shareholders' shareholding
IndDirect orRatio	Sole Director Ratio	Ratio of the number of independent directors to the total number of board members
BusinessY ear	Company Age	Number of years the company has been established
Boardsize	Board Size	Total number of board of directors
CEOAge	CEO Age	The value of 2 if the CEO is male, otherwise 1
CEOGend er	CEO Gender	Gender of CEO
IsDuality	Combination of two positions	1 if the CEO is concurrent with the chairman, 0 otherwise.

4.3. Modeling

To test hypothesis 1, this paper constructs the following regression model:

$$Risk=\alpha 0+\alpha 1* LocalGovDebt +Controls +\varepsilon \quad (1)$$

Model (1) is used to test the effect of local government debt on corporate risk taking. If α1 is significantly negative, it indicates that local government debt reduces firm risk-taking and supports H1. To obtain robust results, the text uses firm-level robust standard errors.

5. Empirical Results and Analysis

5.1. Descriptive Statistics

Descriptive statistics for each variable are presented in Table 2. To explain the variable LocalGovDebt LocalGovDebt has a maximum value of 0.757 and a minimum value of 0.006, indicating that there are large differences in the size of government debt between localities. The maximum and minimum values of the corporate risk-taking level Risk1 (Risk2) are 0.201 (0.37) and 0.002 (0.003) respectively, which are basically consistent with the existing studies (Chen Xian et al., 2022), indicating that there are large differences in the risk-taking level of listed companies in China.

Table 2. Descriptive statistics of the main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Risk1	30404	.032	.035	.002	.201
Risk2	30404	.061	.065	.003	.370
LocalGovDebt	30404	.224	.176	.006	.757
SA	30404	-3.80	0.268	-5.646	-1.455
Size	30404	22.163	1.296	19.896	26.212
Lev	30404	.412	.205	.051	.885
Roa	30404	.041	.061	-.245	.200
ContrshrProportion	29821	36.948	15.286	.004	155.190
IndDirectorRatio	30403	37.561	5.489	14.290	100
BusinessYear	30404	17.911	5.913	2	63
Boardsize	30404	8.526	1.682	0	18
CEOAge	30400	49.945	6.709	24	81
IsDuality	30404	.297	.457	0	1
CEOGender	30404	1.932	.252	1	2

5.2. Principal Regression Analysis

Table 3 presents the results of the main regression analysis, which reflects the impact of local government debt on corporate risk-taking capacity. The regression coefficient of Risk1 and local government liabilities is 0.004, which has a significant negative effect; on this basis, this paper further investigates the impact of the level of local government liabilities on China's economic development. Among the control variables, the regression coefficients of firm size and gearing ratio with firm risk are significant at 1% level, which means that both firm size and gearing ratio reduce the firm's risk tolerance.

Table 3. Main regression results

	Risk1	Risk2
LocalGovDebt	-0.004**	-0.007**
	(-1.99)	(-2.09)
Size	-0.004***	-0.007***
	(-18.56)	(-18.82)
Lev	-0.018***	-0.033***
	(-11.09)	(-11.10)
Roa	-0.176***	-0.324***
	(-28.06)	(-28.00)
ContrshrProportion	-0.000***	-0.000***
	(-5.28)	(-5.22)
IndDirectorRatio	0.000	0.000*
	(1.63)	(1.75)
BusinessYear	0.000**	0.000**
	(-2.42)	(-2.45)
Boardsize	-0.001***	-0.001***
	(-4.76)	(-4.58)
CEOAge	-0.000***	-0.000***
	(-7.05)	(-7.02)
CEOGender	-0.002**	-0.004**
	(-2.52)	(-2.43)
IsDuality	0.003***	0.006***
	(6.62)	6.64)
_cons	0.169***	0.317***
	(33.73)	(33.92)
Industry effect	YES	YES
Annual effect	YES	YES
N	29816	29816
Adj-R^2	0.1811	0.1809

Note: Values in parentheses are t-statistics; ***, **, and * denote 1%, 5%, and 10% significance levels, respectively, as follows.

5.3. Mechanism Testing

In order to test Hypothesis 2, this paper adopts a "three-step approach" to model and test the mediation effect. First, this project intends to examine the impact of local government liabilities on firms' risk tolerance, both theoretically and empirically. Second, the role of local government liabilities on corporate financing constraints is examined by constructing equation (2). On this basis, the financing constraint is introduced and equation (3) is constructed to validate the model.

$$SA=\beta 0+\beta 1* LocalGovDebt + Controls +\varepsilon \quad (2)$$

$$Risk=\gamma 0+\gamma 1* LocalGovDebt +\gamma 2*SA+ Controls +\varepsilon \quad (3)$$

The regression results are shown in Table 4 (since the Eq. 1 regression results have been presented above, the equation will not be repeated here). It can be seen that local government debt has a significant effect on financing constraints, and financing constraints also have a significant effect on corporate risk-taking, i.e., financing constraints play a partially mediating effect between local government debt and corporate risk-taking, verifying hypothesis 2.

Table 4. Regression results of the mediated effects test

	(1)	(2)	(3)
	SA	Risk1	Risk2
LocalGovDebt	-0.041***	-0.003*	-0.007*
	(-6.76)	(-1.73)	(-1.83)
SA		0.012***	0.023***
		(7.30)	(7.28)
Size	0.030***	-0.004***	-0.008***
	(21.26)	(-18.22)	(-18.45)
Lev	-0.057***	-0.017***	-0.031***
	(-11.04)	(-10.55)	(-10.55)
Roa	-0.098***	-0.175***	-0.321***
	(-6.38)	(-27.84)	(-27.78)
ContrshrProportion	0.001***	-0.000***	-0.000***
	(13.14)	(-5.23)	(-5.15)
IndDirectorRatio	0.002***	0.000	0.000
	(12.51)	(0.86)	(0.98)
BusinessYear	-0.041***	0.000***	0.001***
	(-278.95)	(5.12)	(5.10)
Boardsize	0.003***	-0.001***	-0.001***
	(5.25)	(-5.07)	(-4.89)
CEOAge	0.000***	-0.000***	-0.000***
	(2.62)	(-7.15)	(-7.12)
CEOGender	-0.004*	-0.002**	-0.004**
	(-1.84)	(-2.46)	(-2.36)
IsDuality	0.011***	0.003***	0.005***
	(7.49)	(6.31)	(6.33)
_cons	-3.858***	0.216***	0.405***
	(-117.46)	(22.94)	(22.96)
Industry effect	YES	YES	YES
Annual effect	YES	YES	YES
N	29816	29816	29816
Adj-R^2	0.8139	0.1828	0.1826

5.4. Robustness Tests

5.4.1. VIF test

Variance inflation factor (VIF) was used to test for large covariances among the variables. Table 5 lists the IF tests between the variables, with columns (1) and (2) showing the

correlation between Risk1 and each variable, and columns (3) and (4) showing the correlation between Risk1 and each variable, respectively. The results show that all the coefficients of variation are small and significantly below 5, indicating that they do not suffer from serious covariance problems.

Table 5. VIF test

Variable	Risk1		Risk2	
	VIF	1/VIF	VIF	1/VIF
LocalGovDebt	1.14	0.87	1.14	0.87
Size	1.67	0.60	1.67	0.60
Lev	1.71	0.58	1.71	0.58
Roa	1.26	0.79	1.26	0.79
ContrshrProportion	1.08	0.93	1.08	0.93
IndDirectorRatio	1.39	0.72	1.39	0.72
BusinessYear	1.20	0.84	1.20	0.84
Boardsize	1.54	0.66	1.54	0.66
CEOAge	1.08	0.92	1.08	0.92
CEOGender	1.01	0.99	1.01	0.99
IsDuality	1.14	0.88	1.14	0.88
Mean VIF	1.29		1.29	

5.4.2. Substitution of explanatory variables

Diao, Weitao, and Fu, Towel-Yi (2019) suggest that government debt is serviced by the consolidated financial capacity of local governments, and that there is a direct link between the debt ratio, which is also the level of local government debt, and the consolidated financial capacity of the region, Therefore, on this basis, we use the debt ratio (ROF)(ROF), which is the debt balance/revenue of local governments, and the results after regression are shown in Table 6.

Table 6. Alternative explanatory variables regression results

	(1)	(2)
	Risk1	Risk2
ROF	-0.000***	-0.000***
	(-2.68)	(-2.79)
Size	-0.004***	-0.007***
	(-18.59)	(-18.85)
Lev	-0.018***	-0.032***
	(-11.04)	(-11.05)
Roa	-0.176***	-0.324***
	(-28.08)	(-28.01)
ContrshrProportion	-0.000***	-0.000***
	(-4.69)	(-4.61)
IndDirectorRatio	0.000	0.000*
	(1.64)	(1.76)
BusinessYear	-0.000**	-0.000**
	(-2.37)	(-2.39)
Boardsize	-0.001***	-0.001***
	(-4.72)	(-4.55)
CEOAge	-0.000***	-0.000***
	(-7.04)	(-7.02)
CEOGender	-0.002**	-0.004**
	(-2.55)	(-2.46)
IsDuality	0.003***	0.006***
	(6.55)	(6.57)
_cons	0.169***	0.317***
	(33.77)	(33.96)
industry effect	YES	YES
annual effect	YES	YES
Adj-R^2	0.1961	0.1958
N	29816	29816

After a series of regression tests, we find that the negative effect of local government debt on corporate risk-taking is highly significant and consistent with the results of the main regression. As for the coefficient of debt ratio and business risk-taking, the gap between it and the main regression is large, probably due to the fact that we use GDP rather than public revenue as a measure in calculating local government debt.

5.4.3. Substitution of mediator variables

Following Kaplan and Zingales (1997), the KZ index is constructed to measure the financing constraints of firms in China. Larger values of KZ indicate that firms face greater financing constraints. The results of replacing the mediating variables are shown in Table 7, which shows that the results remain robust.

Table 7. Results of regression with replacement of mediator variables

	(1)	(2)	(3)
	KZ	Risk1	Risk2
LocalGovDebt	0.183*	-0.004*	-0.007*
	(1.96)	(-1.82)	(-1.92)
KZ		-0.001***	-0.003***
		(-8.95)	(-8.82)
Size	-0.325***	-0.004***	-0.008***
	(-29.81)	(-19.36)	(-19.55)
Lev	7.034***	-0.002	-0.003
	(98.48)	(-0.82)	(-0.85)
Roa	-12.670***	-0.205***	-0.376***
	(-54.25)	(-27.87)	(-27.78)
ContrshrProportion	-0.012***	-0.000***	-0.000***
	(-16.98)	(-7.82)	(-7.75)
IndDirectorRatio	0.006***	0.000	0.000
	(2.83)	(1.29)	(1.41)
BusinessYear	0.015***	0.000	0.000
	(7.60)	(0.32)	(0.33)
Boardsize	-0.015**	-0.001***	-0.001***
	(-2.19)	(-4.31)	(-4.16)
CEOAge	-0.002	-0.000***	-0.000***
	(-1.04)	(-5.06)	(-5.07)
CEOGender	0.115***	-0.002**	-0.004**
	(2.61)	(-2.46)	(-2.38)
IsDuality	-0.114***	0.002***	0.004***
	(-4.65)	(4.75)	(4.77)
_cons	7.222***	0.175***	0.327***
	(27.72)	(32.44)	(32.57)
Industry effect	YES	YES	YES
Annual effect	YES	YES	YES
Adj-R^2	0.5956	0.1959	0.1955
N	26530	26530	26530

5.4.4. Change of sample range

The main regression includes all provinces including municipalities, but due to the differences of municipalities in the level of economic development, administrative management, etc., municipalities may have greater administrative autonomy, and enterprises located in municipalities generally have stronger risk-taking ability, which may have an impact on the regression results of this paper, for this reason, we will be the four cities of Shanghai, Beijing, Tianjin and Chongqing as the exclusion of objects to the sample data We conducted regression analysis and obtained the corresponding regression results. The study shows that after adjusting the sample size, the regression results are basically consistent with the regression results of the original model, indicating the stability of the regression.

Table 8. Regression results of changing the sample range

	(1)	(2)
	Risk1	Risk2
LocalGovDebt	-0.007***	-0.014***
	(-3.31)	(-3.43)
Size	-0.004***	-0.008***
	(-15.78)	(-15.99)
Lev	-0.016***	-0.030***
	(-8.99)	(-8.93)
Roa	-0.172***	-0.316***
	(-24.23)	(-24.17)
ContrshrProportion	-0.000***	-0.000***
	(-3.89)	(-3.83)
IndDirectorRatio	0.000	0.000
	(0.94)	(1.04)
BusinessYear	-0.000	-0.000
	(-1.34)	(-1.36)
Boardsize	-0.001***	-0.001***
	(-3.89)	(-3.78)
CEOAge	-0.000***	-0.000***
	(-5.87)	(-5.84)
CEOGender	-0.003***	-0.006***
	(-3.69)	(-3.60)
IsDuality	0.003***	0.005***
	(5.21)	(5.19)
_cons	0.173***	0.325***
	(28.15)	(28.33)
Industry effect	YES	YES
Annual effect	YES	YES
Adj-R^2	0.1710	0.1706
N	23801	23801

5.4.5. Endogenous issues

In order to avoid omitted variables and reverse causality issues that may affect this paper, drawing on Demirci et al. (2019), healthcare expenditure (Exp) in local fiscal expenditure was used as an instrumental variable and regressed using two-stage least squares regression to analyze it. In the correlation analysis between the instrumental variables, it was found that there is a significant correlation between local government health care costs and the level of local government spending. However, no study has shown that local government health care expenditures affect the level of business risk-taking, satisfying the exogeneity requirement of the instrumental variable. Based on the above considerations, the selection of health care expenditures as an instrumental variable for local government debt has a certain degree of rationality and reliability, and passes the test of weak instrumental variables, indicating that there is no weak instrumental variable problem. The estimation results of the instrumental variable regressions are presented in Table 9. local government debt is significantly negatively associated with firm risk-taking outcomes, consistent with the previous findings.

Table 9. Regression results of instrumental variable method

Variant	LocalGovDebt	Risk1	Risk2
Exp	-0.000***		
	(-19.06)		
LocalGovDebt		-.103***	-.194***
		(-6.85)	(-6.92)
Control Variable	YES	YES	YES
_cons	-.292	.095	.178
Industry and Year Effect	YES	YES	YES
N	29,769	29,769	29,769

6. Further Analysis

Local government debt is one of the most important ways in which governments can have an impact on firms, and as firms in different life cycles have different characteristics, local government debt may have different economic consequences for firms in different life cycles. To test the above conjecture, growth firms may be less risk tolerant as they have a strong demand for capital but higher financing constraints, lack of R&D experience and lower innovation success rates, and thus are more inclined to adopt a conservative approach to risk aversion. Mature stage companies are well capitalized and well run, and companies have the ability and incentive to differentiate their strategic allocations to explore riskier and higher yielding investment opportunities, and their risk tolerance is significantly affected by local government liabilities. In times of recession, the profitability of the company decreases due to the risk of delisting or merger, in which case the company chooses to exit the industry at the lowest cost and with the least amount of risk, thus reducing the level of risk-taking of the company.

To test this hypothesis, we will refer to the cash flow portfolio method proposed by Dickinson (2011) to classify the life cycle of a company and determine it based on the positive and negative cash flow, which can effectively circumvent the negative impacts of surplus management. Since most of the listed companies have passed the start-up period, this paper draws on previous research methods and categorizes them into growth, maturity and decline periods. The specific method of determination is shown in Table 10.

Table 10. Judgment of business life cycle based on cash flow direction method

Life cycle	Operating activities Net cash	Investing activities Net cash	Financing activities Net cash
Growth	—	—	+
	+	—	+
Mature	+	—	—
	—	—	—
	+	+	+
Recession	+	+	—
	—	+	+
	—	+	—

Separate regressions are performed for growth, maturity, and decline firms, and the results are shown in Table 11.

It can be seen that the risk-taking level of mature firms is negatively and significantly affected by local government debt, while the regression results for growth and decline firms are not significant. It is noteworthy that during the growth

period, local government debt plays a crowding-in effect, and local government debt expansion instead increases the risk-taking capacity of firms.

Table 11. Regression results for firms with different life cycles

	Growth period	Maturity period	Decline period
	Risk1	Risk1	Risk1
LocalGovDebt	0.002	-0.011***	-0.006
	(0.84)	(-3.59)	(-1.07)
Size	-0.002***	-0.003***	-0.008***
	(-9.10)	(-9.99)	(-11.40)
Lev	-0.035***	-0.014***	0.020***
	(-15.90)	(-5.42)	(4.47)
Roa	-0.174***	-0.159***	-0.188***
	(-17.56)	(-16.21)	(-13.04)
ContrshrProportion	0.000**	-0.000***	-0.000***
	(2.23)	(-4.72)	(-5.50)
IndDirectorRatio	0.000	0.000	0.000
	(0.53)	(0.12)	(1.17)
BusinessYear	-0.000***	-0.000*	-0.000
	(-2.75)	(-1.85)	(-0.94)
Boardsize	-0.001***	-0.001***	-0.001
	(-4.40)	(-2.69)	(-1.54)
CEOAge	-0.000***	-0.000***	-0.000
	(-6.63)	(-3.43)	(-1.27)
CEOGender	-0.003***	-0.002	-0.001
	(-2.67)	(-1.47)	(-0.37)
IsDuality	0.003***	0.004***	0.000
	(5.88)	(4.65)	(0.02)
_cons	0.147***	0.156***	0.237***
	(23.01)	(18.79)	(14.40)
Industry effect	YES	YES	YES
Annual effect	YES	YES	YES
Adj-R^2	0.1789	0.1702	0.2743
N	13827	11765	4142

7. Conclusion

This paper analyzes the impact of local government debt expansion on corporate risk-taking by using the data of A-share listed companies in Shanghai and Shenzhen from 2011 to 2021 as a research sample. The results show that (1) local government debt expansion reduces the level of corporate risk-taking, a finding that remains valid after a series of robustness tests.(2) Financing constraints act as a partial mediating effect in the impact of local government debt on firm risk-taking.(3) The level of risk-taking by mature firms is most significantly affected by local government debt.

The conclusions of this paper are of great significance in promoting the sustainable and healthy development of enterprises. First of all, for enterprises themselves, they should combine the characteristics of life cycle, expand financing channels, strengthen their own competitiveness, and improve the level of risk-taking, and only in this way can they develop sustainably and healthily in the fierce market.

Secondly, the relevant departments should pay attention to further optimizing the allocation of resources, especially credit resources, among local governments and enterprises, creating financing opportunities for enterprises, reducing the financing constraints of enterprises and promoting the good operation of the capital market. Finally, local governments should limit the scale of debt raising, improve the financial system, promote the division of income distribution between the central and local governments, effectively alleviate the medium- and long-term financial pressure on local governments, and release the vitality of the real economy, and at the same time, strengthen the disclosure of information on the debt of local governments and accept the supervision of all parties.

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