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Retraction

Retracted: Exploring the Influence of Local Government Debt on Enterprise Investment through the Empirical Evidence at the Municipal Level

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] M. Cao, K. Duan, and H. Ibrahim, "Exploring the Influence of Local Government Debt on Enterprise Investment through the Empirical Evidence at the Municipal Level," *Mathematical Problems in Engineering*, vol. 2022, Article ID 2531808, 18 pages, 2022.

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Research Article

Exploring the Influence of Local Government Debt on Enterprise Investment through the Empirical Evidence at the Municipal Level

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The data of new urban investment bonds in cities from 2011 to 2021 to represent the growth of local government debt is used in this article. This paper studies the relationship between the increase of local government debt and the underinvestment of A-share listed enterprises, which are nonfinancial companies in China. The research finds that the increase in local government debt will crowd out the debt financing of enterprises and then significantly the degree of underinvestment of enterprises, which is represented non-state-owned enterprises, enterprises with high financing constraints, and enterprises with nonlocal debt invested in the industry. As for listed enterprises with relatively low fixed assets, the increase in local debt will further lead to the degree of underinvestment. The above conclusions remain unchanged after a series of robustness tests in this paper. Further research shows that the increase in local government debt will weaken the stimulus effect of loose monetary policy and thus affect the underinvestment of enterprises. This paper expands the research on the factors affecting the underinvestment of enterprises and deepens the research on the consequences of the influence of local government debt on the economic activities of microsubjects.

1. Introduction

The problem of public debt and its risk have always been an important financial and economic problem faced by countries all over the world. Unlike the United States, Europe, and other developed countries, which mainly point to the central government, China's debt problem is mainly manifested in the continuous and rapid expansion of the scale of local government debt. In 1994, the Chinese government implemented the tax-sharing reform at the national level, shifting the fiscal power to the hand of the central government while keeping the local government's administrative power unchanged. In the same year, the Budget Law of the People's Republic of China was promulgated [1, 2]. It stipulates that local governments should not announce fiscal deficits or list funds raised through bonds. It also prohibits local governments from issuing local government bonds (LGBs). As stipulated, local governments legal and compliant financing channels are restricted. Also, lending policies are restricted due to the huge capital demand and the imbalance of administrative and fiscal powers of local governments. As a result, local governments lack funds to fulfill administrative powers to develop the local economy, livelihoods, infrastructure construction, etc. [3–5].

In the face of financial shortages, local governments had to establish platform companies through methods like land asset allocation and receive bank loans to make up for the huge financial gap [6]. Therefore, local government financial vehicles (LGFVs), as local governments' investment and financing carriers, came into being. At the same time, the tax-sharing reform led to the mismatching of administrative power and financial power in the central and local governments, reducing the local government fiscal revenue's share of the national fiscal revenue while the number of public welfare projects and quasi-public welfare projects increased [7–9]. The shifts in administrative and fiscal powers' funding widened the gap in local governments' funds. The financing methods are usually bank loans and the issuance of municipal corporate bonds, known as urban investment bonds. The 4 trillion yuan stimulus plan in China was launched after the global financial crisis in 2008. The central government has funded 1.18 trillion yuan, and most

of the remaining funds need to be raised by local governments [10–12]. In the same year, the People's Bank of China jointly issued the Guiding Opinions with the China Banking Regulatory Commission (CBRC). Local governments have started to establish their LGFVs. Financing instruments such as corporate bonds, short-term financing bonds, and medium-term notes were issued, and the number of LGFVs grew rapidly [13, 14]. Since then, LGFVs have prospered unprecedentedly with the rapid expansion of government debt and an increase in urban investment bonds. With years of development, huge scale, opaque information, and nonstandard management have led to great risks in urban investment bonds, which have become an important source of hidden debt risks for local governments [15, 16]. In addition to paying attention to the systemic risks posed by local government debt, the impact of local debt on the economy has also attracted great attention in academic circles. On the one hand, local government debt plays an important role in promoting the construction of public facilities and rapid economic recovery; on the other hand, the priority of local government financing leads to the redistribution of funds in the credit market, which has a negative impact on the overall efficiency of fund allocation.

Local fiscal and financial risks were accumulating gradually, which made the prevention of and solution to local government debt risks important. In 2012, benefiting from the National Development and Reform Commission's relaxation of the approval of corporate bonds, as well as the central government's strategy of expanding domestic demand and accelerating urbanization, urban investment bonds showed a blowout increase in the amount of nearly one trillion yuan, about three times that of 2011. In 2015, the restriction on the administrative level of the issuing body of urban investment bonds was relaxed while the urban investment bonds issued previously were due at maturity, making encashments prevailing [17–19]. The issuance of urban investment bonds reached a new level that year, doubling that of 2014. By December 2021, the debit balance of local governments rose to 30.5 trillion yuan, from 10.7 trillion yuan in 2010. Although the increase of government debt can improve basic public services to some extent, especially in a period of economic recession, governments' borrowing could increase their expenditure, which is conducive to driving consumers' demand, accelerating regional industrialization and urbanization, and narrowing the regional gap [20, 21]. However, most studies believe that local government bonds are advantageous in the capital market because of their features, including recessive guarantee and rigid redemption, which, to a certain extent, left little space for other credit resources and produced a crowding-out effect on private investment [22–24]. According to document No. 35 of 2011, issued by the National Audit Office, 46.38% of local government debt is issued by local financing platforms in China. Therefore, it is reasonable and representative to select the scale of additional urban investment bonds to measure the increase in local debt [25]. Urban investment bonds are enterprise bonds, medium-term notes, and short-term financing bonds publicly issued by local government investment and financing platforms as the issuing entities, which are mostly used for local infrastructure construction or public welfare projects. At present, China's urban investment bonds are mainly divided into three categories: corporate bonds, short-term financing bonds, and medium-term notes, of which corporate bonds are the main ones, and the development is relatively mature.

The current research on the relationship between government debt and corporate underinvestment can be categorized as follows: some scholars believe that the increasingly growing government debt ties up more social funds, which is detrimental to corporate financing. An excessive concentration of funds in local government debt and financing platforms can crowd out some highly productive SMEs. As a result, private capital cannott create a sufficient investment scale and enough opportunity in the real economy. As a large amount of floating debt is used in large-scale investments for the government and the public sector, and some floating debt is used for enormous due repayment, social funds will decrease. On the other hand, the government issues debt to raise funds from the capital market, which will lead to an increase in the market rate and a decrease in private investment and consumption. Therefore, it will have a crowding-out effect on corporate investment. In order to balance the budget deficit, the government issued government bonds to raise funds from the private borrowing market, which raised the market interest rate and reduced private investment and expenditure accordingly. This is the crowding-out effect of the fiscal deficit caused by public expenditure on private investment and expenditure. Some scholars suggest that the increase in government debt will reduce banks' loanable funds. It is worth noticing a negative correlation between the rise in government debt and corporate finance. With credit endorsement from the local government, local government debt enjoys high security and liquidity. Thus, financial institutions such as banks regard it as reserves, resulting in decreased loanable funds in banks.

Although there is massive existing research on the relationship between government debt and investment, there are still notable limits. First, there is a lack of relevant literature that uses data from municipal governments and enterprises at the prefecturelevel to study the relationship between local government debt and corporate underinvestment. Most of the literature solely focuses on the impact of local public debt on corporate financing and regional economic development, whereas prefecture-level cities and enterprises are the main driving forces for local economic development in China and are better placed to reveal the internal relationship between local government debt and corporate underinvestment. Second, there is little existing research exploring the impact of local government debts on corporate investment at the prefecture level and little research that directly examines how local debt influences underinvestment in enterprises. Besides, there is a lack of discussion on the impact of local debt on economic growth from microeconomic perspectives.

The contributions of this paper lie in the following three aspects: first, it provides new mechanistic validation and empirical evidence on the impact of local government debt

upon the investment activities of microentities in the market. This paper unveils the mystery of Chinese corporate investment from a brand-new angle, namely that neither easing policies nor stimulus measures contribute to mitigating corporate underinvestment. Second, by analyzing the debt of prefecture-level city governments and the underinvestment of enterprises, this paper offers a new perspective to explore how local governments' debt influences the underinvestment of enterprises. Third, it complements the mechanism of slowing growth. The article emphasizes that the increase in local government debt will exacerbate the misallocation of financial resources and lead to the underinvestment of enterprises, which is one of the factors contributing to the slowdown of economic growth.

Our research is based on the research background mentioned above by optimising investment structure as an essential part of economic stabilization and structural adjustment policies, we lay a solid foundation for policy discussion. It can also be viewed as a worth-exploring academic subject with Chinese characteristics to illustrate better the dynamic relationship and mechanism between local government debt and corporate underinvestment. Therefore, this paper will focus on the following research questions: 1. Does local government debt crowd out corporate debt financing? 2. Do enterprises with unmet funding needs suffer from underinvestment? 3. Will the increase of local debt affect the local effects of other monetary policies and further affect the underinvestment of enterprises?

Based on the annual data of Chinese A-shares listed nonfinancial companies from 2011 to 2021, this paper analyzes the impact of local government debt on corporate underinvestment. The results show that: first, there is a significant correlation between local government debt and underinvestment. The scaling up of local government debt will cause underinvestment in non-stated-owned enterprises and non-local debt-invested enterprises. Second, the influential mechanism of local debt on underinvestment is as follows: local government debt squeezes corporate debt financing, reinforces corporate financing constraints, and results in the underinvestment of enterprises. Third, further research has found that the increase in local debt will increase the degree of underinvestment and further reduce enterprise value. Last but not least, the increase in local debt will influence the stimulus effect of loose monetary policy on corporate investment. In the capital supply-demand relationship composed of the government, microenterprises, and financial institutions, the expansion of local government debt financing demand is likely to crowd out the credit resources of microenterprises, and the government's preferential access to capital market financing will also interfere with the market's allocation of credit resources. Capital is the lifeblood of enterprise production, investment, and R&D innovation. The financing constraint caused by the crowding effect of government debt on enterprise credit capital will have an unavoidable impact on enterprise investment and financing decisions and R&D innovation activities. These two are also important factors affecting the high-quality development of enterprises.

The remainder of this paper is structured as follows: Section 2 presents the analysis of related theories and the main hypotheses put forward on the basis of theoretical studies. Section 3 introduces the data and empirical strategies used. Section 4 focuses on the major empirical results of the analysis and the influential mechanism. Section 5 shows a series of robustness tests. Sections 6 and 7 summarize the key findings and offers relevant policy recommendations.

2. Literature Review and Research Hypothesis

The current literature on the subject, which pays attention to the question of how local government debt affects the investment and production activities of microenterprises, mainly focuses on the following three research viewpoints. The first view holds that government debt financing has a significant negative impact on the capital structure of enterprises, which will reduce private investment. Government debt may also crowd out corporate investment by crowding out bank credit resources and raising corporate financing costs. The traditional view of the budget deficit believes that when the budget deficit increases aggregate demand, it also leads to a rise in interest rates and a corresponding decrease in investment. The second study finds that government borrowing can increase public investment expenditure, improve the infrastructure environment, increase aggregate demand and investment opportunities, and then create a good investment environment for enterprises. In addition, the third view holds that the relationship between government debt financing and private investment depends on the type of public investment.

As the second largest economic entity in the world, China has made remarkable achievements in its economic development in the past, which are attributed to the government's characteristic of concentrating its efforts to accomplish large undertakings. To some extent, the investment of these local debts in public goods will have an "external" effect, such as improving local infrastructure and attracting investment, which will reduce the marginal cost of enterprises and promote enterprises' investment and production. However, the government will impose a financial backstop on local financing vehicles and other enterprises, which will lead to severe "soft budget constraint" between local financing vehicles and state-owned enterprises, and then make the interest rate sensitivity of state-owned enterprises to financing generally low. This means that ordinary enterprises, especially private enterprises, often have an "unfair disadvantage" in the competition with local financing platforms in the capital market. As local government debt increases, more ordinary enterprises will withdraw from the financing market and reduce the investment spending, which then lead to enterprises underinvestment.

At present, there are few empirical studies on the impact of local government debt on the investment and production activities of microenterprises in China, and the heterogeneity of this subject is also lacking. We believe that it is necessary to test the influence of local debt on the investment

activities of microenterprises and to test the mechanism of local government's influence on the investment of enterprises by using the data of prefecture-level cities in China. These studies will reveal the micromechanism of local debt affecting economic efficiency.

2.1. Corporate Financing and Under-Investment of Enterprises. As for the influencing factors of enterprise investment efficiency, existing research focuses on the aspects of corporate governance, information disclosure, accounting conservatism, characteristics of the board of directors and managers, and corporate heterogeneity. It can be summarized two points as the following: (1) based on principal-agent theory and the factors of corporate governance with information asymmetry theory, existing research literature has introduced the conflicts of interest between creditors and shareholders and the conflicts of interest between shareholders and managers into the decision-making of company investment. (2) Based on the status of investment and financing, the existing literature analyzes the impact of investment and financing on the underinvestment of enterprises. This paper will focus on the analysis of the impact of enterprises' investment and financing conditions on enterprises investment shortages.

Financing management refers to the financing strategy and corresponding financing mode selected by the enterprise through risk and feasibility analysis to meet its own capital needs and realize the dual control of the risk and cost of financing, so as to build a more reasonable enterprise capital structure. The main contents of financing management include: clarifying the financial objectives of the enterprise, scientifically predicting the demand for funds, selecting reasonable financing channels and methods, and ensuring the rationality of the capital structure. In a perfect capital market, there is no difference in the financing cost of all enterprises. No matter what kind of financing method an enterprise chooses, its capital cost is consistent. The change of financing mode will not affect the discount rate, so the investment decision of enterprises does not need to consider the financing factor, the investment decision of enterprises completely depends on the current investment opportunity. When enterprises are faced with investment projects with NPV greater than zero and investment projects with NPV less than zero, they will choose to expand investment expenditure and refuse to increase investment expenditure, respectively, which means that in a perfect capital market, the investment expenditure of enterprises can always be in the optimal investment decision. However, there are often financial frictions in the real capital market, making investment decisions not only depend on the investment opportunities they face, but also depends on the cost of using funds and the degree of financing constraints. Relying on external debt financing may restrict the ability of enterprises to invest in the future, and enterprises' investments may deviate from the optimal investment decision, resulting in insufficient investment.

2.2. Local Government Debt and Insufficient Enterprise Investment. Macroeconomic policies and environment (e.g., macroeconomic stability, economic cycle, monetary policy, credit policy, financial development level, and fiscal and tax policy) will directly or indirectly affect the financing cost and scale of enterprises, thus affecting the underinvestment of enterprises.

Local government debt refers to the debt that the local government, as the debtor, undertakes the obligation of fund repayment to the creditor in accordance with the provisions of the agreement or contract, including the direct debt formed by direct borrowing and default of project funds and the debt formed by providing credit support such as guarantee or rescue. In recent years, the rapid expansion of local government debt in China has occupied a considerable amount of bank credit funds. Existing studies at home and abroad have shown that with the increase of local government debt, the debt capital obtained by enterprises decreases correspondingly. The crowding-out effect of local debt makes the financing costs of Chinese enterprises, which are generally constrained by financing, rise and the scale of debt financing decrease. Therefore, the growth of local government debt will have an impact on the degree of underinvestment of enterprises. Even if there are good investment opportunities, enterprises will give up investment due to the crowding-out effect of local government debt. China's credit market has the characteristics of geographical segmentation, which provides an ideal environment for testing the local crowding out effect. However, the impact of the different nature of borrowing enterprises is not the same. In order to maximize profits, banks will tighten lending to higher risk borrowers. In the Chinese market, state-owned enterprises have explicit or implicit government guarantees, which makes it easier to obtain bank funds.

From the existing literature research, the crowding out effect of local government debt on corporate financing can be divided into bond financing channels and bank credit channels. From the perspective of bond financing channels, under the credit and financial guarantee of local governments, the default risk of government bonds and private corporate bonds are significantly lower than corporate bonds. Once a large number of new government bonds flood into the bond market, they will form a substitute role for corporate bonds, especially those issued by non-state-owned enterprises. In order to raise funds, companies have to raise the yield to maturity on the bonds they issue. The increase of yield to maturity makes the financing cost of corporate bonds rise and increases the financing constraint of enterprises.

From the bank credit squeezing channel: our country's enterprise departments and local debt financing sources have a lot of overlap parts, and bank loans for local government debt are huge. The two forms a strong competitive relationship between bank credit demand and government debt. Because of its government background and implicit guarantee, government debt enjoys an absolute advantage in the competition with bank loans in the enterprise sector.

First of all, in the bank-dominated financial system in China, the overall financing structure of enterprises is dominated by indirect financing. Compared with equity financing, enterprises prefer debt financing. In external financing, long-term corporate bank loans account for more than 60%, bond financing accounts for about 10%, other financing sources account for 20%, and equity financing only accounts for 10%. It can be seen that bank loans have long been the most important channel for Chinese enterprises to seek external financing. According to the audit results of local government debt nationwide in 2011, the growth rate of local government debt in 2010 and 2011 was 61.92% and 18.86%, respectively. In that year, new local government debt was 2.0472 and 2.021.3 billion yuan, respectively. Bank loans accounted for 79% of the financing sources of local government debt, and 1617.3 billion yuan and 1596.8 billion yuan of new local government debt came from bank credit. According to the statistical data report on the scale of social financing released by the central bank, the total amount of RMB loans in 2010 and 2011 was 7,904 billion yuan and 7,479.9 billion yuan respectively, accounting for 56.7% and 58.3% of the total scale of social financing. Local government debt accounted for 20.46% and 21.35% of bank loans in 2010 and 2011. Therefore, local debt is a very important force in the credit markets. Based on the above facts, the phenomenon of local debts competing with the private enterprise sector in corporate bank loans is an objective existence. Secondly, due to the government background attribute of local debt and the implicit guarantee of the government to the financing platform and the credit enhancement behavior of injecting assets such as land and other collateral. Banks and other financial institutions with "political motivation" and risk considerations are more inclined to lend funds to local debt. Therefore, compared with the bank loans of local government debt, the enterprise sector is at an absolute disadvantage. The amount of credit available to enterprises decreases as local government debt increases. In addition, the infrastructure construction industry to which local government debt funds are invested had a large capital demand with a long construction cycle, which occupied bank credit resources for a long time, aggravating the long-term occupation of bank credit funds. According to the financing priority theory, enterprise financing generally follows the sequence of internal financing, debt financing and equity financing. When the external financing cost rises, enterprises tend to choose internal financing. In addition, too much local government debt will lead to the increase of economic policy uncertainty, thus inhibiting the investment intention of enterprises and reducing the external financing demand of enterprises. As the local government debt pushes up the debt financing cost of enterprises through the price mechanism, and the debt financing cost rises, enterprises tend to replace debt financing through equity financing.

The article constructed a DID model based on the difference of the time of establishing local government financing platform in different counties, by matching the list of financing platforms of county-level local governments with the loan data of county-level financial institutions from 2006 to 2010. Therefore, with the expansion of local debt, the investment of bank credit to the nonefficient enterprise sector was largely influenced by the intervention of local governments. In addition, with the regulations on traditional sources of bank loans coming from the central government becoming increasingly strict, local governments have turned to nontraditional sources of credit loans for debt financing, such as the shadow banking system. As a result, local governments have greatly increased the demand for shadow banking products and have raised the borrowing rates of local shadow banks. This has increased the cost of financing for non-state-owned enterprises, crowding out non-state-owned enterprises.

To sum up, the crowding out of local government debt on corporate debt funds will lead to an increase of the underinvestment of enterprises.

Excessive growth of local government debt will crowd out private sector funds. However, compared with non-state-owned enterprises, state-owned enterprises have a great priority in obtaining bank credit funds due to their natural political relations and implicit government guarantees. The implicit guarantee provided to state-owned enterprises refers to the self-evident guarantee provided by the government for the competition failure and operational loss of state-owned enterprises. This kind of guarantee is an abuse of the government's credit. It is the offside of the government, which is beyond its functions. It excludes private credit and private guarantees that meet the requirements of market economy laws and regulations. The information it conveys also deviates from the market rules and undermines the market order of "survival of the fittest." In addition, the crowding-out effect of government debt had little impact on state-owned enterprises. As for these enterprises with low financing constraints, they are less dependent on debt funds. When debt funds are squeezed by local debts, they can make financing investments through more channels, such as internal financing, which relies on their own cash flow, and equity financing. Therefore, the crowding out effect of local government debt on enterprises with high financing constraints is stronger. Local debt funds can invest mainly in infrastructure projects in the region. The construction of infrastructure needs to cooperate with a class of construction enterprises, so the investment crowding out effect of local government debt on enterprises is weaker. The industry attributes of these enterprises are that local government debt mainly invests to industry.

Based on the above theoretical analysis, the following research hypotheses are proposed in this paper.

2.3. Local Government Debt, Proportion of Fixed Assets, and Underinvestment of Enterprises. Fixed assets are the main credit collateral provided by enterprises when they lend money to banks. With the increase of the proportion of fixed assets, the ability of enterprises to obtain bank credit is also enhanced. In particular, after the implementation of ≪the Property Law of the People's Republic of China in 2007, the real right system of security in China has been improved, and the mortgage guarantee value of fixed assets in bank credit has been further enhanced. The expansion of the debt

scale of local government squeezes the scale of bank credit financing of enterprises and further aggravates the scarcity of credit funds and the shortage of supply in the market. So banks will pay more attention to the guarantee of corporate credit collateral when they grant credit loans to enterprises. In the context of the rapid growth of local government debt, when enterprises carry out bank credit financing, enterprises with high fixed assets ratios are less squeezed by local government debt than those with low fixed assets ratios. Therefore, the impact of local government debt on the underinvestment of enterprises with a high fixed asset ratio will be relatively less. In other words, with the increase of the proportion of fixed assets of enterprises, the impact of the scale of local government debt on the underinvestment of enterprises decreases. We call this effect the "collateral effect" of fixed asset ratio.

In addition, the proportion of fixed assets in the total assets of an enterprise often means the strength of the liquidity of fixed assets in the capital market, namely the degree of reversibility of enterprise assets, which is mainly reflected in the sunk costs and transaction costs that enterprises have to bear when disposing of investment assets.

The effect is embodied in the following: on the one hand, when investment assets are realized, sunk costs of existing investments cannot be recovered due to factors such as asset specificity. On the other hand, in order to conclude a transaction to dispose of the investment assets, enterprises need to pay the transaction costs and bear the purchasing costs of assets. At the same time, when waiting for the right transaction opportunity, enterprises need to bear the opportunity cost of time in the waiting process. The reversibility of assets measures a firm's ability to protect itself in times of trouble. When external financing is tight, companies with more irreversible assets are more likely to cut down investment spending. Therefore, with the increase in the irreversibility of enterprise assets, the greater the degree of local government debt crowding out enterprise investment. This effect is called "the asset irreversible effect" of fixed asset proportion.

Based on the above theoretical analysis, this paper proposes the following hypotheses.

3. Research Design

3.1. Sample Sources and Data Description. The annual financial data of A-share listed companies used in the study is derived from the CSMAR database, and the data span is from 2011 to 2021. At the same time, we obtained the geographic information of enterprise registration and office location from the Wind database, and combined the information with that obtained from the CSMAR database. Based on the availability on data of local bonds, and local financing platforms in each city, the urban investment bonds issued by each prefecture-level city are used in the paper to represent the new local bonds of the prefecture-level city every year. The data of urban investment bonds used is from the Wind database which includes corporate bonds, corporate bonds, medium-term notes, short-term financing bonds, privately raised bonds and other types of bonds issued by various urban investment and financing platform companies in the bond market (including the interbank bond market and the exchange bond market) in the same year. It should be noted that, though most local government debt funding comes from bank loans, the crowding out effect of local government debt on enterprise investment will be underestimated, due to the availability of data. In the article, urban investment bonds instead of local government bonds. The paper also emphasizes the crowding out effect of local government debt on corporate bank credit is one of the important factors affecting cause enterprises' lack of investment. M2 money supply and other macro data are derived from the CEIC database. In this paper, samples were screened according to the following criteria: (1) excluding financial and insurance companies; (2) excluding these companies which are ST or ST*; (3) excluding insolvent companies; (4) the article winsorized the extreme value of each variable according to 1% quantile.

3.2. Variable Selection

3.2.1. A Measure of Underinvestment in a Business. The residual regression of this model ε_{it} represents the inefficient investment expenditure of the company. When $\varepsilon_{it} > 0$, it means that the company's investment is overinvested, which is denoted as Over_INV. When $\varepsilon_{it} < 0$, it means that investment of the company is underinvested, which is denoted as Under_INV.

$$\begin{aligned}\text{Invest}_{i,t} = {} & \alpha_0 + \alpha_1 \text{Growth}_{i,t-1} + \alpha_2 \text{Size}_{i,t-1} + \alpha_3 \text{Lev}_{i,t-1} \\ & + \alpha_4 \text{Cash}_{i,t-1} + \alpha_5 \text{Age}_{i,t-1} \\ & + \alpha_6 R_{i,t-1} + \alpha_7 \text{Invest}_{i,t-1} + \sum \text{Industry} + \sum \text{Year} + \varepsilon_{\text{it}}.\end{aligned} \tag{1}$$

Among them, variable Invest represents the investment expenditure of a business. Variable growth represents the growth rate of core operations of an enterprise, which measures the growth of the enterprise. Variable size measures the size of a company. Variable Lev represents the company's financial leverage ratio. Variable cash represents the cash holdings of a company. Age represents the company's age. R represents the return on shares. The detailed composition of variables is shown in Table 1.

3.2.2. Measurement of Financing Constraints. There are many indexes to measure corporate financing constraints, but most of them have strong endogenous problems with corporate financial indicators. For example, financing constraints are mutually determined by cash flow and leverage ratio. When the value of SA is negative, and the greater the value of SA, enterprises will face stronger financing constraints. Therefore, the financing constraint SA index is temporarily adopted as the grouping basis of corporate financing constraints to test the hypothesis1 in this paper. When the SA index of the companies is below 50%, the companies are classified into the low financing constraint group. When the SA index of the companies is above 50%, the companies are classified into the high financing constraint group.

Table 1: Main variables and description.

Variable name	Variable symbol	Variable definition
Underinvestment of enterprises	UnderInv	The residual of the expected investment model is greater than zero, and the absolute value is taken
Availability of debt financing	Loan	(Total borrowings in the current period - total borrowings in the previous period)/total borrowings in the previous period
The scale of local government debt	Debt	The additional quota of urban investment bonds issued by various prefecture-level city financing platforms pluses 1; then, we take its log
Proportion of fixed assets	PPE	Net value of fixed assets/total assets
The growth of the enterprise	Growth	Growth in the main business
The size of a company	Size	ln(total assets)
Leverage ratio	Lev	Total liabilities/total assets
Cash holdings	Cash	(Monetary funds + net short-term investments)/total assets
Firm age	Age	ln⁅Year established +1⁆
Return on equity	R	Annual return on a single stock taking into account the reinvestment of cash dividends-a weighted average method of the combined annual market return and current market value taking into account the reinvestment of cash dividends
Operating margin	OPR	Net profit/operating income
Investment opportunity	Q	Market value of the company/(total assets at year-end-net intangible assets)
Year-on-year growth rate of M2	M2R	Year-on-year growth rate of M2
Year-on-year GDP growth rate	GDPR	Year-on-year GDP growth

The specific calculation formula is as follows:

$$SA = -0.737^{*}\,\text{Size} + 0.043 * \text{Size}^2 - 0.04^{*}\,\text{Age}. \quad (2)$$

3.3. Model Setting

3.3.1. Local Government Debt and Insufficient Enterprise Investment. If corporate financing, especially bank credit financing, has been squeezed by local government debt, enterprises will face tighter financing constraints. This leads us to wonder whether local government debt is increasing the underinvestment of companies. In order to verify hypothesis 2, a benchmark model (4) was used to test the relationship between local government debt scale and enterprise underinvestment. The model is referenced by the underinvestment model in Zhang [26].

$$\begin{aligned} UnderInv_{j,i,t} = {} & \alpha_0 + \beta_1 Debt_{j,t} + \gamma_1 CF_{i,t} + \gamma_2 Lev_{i,t} cr \\ & + \gamma_6 OPR_{i,t} + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t}\ cr \end{aligned} \quad (3)$$

In model (3), we mainly focus on the coefficient of $\beta 1$. If $\beta 1$ is significantly positive, it means that as the scale of local government debt grows, the underinvestment of enterprises rises.

3.3.2. Local Government Debt, the Proportion of Fixed Assets, and Insufficient Enterprise Investment. In the article, we need to explore whether there is a difference in the impact of local government debt on the underinvestment of enterprises with different fixed asset proportions. We need to find out whether the difference is dominated by the "collateral effect" of fixed assets or by the "irreversible effect" of fixed assets. Based on the basis of model (3), we add the variable L. PPE, which measures the proportion of fixed assets of enterprises lagging behind the first stage, and variable L.PPE × Debt is also added in the article. The interactive items L.PPE × Debt represents the product of the proportion of fixed assets of enterprises lagging behind in one period and local debt. Therefore, the empirical model 4 is constructed, which mainly examines the moderating effect of the ratio of fixed assets to local government debt and the underinvestment of enterprises.

$$\begin{aligned} UnderInv_{i,j,t} = {} & \alpha_0 + \beta_1 Debt_{j,t} + \beta_2 L.PPE_{i,t} \\ & + \beta_3 L.PPE_{i,t} * Debt_{j,t} + \gamma_1 CF_{i,t} \\ & + \gamma_2 Lev_{i,t} + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} \\ & + \gamma_5 Size_{i,t} + \gamma_6 OPR_{i,t} \\ & + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t} \\ & + \sum Individual + \sum Year + \varepsilon_{it}. \end{aligned} \quad (4)$$

In model (4), we mainly focus on the coefficient of β_3. If β_3 is significantly positive, it indicates that with the increase of the proportion of fixed assets, the influence of the scale of local government debt on the underinvestment of enterprises is strengthened, and the "irreversible effect of assets" of the proportion of fixed assets is dominant. If β_3 is significantly negative, it indicates that with the increase of the proportion of fixed assets, the influence of the scale of local government debt on the underinvestment of enterprises is weakened, and the "mortgage guarantee effect" of the proportion of fixed assets is dominant.

3.3.3. The Test of the Influence Channel of Local Government Debt on the Underinvestment of Enterprises. This paper argues that the increase in local government debt will reduce the availability of corporate debt financing through bank credit channels and bond financing channels, thus leading to the underinvestment of enterprises. This paper adopts a two-step empirical analysis order to verify the influence mechanism of local debt on the underinvestment of enterprises.. First of all, the loan growth rate of enterprises is used as the dependent variable, and the debt growth scale of local government is used as the explanatory variable for the regression. This regression mainly tests the crowding out effect of local debt issuance on corporate debt financing. Then, variable Invest, which represents investment expenditure of the company is used as the dependent variable, and variable Loan, which represents growth rate of corporate loans is used as the explanatory variable for the regression. This regression mainly tests the impact of debt financing on corporate investment. Model (5) and model (6) are as follows:

$$\begin{aligned} Loan_{i,j,t} = {} & \alpha_0 + \beta_1 Debt_{i,j,t} + \lambda_1 PPR_{i,t} + \gamma_2 CF_{i,t} \\ & + \gamma_3 Lev_{i,t} + \gamma_4 Growth_{i,t} \\ & + \gamma_5 Cash_{i,t} + \gamma_6 Size_{i,t} + \gamma_7 OPR_{i,t} + \gamma_8 TobinQ_{i,t} \\ & + \gamma_9 GDPR_{j,t} \\ & + \sum Individual + \sum Year + \varepsilon_{it}. \end{aligned} \tag{5}$$

In model (5), Loan is an indicator to measure the availability of corporate debt financing. If $\beta 1$ is less than 0, it indicates that the growth of local debt squeezes the debt financing of enterprises.

$$\begin{aligned} \mathrm{Invest}_{i,j,t} = {} & \alpha_0 + \beta_1 \mathrm{Loan}_{i,j,t} + \lambda_1 \mathrm{PPR}_{i,t} + \gamma_2 \mathrm{CF}_{i,t} \\ & + \gamma_3 \mathrm{Lev}_{i,t} + \gamma_4 \mathrm{Growth}_{i,t} \\ & + \gamma_5 \mathrm{Cash}_{i,t} + \gamma_6 \mathrm{Size}_{i,t} + \gamma_7 \mathrm{OPR}_{i,t} + \gamma_8 \mathrm{TobinQ}_{i,t} \\ & + \gamma_9 \mathrm{GDPR}_{j,t} \\ & + \sum \mathrm{Individual} + \sum \mathrm{Year} + \varepsilon_{\mathrm{it}}. \end{aligned} \tag{6}$$

In model (6), Invest is an indicator to measure the investment spending of a company. If $\beta 1$ is less than 0, it indicates that the reduced availability of debt financing makes enterprises reduce investment expenditure.

This avoids the influence of the clustering effect, which is at the company level and the annual level, on the standard error.

Table 1 shows the names, symbols, and definitions of the main variables.

4. Empirical Analysis

4.1. Descriptive Statistics. The main descriptive statistics are shown in Table 2.

4.2. Local Government Debt and Insufficient Enterprise Investment

4.2.1. Baseline Regression Results. The estimation results of model (3) on local government debt and enterprise investment underinvestment are shown in Table 3. The regression results of OLS regression were showed in column (1), column (2), and column (3). The individual fixed effect and annual effect were controlled during the regression. The results show that the regression coefficient between the scale of local government debt and the sample of enterprise underinvestment is significantly positive at the 1% level, respectively. Namely, the scale of local government debt (Debt) has a significant positive impact on the underinvestment level (Under_INV) of local listed companies. It means that, with the expansion of local government debt scale, the phenomenon of underinvestment in enterprises also increases. The results confirm the prediction in economic theory that the expansion of government debt will crowd out private investment, and hypothesis 1 is supported.

In terms of the regression results of microcontrol variables, the cash flow coefficient generated by the business activities of enterprises is significantly negative, indicating that enterprises with good cash flow can alleviate the degree of underinvestment. The coefficient of enterprise scale and leverage financial leverage is significantly negative, indicating that with the increase of enterprise scale and financial leverage, the phenomenon of underinvestment will be alleviated. The coefficient of cash holding and growth of enterprises is significantly positive, indicating that the increase in cash holding and growth level will increase the underinvestment of enterprises. The main reason is that enterprises with insufficient investment often lack relatively stable and low-cost financing channels, so they need to hold a certain cash flow to prepare for an unexpected "liquidity shock." As cash holdings are hoarded, the scale of enterprise investment expenditure will fall, thus resulting in underinvestment. Companies with good growth prospects are usually small-scale and have been established for a short time, and they are often faced with relatively strong financing constraints. The more a company grows, the more it shows strong precautionary cash holding. Therefore, with the growth of enterprises, the phenomenon of underinvestment increases. The coefficient of operating profit ratio (OPR) and investment opportunity (TobinQ) is significantly positive, but the coefficient value closes to zero, indicating that the underinvestment level of listed companies is not strongly correlated with profitability and investment opportunities.

4.2.2. Heterogeneity Analysis

(1) Heterogeneity of Ownership Attributes. State-owned enterprises in our country often have implicit government guarantees due to the care of fatherhood that comes from

Table 2: Descriptive statistics of major variables.

Variable	Mean	Sd	min	p50	Max
Under INV	0.0122	0.0148	0.0022	0.0314	0.0985
Over INV	0.0904	0.1135	0.0031	0.0547	0.3846
Loan	0.0632	0.4256	−0.3584	0.0221	0.2267
Debt	5.1324	2.3458	0.0017	4.5426	6.8642
PPR	0.1856	0.1435	0.0014	0.1359	0.9227
Growth	0.2654	0.5324	−0.4358	0.1046	3.2416
Size	26.2451	1.4652	18.7652	23.4508	24.5138
CF	0.0347	0.1138	−0.2541	0.0254	0.3385
Lev	0.3846	0.2456	0.0457	0.3184	0.8756
Cash	0.2754	0.1807	0.0216	0.1358	0.9648
OPR	0.3561	24.6859	−1.3568	0.1085	1.2648
TobinQ	3.1652	7.6258	0.1854	2.2437	72.1548
Age	2.4239	0.5429	1.0423	2.4585	2.4584
BC	0.6854	0.3755	0.0042	0.8756	0.8456
OC	53.1435	16.7548	13.2456	57.8546	97.5848
GDPR	0.1852	0.1854	−0.9617	0.1237	0.2345

Table 3: Local government debt and insufficient enterprise investment.

Variables	(1) Under_INV	(2) Under_INV	(3) Under_INV
Debt	0.006**	0.008**	0.012***
	(5.48)	(3.42)	(1.56)
CF	−0.018***	−0.126**	−0.026***
	(−11.24)	(−4.07)	(−5.64)
Lev	−0.107**	−0.042***	−0.068**
	(−18.65)	(−6.53)	(−5.14)
Growth	0.005***	0.002**	0.002**
	(4.99)	(2.34)	(2.26)
Cash	0.018***	0.124***	0.026***
	(12.15)	(4.25)	(6.12)
Size	−0.252***	−0.012***	−0.026***
	(−28.26)	(−4.14)	(−6.85)
OPR	0.001***	0.006***	0.006***
	(20.15)	(54.56)	(36.54)
TobinQ	0.008**	0.026***	0.011***
	(2.24)	(4.46)	(2.56)
GDPR	−0.015*	0.026***	0.002
	(−1.26)	(2.25)	(1.96)
Observations	9542	9542	9542
Adjusted *R*-squared	0.245	0.054	0.056
Individual effect	Yes	No	Yes
The annual effect	No	Yes	No
Control variables	No	No	Yes
F	565.4	618.6	258.6

Note : ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

local government [27]. The care allowed state-owned enterprises to be bailed out by the government in the event of failed investments and financial difficulties. Therefore, compared with private enterprises, state-owned enterprises have unique advantages in external financing because of their "soft budgetary constraint." In the context of the expansion of local government debt, the underinvestment level of state-owned enterprises is not affected. However, local government debt squeezes more external sources of capital for private companies, thus resulting in a rise in underinvestment. We need to investigate whether there is a heterogeneity between local government debt and enterprise

investment insufficiency, due to the difference in enterprise ownership attributes. Model (3) is used for sample regression. The cross product of dummy variable of ownership attribute (NSOE) and local government debt (Debt) is added into model (3), and then model (7) is constructed.

$$\begin{aligned} UnderInv_{i,j,t} = {} & \alpha_0 + \beta_1 Debt_{j,t} + \beta_2 NSOE_i \\ & + \beta_3 NSOE_i * Debt_{j,t} + \gamma_1 CF_{i,t} \\ & + \gamma_2 Lev_{i,t} + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} \\ & + \gamma_5 Size_{i,t} + \gamma_6 OPR_{i,t} \\ & + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t} \\ & + \sum Individual + \sum Year + \varepsilon_{it}. \end{aligned} \tag{7}$$

If the property of enterprise ownership is non-state-owned, the value of NSOE is 1. If the property of enterprise ownership is a state-owned enterprise, the value of NSOE is 0. We predict that the coefficient of β_3 is positive. It means that, compared with state-owned enterprises, non-state-owned enterprises will faced a more serious crowding-out effect, which comes from the local government debt.

Columns (1) and (2) of Table 4 show the regression results for model (3) based on the ownership attribute, In column (1), the scale of local government debt and underinvestment of enterprises is significantly negative, suggests that an increase in the scale of local government debt reduces the level of underinvestment of state-owned enterprises. In column (2), the scale of local government debt and underinvestment of enterprises is positive, suggesting that an increase in the scale of local government debt increases the level of underinvestment of non-state enterprises. In column (3), the dummy variable for ownership attributes, NSOE × Debt is significantly positive, which indicates that an increase in the scale of local government debt causes more severe underinvestment in private enterprises.

(2) Heterogeneity under Different Financing Constraints. Debt financing is the main external financing for enterprises. It refers to the working capital or capital expenditure raised by the enterprise through the sale of bonds and notes to individual or institutional investors. Individual or institutional investors lend funds, become the creditors of the company, and obtain the commitment of the company to repay the principal and interest. The financing decision-making of enterprises should consider the financing channels and financing costs, so a series of financing theories have been produced. As for enterprises with tight financing constraints, when they face the "squeeze" of local government debt on bank credit resources and the "substitution" of corporate bonds, the degree of underinvestment will increase. Compared with enterprises with lower financing constraints, enterprises with tight financing constraints tend to reduce the scale of their investments scale. In order to investigate whether there is a heterogeneity between local government debt and enterprise investment insufficiency due to the difference in the degree of financing constraints, model (3) is used for sample regression, according to the degree of financing constraints. The cross product of dummy variables of financing constraints (FC) and local government debt (Debt) is added into model (3), and then model (8) is constructed.

$$\begin{aligned} UnderInv_{i,j,t} = {} & \alpha_0 + \beta_1 Debt_{j,t} + \beta_2 FC_{i,t} \\ & + \beta_3 FC_{i,t} * Debt_{j,t} + \gamma_1 CF_{i,t} \\ & + \gamma_2 Lev_{i,t} + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} \\ & + \gamma_5 Size_{i,t} + \gamma_6 OPR_{i,t} \\ & + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t} \\ & + \sum Individual + \sum Year + \varepsilon_{it}. \end{aligned} \tag{8}$$

According to the financing constraint SA index, the samples were divided into two groups according to the quantile statistics. Those with less than 50% quantile were in the low financing constraint group, while those with more than 50% quantile were in the high financing constraint group. When the sample enterprise is in the group with high financing constraints, the value of FC is 1. When the sample enterprise is in the group with low financing constraints, the value of FC is 0. We predict that the coefficient of $\beta 3$ is positive. That is, compared with enterprises with low financing constraints, enterprises with high financing constraints will face a more serious crowding out effect.

The regression results of model (8) are shown in columns (1) and columns (2) in Table 5. According to the financing constraint SA index, the underinvestment enterprises were divided into two groups: enterprises with low financing constraints and enterprises with high financing constraints. In the group with high financing constraints, the coefficient between local debt and underinvestment was significantly positive. It shows that regardless of whether enterprises have low financing constraints or high financing constraints, the increase in local debt causes an increase in the level of underinvestment in enterprises. Meanwhile, the positive effect of local debt on the level of underinvestment of enterprises with low financing constraints is slightly greater than that of enterprises with high financing constraints. In column (3), the cross product of the dummy variable CF, which represents the degree of financing constraint, and local government debt (Debt), is significantly positive. This means that the increase in local government debt will cause more serious underinvestment for enterprises with tight financing constraints. The impact of local government debt on underinvestment has different results among enterprises with different financing constraints.

4.2.3. The Heterogeneity of Different Investment Industries. Local debt funds mainly flow to infrastructure projects in the region. The project investment process is an organizational configuration process based on the project's own stakeholders. The investment subject of the project needs to focus on the construction of the infrastructure project and gather the construction party, investor, and material supplier of the project. Among the infrastructure enterprises cooperating

Table 4: The regression results of local debt and enterprise investment under different ownership attributes.

Variables	(1) State-owned enterprises Under_INV	(2) Non-state-owned enterprises Under_INV	(3) Under_INV
Debt	−0.008** (−0.85)	0.009*** (3.26)	−0.007*** (−0.46)
NSOE × Debt			0.008** (3.37)
Adjusted *R*-squared	0.207	0.158	0.254
Individual effect	No	Yes	Yes
The annual effect	Yes	Yes	No
Control variable	No	Yes	Yes
F	257.6	18.52	248.7

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Table 5: The regression of local debt and enterprise investment under different financing constraints.

Variables	(1) Low financing constraints Under_INV	(2) High financing constraints Under_INV	(3) Under_INV
Debt	0.017** (0.46)	0.012*** (3.14)	0.019 (0.46)
FC			−0.253 (−1.89)
FC × Debt			0.038** (1.85)
Adjusted *R*-squared	0.168	0.047	0.185
Individual effect	Yes	No	Yes
The annual effect	Yes	Yes	No
Control variable	No	Yes	Yes
F	286.4	11.37	314.5

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

with the government, construction enterprises account for most of the enterprises. According to the results of the national local debt audit in 2011 and 2013, the outstanding expenditures of local government debt were mainly used for basic and public welfare projects such as municipal construction, land purchase and storage, transportation, low-income housing, education, science, culture, and health, agriculture, forestry, water conservancy, and ecological construction, accounting for 86.54% and 86.77% of the total local debt in the same year, respectively. Therefore, the sharp increase in local government debt has less impact on the investment of enterprises investing in the industry. However, it has a greater impact on enterprises that are not invested in the industry. In order to analyze whether the impact of the expansion of local government debt on the underinvestment of listed companies is related to their industries, the paper divides the local government debt expenditure into the following industries: (1) Transportation, warehousing, postal services;(2) water conservancy, environmental , public facilities management; (3) electricity, heat, gas , water production and supply; (4) residential services, repairs, and, other services; (5) education; (6) health, and, social work; (7) culture, sports, and, recreation; (8) construction. If the enterprise does not invest money to the industry above, the value of INDU is 1. If the enterprise invests the money to the industry above, the value of INDU is 0. In order to investigate whether there is the heterogeneity between local government debt and enterprise investment insufficiency, due to the difference of industry attributes, model (3) is used for sample regression, according to the difference of industry attributes. The cross product of dummy variable of financing constraints (FC) and local government debt (Debt) is added into model (3), and then model (9) is constructed.

$$\begin{aligned} UnderInv_{i,j,t} = {} & \alpha_0 + \beta_1 Debt_{j,t} + \beta_2 INDU_i cr \\ & + \gamma_2 Lev_{i,t} + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} cr \\ & + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t}\ cr \end{aligned} \quad (9)$$

We predict that the coefficient of β_3 is positive. It means that if companies do not belong to one of these eight sectors, the squeeze from government debt is significant.

The regression results of model (9) are shown in the columns (1) and column (2) in Table 6, according to the industry group. The dummy variables for the degree of financing constraints are all significantly positive, suggesting that in both enterprises that are invested in the industry and enterprises that are not invested in the industry, an increase in local debt causes an increase in the level of

Table 6: Insufficiency under the attribute of different industries.

Variables	(1) Invet to the industry Under_INV	(2) Invet not to the industry Under_INV	(3) Under_INV
Debt	0.019** (0.26)	0.004*** (1.86)	0.065** (0.16)
INDU × Debt			0.016* (1.28)
Adjusted *R*-squared	0.108	0.208	0.135
Individual effect	No	Yes	Yes
The annual effect	Yes	Yes	No
Control variable	Yes	Yes	No
F	942.5	22.15	308.6

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

underinvestment by firms, while the positive effect of enterprises that are invested in the industry level of underinvestment is slightly greater than that of enterprises that are not invested in the industry. As for the results in column (3), the cross term between the dummy variable INDU, which represents the industry attribute and local government debt (Debt) is significantly positive, indicating that local government debt will cause more serious underinvestment for these enterprises that do not belong to the industry that local government debt invests in.

4.3. Local Government Debt, Proportion of Fixed Assets, and Insufficient Enterprise Investment. The regression results of model (4) are shown in Table 7. The coefficient of PPE × Debt of the ratio of fixed assets and local debts is significantly greater than 0, indicating that the increase of local government debt will have a greater impact on the underinvestment of enterprises, that have a higher ratio of fixed assets. This shows that the "irreversible effect of assets" plays a dominant role in regulating the relationship between local government debt and enterprise investment deficiency. With the increase in the proportion of fixed assets, enterprises will have greater probability to bear the sunk cost, transaction cost and fall into financial difficulties. With external financing constrained by local government debt, companies with more irreversible assets are more likely to cut investment spending.

4.4. The Test of the Influence Channel of Local Government Debt on the Underinvestment of Enterprises. The regression results of model (5) are shown in Table 8. On the whole, the regression coefficient between the scale of local government debt and the availability of corporate debt financing is negative significant, which is at the significance level of 1%. It means that local government debt has a crowding-out effect on corporate debt financing.

In columns (2) and (3), the regression coefficients between the scale of local government debt of SOEs, and *n* non-SOEs enterprises and the availability of corporate debt financing are *s* significantly negative at levels of 1% and 5%, respectively, the absolute value of the impact coefficients is larger than the coefficients of the whole sample. It shows that whether state-owned or non-state-owned enterprises, local debt increases crowding out affect the availability of corporate debt financing. The negative impact of the scale of local government debt on corporate debt financing is greater for nonSOEs than for SOEs, indicating that the scale of local debt has a greater significant impact on nonSOEs. In columns (4) and (5), the regression coefficients between the scale of local government debt of invet to the industry and Invet not to the industrial enterprises and the availability of corporate debt financing are significantly negative in levels 1% and 5%, respectively, the absolute value of the impact coefficients is larger than the coefficients of the whole sample, It shows that whether invet to the industry enterprises or Invet not to the industry enterprises, local government debt increases crowding-out effect the availability of corporate debt financing. The negative impact of the scale of local government debt on corporate debt financing is greater for Invet not to the industrial enterprises than for invet to the industry enterprises, indicating that the scale of local debt has a greater significant impact on not to the industry enterprises.

The regression results of model (6) are shown in Table 9, which mainly test the change of corporate debt financing on corporate expenditure. The coefficient of corporate debt financing and local debt is significantly positive at the significance level of 1%. This result is not affected by the overall regression results nor the sample regression results. The samples mainly refer to state-owned enterprises and non-state-owned enterprises, invested industries and non-invested industries. The increase of corporate debt financing can increase corporate investment expenditure. In other words, enterprise's investment expenditure is highly sensitive to the change of enterprise's debt financing. When enterprise's debt financing is squeezed by local debt, enterprise will reduce investment expenditure.

Based on the regression results in Tables 8 and 9, the influence mechanism of local debt on the underinvestment of enterprises is verified. The expansion of local government debt is crowding out the debt financing channels of corporations in the bond market and financial institutions such as banks. However, the investment expenditure of enterprises is very sensitive to the increase or decrease of debt financing, and the reduction of debt financing makes

Table 7: Regulating effect of different fixed assets proportion.

Variables	(1) Invet to the industry Under_INV	(2) Invet not to the industry Under_INV	(3) Under_INV
Debt	0.019** (0.26)	0.004*** (1.86)	0.065** (0.16)
INDU × Debt			0.016* (1.28)
Adjusted *R*-squared	0.108	0.208	0.135
Individual effect	No	Yes	Yes
The annual effect	Yes	Yes	No
Control variable	Yes	Yes	No
F	942.5	22.15	308.6

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Table 8: Local government debt and the availability of corporate debt financing.

Variables	(1) Whole sample	(2) State-owned enterprise	(3) Non-state-owned enterprise	(4) Invet to the industry	(5) Invet not to the industry
	Loan	Loan	Loan	Loan	Loan
Debt	−0.038*** (−2.86)	−0.045*** (−0.68)	−0.107** (−3.16)	−0.054*** (−0.39)	−0.113** (−3.25)
Adjusted R^2	0.249	0.165	0.254	0.281	0.217
Individual effect	Yes	Yes	No	Yes	No
The annual effect	Yes	Yes	Yes	Yes	Yes
Control variable	Yes	Yes	Yes	No	Yes
F	59.65	33.24	24.25	25.64	30.13

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

Table 9: Regression of debt financing and corporate investment.

Variables	(1) Whole sample	(2) State-owned enterprise	(3) Non-state-owned enterprise	(4) Invet to the industry	(5) Invet not to the industry
	Invest	Invest	Invest	Invest	Invest
Loan	0.146*** (17.54)	0.234*** (11.36)	0.068** (14.17)	0.124*** (16.54)	0.023** (8.64)
Adjusted R^2	0.314	0.185	0.264	0.288	0.184
Individual effect	Yes	Yes	Yes	No	Yes
The annual effect	Yes	No	Yes	No	Yes
Control variable	Yes	Yes	Yes	Yes	No
F	64.38	28.65	38.46	58.64	13.56

enterprises reduce investment expenditure, thus showing the phenomenon of underinvestment.

5. Robustness Test

To a large extent, the robustness of the above research conclusions depends on the reliability measured by underinvestment and the reliability of urban investment bond data. The methods of reducing the number of sample and changing the estimation method of underinvestment are used to further test the robustness of the above conclusions. The regression of model (3) is carried out again by using these urban investment bond data, collected and published by existing scholars.

5.1. Reducing the Number of the Sample and Changing the Estimation Method of Underinvestment. First of all, considering that there are few enterprises that meet the expected investment expenditure in the expected investment model (1), the residual value, which is greater than 25% quantile and less than 75% was eliminated in this paper. The residual represents the cost of the firm's inefficient investment. If the residual is

Table 10: Regression results of reducing the sample and reestimating firm underinvestment.

Variables	(1) Under_INV	(2) Over_INV	(3) Under_INV	(4) Over_INV
Debt	0.128***	0.025**	0.008***	0.006**
	(1.85)	(0.32)	(2.58)	(0.54)
Adjusted *R*-squared	0.118	0.238	0.164	0.224
Individual effect	Yes	Yes	Yes	Yes
The annual effect	No	Yes	Yes	Yes
Control variable	Yes	Yes	Yes	Yes
F	8.567	9.234	225.6	16.58

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

greater than 0, it means the company has overinvested, which is recorded as Over_INV. If the residual is less than 0, it means that the company has underinvested. For the convenience of understanding, the absolute value of the sample with a residual of less than 0 is taken in the regression analysis to measure the degree of underinvestment, which is recorded as Under_INV. Secondly, the growth of investment opportunities in the expected investment model is replaced by the TobinQ with a lag phase. And then the underinvestment was reestimated and the model (3) was reregressed. The regression results of the reduction sample are shown in column 1 and column 2 in Table 10. The regression results of changing the underinvestment estimation method are shown in column 3 and column 4. The regression results of enterprise underinvestment and local government debt are consistent with the above results, both of which are significantly positive. The increase in local government debt will reduce enterprises' underinvestment, which is specifically manifested as underinvestment.

5.2. Substitution Independent Variable. In this paper, two alternative independent variables are used to test the robustness of the results. First of all, the independent variable Debt was replaced by a dummy variable Debt_Dum. Variable debt represents the number of urban investment bonds issued in the city where the enterprise is located. If the city where the enterprise is located has issued urban investment bonds, the value of Debt_Dum is set to 1 in that year, otherwise it is set to 0. This can reduce the influence of some extreme values on the regression results. In addition, Inverse Hyperbolic Sine (IHS), the amount of bonds issued after the transformation, is used as a variable to reflect the issuance scale of urban investment bonds, according to some research by Mao Jie [28]. The regression result after replacing the independent variable is shown in Table 11. The calculating formula is ln (Debt IHS) = ln [the number of debt issuance + ((the number of debt issuance)^2 + 1)$^{1/2}$].

Table 11: The regression result is after replacing the independent variable.

Variables	(1) Under_INV	(2) Under_INV
Debt_Dum	0.122***	
	(3.16)	
DebtIHS		0.018***
		(2.26)
Adjusted *R*-squared	0.215	0.264
Individual effect	Yes	Yes
The annual effect	Yes	No
Control variable	Yes	Yes
F	265.4	282.4

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

6. Further Studies

6.1. A Quasi-Natural Experiment Based on the New Budget Law. The debt capital is financed by a local financing platform and is mainly used for the construction of local infrastructure and public goods. The payback of a project invested in debt is longer, and the return on the project is low. If we only rely on the low yield of the financing vehicle itself, it is difficult to repay the principal and interest when the debt matures. Based on this, if local financing vehicles are "real" debt subjects, banks and bond market investors will not lend money and buy the issued bonds at a lower rate, which is less than the average corporate loan interest rate and average corporate bond yield. And then the "crowding out effect" of local debt on corporate debt financing will be weakened or even nonexistent. However, in our country, the government often acts as the "actual controller" of the local financing platform. The government can inject a large number of land assets controlled by local state-owned enterprises' equity into the financing platform and also increase government subsidies for financing platforms. Therefore, the government not only provides invisible guarantees for financing platform, but also helps to improve enterprise profitability to meet the regulatory 'threshold' for issuing of corporate bond [29]. Based on this, banks and investors assess the default risk of financing vehicles and urban investment bonds to be much lower than that of general corporate bonds. Therefore, government debt can have a "squeeze effect" on corporate debt financing, thus affecting corporate investment and resulting in underinvestment. In other words, if the relationship between the government and urban investment companies is weakened and the confidence of banks and investors in the implicit government guarantee is shaken, then the crowding out effect of local debt on corporate debt financing will also be weakened. Since January 1, 2015, the implementation of the New Budget Law has provided us with an excellent opportunity for quasi-natural experiment. After the new law takes effect, local government debt can only be in the form of

government bonds. At the same time, local government debt is implemented through quota management. Now the debts that come from financing platforms don't't belong to the government debt. The introduction of the ≪New Budget Law≫ clarifies the responsibilities of the government and enterprises. It means that government debts shall not be borrowed through corporate financing platforms, and corporate debts shall not be repaid by the government, which ensures that who borrows what and who pays what and take risks on their own, further demarcating the boundary between financing vehicles and local government debt. Therefore, after the establishment of the new law, the implicit guarantee and guarantee effect brought by the local government to enterprises will be reduced, and the "crowding out effect" on enterprises will be weakened. The status quo of enterprises' underinvestment will be alleviated.

Based on the above analysis, the DID model was constructed in this paper to study the impact of the ≪New Budget Law≫ on the underinvestment of enterprises. In this paper, the dummy variable was designed to represent the implementation of the ≪New Budget Law≫. The value of the dummy variable is 1, when the years are 2015 and after 2015. While in other years, the value of the dummy variable is 0. The phenomenon of under-investment appeared in non-state-owned enterprises, because that the local debt significantly squeezed out the debt financing of non-state-owned enterprises. However, this crowding out effect is not obvious in state-owned enterprises. Therefore, non-state-owned enterprises were set as the experimental group and state-owned enterprises as the control group. And then a double difference model (10) and triple difference model (11) were constructed.

$$\begin{aligned} UnderInv_{i,j,t} &= \alpha_0 + \beta_1 Law_t * NSOE_i + \gamma_1 CF_{i,t} + \gamma_2 Lev_{i,t} \\ &\quad + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} + \gamma_5 Size_{i,t} + \gamma_6 OPR_{i,t} \\ &\quad + \gamma_7 TobinQ_{i,t} + \gamma_8 GDPR_{j,t} \\ &\quad + \sum Industrial + \sum Year + \varepsilon_{it}, \\ Loan_{i,j,t} &= \alpha_0 + \beta_1 Law_t * NSOE_i + \beta_2 debt_{j,t} \\ &\quad + \beta_5 Law_t * NSOE_i * debt_{j,t} + Control_{i,t}. \end{aligned} \tag{10}$$

In model (9), the coefficient β_1 is the mainly concern. If β_1 is less than 0, it indicates that the underinvestment of enterprises has been alleviated after the implementation of the new law. In model (10), the coefficient β_5 is mainly concerned. If β_5 is less than 0, it indicates that the crowding out effect of local debt on corporate debt financing decreases after the implementation of the new law.

The regression results of model (10) and model (11) are shown in column (1) and column (2) of Table 12, respectively. Since the annual fixed effect and enterprise fixed effect have been controlled in the model, the regression results do not include the variables Law and SOE separately. The coefficient β_1 of model (9) is significantly negative at the significance level of 5%. It means that the underinvestment level of enterprises has improved after the implementation of the New Budget Law. The coefficient β_5 in model (10) is significantly negative at the significance level of 5%. It means that the crowding out effect of local debts on enterprises' debt financing has weakened after the implementation of the new law.

Table 12: Quasi-natural experiment and the economic consequence of regression based on the new budget law.

Variables	(1) Under_INV	(2) Loan	(3) TobinQ
Debt		−0.207***	−0.214***
		(−1.36)	(−1.86)
Law × NSOE	−0.128**	0.148*	
	(−1.86)	(1.84)	
NSOE × Debt		0.128	
		(0.84)	
Law × Debt		0.058**	
		(1.86)	
Law × Debt × NSOE		−0.186***	
		(−2.64)	
Under_INV			−5.546**
			(−3.18)
Debt × Under_INV			2.126***
			(7.58)
Adjusted R-squared	−0.426	−0.152	−0.138
Individual effect	Yes	Yes	Yes
The annual effect	Yes	No	Yes
Control variable	Yes	Yes	Yes
F	44.58	62.58	90.18

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

6.2. The Economic Consequences of Insufficient Investment. With the increase of local government debt, the amount of enterprise investment will be significantly reduced, leading to the underinvestment of enterprises. Then what are the economic consequences of underinvestment? We analyze the economic consequences caused by local debt from the perspective of enterprise value. The information about an enterprise investment decision is easily captured by relevant stakeholders and market investors. And investors will judge the value of the business. Therefore, the lack of debt funds may cause enterprises to miss a lot of development opportunities, thus adversely affecting the market value of enterprises. In order to verify this hypothesis, Tobin Q as the measurement index of enterprise value was used in this paper. The interaction term of Debt × Under_INV was added into the model, which is the product of local government debt (Debt) and underinvestment (Under_INV), to test the impact of underinvestment driven by local government debt on enterprise value. The result of column (3) in Table 12 shows that the regression coefficients of local government debt and underinvestment are both negative, and he regression coefficients of Debt × Under_INV are positive which are both significant at the 1% significance level. This indicates that the increase of local government debt and the increase of underinvestment significantly reduce the value of enterprises. With the increase of local government debt, the investment of enterprises is gradually squeezed out, which is not conducive to the improvement of enterprise value.

Table 13: Partial effect of local government debt on the effect of monetary policy (underinvestment).

Variables	(1) Whole sample Under_INV	(2) Non-state-owned enterprise Under_INV	(3) State-owned enterprise Under_INV	(4) Invet not to the industry Under_INV	(5) Invet to the industry Under_INV
Debt	0.124*** (6.38)	0.014*** (5.68)	0.018** (0.86)	0.018*** (5.18)	0.009** (0.46)
MP	−0.024*** (−2.18)	−0.004*** (−1.58)	−0.034*** (−3.68)	−0.218*** (−1.58)	−0.128 (−0.84)
MP × debt	−0.015** (−1.46)	−0.008** (−1.58)	−0.028*** (−0.26)	−0.009** (−2.86)	−0.014*** (−0.18)
CF	−0.038*** (−5.65)	−0.142*** (−5.64)	−0.128*** (−4.86)	−0.114** (−2.56)	−0.128*** (−2.68)
Lev	−0.108** (−8.42)	−0.318*** (−7.52)	−0.026*** (−6.52)	−0.028** (−7.85)	−0.084*** (−1.85)
Growth	0.014** (2.58)	0.018** (3.58)	−0.018*** (−0.15)	0.023*** (1.84)	0.014** (1.08)
Cash	0.014*** (7.58)	0.028*** (5.68)	0.012** (5.42)	0.142*** (8.56)	0.108*** (6.25)
Size	−0.024** (−5.46)	−0.024*** (−6.58)	−0.018*** (−3.86)	−0.084*** (−6.58)	−0.065** (−3.86)
OPR	0.028*** (38.18)	0.008** (0.14)	0.005*** (53.46)	0.018 (0.68)	0.264*** (34.58)
TobinQ	0.018** (1.84)	0.003** (1.46)	0.024*** (3.54)	0.082** (3.48)	0.124*** (2.14)
GDPR	−0.014*** (−0.24)	−0.008** (−0.38)	0.005** (0.24)	−0.007*** (−0.58)	0.468* (0.86)
Adjusted R-squared	0.034	0.018	0.104	0.034	0.028
Individual effect	Yes	Yes	NO	Yes	Yes
The annual effect	NO	NO	NO	Yes	NO
Control variable	Yes	Yes	Yes	Yes	Yes
F	181.54	17.64	482.28	18.46	332.46

Note. ***, **, and * are significant at the 1%, 5%, and 10% levels, respectively.

6.3. Indirect Impact of Local Government Debt on Underinvestment in Enterprises. In the above benchmark equation, we analyzed the direct impact of local government debt on the underinvestment of enterprises. The expansion of local government debt has a wide and far-reaching impact. Will it affect the investment of enterprises through the partial effect of other variables? Therefore, the indirect impact of local government debt on the underinvestment of enterprises was discussed in further research: Does local government debt affect the effectiveness of monetary policy?.

The traditional theory holds that loose monetary policy can effectively reduce the market interest rate on money by increasing the money supply. The short-term price of the means of production can stimulate enterprises to expand the scale of investment and improve the phenomenon of underinvestment. However, enterprises (especially non-state-owned enterprises and manufacturing industries) have been suffering from sluggish investment in China. It seems that not all the funds released by the central bank have gone into industrial investment. The effect of stimulating industrial investment is relatively weak, resulting in an increasingly high cost of stimulus policies. This situation may be due to the expansion of local government debt rules. In addition, a considerable part of the liquidity released by the loose monetary policy flows into local government debt, thus affecting the transmission effect of monetary policy to boost the real economy. Based on this, the dummy variables of monetary policy and the cross product of local debt and monetary policy were added into model (3):

$$\begin{aligned} UnderInv_{i,j,t} = {} & \alpha_0 + \beta_1 debt_{j,t} + \beta_2 Mp_t \\ & + \beta_3 debt_{j,t} * Mp_t + \gamma_1 CF_{i,t} \\ & + \gamma_2 Lev_{i,t} + \gamma_3 Growth_{i,t} + \gamma_4 Cash_{i,t} \\ & + \gamma_5 Size_{i,t} + \gamma_6 OPR_{i,t} \\ & + \gamma_7 TobinQ_{i,t} + GDPR_{j,t} \\ & + \sum Individual + \varepsilon_{it}. \end{aligned} \tag{11}$$

The annual monetary policy variable was set in this paper. If the year is a year of tight monetary policy, the value of the variable is 0. If this year is a year of loose monetary policy, the value of the variable is 1. Monetary policy is

defined as follows: HP filtering was applied to the M2 growth rate time series to generate long-term trend terms and periodic fluctuation terms. If the periodic fluctuation is greater than zero, then the corresponding year is defined as the year of monetary policy easing, and if it is less than zero, it is defined as the year of monetary policy tightening. Within the sample period, 2011–2015 are the years of monetary easing, 2016–2021 are the years of monetary tightening.

The estimated results of equation (11) are reported in Table 13. The coefficient of MP is negative significant, which indicates the loose monetary policy can alleviate the problem of underinvestment by businesses. The coefficient of cross product between MP, a dummy variable of loose monetary policy, and local government debt (Debt) is significant negative. This suggests that the increase in local government debt has weakened the effect of easy monetary policy. The weakening effect is significant between non-state-owned enterprises and enterprises in nonlocal government debt input industry, but not significant between state-owned enterprises and enterprises in nonlocal government debt input industry. This suggests that the money injected by loose monetary policy is likely to be absorbed as local government debt rises in short term. The money should have gone to private and noninvested companies.

7. Conclusions and Policy Recommendations

This paper mainly studies the impact of local government debt on the underinvestment of enterprises. Conclusions are drawn in the article that with the increase in local debt, business underinvestment has increased. This kind of phenomenon is most obvious in state-owned enterprises, enterprises with high financing constraints, and enterprises with local debt invested in the industry. The issuance data of urban investment bonds at the city level, which is a proxy indicator to measure local debt growth, is used in the empirical process. The main reason is that the increase in local debt has squeezed the channels of debt financing for local companies. This crowding out effect is obvious in nonstate-owned enterprises and enterprises whose nonlocal government debts are invested in the industry. We compared with enterprises with a low fixed assets ratio, enterprises with high fixed assets ratio will have a less positive impact of local debt on the underinvestment in enterprises. This is mainly due to the role of fixed assets as collateral. In the further study, the conclusion is drawn that the "crowding out effect" of local debt will cause the decline of enterprise value. Finally, it is found that the monetary fund brought by the loose monetary policy in the short-term are likely to be absorbed by the increase in local government debt. However, this fund should have gone to private enterprises and enterprises whose money is not invested in industry.

The conclusion of this paper provides new clues and empirical evidence for the current sluggish investment in China's enterprise sector, which has very important policy implications. For a long time, local governments have been expanding their own debt to achieve the goal of economic development while ignoring the fact that the increase in local debt will squeeze out financing channels of real enterprises that are in urgent need of external capital support, thus leading to the underinvestment of enterprises. Local governments should properly handle the scale of government debt issuance in the course of steady economic growth, and should not interfere too much in the flow of credit funds. The government should give full play to the role of the market in resource allocation and let capital flow to efficient sectors.

Data Availability

The tables used to support the findings of this study are included in the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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