

Article

Local Government Debt and Corporate Maturity Mismatch between Investment and Financing: Evidence from China

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Abstract: Based on the perspective of investment and financing term structure, this study verifies that local government debt crowds out bank loans available to corporates, resulting in corporate maturity mismatch between investment and financing, namely, short-term financing for long-term investment. According to our heterogeneity analyses, the real impact of local government debt on maturity mismatch between investment and financing is more pronounced for non-state-owned enterprises and firms with high financing demand, located in cities with more local government debt and low financial development. Furthermore, our study reveals that local government debt and corporate maturity mismatch between investment and financing bring about underinvestment and default risk, which ultimately affects local sustainable economic development. This research contributes to the literature on Chinese-specific maturity mismatches.

Keywords: local government debt; maturity mismatch; short-term financing for long-term investment; financing competition



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1. Introduction

According to classical corporate finance theory, matching the investment period with the financing period is a basic principle, that is, using short-term funds to support current assets and long-term funds to support long-term assets [1]. However, the cost of long-term debt is generally higher than that of short-term debt. After weighing financing costs, some companies actively raise long-term funds needed for development through short-term debt [2]. Meanwhile, in China, this is not the case. China's bond and stock markets are still underdeveloped, and corporate long-term financing mainly relies on bank credit, which limits the availability of long-term financing. Additionally, under the long-standing interest rate control, banks cannot adjust interest rates according to debt risks, further hampering the supply of long-term funding [3]. In China, the liabilities of listed companies are mainly bank loans, most of which are short-term, and some listed companies have almost no long-term liabilities [4]. Thus, Chinese companies passively adopt short-term funds to support long-term assets, namely, short-term financing for long-term investment. Because short-term debt must be repaid in the current year, high short-term debt and maturity mismatches bring serious liquidity risks. If the investment cannot generate sufficient cash flow to repay the outstanding debt, it will most likely break the capital chain, even causing financial distress. Moreover, the financial risk will be transmitted to the entire financial system [5]. In other words, matching investment and financing period is the basis for the healthy and sustainable development of enterprises. Enterprises create tax revenues, and their sustainable development also helps the sustainability of local finance.

In China, the risk of maturity mismatch between investment and financing is growing, and has attracted special attention in recent years. Previous studies focus on the characteristics of enterprises, the development of the financial market, and external economic policies to explore the driving mechanism for corporate maturity mismatch between investment

and financing. However, the existing studies ignore the important impact of local governments, which intervene in the allocation of financial resources. In China, local governments actually operate or participate in the routine activity of local financial institutions. Thus, financial resources are preferentially allocated to local government. Because the Chinese financial market is dominated by banks, both local government debt and corporate debt mostly originate from the banking sector. Moreover, the increasing issuance of government debt can drive up its expected return, and further crowd out the financing resources available to the private sector [6]. In light of the preceding discussion, this study seeks to answer the following questions: Does local government debt exacerbate or alleviate companies' maturity mismatch between investment and financing? What are the mechanisms that affect maturity mismatches? Furthermore, what economic consequences do they bring?

Based on the above considerations, using a dataset of all Chinese A-share listed companies and local government debt from 2009 to 2018, we discover that local government debt exacerbates companies' short-term financing for long-term investment. The impact mechanism shows that local government debt crowds out bank loans for companies with long-term funding gaps and exacerbates their maturity mismatches. According to further analyses, the real impact of local government debt is more pronounced in regions with more local government debt and lower levels of financial development, and for companies with greater financing demand and non-SOEs. Moreover, maturity mismatches further aggravate companies' underinvestment and increase default risk, which ultimately affects local sustainable economic development. These results deepen our understanding of the balance between local government debt and corporate growth, and the allocation efficiency of financial resources.

This study contributes to the existing literature in several ways. First, by focusing on a transitional economy with Chinese characteristics, this study expands the research on the influencing factors behind corporate short-term financing for long-term investments, citing local government fiscal policy, which supplements maturity mismatch between investment and financing. Second, this study enriches research on the microeconomic consequences of local government debt and clarifies the impact mechanism of local government debt on corporate maturity mismatches. Third, this study validates the theory that local government debt has brought about unexpected distortions in corporate investment and financing, thus, providing enlightenment for economic security and high-quality development.

The remainder of this paper is organized as follows: Section 2 is the literature review and develops the hypotheses; Section 3 provides background information on local government debt in China and introduces the sample, variables, and empirical methodology used in the study; Sections 4–6 present the empirical results, including robustness tests, mechanism tests, and further analyses; and Section 7 concludes.

2. Literature Review and Hypothesis Development

2.1. A Literature Review on Local Government Debt

Since the 1980s, the competition for financial resources between the government sector and the private sector has inspired a long-running debate. Friedman (1978) and Becker and Ivashina (2018) [7,8] propose that the increasing issuance of long-term bonds can increase the expected returns on government debt, thereby resulting in government debt squeezing out corporate financing. Subsequent studies have systematically explored this competitive relationship from the perspectives of debt maturity, yield spreads, and price competition. The yields of long- and short-term bonds are generally different. When the government increases its issuance of long-term bonds, companies issue more short-term debt, thereby resulting in a negative relationship between the maturities of corporate and government debt [9]. According to the theory of risk aversion, investors prefer liquidity and safety, and increasing the supply of government bonds will reduce their yield differential with corporate bonds [10] and crowd out other highly liquid and secure assets [11]. In terms of price competition, Demirci et al. (2019) [12] use data from 40 countries from 1990 to 2014 to

demonstrate that increases in the supply of government debt increase its expected rate of return, and companies reduce their debt financing in response to increased financing costs.

Differentiating between central and local bonds, Zhang et al. (2022) [13] point out that central government debt squeezes out corporate bonds and local government debt squeezes out corporate loans. Liang et al. (2017) [14] and Huang et al. (2020) [6] also demonstrate that local government debt crowds out corporate financing, reduces corporate leverage ratio, and even causes leverage manipulation to enhance external financing capacity [15]. The crowding-out effect of financing further hinders corporate investment activities. Using data from 50 countries from 1991 to 2017, Alimov (2019) argues that rising government debt affects corporate acquisition activity and aggregate levels [16]. Fan et al. (2022) find that local government debt reduces firms' R&D expenditure and lowers firms' numbers of new patents [17]. Moreover, the banking sector supplies the main funding resource for local government debt. Xiong and Jin (2018) imply that local government debt default risk increases financial risk and transmits to the real economy [18]. Li and Tian (2022) construct a multi-sector DSGE model to demonstrate that the expansion of local government debt increases the risk level for banks, the impact being especially strong for the local banks [19].

2.2. A Literature Review on Short-Term Financing for Long-Term Investment

Short-term financing for long-term investment refers to a type of maturity mismatch between investment and financing which is common among Chinese corporates. There are two mainstream views to explain the maturity mismatch. According to the credit demand theory, in order to reduce financing costs and send good signals, corporates actively choose short-term financing to support long-term investments [20]. Conversely, according to the credit rationing theory, credit allocation dominated by banks has strong risk aversion and banking institutions prefer short-term loans to control risk, thus, corporates passively choose short-term financing for long-term investments [21]. Due to imperfect financial markets and unreasonable interest rates, long-term funding cannot satisfy corporate demand, and Chinese corporates passively adopt short-term funds to invest in long-term assets [3]. Due to soft budget constraints, short-term financing for long-term investment in state-owned companies is more severe than in central state-owned companies [22].

Regarding the capital demander, previous studies show that family control [23], directors' and executives' liability insurance [24], offensive strategies [25], and equity pledge pressure [26] deteriorate the external financing environment and intensify the maturity mismatch between investment and financing. With regard to the capital supplier, financial-industrial integration [27] and financial technology [28] promote the development of the financial market, as well as stable monetary policies, alleviating maturity mismatch between investment and financing [29,30]. Bao et al. (2020) [31] demonstrate that CSR makes companies obtain more short-term debt, and forces polluting companies to undertake environmental responsibility through long-term investments, leading maturity mismatch of investment and financing. Regarding the external economic environment, economic policy uncertainty leads financial institutions to reduce medium- and long-term loans [32], increasing maturity mismatch between investment and financing. In contrast, the value-added tax preference supplements companies' internal funds [33], which alleviates maturity mismatches. Chen et al. (2019) [34] demonstrate that both market timing and collateral constraints are key determinants of maturity mismatches, which impair companies' future operating performance and even cause stock price crashes [35].

2.3. Hypothesis Development

In China, the long-term administrative barriers in jurisdictions, as well as the head office and branch system of banks, has led to natural geographical segmentation in the financial market [6]. Given interest rate control, the effect of interest rate adjustment on the cross-regional flow of funds is limited. Because China's financial market is dominated by indirect financing, both local governments and companies rely on bank loans as their main source of financing [3]. In summary, the relatively fixed amounts of financial resources have

resulted in direct competition between local governments and companies. Moreover, local governments have the power to actually operate and intervene in the resource allocation of local financial institutions. The expansion of local government debt squeezes out corporate debt and increases its cost through price competition [6,14]. There is natural competition between government and corporate debt maturities [9], and increases in long-term local government bonds lead to decreases in long-term corporate loans [13]. Local government debt is mainly used for infrastructure construction and is generally structured as medium- and long-term loans of 3–5 years [36]. In China, interest rate structure is unreasonable, monetary policy is unstable, and the supply of long-term loans is insufficient to meet market demand. The expansion of local government debt has further squeezed out the limited long-term loans, thus, making it more difficult for companies to obtain long-term financing.

The banking sector is the major holder of local government debt. Risks associated with the expansion of local government debt also increase bank risk [37], which is especially true for local banks [19], and further distorts the efficiency of capital allocation. Short-term loans put borrowers under pressure to repay principal and interest. Compared with long-term debt, they also have priority of repayment and their contracts need to be resigned frequently, so the cost of supervision is relatively low [38–40]. Due to information asymmetry, long-term loans have a longer repayment period and are more risky than short-term loans. Moreover, in China, the interest rate gap between long- and short-term loans is quite low, and market pricing does not reflect the costs and risks of long-term loans [3]. Therefore, in response to the risks associated with the expansion of local government debt, banks and other financial institutions become more cautious and control default risks by shortening loan terms [21]. In short, the expansion of local government debt leads financial institutions to be more cautious and to shorten loan maturities, and companies passively use short-term loans to support long-term investment. Considering the aforementioned arguments, we propose the following hypothesis:

Hypothesis 1 (H1). *Local government debt exacerbates corporate maturity mismatch between investment and financing, namely, short-term financing for long-term investment.*

3. Data and Methodology

3.1. Institutional Background

Since 1994, China's financial system has transitioned from a "financial contract system" to a "tax sharing system", which has helped the central government restore its fiscal power. Since then, financial power has been transferred upwards while administrative power has been delegated. Local government expenditures do not match fiscal revenues, thereby resulting in a large fiscal gap. Additionally, the Budget Law of China, which came into effect in 1995, clearly stipulates that local governments and their departments cannot directly assume debt. However, indirect borrowing through local government financing vehicles (LGFVs) is not explicitly prohibited. LGFVs are state-owned enterprises with the corresponding local government as the only or dominant shareholder, and are used to raise funds for public expenditure. Moreover, the land system and financial system facilitate the development of LGFVs. In the early stage, such LGFVs remain tightly controlled, and only a few local governments can obtain resources through this channel.

In response to the 2008 Global Financial Crisis, China's central government issued the "four trillion yuan" economic stimulus plan, which led to the rapid development of LGFVs. As a supporting policy for implementing the stimulus plan, in 2009 China's Banking Regulatory Commission encouraged local governments to set up compliant LGFVs, while on the other hand, attracting and motivating the credit support of banking financial institutions. In the same year, the Ministry of Finance urged local governments to use various sources of funding to finance investment projects, including budgetary revenues, land revenues, and borrowing funds through LGFVs. At the end of 2010, after raising funds for the stimulus plan, the development of LGFVs has not weakened, and they have

shifted from passive to active debt issuance. Coupled with the loose financial environment from 2011 to 2014, LGFVs remain an important channel for local government borrowing and the scale of local government debt continues to expand [3]. There are three sources of financing for LGFVs: bank loans, bond issuance, and shadow bank credit, and bank loans are the main source [41]. According to the National Audit Office, bank loans accounted for 79.01% and 78.07% of local government debt at the end of 2010 and 2012, respectively, and LGFVs' debt accounted for 46.38% and 45.67% of local government debt at the end of 2010 and 2012, respectively. Bank loans are the most important source of financing, and LGFVs are the most important borrowers.

With the rapid expansion of LGFVs and aggregate debt, local government debt risk has attracted the attention of various sectors. In 2014, the State Council issued the "Opinions on Strengthening Local Government Debt Management" (hereinafter referred to as Guo Fa (2014) No. 43) [42], which clearly require that LGFV financing for local governments should be eliminated and the disorderly expansion of LGFVs should be curbed. In addition, the new "Budget Law" that came into effect in 2015 also stipulated systematic and clear regulations concerning local government debt lending entities and borrowing methods to regulate the debt-raising behaviors. However, since then, some LGFVs still borrow illegally for local governments, and local governments provide guarantees for LGFVs.

3.2. Sample Selection and Data Sources

In accordance with Huang et al. (2020) [6], this study uses the interest-bearing debt of LGFVs to measure local government debt. This measurement can eliminate the impact of operating debts such as payables and advance receipts, and includes nonpublic issuance debts. Xu et al. (2020) [43] redefine the list of LGFVs and form a corresponding interest-bearing debt database, which has been widely used in recent years [44,45]. Additionally, considering that listed companies have implemented new accounting standards since 2007 and the debt borrowed by LGFVs was minimal before 2009, we employ local government debt [43] and Chinese A-share listed companies from 2009 to 2018 as the empirical sample.

Both companies' financial data and city-level macroeconomic data come from the China Securities Market and Accounting Research (CSMAR). The following are then excluded from the sample: (1) specially treated (ST, ST*) and other companies with abnormal trading statuses; (2) financial industry samples; (3) samples with missing data; and (4) cross-listed samples. Furthermore, we winsorize the continuous variables at the 1% and 99% levels to mitigate the effect of outliers.

3.3. Variable Definitions

3.3.1. Dependent Variable

Referring to Zhong et al. (2016) [29] and Wang et al. (2021) [26], we measure short-term financing for long-term investment (SFLI) using the following formula:

$$\text{SFLI} = (\text{CAP} - \text{LTL} - \text{NEF} - \text{NCFO} - \text{FAD}) / \text{ASSET}$$

In the formula, CAP represents capital expenditure; LTL represents increase in long-term loans; NEF represents net proceeds from equity financing; NCFO represents net cash flow from operations; FAD represents disposal of fixed assets; and ASSET represents total assets in the previous year.

3.3.2. Independent Variable

Following Huang et al. (2020) [6], we measure the local government debt as interest-bearing debt of LGFVs, which includes short-term loans, notes payable, short-term bonds payable, noncurrent liabilities due within one year, other current liabilities, long-term loans, and bonds payable. Specifically, this study adds the interest-bearing debts of all LGFVs at the year–city level and takes its natural logarithm as the local government debt at the city level where the company under consideration is located (LDEBT).

3.3.3. Control Variables

Following previous studies [3,15,26,29], GDP growth rate (GDPgr), fixed asset investment ratio (Finvest), asset size (SIZE), company age (AGE), operating cash flow (COA), net fixed assets (PPE), investment opportunities (TobinQ), the separation of control and ownership rights (DIVERT), and board size (DIRNUM) may affect corporate investment and financing activity and further impact the maturity match. Thus, this study controls these variables. Table 1 presents the definitions of all the aforementioned variables.

Table 1. Variable definitions.

Variable	Definition and Measurement
Short-term financing for long-term investment	
SFLI	(capital expenditure—increase in long-term loans—net proceeds from equity financing—net cash flow from operations—disposal of fixed assets)/total assets of previous year
Local government debt	
LDEBT	The natural logarithm of the total interest-bearing debt of LGFVs for the previous year at the city level where the company under consideration is located
Mechanism variable	
LGAP	Long-term funding gap (i.e., the difference between the newly increased fixed asset investment and the newly increased long-term liabilities)
BANK	Nonpublic financing (i.e., the ratio of local government debt financing from bank to total local government debts)
Control variable	
SIZE	The natural logarithm of total assets
AGE	The natural logarithm of the number of days from the date of incorporation to the last day of the year
COA	Net cash flow from operating activities divided by total assets
TobinQ	Corporate market capitalization divided by total assets
PPE	Net fixed assets divided by total assets
DIVERT	The difference between corporate control and ownership rights
DIRNUM	The natural logarithm of the number of directors
LEV	Total liabilities divided by total assets
GDP_gr	GDP growth rate of the city where the company is located
Finvest	The ratio of investment in fixed assets to the GDP of the city

3.4. Model Specification

We construct the following model to estimate the impact of local government debt on corporate short-term financing for long-term investment:

$$SFLI_{ict} = \beta_0 + \beta_1 LDEBT_{ct-1} + \beta_2 X_{ict} + \beta_3 Z_{ct} + Year + Ind + Province + \varepsilon \quad (1)$$

$SFLI_{ict}$ represents the short-term financing for long-term investment of firm i in city c and year t . The main explanatory variable $LDEBT_{ct-1}$ is the local government debt in city c and year $t - 1$. X_{ict} and Z_{ct} represent control variables at firm and city levels, respectively. To better control fixed effects, this study also includes year (*Year*), industry (*Ind*), and province (*Province*) dummy variables. We use the pooled OLS, and all regressions cluster the standard errors at the city level, and ε is the random error item. According to the preceding arguments, if the expansion of local government debt increases corporate short-term financing for long-term investment, β_1 will be expected to be significantly positive.

3.5. Descriptive Statistics

Table 2 presents the descriptive statistics for the main variables used in the empirical analyses. The sample minimum of corporate short-term financing for long-term investment (*SFLI*) is -2.002 , the maximum is 0.308 , and the standard deviation is 0.298 , thus, indicating

that SFLI fluctuates greatly and only some companies have enough long-term financing to support long-term investment. The sample minimum of local government debt (*LDEBT*) is 0.000, the maximum is 8.875, and the standard deviation is 1.805, thus, indicating that local government debt in different cities varies greatly. In addition, the mean of *GDP_gr* and *Finvest* at the city level are 0.109 and 0.608, respectively. Other control variables are also within a reasonable range.

Table 2. Descriptive statistics.

VarName	Obs	Mean	SD	Min	Median	Max
<i>SFLI</i>	17,832	−0.125	0.298	−2.002	−0.065	0.308
<i>LDEBT</i>	19,470	6.182	1.805	0.000	6.566	8.875
<i>SIZE</i>	19,470	21.865	1.185	19.255	21.757	25.144
<i>AGE</i>	19,467	8.624	0.387	7.266	8.682	9.313
<i>COA</i>	19,468	0.044	0.073	−0.179	0.043	0.251
<i>PPE</i>	19,470	0.225	0.162	0.002	0.194	0.709
<i>TobinQ</i>	18,458	2.071	1.284	0.913	1.654	8.464
<i>DIVERT</i>	18,707	0.051	0.076	0.000	0.000	0.281
<i>DIRNUM</i>	19,240	2.249	0.171	1.792	2.303	2.708
<i>GDP_gr</i>	19,357	0.109	0.055	−0.054	0.101	0.263
<i>Finvest</i>	17,599	0.608	0.255	0.172	0.607	1.276

4. Results and Analysis

4.1. Regression Analysis

First, we estimate the relationship between local government debt and corporate short-term financing for long-term investment. Based on controlling the industry, year, and province fixed effects, Column (1) of Table 3 only controls variables of individual companies and Column (2) further adds variables of prefecture-level cities. In both columns, the *LDEBT* coefficients are significantly positive at the 1% level, thus, indicating that companies located in cities with more government debt have more short-term financing for long-term investment. In addition, among the control variables, the coefficients on asset size (*SIZE*) and operating cash flow (*COA*) are significantly negative, and those on corporate net fixed assets (*PPE*), investment opportunity (*TobinQ*), and board size (*DIRNUM*) are significantly positive, which is consistent with the findings of previous studies.

Table 3. Determinants of corporate short-term financing for long-term investment.

	(1)	(2)
	<i>SFLI</i>	<i>SFLI</i>
<i>LDEBT</i>	0.005 *** (3.22)	0.006 *** (3.22)
<i>SIZE</i>	−0.024 *** (−7.90)	−0.024 *** (−7.28)
<i>AGE</i>	−0.005 (−0.71)	−0.009 (−1.16)
<i>COA</i>	−1.262 *** (−36.74)	−1.256 *** (−33.45)
<i>PPE</i>	0.347 *** (18.50)	0.362 *** (18.38)
<i>TobinQ</i>	0.011 *** (5.10)	0.012 *** (5.40)
<i>DIVERT</i>	0.010 (0.34)	0.011 (0.34)
<i>DIRNUM</i>	0.045 *** (2.92)	0.054 *** (3.09)

Table 3. Cont.

	(1)	(2)
<i>GDP_gr</i>		−0.007 (−0.10)
<i>Finvest</i>		0.008 (0.44)
<i>_cons</i>	0.278 *** (2.92)	0.266 ** (2.57)
<i>Industry FE</i>	YES	YES
<i>Year FE</i>	YES	YES
<i>Province FE</i>	YES	YES
<i>R²</i>	0.136	0.133
<i>Adj. R²</i>	0.133	0.130
<i>N</i>	16,695	14,982

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$.

4.2. Endogeneity Problem and Robustness Tests

4.2.1. Endogeneity Problem

- Instrumental Variable

Although local government debt is relatively exogenous to companies in each jurisdiction, we may still miss factors that affect both local government debt and corporate short-term financing for long-term investment, thereby resulting in biased estimations. Following Demirci et al. (2019) [12], we use per capita expenditures on medical care and family planning in the same city as an instrumental variable of local government debt (Debt_IV), and further conduct the 2SLS estimates. In Column (1) of Table 4, the estimated Debt_IV coefficient is significantly positive, indicating that the higher the per capita expenditures on medical care and family planning, the more local government debt, which is in line with our expectations. The LDEBT coefficient in the second-stage regression is still significantly positive at the 1% level, thus, indicating that after controlling for possible endogeneity problems, the baseline regression results remain robust. Moreover, the under-identification test and weak identification test in Table 4 indicate Debt_IV is an effective instrumental variable.

- Exogenous Policy

As mentioned above, in October 2014, the State Council issued the “Guo Fa (2014) No. 43” [42], which clearly requires the disorderly expansion of LGFVs to be curbed. In addition, the new “Budget Law” that came into effect in 2015 also favors local government raising debts from public channels. We regard the implementation of “Guo Fa (2014) No. 43” and the new “Budget Law” as an exogenous shock for local government debt financing, and use DID method to solve endogeneity problems. We calculate the average scale of local government debt from 2011 to 2013, and regard cities with larger scale debt as the treated group, and the corresponding treatment variable Treat1 equals 1, otherwise it is 0. Similarly, we also set up the treated group and the control group according to the average scale of local government debt from 2012 to 2014 and Treat2 equals 1 for the treated group. Additionally, Post equals 1 for samples after 2015, otherwise it is 0. Columns (3) and (4) of Table 4 show that the regression coefficients of Treat1 $\times$ Post and Treat2 $\times$ Post are significantly negative at the level of 5% and 1%, respectively. This indicates that “Guo Fa (2014) No. 43” and the new “Budget Law” standardize local government debt and further alleviate corporate maturity mismatch between investment and financing.

Table 4. Endogeneity problem.

	(1)	(2)	(3)	(4)
	First stage <i>LDEBT</i>	Second stage <i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>
<i>Debt_IV</i>	1.541 *** (5.08)			
<i>LDEBT</i>		0.012 *** (2.60)		
<i>Treat1 × Post</i>			−0.030 ** (−2.56)	
<i>Treat1</i>			0.026 *** (3.55)	
<i>Treat2 × Post</i>				−0.031 *** (−2.60)
<i>Treat2</i>				0.027 *** (3.61)
<i>Post</i>			0.127 *** (8.71)	0.127 *** (8.77)
<i>SIZE</i>	0.017 (0.93)	−0.024 *** (−7.09)	−0.024 *** (−7.28)	−0.024 *** (−7.27)
<i>AGE</i>	−0.112 (−1.74)	−0.008 (−1.00)	−0.009 (−1.15)	−0.009 (−1.16)
<i>COA</i>	0.230 (1.18)	−1.246 *** (−33.55)	−1.256 *** (−33.48)	−1.256 *** (−33.49)
<i>PPE</i>	−0.552 *** (−2.92)	0.363 *** (19.90)	0.362 *** (18.26)	0.362 *** (18.31)
<i>TobinQ</i>	−0.023 (−1.46)	0.012 *** (4.93)	0.012 *** (5.35)	0.012 *** (5.34)
<i>DIVERT</i>	−0.254 (−0.87)	0.008 (0.25)	0.009 (0.29)	0.009 (0.28)
<i>DIRNUM</i>	−0.129 (−1.27)	0.052 *** (3.00)	0.052 *** (2.99)	0.052 *** (3.01)
<i>GDP_gr</i>	3.332 ** (2.70)	−0.049 (−0.65)	0.016 (0.21)	0.011 (0.14)
<i>Finvest</i>	−2.442 *** (−6.16)	0.019 (0.86)	−0.011 (−0.62)	−0.009 (−0.54)
<i>_cons</i>	4.456 *** (4.56)	0.242 ** (2.24)	0.283 *** (2.75)	0.281 *** (2.72)
<i>Industry FE</i>	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES
<i>Province FE</i>	YES	YES	YES	YES
<i>R²</i>	0.62	0.13	0.133	0.133
<i>Adj. R²</i>	0.62	0.13	0.130	0.130
<i>N</i>	15,810	14,613	14,982	14,982
<i>Anderson canon statistic (p-value = 0.00)</i>		1798.607		
<i>Cragg-Donald statistic</i>		2042.354		
<i>Stock-Yogo test critical values</i>		16.38 (10%)		

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$.

4.2.2. Robustness Test

- Alternative measures of local government debt

Moreover, the annual increase in interest-bearing debt of LGFVs is also an important dimension when measuring the scale of local government debt. Thus, we further replace LDEBT with the natural logarithm of newly added interest-bearing debt (DEBT_add). In addition, this section also uses the local government debt for the same year (DEBT) as an explanatory variable. The regression results are shown in Columns (1) and (2) of Table 5, where it can be seen that the coefficients on the explanatory variables are all significantly positive, thus, indicating that the above conclusions are robust.

Table 5. Robustness tests.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>
<i>DEBT_add</i>	0.006 *** (3.40)					
<i>DEBT</i>		0.006 *** (3.10)				
<i>LDEBT</i>			0.007 ** (2.33)	0.005 ** (2.53)	0.004 * (1.96)	0.006 *** (3.25)
<i>SIZE</i>	−0.024 *** (−7.29)	−0.024 *** (−7.27)	−0.029 *** (−8.41)	−0.021 *** (−5.97)	−0.041 *** (−11.78)	−0.024 *** (−8.56)
<i>AGE</i>	−0.009 (−1.06)	−0.009 (−1.16)	−0.013 (−1.10)	−0.009 (−1.09)	−0.025 *** (−3.22)	−0.009 (−1.19)
<i>COA</i>	−1.246 *** (−30.37)	−1.255 *** (−33.46)	−1.323 *** (−26.91)	−1.257 *** (−33.17)	−1.149 *** (−30.18)	−1.256 *** (−35.13)
<i>PPE</i>	0.365 *** (17.06)	0.362 *** (18.40)	0.402 *** (16.65)	0.365 *** (17.69)	0.322 *** (15.89)	0.362 *** (18.28)
<i>TobinQ</i>	0.012 *** (5.01)	0.012 *** (5.40)	0.012 *** (5.08)	0.013 *** (5.83)	0.012 *** (5.53)	0.012 *** (6.16)
<i>DIVERT</i>	0.009 (0.24)	0.011 (0.34)	0.013 (0.33)	0.015 (0.47)	−0.005 (−0.15)	0.011 (0.34)
<i>DIRNUM</i>	0.059 *** (3.22)	0.054 *** (3.09)	0.067 *** (2.96)	0.050 *** (2.78)	0.054 *** (3.22)	0.054 *** (3.40)
<i>GDP_gr</i>	−0.023 (−0.30)	−0.008 (−0.11)	−0.011 (−0.14)	−0.039 (−0.46)	−0.027 (−0.39)	−0.007 (−0.10)
<i>Finvest</i>	0.001 (0.04)	0.006 (0.33)	0.009 (0.39)	0.002 (0.11)	0.012 (0.68)	0.008 (0.48)
<i>LEV</i>					0.213 *** (14.19)	
<i>save_GDP</i>					0.007 (1.17)	
<i>_cons</i>	0.268 ** (2.41)	0.262 ** (2.53)	0.357 *** (3.10)	0.190 (1.54)	0.675 *** (6.56)	0.266 *** (3.01)
<i>Industry FE</i>	YES	YES	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES	YES	YES
<i>Province FE</i>	YES	YES	YES	YES	YES	YES
<i>R²</i>	0.133	0.133	0.142	0.130	0.146	0.133
<i>Adj. R²</i>	0.129	0.130	0.136	0.126	0.142	0.130
<i>N</i>	13,464	14,982	9545	13,994	14,966	14,982

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

- Subsample test

There are large differences in fiscal autonomy and financial resources among cities at different administrative levels. To avoid the possible impact of differences in the urban administrative structure, this section further deletes the samples of sub-provincial cities, and the remaining 9545 firm–year samples are regressed. Column (3) of Table 5 shows that the LDEBT coefficient is significantly positive at the 5% level, which further verifies the robustness of the above conclusions.

The samples of 2009 can be affected by the Great Economic Crisis of 2007–2008; we further exclude these samples and regressed results are shown in Column (4) of Table 5, which is consistent with the above conclusions.

- Add control variables

We further control the impact of corporate financial leverage ratio (LEV) and financial institution deposits in prefecture-level cities (save_GDP) in the regression model. The regression results reported in Column (5) of Table 5 show that the conclusions remain robust.

- Change clustering group

We further cluster the error at firm level to perform robustness tests. The results are shown in Column (6) of Table 5, which verifies the robustness of the above conclusions.

5. Mechanism Test

5.1. Local Government Nonpublic Financing

Local government debts include both publicly issued bonds that are financed through exchanges and the interbank market and nonpublic debts from commercial banks in the region. Financial geographic segmentation is common in China [6]. Unlike publicly issued bonds, loan financing from commercial banks squeezes out corporate financing more seriously. This section uses the ratio of local government debt financing from banks to total local government debt as a proxy for nonpublic financing of local government (BANK) and divides the sample into two groups based on its median value. Columns (1) and (2) of Table 6 present the grouping regression results. For cities with more nonpublic loan financing from regional commercial banks, the LDEBT coefficient is significantly positive at the 5% level, while cities with low levels of nonpublic loan financing are not significant. This indicates that local government debt squeezes out corporate financing resources mainly by competing for bank loans.

Table 6. Mechanism test.

	(1)	(2)	(3)	(4)	(5)	(6)
	HighBANK SFLI	LowBANK SFLI	LGAP SFLI	No LGAP SFLI	ROA	ROE
LDEBT	0.007 ** (2.40)	0.004 (1.20)	0.006 *** (3.19)	0.006 (1.08)		
SFLI					−0.016 *** (−8.72)	−0.028 *** (−7.50)
SIZE	−0.020 *** (−4.80)	−0.027 *** (−6.31)	−0.009 *** (−2.84)	−0.025 *** (−3.48)	0.014 *** (19.04)	0.028 *** (17.51)
AGE	−0.006 (−0.64)	−0.015 (−1.17)	0.001 (0.08)	−0.012 (−0.47)	−0.003 (−1.52)	−0.004 (−1.22)
COA	−1.149 *** (−24.92)	−1.390 *** (−24.34)	−1.331 *** (−33.28)	−1.477 *** (−15.07)	0.279 *** (27.45)	0.463 *** (21.65)
PPE	0.335 *** (13.91)	0.395 *** (14.17)	0.390 *** (23.57)	0.302 *** (5.19)	−0.043 *** (−10.34)	−0.114 *** (−11.64)
TobinQ	0.013 *** (3.57)	0.013 *** (4.73)	0.011 *** (5.28)	0.013 * (1.72)	0.006 *** (8.00)	0.006 *** (4.45)
DIVERT	−0.071 (−1.24)	0.103 ** (2.52)	0.036 (1.32)	−0.084 (−0.91)	0.020 *** (2.71)	0.041 *** (2.65)
DIRNUM	0.034 (1.42)	0.078 *** (3.27)	0.007 (0.43)	0.172 *** (3.77)		
LEV					−0.097 *** (−24.00)	−0.164 *** (−15.33)
GROWTH					0.019 *** (15.75)	0.042 *** (13.99)
GDP _{gr}	−0.033 (−0.28)	0.028 (0.32)	0.039 (0.46)	−0.265 (−1.52)		
Finvest	0.014 (0.44)	−0.017 (−0.72)	0.001 (0.04)	0.026 (0.54)		
_cons	0.194 (1.39)	0.393 *** (3.21)	0.007 (0.06)	0.005 (0.02)	−0.214 *** (−9.85)	−0.454 *** (−10.17)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Province FE	YES	YES	YES	YES	NO	NO
R ²	0.127	0.153	0.161	0.127	0.338	0.224
Adj. R ²	0.120	0.146	0.157	0.109	0.336	0.222
N	7927	7055	11,983	2999	16,691	16,691

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

5.2. Long-Term Funding Gap

For companies without a long-term funding gap, it remains unclear whether the company still uses short-term financing for long-term investment when local government debt crowds out bank loan financing. This section uses the difference between the newly increased fixed asset investment and long-term liabilities as a proxy for the long-term funding gap. If the long-term funding gap is greater than zero, *LGAP* equals one, otherwise it is zero. We further divide the sample into two groups based on *LGAP* value. Columns (3) and (4) of Table 6 present the grouping regression results. For companies with a funding gap, the *LDEBT* coefficient is significantly positive at the 1% level, while that for companies without a funding gap is not significant. This indicates that when facing the crowding out effect of local government debt, companies have no choice but to use short-term financing to support long-term investment.

5.3. Ruling out Competing Hypotheses

According to the financing cost theory, short-term debt helps to reduce corporate financing costs, and the “short-term financing for long-term investment” method has a positive effect on operating performance. Kahl et al. (2015) [2] also propose that in the initial stages of capital investment, firms will use short-term commercial paper to support their long-term capital investment, reduce financing costs, and improve investment performance. Thus, if companies actively choose short-term financing for long-term investment to reduce financing costs, the resulting mismatch will improve business performance. This section uses return on assets (ROA) and return on equity (ROE) to represent corporate performance, and further controls companies’ financial leverage ratio (LEV) and growth rate (GROWTH). The regression results are shown in Columns (5) and (6) of Table 6, and *SFLI* coefficients are both significantly negative at the 1% level, thus, indicating that *SFLI* reduces companies’ operating performance. That is, the “short-term financing for long-term investment” method is not companies’ active choice for reducing financing costs.

6. Further Analyses

6.1. Heterogeneity Analyses

6.1.1. The Scale of Local Government Debt

China’s financial market is dominated by indirect financing and thus, both local governments and companies rely on bank loans as their main source of financial resources [3]. Thus, cities with more local government debt will crowd out corporate financing to a greater extent. In this section, samples are divided into two groups according to the median of local government debt to estimate its heterogeneous impact. The regression results are shown in Columns (1) and (2) of Table 7. Whether the scale of local government debt is high or low, the *LDEBT* coefficients are both significantly positive at the 5% level. The coefficient of cities with a high scale of local government debt is larger and the coefficient difference test also proves that heterogeneous impacts exist. This indicates that the higher the scale of local government debt, the greater its impact on companies’ short-term financing for long-term investment, which is also consistent with the preceding arguments.

6.1.2. Financial Development

China has vast territory and thus, regional financial development varies widely. This section further explores the heterogeneous impact of local government debt on corporate short-term financing for long-term investment under different levels of financial development. We use the ratio of the balance of various types of deposits in the city to GDP as a proxy for regional financial development. The samples are divided into two groups to test the heterogeneous impact according to the median of financial development. The grouping regression results are shown in Columns (3) and (4) of Table 7. For cities with low levels of financial development, the *LDEBT* coefficient is significantly positive at the 5% level, while that for cities with high levels of financial development is not significant. This shows that promoting financial development and improving the efficiency of financial

resource allocation can mitigate the impact of local government debt on corporate maturity mismatch between investment and financing.

Table 7. Heterogeneity analyses.

	(1)	(2)	(3)	(4)
	Large scale	Small scale	High financial development	Low financial development
	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>
<i>LDEBT</i>	0.023 ** (2.60)	0.007 ** (2.26)	0.004 (0.69)	0.007 ** (2.09)
<i>SIZE</i>	−0.021 *** (−4.05)	−0.027 *** (−6.57)	−0.018 *** (−3.95)	−0.029 *** (−8.07)
<i>AGE</i>	−0.009 (−0.85)	−0.011 (−0.85)	−0.006 (−0.60)	−0.010 (−0.88)
<i>COA</i>	−1.179 *** (−21.42)	−1.338 *** (−24.66)	−1.129 *** (−22.31)	−1.392 *** (−26.10)
<i>PPE</i>	0.345 *** (12.37)	0.391 *** (14.05)	0.310 *** (13.04)	0.411 *** (14.96)
<i>TobinQ</i>	0.013 *** (2.97)	0.013 *** (5.23)	0.015 *** (3.91)	0.011 *** (4.45)
<i>DIVERT</i>	0.001 (0.02)	0.038 (0.88)	−0.015 (−0.27)	0.056 (1.31)
<i>DIRNUM</i>	0.030 (1.24)	0.073 *** (3.07)	0.043 * (1.88)	0.065 ** (2.31)
<i>GDP_gr</i>	−0.121 (−0.96)	0.073 (0.88)	−0.038 (−0.28)	0.013 (0.14)
<i>Finvest</i>	−0.000 (−0.00)	0.002 (0.08)	−0.004 (−0.13)	0.010 (0.38)
<i>_cons</i>	0.102 (0.55)	0.281 ** (2.17)	0.148 (1.02)	0.357 *** (2.94)
<i>Industry FE</i>	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES
<i>Province FE</i>	YES	YES	YES	YES
<i>R²</i>	0.135	0.140	0.124	0.151
<i>Adj. R²</i>	0.129	0.133	0.117	0.144
<i>N</i>	7554	7428	7632	7350
<i>Prob > chi2</i>	0.0877			

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

6.1.3. Ownership Type

From the perspective of financing ability, we further estimate the heterogeneous impact of local government debt on corporate short-term financing for long-term investment. State-owned enterprises play an important supporting role in local economic development and have advantages in obtaining credit resources. Considering that banks are more favorable to state-owned enterprises, the expansion of local government debt is more likely to squeeze out the credit of privately-owned enterprises. Samples are divided into two groups: SOE and POE, and the grouping regression results are shown in Columns (1) and (2) of Table 8. For POE, the LDEBT coefficient is significantly positive at the 5% level, but for SOE, it is not significant. This indicates that the local government debt has a greater impact on private-owned enterprises' maturity mismatch between investment and financing.

Table 8. Heterogeneity analyses from companies' perspective.

	(1)	(2)	(3)	(4)
	SOE	POE	High financing demand	Low financing demand
	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>	<i>SFLI</i>
<i>LDEBT</i>	0.002 (0.69)	0.006 ** (2.29)	0.008 ** (2.46)	0.003 (1.53)
<i>SIZE</i>	−0.024 *** (−5.93)	−0.030 *** (−5.68)	−0.028 *** (−6.43)	−0.010 *** (−2.94)
<i>AGE</i>	−0.010 (−0.64)	−0.021 ** (−2.21)	−0.026 ** (−2.02)	−0.008 (−0.79)
<i>COA</i>	−1.193 *** (−19.31)	−1.293 *** (−27.51)	−1.386 *** (−23.73)	−1.076 *** (−26.31)
<i>PPE</i>	0.196 *** (7.21)	0.471 *** (17.89)	0.432 *** (12.84)	0.237 *** (10.90)
<i>TobinQ</i>	0.002 (0.57)	0.019 *** (6.00)	0.025 *** (7.41)	0.007 *** (3.43)
<i>DIVERT</i>	0.044 (0.92)	0.038 (1.00)	0.006 (0.12)	0.006 (0.21)
<i>DIRNUM</i>	0.028 (1.45)	0.026 (1.08)	0.080 *** (3.05)	0.008 (0.51)
<i>GDP_{gr}</i>	0.003 (0.03)	0.031 (0.29)	0.055 (0.42)	0.096 (1.50)
<i>Finvest</i>	−0.009 (−0.38)	0.017 (0.63)	−0.016 (−0.60)	0.015 (0.82)
<i>_cons</i>	0.439 *** (2.77)	0.498 *** (3.69)	0.325 ** (2.07)	0.119 (1.17)
<i>Industry FE</i>	YES	YES	YES	YES
<i>Year FE</i>	YES	YES	YES	YES
<i>Province FE</i>	YES	YES	YES	YES
<i>R²</i>	0.136	0.155	0.138	0.165
<i>Adj. R²</i>	0.127	0.150	0.131	0.158
<i>N</i>	5312	9669	7508	7474

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$.

6.1.4. Corporate Financing Demand

High-growth companies typically increase their market share through expansion. They also have high demand for capital investment [46] and long-term funding. Based on this, we use the growth rate of operating income to measure such companies' financing demand. The samples are divided into two groups according to the median of operating income growth rate and we further test for heterogeneous impacts. Columns (3) and (4) of Table 8 report the results. For companies with high financing demand, the *LDEBT* coefficient is significantly positive at the 5% level, while for companies with low financing demand, it is not significantly. This shows that local government debt has a greater positive impact on maturity mismatches for companies with high financing demand.

6.2. Economic Consequences

6.2.1. Insufficient Investment

Following Richardson (2006) [47], this section utilizes an expected investment model to measure corporate investment efficiency. When the estimated residual is less than zero, the value of underinvest is one; otherwise, it is zero. We use the logit model to estimate whether local government debt and corporate short-term financing for long-term investment will aggravate or alleviate corporate underinvestment. The results in Column (1) of Table 9 show that *LDEBT* and *SFLI* coefficients are both significantly positive at the 5% level, indicating that local government debt and corporate maturity mismatches exacerbate corporate underinvestment.

Table 9. Economic consequences.

	(1)	(2)
	Underinvest	FDD
<i>LDEBT</i>	0.044 *** (2.60)	−0.083 *** (−2.71)
<i>LDEBT * SFLI</i>	−0.010 (−0.31)	−0.107 *** (−2.73)
<i>SFLI</i>	0.423 ** (2.10)	1.700 *** (6.12)
<i>LEV</i>	−0.534 *** (−3.89)	−0.312 (−1.34)
<i>AGE</i>	−0.193 *** (−2.88)	
<i>PPE</i>	1.089 *** (6.37)	
<i>TobinQ</i>	0.231 *** (12.90)	
<i>DUAL</i>	−0.133 *** (−2.71)	−0.547 *** (−8.22)
<i>DIRECT</i>	0.113 (0.33)	0.411 (0.79)
<i>GDP_gr</i>	−0.652 (−1.35)	0.535 (0.68)
<i>loan_GDP</i>	−0.119 ** (−2.49)	
<i>ROA</i>		1.875 *** (3.03)
<i>liquidity</i>		0.071 *** (3.56)
<i>COA</i>		4.655 *** (10.70)
<i>_cons</i>	1.443 ** (2.43)	9.607 *** (22.24)
<i>Industry FE</i>	YES	YES
<i>Year FE</i>	YES	YES
<i>Province FE</i>	YES	YES
<i>R²</i>		0.482
<i>N</i>	14,426	16,918

Notes: t statistics in parentheses. *** $p < 0.01$, ** $p < 0.05$.

6.2.2. Default Risk

Short-term loans for long-term investments are essentially a mismatch between financing and investment, and companies face the risk of capital flow disruption, which increases the probability that they will be unable to repay their debts on schedule. This section uses the simplified model proposed by Bharath and Shumway (2008) [48] to estimate the default distance as a proxy variable for companies' default risk. The results in Column (2) of Table 9 show that the LDEBT coefficient is significantly negative at the 1% level, as is the interaction coefficient between LDEBT and SFLI. This implies that the expansion of local government debt and corporate short-term financing for long-term investment decreases companies' distance to default, that is, it increases default risk.

7. Conclusions

This study incorporates local government debt into an analysis framework of corporate maturity mismatch between investment and financing. Using a dataset of all Chinese A-share listed companies and local government debt from 2009 to 2018, we discover that local government debt exacerbates corporate short-term financing for long-term investment. The results show that this effect is mainly due to bank loans being crowded out for companies with a long-term funding gap. Thus, the Chinese government should continue to optimize

the issuance of local government bonds, obtain long-term funds through the public capital market, and avoid crowding out bank loans. According to our further analyses, the real impact of local government debt is more pronounced for non-SOEs and firms with high financing demand, located in cities with more local government debt and low financial development. That is, controlling the level of local government debt, promoting financial deepening, and treating financing entities fairly are crucial to the sustainable development of enterprises. Moreover, maturity mismatches further aggravate underinvestment and increase default risk, which ultimately affects local sustainable economic development. As for enterprises, it is reasonable to match the investment and financing period and prohibit aggressive investment strategies, otherwise it will lead to huge financial risk. From this study, it can be seen that there are inextricable links between local governments and enterprises. With the development of the capital market and the governance of local government bonds, under different macro-environments, it's necessary to compare the crowding-in or crowding-out effects of local government debts on the sustainable development of enterprises. Related research provides policy recommendations for China's economic reform.

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