

# **Does Big-Data Tax Governance Alleviate the Maturity Mismatch of Corporate Investment and Financing?**

## **Abstract:**

Corporate investment and financing maturity mismatches is an urgent issue requiring attention from governments and firms. This study uses Chinese A-share listed companies from 2009 to 2021 as the research sample and the local implementation of big-data tax governance as a quasi-natural experiment to examine whether big-data tax governance can address the corporate investment and financing maturity-mismatch problem. Furthermore, corporate-tax compliance is selected as the mechanism variable to study the mechanism of action of big-data tax governance on the investment and financing term mismatch of firms. We find that big-data tax governance intensifies the investment and financing term-mismatch problem of firms and significantly affects the investment and financing term-mismatch problem of firms by improving corporate-tax compliance.

## **Keywords:**

Big-data tax governance, Tax Compliance, Firm Investment and Financing Maturity Mismatch.

## **1. Introduction**

The maturity structure of corporate investment and financing should match that of debt (Myers, 1977). However, owing to the immaturity and imperfections of China's financial-market structure, some listed firms have continuously engaged in financing long-term investments with short-term debt—that is, using short-term debt to finance long-term assets—leading to the problem of a “maturity mismatch between investment and financing (Campello et al., 2011; Custodio et al., 2013).” In the long run, this behavior hinders economic growth and increases the debt-repayment pressure on firms at the micro level, in addition to operational risks and prudential costs at the macro level (Farhi et al., 2012). These conditions eventually increase systemic financial risks (Acharya et al., 2011). In 2023, the Central Financial Work Conference of China established that upholding risk prevention and control as a perpetual theme in financial work is necessary. From this perspective, the Chinese government urgently needs to solve the problem of firms financing long-term investments with short-term debt at the micro level, which will allow it to effectively prevent and defuse the systemic financial risks that may manifest owing to the maturity mismatch between investment and financing.

Firms with financing constraints are more inclined to reduce cash outflows through tax avoidance, thereby alleviating financing constraints (Law and Mills, 2015). The implementation of big-data tax governance has significantly enhanced tax-collection and tax-management capabilities, and information technology can help tax authorities detect corporate-tax-avoidance behavior (Gordon and Li, 2009; Casaburi

and Troiano, 2016; Fan et al., 2020; Li et al., 2020; Xiao and Shao, 2020). This is because a reduction in tax avoidance leads to an increase in corporate cash outflows, which reduces the internal financing capacity of firms, thereby increasing the external financing needs of firms and raising their financing costs (Myers and Majluf, 1984). As one of the external regulatory mechanisms for firms, tax collection and management affect the financing constraints of firms, and the financing-constraint problem is a key factor causing the maturity mismatch between corporate investment and financing. Studying whether and how big-data tax governance affects the maturity mismatch between corporate investment and financing can help identify and reduce potential systemic financial risks in advance and optimize the financing structure of firms, and it is of significant practical importance for actively promoting the high-quality development of the Chinese economy.

This study primarily makes the following three contributions at the margin. First, big-data tax governance is taken as the entry point to analyze the influence mechanism of big-data tax governance on micro-firm behavior from the perspective of corporate investment and financing, and the influence path of tax governance on corporate investment and financing behavior is explored, thereby enriching relevant research on taxation and facilitating high-quality economic development. Second, corporate-tax compliance is selected as a mechanism variable to study how big-data tax governance affects the level of firm investment and financing term mismatch by influencing corporate-tax compliance, providing empirical evidence for optimizing tax-collection and tax-management policies. Third, theoretical support and empirical evidence is presented for further promoting tax-administration reform, in addition to research references for optimizing corporate investment and financing and promoting high-quality economic development.

## 2. Research design

### 2.1 Data sources and processing

This study uses data from China's A-share listed companies from 2009 to 2021, sourced from the CSMAR database, and gathers and organizes data on big-data tax governance. The data are processed as follows: financial company samples, ST samples, samples with net assets less than zero, and samples with missing financial data are excluded, and finally, 19,869 observations are obtained.

### 2.2. Model design

To examine the relationship between big-data tax governance and the maturity mismatch in corporate investment and financing, we establish the following model:

$$SFLI_{i,t} = \alpha_0 + \alpha_1 BigData_{c,t} + \beta_j \sum Controls_{i,t} + FirmFE + YearFE + \varepsilon_{i,t} \quad (1)$$

where the variables "*i*," "*t*," and "*c*" represent "firm," "year," and "region," respectively. The *SFLI* indicator is used to quantify the extent of a firm's investment and financing maturity mismatch. This is calculated by subtracting the increase in long-term borrowings from the current period from the increase in equity and net cash flow from operating activities, and then dividing the result by the total amount of assets. A

higher value of the indicator indicates a greater degree of the investment and financing maturity mismatch. The value of this indicator is positively correlated with the degree of the investment and financing maturity mismatch. The variable *BigData* denotes whether the firm location has implemented big-data tax governance in the current year, and *Controls* denotes other control variables. The term *FirmFE* represents the firm fixed effect, while *YearFE* denotes the year fixed effect. A significantly negative coefficient of *BigData* indicates that big-data tax governance mitigates the corporate investment and financing maturity mismatch, whereas a significantly positive coefficient indicates the opposite effect. Table 1 presents descriptive statistics for each variable.

**Table 1**

Definition of variables and descriptive statistics.

Variable	Variable Meaning	N	Mean	sd	Min	Max
<i>SFLI</i>	Firm investment and financing maturity mismatch	19869	-0.0800	0.120	-0.470	0.280
<i>BigData</i>	Big-data tax governance	19869	0.390	0.490	0	1
<i>Size</i>	firm size	19869	22.24	1.320	19.74	27.13
<i>Top1</i>	First major shareholder's equity stake	19869	0.350	0.150	0.0800	0.760
<i>INST</i>	Institutional shareholders' equity ratio	19869	0.410	0.240	0	0.910
<i>FirmAge</i>	Firm age	19869	2.850	0.360	1.100	3.710

### 3. Regression results analysis

#### 3.1. Regression results

The results of the benchmark regression analysis in Table 2 show that, irrespective of whether the control variables are added to the model, the regression coefficients for *BigData* are significantly positive. This result indicates that the implementation of big-data tax governance intensifies the investment and financing maturity mismatch between firms.

**Table 2**

Results of the benchmark regression.

Variable	<i>SFLI</i>	
	(1)	(2)
<i>BigData</i>	0.0070* (0.0031)	0.0080** (0.0031)
<i>Size</i>		-0.0294***

		(0.0026)
<i>Top1</i>		0.0957***
		(0.0168)
<i>INST</i>		-0.0255***
		(0.0062)
<i>FirmAge</i>		-0.0500***
		(0.0126)
<i>_cons</i>	-0.0870***	0.6875***
	(0.0014)	(0.0653)
<i>FirmFE</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>R</i> <sup>2</sup>	0.3040	0.3147
<i>N</i>	19602	19602

\*, \*\*, \*\*\* signify  $P < 0.10$ ,  $0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.2 Mechanism Test

In this study, tax compliance (*BTD*) is substituted into the regression model to test whether it is an effective mechanism variable. *BTD* is defined as accounting profit before tax minus taxable income, divided by total assets at the end of the period; the lower the *BTD*, the higher the tax compliance of the firm. Table 3 demonstrates that big-data tax governance improves the tax compliance of firms, and firms with higher tax compliance have a more severe investment and financing maturity mismatch.

**Table 3**  
Mechanism Test.

Variable	(1) <i>SFLI</i>	(2) <i>BTD</i>	(3) <i>SFLI</i>
<i>BigData</i>	0.0080** (0.0031)	-0.0016* (0.0008)	0.0070* (0.0033)
<i>BTD</i>			-0.597*** (0.0365)
<i>Controls</i>	Yes	Yes	Yes
<i>_cons</i>	0.6875*** (0.0653)	0.0987*** (0.0187)	0.7907*** (0.0669)
<i>Firm FE</i>	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes
<i>N</i>	19602	19860	19860
<i>R</i> <sup>2</sup>	0.3147	0.0620	0.1010

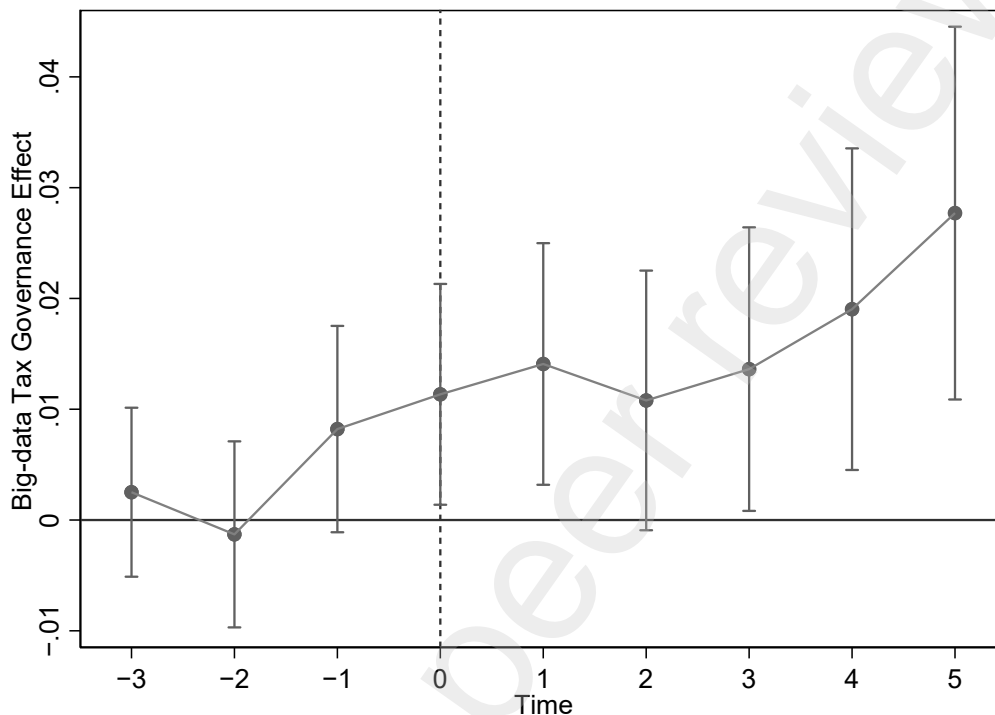
\*, \*\*, \*\*\* signify  $P < 0.10$ ,  $0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.3. Robustness check

#### 3.3.1. Parallel-trend test

In this study, we capture whether a significant difference exist in *SFLI* between the two samples ex ante by adding an interaction term between the big-data tax policy

and the year dummy variable in the regression to determine whether the parallel-trend hypothesis is satisfied. Fig. 1 shows that no significant difference exists in the investment and financing maturity mismatch between the experimental and control groups before the implementation of the big-data tax policy at the firm's location, verifying the parallel-trend hypothesis.



**Fig. 1. Parallel-trend test.**

### 3.3.2. Placebo test

To exclude the influence of other policy reforms and uncertainties, this study takes the three years before, two years before, two years after, and three years after the actual implementation time of the big-data tax in the firm location as dummy time points for the implementation of the big-data tax, and it constructs the dummy variables *BigData1*, *BigData2*, *BigData3*, and *BigData4* to be retested. The regression results show that the regression coefficients of the four dummy variables are not significant, meaning that the influence of other factors can be excluded.

**Table 4**

Placebo test results.

Variable	<i>SFLI</i>			
	(1)	(2)	(3)	(4)
<i>BigData1</i>	-0.0031 (0.0048)			

<i>BigData2</i>		-0.0023		
		(0.0039)		
<i>BigData3</i>			-0.0071	
			(0.0052)	
<i>BigData4</i>				-0.0043
				(0.0054)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>_cons</i>	0.8843***	0.8767***	1.9803***	1.8702***
	(0.1297)	(0.1118)	(0.2841)	(0.4006)
<i>Firm FE</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	7651	10510	5727	4391
<i>R<sup>2</sup></i>	0.3797	0.3751	0.4596	0.5065

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05, 0.01$ . SEs clustered in parentheses.

### 3.3.3. Removing policy disruptions

In 2016, China fully implemented the transition from business tax to VAT, and in 2019, it continued to implement a tax-reduction policy in the form of a VAT rate reduction. To eliminate the interference of the aforementioned policies, this study uses data from before 2016 and before 2019 to conduct regression analyses. The results show that the coefficients of the variables related to *BigData* are all significantly positive, which is consistent with the results of the benchmark regression.

**Table 5**

Removing policy disruptions.

Variable	<i>SFLI</i>	
	Exclusion of 2016 policies	Exclusion of 2019 policies
<i>BigData</i>	0.0150*	0.0075**
	(0.0073)	(0.0038)
<i>Controls</i>	Yes	Yes
<i>_cons</i>	1.7059***	0.7627***
	(0.1527)	(0.0844)
<i>Firm FE</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>N</i>	8954	14405
<i>R<sup>2</sup></i>	0.4023	0.3303

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.4. Further analysis

To further study the impact of big-data tax governance on the maturity mismatch of investment and financing between different firms, this study divides the sample into three groups: state-owned firms and non-state-owned firms, large firms and small firms, and firms with high-collateral security capacity and firms with low-collateral security capacity.

The study finds that, first, big-data tax governance has a significant impact on state-owned firms, while the impact on non-state-owned firms is not significant. This reveals that state-owned firms are more responsive to the implementation of tax-related initiatives and can more accurately understand the implementation and formulation of economic policies. Second, compared with small firms, big-data tax governance has a significant impact on the investment and financing term mismatch of large firms. This may be because the increase in the tax burden of large firms leads to a decrease in their internal surplus, so they increase the proportion of short-term loans to adjust their credit structure, which worsens the investment and financing term mismatch. Third, the tax treatment of big data significantly affects firms with low-collateral security capacity and has no significant effect on firms with high-collateral security capacity. This reveals that firms with high-collateral security capacity usually have more high-value collateral, and banks may not immediately tighten their credit lines owing to their strong asset strength. Firms with low-collateral security capacity usually have relatively limited financial-management capabilities. Big-data-based tax governance requires firms to standardize their financial management. As such, lacking sufficient collateral, firms face significant obstacles when tax-credit issues arise, which leads to greater challenges in the credit market, thus exacerbating the maturity mismatch between investment and financing.

**Table 6**  
Heterogeneity analysis.

Variable	<i>SFLI</i>					
	(1) SOEs	(2) non-SOEs	(3) Large companies	(4) Small companies	(5) Companies with High Collateral Value	(6) Companies with Low Collateral Value
<i>BigData</i>	0.0091** (0.0044)	0.0060 (0.0044)	0.0159** * (0.0046)	0.0008 (0.0045)	0.0077 (0.0047)	0.0089** (0.0044)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>_cons</i>	0.3544** * (0.0989)	0.8950** * (0.0940)	0.2908** (0.1254)	1.1338** * (0.1130)	0.6554** * (0.1092)	0.8207*** (0.0932)
<i>Firm FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	8019	11496	8428	10936	7943	11251

$R^2$	0.2846	0.3464	0.3196	0.3468	0.3216	0.3621
-------	--------	--------	--------	--------	--------	--------

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05, 0.01$ . SEs clustered in parentheses.

#### 4. Conclusions

The present study finds that first, big-data taxation has an external effect on tax governance, which worsens the investment and financing maturity mismatch between firms. Big-data tax governance makes taxpayers' tax-related information more transparent, and to avoid tax risks, firms choose to make myopic investment and financing decisions, thereby exacerbating the firm investment and financing term mismatch. Second, tax compliance is an effective mechanism variable of big-data tax governance that affects the investment and financing maturity mismatch of firms. Big-data tax governance positively affects tax compliance, and increased tax compliance worsens the firm investment and financing term mismatch. Finally, big-data tax governance worsens the investment and financing term mismatch for state-owned firms, large firms, and firms with low-collateral secured capacity, while it has no significant effect on non-state-owned firms, small firms, and firms with high-collateral security capacity.

#### Funding

This work was supported by the National Social Science Foundation of China (NSSC) under the Youth Program [No. 20CJY059].

#### References

- Acharya, V.V., Gale, D., Yorulmazer, T., 2011. Rollover risk and market freezes. *The Journal of Finance*, 66(4), 1177–1209.
- Armstrong, C.S., Guay, W.R., Weber, J.P., 2010. The role of information and financial reporting in corporate governance and debt contracting, *Journal of Accounting and Economics*, 50(2–3), 179–234.
- Bertrand, M., Mullainathan, S., 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy*, 111(5), 1043–1075.
- Campello, M., Giambona, E., Graham, J.R., Harvey, C.R., 2011. Liquidity management and corporate investment during a financial crisis, *Review of Financial Studies*, 24(6), 1944–1979.
- Casaburi, L. and Troiano, U., 2016. Ghost-House Busters: The Electoral Response to a Large Anti-Tax Evasion Program. *Quarterly Journal of Economics*, 131(1), 273–314.
- Chen, L, He, R., 2024. Does digital tax enforcement drive corporate digitalization? Evidence from the Golden Tax Project III in China: a pre-registered report. *Pacific-Basin Finance Journal*, 83, 102242.
- Custódio, C., Ferreira, M.A., Laureano, L., 2013. Why are US firms using more short-term debt? *Journal of Financial Economics*, 108(1), 182–212.
- Farhi, E., Tirole, J., 2012. Collective moral hazard, maturity mismatch, and systemic bailouts. *American Economic Review*, 102, 60–93.
- Gordon, R. and Li, W., 2009. Tax Structures in Developing Countries: Many Puzzles



- and a Possible Explanation. *Journal of Political Economy*, 93(7), 855–866.
- Hanlon, M, Hoopes, L J, Shroff, N., 2014. The effect of tax authority monitoring and enforcement on financial reporting quality. *Journal of the American Taxation Association*, 36(2), 137–170.
- Ma, S., Peng, Y., Wu, W., Zhu, F., 2022. Bank liquidity hoarding and corporate maturity mismatch: evidence from China. *Research in International Business and Finance*, 63, 101776.
- Myers, S.C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147–175.
- Shleifer, A., Vishny, R.W., 1994. Politicians and firms. *Quarterly Journal of Economics*, 109 (4), 995–1025.
- Zheng, T., Lin, S., Chen, M., 2023. Tax enforcement and investment efficiency: Based on China's “VAT reform”. *Financial Research Letters*, 58, 104605.
- Vig, V., 2013. Access to collateral and corporate debt structure: evidence from a natural experiment. *Journal of Finance*, 68 (3), 881–928.

# **Does Big-Data Tax Governance Alleviate the Maturity Mismatch of Corporate Investment and Financing?**

## **Abstract:**

Corporate investment and financing maturity mismatches is an urgent issue. This study uses Chinese A-share listed companies as the research sample and the local implementation of big-data tax governance as a quasi-natural experiment to examine whether big-data tax governance can address the corporate investment and financing maturity-mismatch problem. Furthermore, corporate-tax compliance is selected as the mechanism variable to study the mechanism of action of big-data tax governance on the investment and financing term mismatch of firms. We find that big-data tax governance intensifies the investment and financing term-mismatch problem of firms and significantly affects the investment and financing term-mismatch problem by improving corporate-tax compliance.

## **Keywords:**

Big-data tax governance, Tax Compliance, Firm Investment and Financing Maturity Mismatch.

## **1. Introduction**

The maturity structure of corporate investment and financing should match that of debt (Myers, 1977). However, owing to the immaturity and imperfections of China's financial-market structure, some listed firms have continuously engaged in financing long-term investments with short-term debt—that is, using short-term debt to finance long-term assets—leading to the problem of a “maturity mismatch between investment and financing (Campello et al., 2011; Custodio et al., 2013).” In the long run, this behavior hinders economic growth and increases the debt-repayment pressure on firms at the micro level, in addition to operational risks and prudential costs at the macro level (Farhi et al., 2012). These conditions eventually increase systemic financial risks (Acharya et al., 2011). In 2023, the Central Financial Work Conference of China established that upholding risk prevention and control as a perpetual theme in financial work is necessary. From this perspective, the Chinese government urgently needs to solve the problem of firms financing long-term investments with short-term debt at the micro level, which will allow it to effectively prevent and defuse the systemic financial risks that may manifest owing to the maturity mismatch between investment and financing.

Firms with financing constraints are more inclined to reduce cash outflows through tax avoidance, thereby alleviating financing constraints (Law and Mills, 2015). The implementation of big-data tax governance has significantly enhanced tax-collection and tax-management capabilities, and information technology can help tax authorities detect corporate-tax-avoidance behavior (Gordon and Li, 2009; Casaburi and Troiano, 2016; Fan et al., 2020; Li et al., 2020; Xiao and Shao, 2020). This is

because a reduction in tax avoidance leads to an increase in corporate cash outflows, which reduces the internal financing capacity of firms, thereby increasing the external financing needs of firms and raising their financing costs (Myers and Majluf, 1984). As one of the external regulatory mechanisms for firms, tax collection and management affect the financing constraints of firms, and the financing-constraint problem is a key factor causing the maturity mismatch between corporate investment and financing. Studying whether and how big-data tax governance affects the maturity mismatch between corporate investment and financing can help identify and reduce potential systemic financial risks in advance and optimize the financing structure of firms, and it is of significant practical importance for actively promoting the high-quality development of the Chinese economy.

This study primarily makes the following three contributions at the margin. First, big-data tax governance is taken as the entry point to analyze the influence mechanism of big-data tax governance on micro-firm behavior from the perspective of corporate investment and financing, and the influence path of tax governance on corporate investment and financing behavior is explored, thereby enriching relevant research on taxation and facilitating high-quality economic development. Second, corporate-tax compliance is selected as a mechanism variable to study how big-data tax governance affects the level of firm investment and financing term mismatch by influencing corporate-tax compliance, providing empirical evidence for optimizing tax-collection and tax-management policies. Third, theoretical support and empirical evidence is presented for further promoting tax-administration reform, in addition to research references for optimizing corporate investment and financing and promoting high-quality economic development.

## 2. Research design

### 2.1 Data sources and processing

This study uses data from China's A-share listed companies from 2009 to 2021, sourced from the CSMAR database, and gathers and organizes data on big-data tax governance. The data are processed as follows: financial company samples, ST samples, samples with net assets less than zero, and samples with missing financial data are excluded, and finally, 19,869 observations are obtained.

### 2.2. Model design

To examine the relationship between big-data tax governance and the maturity mismatch in corporate investment and financing, we establish the following model:

$$SFLI_{i,t} = \alpha_0 + \alpha_1 BigData_{c,t} + \beta_j \sum Controls_{i,t} + FirmFE + YearFE + \varepsilon_{i,t} \quad (1)$$

where the variables "*i*," "*t*," and "*c*" represent "firm," "year," and "region," respectively. The *SFLI* indicator is used to quantify the extent of a firm's investment and financing maturity mismatch. This is calculated by subtracting the increase in long-term borrowings from the current period from the increase in equity and net cash flow from operating activities, and then dividing the result by the total amount of assets. A higher value of the indicator indicates a greater degree of the investment and financing

maturity mismatch. The value of this indicator is positively correlated with the degree of the investment and financing maturity mismatch. The variable *BigData* denotes whether the firm location has implemented big-data tax governance in the current year, and *Controls* denotes other control variables. The term *FirmFE* represents the firm fixed effect, while *YearFE* denotes the year fixed effect. A significantly negative coefficient of *BigData* indicates that big-data tax governance mitigates the corporate investment and financing maturity mismatch, whereas a significantly positive coefficient indicates the opposite effect. Table 1 presents descriptive statistics for each variable.

**Table 1**

Definition of variables and descriptive statistics.

Variable	Variable Meaning	N	Mean	sd	Min	Max
<i>SFLI</i>	Firm investment and financing maturity mismatch	19869	-0.0800	0.120	-0.470	0.280
<i>BigData</i>	Big-data tax governance	19869	0.390	0.490	0	1
<i>Size</i>	firm size	19869	22.24	1.320	19.74	27.13
<i>Top1</i>	First major shareholder's equity stake	19869	0.350	0.150	0.0800	0.760
<i>INST</i>	Institutional shareholders' equity ratio	19869	0.410	0.240	0	0.910
<i>FirmAge</i>	Firm age	19869	2.850	0.360	1.100	3.710

### 3. Regression results analysis

#### 3.1. Regression results

The results of the benchmark regression analysis in Table 2 show that, irrespective of whether the control variables are added to the model, the regression coefficients for *BigData* are significantly positive. This result indicates that the implementation of big-data tax governance intensifies the investment and financing maturity mismatch between firms.

**Table 2**

Results of the benchmark regression.

Variable	<i>SFLI</i>	
	(1)	(2)
<i>BigData</i>	0.0070* (0.0031)	0.0080** (0.0031)
<i>Size</i>		-0.0294*** (0.0026)

<i>Top1</i>		0.0957*** (0.0168)
<i>INST</i>		-0.0255*** (0.0062)
<i>FirmAge</i>		-0.0500*** (0.0126)
<i>_cons</i>	-0.0870*** (0.0014)	0.6875*** (0.0653)
<i>FirmFE</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>R<sup>2</sup></i>	0.3040	0.3147
<i>N</i>	19602	19602

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.2 Mechanism Test

In this study, tax compliance (*BTD*) is substituted into the regression model to test whether it is an effective mechanism variable. *BTD* is defined as accounting profit before tax minus taxable income, divided by total assets at the end of the period; the lower the *BTD*, the higher the tax compliance of the firm. Table 3 demonstrates that big-data tax governance improves the tax compliance of firms, and firms with higher tax compliance have a more severe investment and financing maturity mismatch.

**Table 3**  
Mechanism Test.

Variable	(1) <i>SFLI</i>	(2) <i>BTD</i>	(3) <i>SFLI</i>
<i>BigData</i>	0.0080** (0.0031)	-0.0016* (0.0008)	0.0070* (0.0033)
<i>BTD</i>			-0.597*** (0.0365)
<i>Controls</i>	Yes	Yes	Yes
<i>_cons</i>	0.6875*** (0.0653)	0.0987*** (0.0187)	0.7907*** (0.0669)
<i>Firm FE</i>	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes
<i>N</i>	19602	19860	19860
<i>R<sup>2</sup></i>	0.3147	0.0620	0.1010

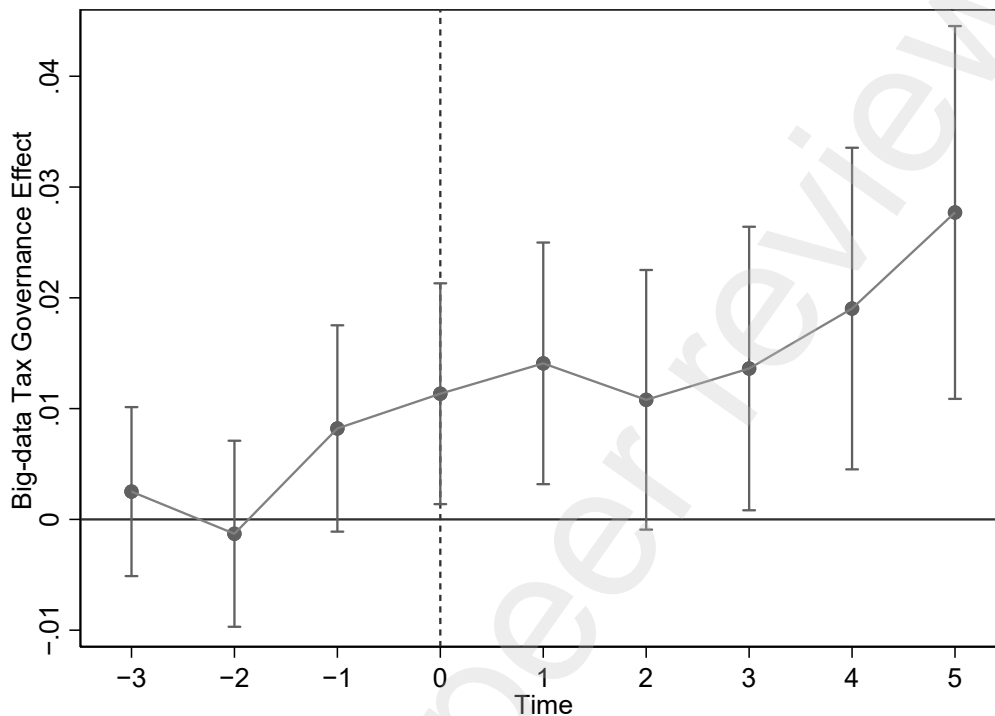
\*, \*\*, \*\*\* signify  $P < 0.10, 0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.3. Robustness check

#### 3.3.1. Parallel-trend test

In this study, we capture whether a significant difference exist in *SFLI* between the two samples ex ante by adding an interaction term between the big-data tax policy and the year dummy variable in the regression to determine whether the parallel-trend

hypothesis is satisfied. Fig. 1 shows that no significant difference exists in the investment and financing maturity mismatch between the experimental and control groups before the implementation of the big-data tax policy at the firm's location, verifying the parallel-trend hypothesis.



**Fig. 1. Parallel-trend test.**

### 3.3.2. Placebo test

To exclude the influence of other policy reforms and uncertainties, this study takes the three years before, two years before, two years after, and three years after the actual implementation time of the big-data tax in the firm location as dummy time points for the implementation of the big-data tax, and it constructs the dummy variables *BigData1*, *BigData2*, *BigData3*, and *BigData4* to be retested. The regression results show that the regression coefficients of the four dummy variables are not significant, meaning that the influence of other factors can be excluded.

**Table 4**

Placebo test results.

Variable	<i>SFLI</i>			
	(1)	(2)	(3)	(4)
<i>BigData1</i>	-0.0031 (0.0048)			
<i>BigData2</i>		-0.0023		

			(0.0039)	
<i>BigData3</i>				-0.0071 (0.0052)
<i>BigData4</i>				-0.0043 (0.0054)
<i>Controls</i>	Yes	Yes	Yes	Yes
<i>_cons</i>	0.8843*** (0.1297)	0.8767*** (0.1118)	1.9803*** (0.2841)	1.8702*** (0.4006)
<i>Firm FE</i>	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes
<i>N</i>	7651	10510	5727	4391
<i>R<sup>2</sup></i>	0.3797	0.3751	0.4596	0.5065

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05, 0.01$ . SEs clustered in parentheses.

### 3.3.3. Removing policy disruptions

In 2016, China fully implemented the transition from business tax to VAT, and in 2019, it continued to implement a tax-reduction policy in the form of a VAT rate reduction. To eliminate the interference of the aforementioned policies, this study uses data from before 2016 and before 2019 to conduct regression analyses. The results show that the coefficients of the variables related to *BigData* are all significantly positive, which is consistent with the results of the benchmark regression.

**Table 5**

Removing policy disruptions.

Variable	<i>SFLI</i>	
	Exclusion of 2016 policies	Exclusion of 2019 policies
<i>BigData</i>	0.0150* (0.0073)	0.0075** (0.0038)
<i>Controls</i>	Yes	Yes
<i>_cons</i>	1.7059*** (0.1527)	0.7627*** (0.0844)
<i>Firm FE</i>	Yes	Yes
<i>Year FE</i>	Yes	Yes
<i>N</i>	8954	14405
<i>R<sup>2</sup></i>	0.4023	0.3303

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05$ , and  $0.01$ . SEs clustered in parentheses.

### 3.4. Further analysis

To further study the impact of big-data tax governance on the maturity mismatch of investment and financing between different firms, this study divides the sample into

three groups: state-owned firms and non-state-owned firms, large firms and small firms, and firms with high-collateral security capacity and firms with low-collateral security capacity.

The study finds that, first, big-data tax governance has a significant impact on state-owned firms, while the impact on non-state-owned firms is not significant. This reveals that state-owned firms are more responsive to the implementation of tax-related initiatives and can more accurately understand the implementation and formulation of economic policies. Second, compared with small firms, big-data tax governance has a significant impact on the investment and financing term mismatch of large firms. This may be because the increase in the tax burden of large firms leads to a decrease in their internal surplus, so they increase the proportion of short-term loans to adjust their credit structure, which worsens the investment and financing term mismatch. Third, the tax treatment of big data significantly affects firms with low-collateral security capacity and has no significant effect on firms with high-collateral security capacity. This reveals that firms with high-collateral security capacity usually have more high-value collateral, and banks may not immediately tighten their credit lines owing to their strong asset strength. Firms with low-collateral security capacity usually have relatively limited financial-management capabilities. Big-data-based tax governance requires firms to standardize their financial management. As such, lacking sufficient collateral, firms face significant obstacles when tax-credit issues arise, which leads to greater challenges in the credit market, thus exacerbating the maturity mismatch between investment and financing.

**Table 6**  
Heterogeneity analysis.

Variable	<i>SFLI</i>					
	(1) SOEs	(2) non-SOEs	(3) Large companies	(4) Small companies	(5) Companies with High Collateral Value	(6) Companies with Low Collateral Value
<i>BigData</i>	0.0091** (0.0044)	0.0060 (0.0044)	0.0159** * (0.0046)	0.0008 (0.0045)	0.0077 (0.0047)	0.0089** (0.0044)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>_cons</i>	0.3544** * (0.0989)	0.8950** * (0.0940)	0.2908** (0.1254)	1.1338** * (0.1130)	0.6554** * (0.1092)	0.8207*** (0.0932)
<i>Firm FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year FE</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	8019	11496	8428	10936	7943	11251
<i>R<sup>2</sup></i>	0.2846	0.3464	0.3196	0.3468	0.3216	0.3621

\*, \*\*, \*\*\* signify  $P < 0.10, 0.05, 0.01$ . SEs clustered in parentheses.



#### 4. Conclusions

The present study finds that first, big-data taxation has an external effect on tax governance, which worsens the investment and financing maturity mismatch between firms. Big-data tax governance makes taxpayers' tax-related information more transparent, and to avoid tax risks, firms choose to make myopic investment and financing decisions, thereby exacerbating the firm investment and financing term mismatch. Second, tax compliance is an effective mechanism variable of big-data tax governance that affects the investment and financing maturity mismatch of firms. Big-data tax governance positively affects tax compliance, and increased tax compliance worsens the firm investment and financing term mismatch. Finally, big-data tax governance worsens the investment and financing term mismatch for state-owned firms, large firms, and firms with low-collateral secured capacity, while it has no significant effect on non-state-owned firms, small firms, and firms with high-collateral security capacity.

#### Funding

This work was supported by the National Social Science Fund of China (NSSC) under the Youth Program [No. 20CJY059].

#### References

- Acharya, V.V., Gale, D., Yorulmazer, T., 2011. Rollover risk and market freezes. *The Journal of Finance*, 66(4), 1177–1209.
- Armstrong, C.S., Guay, W.R., Weber, J.P., 2010. The role of information and financial reporting in corporate governance and debt contracting, *Journal of Accounting and Economics*, 50(2–3), 179–234.
- Bertrand, M., Mullainathan, S., 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy*, 111(5), 1043–1075.
- Campello, M., Giambona, E., Graham, J.R., Harvey, C.R., 2011. Liquidity management and corporate investment during a financial crisis, *Review of Financial Studies*, 24(6), 1944–1979.
- Casaburi, L. and Troiano, U., 2016. Ghost-House Busters: The Electoral Response to a Large Anti-Tax Evasion Program. *Quarterly Journal of Economics*, 131(1), 273–314.
- Chen, L, He, R., 2024. Does digital tax enforcement drive corporate digitalization? Evidence from the Golden Tax Project III in China: a pre-registered report. *Pacific-Basin Finance Journal*, 83, 102242.
- Custódio, C., Ferreira, M.A., Laureano, L., 2013. Why are US firms using more short-term debt? *Journal of Financial Economics*, 108(1), 182–212.
- Farhi, E., Tirole, J., 2012. Collective moral hazard, maturity mismatch, and systemic bailouts. *American Economic Review*, 102, 60–93.
- Gordon, R. and Li, W., 2009. Tax Structures in Developing Countries: Many Puzzles and a Possible Explanation. *Journal of Political Economy*, 93(7), 855–866.
- Hanlon, M, Hoopes, L J, Shroff, N., 2014. The effect of tax authority monitoring and

- enforcement on financial reporting quality. *Journal of the American Taxation Association*, 36(2), 137–170.
- Ma, S., Peng, Y., Wu, W., Zhu, F., 2022. Bank liquidity hoarding and corporate maturity mismatch: evidence from China. *Research in International Business and Finance*, 63, 101776.
- Myers, S.C., 1977. Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147–175.
- Shleifer, A., Vishny, R.W., 1994. Politicians and firms. *Quarterly Journal of Economics*, 109 (4), 995–1025.
- Zheng, T., Lin, S., Chen, M., 2023. Tax enforcement and investment efficiency: Based on China's “VAT reform”. *Financial Research Letters*, 58, 104605.
- Vig, V., 2013. Access to collateral and corporate debt structure: evidence from a natural experiment. *Journal of Finance*, 68 (3), 881–928.