



Research on the Impact of Digital Tax Administration Policies on Enterprise Investment Efficiency: Based on the Experience of Chinese Listed Companies

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ABSTRACT: In the era of digital economy, advanced technologies have driven the transformation of tax collection and management towards digitalization and intelligence. This research deeply analyzes the impact of digital tax collection and management on the investment efficiency of enterprises. Using the progressive multi-period DID method, a study was conducted with Chinese A-share listed companies from 2010 to 2024 as the sample. The research found that digitalization of tax collection and management can enhance the investment efficiency of enterprises. After distinguishing between insufficient investment and excessive investment, it was discovered that its enhancing effect was more significant in the excessive investment sample, mainly achieved through the "governance effect" to curb excessive investment. Further, based on the examination of differences in manager characteristics, it was found that when the proportion of managers' holdings is low and the degree of overconfidence is higher, the enhancing effect of digitalization of tax collection and management on investment efficiency is more significant. At the same time, "tax burden perception" strengthened its enhancing effect on investment efficiency, and "tax practice" also played an important role.

KEYWORDS: Digitalization of tax collection and administration; Enterprise investment efficiency; Enterprise financial decision-making.

I. INTRODUCTION

In the context of the booming digital economy, cutting-edge technologies such as big data, cloud computing, and artificial intelligence have deeply integrated into the field of national tax collection and management, driving a profound transformation towards digitalization and intelligence. Globally, countries are undergoing a leapfrog transformation from traditional tax collection models to "tax collection by data". International organizations like

the OECD and multiple national tax authorities have significantly enhanced the efficiency and accuracy of tax collection through measures such as establishing digital identity systems, integrating taxpayer touchpoints, and establishing data standard systems, while also optimizing the tax service experience.

The digitization of tax collection and management not only breaks down the information barriers between the national tax authorities and enterprises, enabling real-time sharing and interaction of data, but also has a profound impact on enterprises' financial behaviors. On one hand, digital tax collection requires a complete reshaping of enterprise financial processes, transforming from the traditional "bookkeeper" role to a "data think tank", providing strong support for enterprise strategic decisions; on the other hand, it also raises higher requirements for the compliance, efficiency and data security of enterprise financial management, prompting enterprises to strengthen internal tax management, enhance the digital skills of financial personnel, and improve the data governance system to adapt to the new normal of digital tax collection.

Based on this background, This research conducts an in-depth analysis of whether digital tax collection and management will affect the investment efficiency of enterprises. It then distinguishes between excessive investment and insufficient investment and examines whether there are different conclusions. At the same time, it analyzes the role of managerial characteristics in playing a regulatory role. Starting from the practice of tax collection and management, it explores the practical paths through which digital tax collection and management affect corporate governance.



II. THEORETICAL ANALYSIS AND

Enterprise investment behavior is an important manifestation of the utilization of enterprise resources, and the effectiveness of resource utilization depends on the level of corporate governance^{[1][2][3]}. Digital tax collection and management can bring about resource effects, that is, providing available resources for enterprise investment. This may also affect the level of corporate governance. Under the given investment opportunities, investment efficiency depends on the acquisition of resources and the effective use of resources - the level of governance. magnetic flux setup within the coils body, which in turn compresses a small spring attached to one end of the plunger. The force and speed of the plungers movement is determined by the strength of the magnetic flux generated within the coil.

From the perspective of the resource effect, digitalized tax collection and management can reduce the debt financing costs of enterprises and alleviate the financing constraints of enterprises. Digitalization manifests as the resource effect brought to enterprises by tax collection and management. On one hand, the resource effect may provide enterprises with better resource support when they encounter investment opportunities, thereby enabling them to better seize investment opportunities and alleviate the problem of insufficient investment^[4]. However, on the other hand, the resource effect can also lead to resource waste, causing enterprises to invest in projects with negative NPV, resulting in excessive investment^[5].

From the perspective of governance effects, numerous studies have shown that higher-quality financial information can reduce managers' moral hazard and adverse selection^[6]. This is because financial information, as an important component of the company's control mechanism, can restrain the behavior of managers^[7], alleviate the moral hazard caused by information asymmetry, prevent managers from infringing upon the interests of investors, curb managers' excessive pursuit of enterprise scale at the expense of company value motivation^[8], and thereby reduce managers' excessive investment and improve the investment efficiency of the enterprise.

Therefore, digital taxation may enhance or reduce the investment efficiency of enterprises. Based on the above theoretical analysis, This research proposes the following hypotheses:

H1: Digital tax collection and management may lower the investment efficiency of enterprises through the resource effect.

RESEARCH HYPOTHESES

H2: Digital tax collection and management may increase the investment efficiency of enterprises through the resource effect or governance effect.

III. RESEARCH DESIGN

1. research method

This research adopts the staggered DID (StaggeredDID) approach in a progressive multi-period manner for the research. DID is the mainstream analytical method in the field of policy evaluation in recent years, and it can effectively address the impact of endogeneity issues. Beck (2010)^[9] pointed out that the progressive multi-period DID can effectively compare and analyze the differentiated impacts of policy implementation on the experimental group (affected by the policy) and the control group (not affected by the policy), and more clearly identify the impacts brought by the policy.

2. Data Sources

The data used in This research is panel data. The research sample is composed of Chinese A-share listed companies from 2010 to 2024. According to the suggestion of Krejcie and Morgan (1970)^[10], with a 95% confidence level and a 5% margin of error, the final sample size was determined.

The data sources of This research mainly consist of two aspects: Firstly, the original data comes from the CSMAR database of Guotai Nanfang; Secondly, the digital variables related to tax collection and management used in This research are derived from the annual reports of listed companies.

3. Data Analysis Tool

This research will conduct the analysis using the STATA software.

4. Dependent Variable

This research takes the enterprise investment efficiency as the dependent variable. The investment efficiency will adopt the model proposed by Chen (2011)^[11] to estimate the enterprise investment efficiency. The following model will be used to estimate the investment efficiency proxy variable AINVit. Here, NEG is a dummy variable, taking 1 when the growth rate of operating income is less than zero and 0 otherwise, and GROWTH represents the enterprise growth.

$$INV_t = a_0 + a_1 GROWTH_{t-1} + a_2 NEG_{t-1} + a_3 NEG_{t-1} \times GROWTH_{t-1} + \varepsilon_t \quad (a)$$

$$PINV_t = a_0 + a_1 GROWTH_{t-1} + a_2 NEG_{t-1} + a_3 NEG_{t-1} \times GROWTH_{t-1} \quad (b)$$

$$DINV_t = INV_t - PINV_t \quad (c)$$



In this section, the absolute values of $DINV_{i,t}$ will be calculated to obtain the investment efficiency proxy variable for this section - $AINV_{i,t}$.

5.Independent Variables
 In this study, enterprises that have implemented the digitalization policy for taxation are classified as the experimental group, while enterprises that have not yet implemented the digitalization policy are regarded as the dynamic control group. By using the progressive multi-period DID method, the impact of digitalized tax collection and management on the investment efficiency of enterprises can be more clearly identified. This study adopts the same approach as previous literature. When an enterprise implements the digitalized tax collection and management policy, the variable (REFORM) takes the value of 1, and 0 if it does not implement it. The fixed effects at the individual level are controlled in the model.

6.Control Variables

This section comprehensively selects the following control variables, as shown in Table 2.1.

Table3.1: Digitization of tax collection and administration VS The investment efficiency of corporations variable definition table

Variable	Name	Symbol	Description
DV	Efficiency Of Investment	AINV	The Absolute Value Of The Residuals Estimated By The Chen Et Al. (2011) Model
IV	Digitization Of Tax Collection And Administration	REFORM	The REFORM Variable In The Experimental Group Is Equal To 1, Otherwise It Is 0
	Company Size	SIZE	Add 1 To The Company's Total Assets At The End Of The Year To Take The Natural Logarithm
	Debt To Asset Ratio	LEV	Total Liabilities Of The Company At The End Of The Year / Total Assets Of The Company
	Ratio Of Independent Directors	OUTR	Number Of Independent Directors / Number Of Board Members
	Board Size	BSIZE	Total Number Of Board Members
	The Chairman Also Serves As The General Manager	DUAL	If The Chairman And The General Manager Hold The Same Position, The Result Is 1; Otherwise, It Is 0.
CV	Enterprise Profitability	ROE	Return On Equity
	Share Proportion Of The Largest Shareholder	TOP	The Number Of Shares Held By The Largest Shareholder / Total Number Of Shares
	Enterprise Growth	GROWTH	Growth Rate Of Main Business Revenue
	Enterprise Age	AGE	The Establishment Years Of The Enterprise Are Calculated As The Natural Logarithm
	The Proportion Of Tangible Assets	TANG	(Total Assets - Intangible Assets) / Total Assets
	Net Cash Flow From Operating Activities	OCF	Net Cash Flow From Operating Activities / Total Assets

7.Model Design

This section studies the impact of digital tax collection and management on the investment efficiency of enterprises. This section draws on the multi-period DID research of Beck et al. (2010) and uses the following model for analysis:

$$AINV = \beta_1 + \beta_2 REFORM + \beta_3 SIZE + \beta_4 LEV + \beta_5 OUTR + \beta_6 BSIZE + \beta_7 DUAL + \beta_8 ROA + \beta_9 TOP + \beta_{10} GROWTH + \beta_{11} AGE + \beta_{12} TANG + \beta_{13} OCF + \Sigma Firm + \Sigma Year + \epsilon(\text{Model1})$$

IV. EMPIRICAL ANALYSIS

1.Descriptive Statistical Analysis

The descriptive statistical analysis of the impact of digitalization in tax collection and management on the efficiency of enterprise investment is presented in Table 4.1.

Table 4.1 Descriptive Statistical Results of Key Variables

VarName	Obs	SD	Mean	Min	Median	Max
AINV	30269	0.036	0.038	0.001	0.030	0.217
REFORM	30269	0.438	0.742	0.000	1.000	1.000
SIZE	30269	1.262	22.353	20.236	22.137	26.405
LEV	30269	0.192	0.411	0.059	0.405	0.841
OUTR	30269	0.053	0.376	0.333	0.364	0.571
BSIZE	30269	0.195	2.116	1.609	2.197	2.639
DUAL	30269	0.460	0.303	0.000	0.000	1.000
ROA	30269	0.058	0.041	-0.168	0.039	0.216
TOP	30269	0.147	0.333	0.082	0.310	0.738
GROWTH	30269	0.306	0.136	-0.487	0.094	1.609
AGE	30269	0.309	2.978	2.079	2.996	3.611

The mean value of the investment efficiency indicator (AINV) calculated in this article is 0.038, while the mean value of the tax administration digitalization (REFORM) is 0.742. This indicates that approximately 74.26% of the samples in the research sample of this article have implemented the tax digitalization policy.

2.Correlation Analysis

The correlation analysis between the digitalization of tax collection and management and enterprise investment efficiency is presented in Table4.2.

Table 4.2 shows that the correlation coefficient between tax administration digitalization (REFORM) and investment efficiency (AINV) is -0.073, and both are significant at the 1% level. A smaller value of investment efficiency AINV indicates higher investment efficiency of the enterprise, preliminarily suggesting that tax administration digitalization can improve the investment efficiency of enterprises. The correlation coefficients in Table 4.2 are generally less than 0.05, indicating the absence of multicollinearity.

3 Regression Analysis

The results of the basic regression analysis on the digitalization of tax collection and enterprises' investment efficiency are presented in Table 4.3.

Table 4.3 Basic Regression Results of Digitalization of Tax Collection and Enterprises' Investment Efficiency

	(1) AINV	(2) AINV
REFORM	-0.005*** (-3.60)	-0.004*** (-3.19)
SIZE		-0.000 (-0.61)
LEV		0.019*** (8.17)
OUTR		-0.011 (-1.61)
BSIZE		-0.002 (-1.06)
DUAL		0.001 (1.60)
ROA		0.057*** (10.84)
TOP		0.022*** (6.12)
GROWTH		0.008***



		(10.65)
AGE		-0.014***
TANG		(-3.48)
		-0.037***
OCF		(-4.58)
		-0.013***
_CONS	0.041***	(-3.41)
	(43.26)	0.119***
		(5.92)
ID fixed effect	YES	YES
YEAR fixed effect	YES	YES
N	30269	30269
Adj. R ²	0.249	0.263

Note: The values in parentheses represent the robust t-statistics. *, **, *** indicate significance levels of 10%, 5%, and 1% respectively.

Table 4.3 presents the basic regression analysis results of the impact of tax administration digitization on enterprise investment efficiency. In this table, investment efficiency AINV is the dependent variable, and tax administration digitization (REFORM) is the independent variable. The first column (Column (1)) is the preliminary verification of the impact of the core variable REFORM on AINV. It controls for the individual fixed effects and annual fixed effects of the controlling companies and does not include other control variables. The second column (Column (2)) adds other control variables on the basis of the first column. After excluding the interference, it can more accurately observe the core impact of REFORM on AINV. The model fit degree of Adj. R² is 0.249 without including control variables, and it

increases to 0.263 after adding control variables, indicating that adding control variables has enhanced the explanatory power of the model for AINV.

The regression results in Table 4.3 show that the regression coefficients of Tax Administration Digitalization (REFORM) change from the (1) column to the (2) column as -0.005 and -0.004 respectively. The significance levels for both are 1%. This indicates that tax administration digitalization represented by the Golden Tax Phase IV has enhanced the investment efficiency of enterprises. Tax administration digitalization may generate "resource effects" or "governance effects". The outcomes of these two effects may differ. From the specific empirical analysis results, it ultimately manifests as tax administration digitalization being able to improve the investment efficiency of enterprises. This could be because the governance effect has exerted an inhibitory effect on excessive investment, or it could be that the "resource effect" has alleviated the problem of insufficient investment. In the next subsection, further analysis will be conducted to explore the specific effects of tax administration digitalization.

Table 4.2 Analysis of the Correlation between Tax Collection and Management Digitalization and Enterprise Investment Efficiency

	AINV	REFORM	SIZE	LEV	OUTR	BSIZE	DUAL	ROA	TOP	GROWTH	AGE	TANG	OCF
AINV	1												
REFORM	-0.073***	1											
SIZE	-0.045***	0.077***	1										
LEV	0.00900	-0.040***	0.503***	1									
OUTR	0.00300	0.067***	-0.010*	-0.020***	1								
BSIZE	-0.00900	-0.143***	0.267***	0.149***	-0.561***	1							
DUAL	0.028***	0.096***	-0.171***	-0.124***	0.128***	-0.206***	1						
ROA	0.083***	-0.088***	0.032***	-0.315***	-0.014**	0.039***	0.00300	1					
TOP	0.031***	-0.110***	0.181***	0.045***	0.031***	0.037***	-0.062***	0.135***	1				
GROWTH	0.137***	-0.077***	0.016***	0.047***	-0.011*	0.012**	0.020***	0.297***	0.00800	1			
AGE	-0.102***	0.402***	0.186***	0.107***	-0.012**	0.028***	-0.055***	-0.091***	-0.105***	-0.135***	1		
TANG	-0.051***	0.020***	-0.050***	-0.016**	0.030***	-0.078***	0.041***	0.027***	-0.037***	-0.00100	0.00300	1	
OCF	0.041***	0.024***	0.071***	-0.162***	-0.00800	0.045***	-0.00900	0.472***	0.109***	0.041***	0.013**	-0.074***	1

Note: The values in parentheses represent the robust t-statistics. *, **, *** indicate significance levels of 10%, 5%, and 1% respectively.

4 Further Analysis: Resource Effect vs. Governance Effect

In order to determine whether the digitalization of tax collection and administration is primarily driven by the resource effect, the governance effect, or both, this chapter will group the entire sample based on the sign of the investment indicator DINV before taking the absolute value. Samples with a positive sign mainly indicate excessive investment, while samples with a negative sign mainly indicate insufficient investment. Therefore, this subsection will divide the entire sample into the insufficient investment group and the excessive investment group for regression analysis. The specific regression results are shown in Table 4.4.

Table 4.4 Regression Analysis of Resource Effectiveness vs. Governance Effectiveness

	(1)	(2)
	Insufficient Investment	Over-Investment
	AINV	AINV
REFORM	-0.001	-0.006***
	(-1.025)	(-3.915)
SIZE	-0.002***	-0.006***
	(-7.132)	(-10.21)
LEV	-0.002***	-0.003
	(-1.662)	(-1.413)
OUTR	-0.008***	-0.004
	(-1.999)	(-0.445)
BSIZE	-0.001	-0.001
	(-0.902)	(0.114)
DUAL	0.001	0.001
	(-1.025)	(0.329)
ROA	-0.001	0.008
	(-0.281)	(1.614)
TOP	0.001	0.025***
	(0.306)	(5.261)
GROWTH	-0.001**	-0.001
	(-2.522)	(-0.810)
AGE	-0.003	-0.021***
	(-1.105)	(-3.637)
TANG	-0.006	-0.041***
	(-1.4295)	(-4.400)
OCF	0.003*	0.013***
	(1.834)	(2.923)
_CONS	0.083***	0.223***
	(9.354)	(11.31)
ID fixed effect	YES	YES
YEAR fixed effect	YES	YES



Adj. R ²	0.023	0.041
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Note: The values in parentheses represent the robust t-statistics. *, **, *** indicate significance levels of 10%, 5%, and 1% respectively.

Table 4.4 presents the grouped regression results of dividing the entire sample into the underinvestment group and the overinvestment group. The first column (1) shows the regression results for the underinvestment group, and the second column (2) shows the regression results for the overinvestment group. From the regression results in Table 5.22, it can be seen that in the first column (1), the regression coefficient of tax administration digitalization (REFORM) is not significant, meaning that in the underinvestment group, tax administration digitalization did not have the effect of improving investment efficiency, indicating that tax administration digitalization had no significant impact on enterprise investment efficiency through the resource effect. In the overinvestment group, that is, the second column (2), the regression results show that the regression coefficient of tax administration digitalization (REFORM) is all significantly negative, at -0.006, indicating that tax administration digitalization has played a role in improving investment efficiency through the governance effect, that is, by suppressing excessive investment of enterprises to achieve an increase in investment efficiency.

Therefore, from the perspective of enterprise investment, the digitalization of tax collection and management may bring about resource effects or governance effects. The final research conclusion indicates that the governance effect plays a dominant role.

5 Robustness Test

The level of economic development has an impact on the investment efficiency of enterprises. Meanwhile, the digitalization of tax collection and management studied in This research is mainly based on the provincial pilot promotion. Therefore, this part will control the influence of regional economic development on the investment efficiency of enterprises. By introducing the regional economic development level (GDP) into Model (1), where the regional economic development level (GDP) is the natural logarithm of the regional GDP. The regression results are shown in Table 4.5.

Table 4.5 Economic Development Situation of Controlled Areas

	AINV
REFORM	-0.004*** (-3.13)
SIZE	-0.000 (-0.55)
LEV	0.019*** (8.17)
OUTR	-0.011 (-1.62)

BSIZE	-0.002 (-1.06)
DUAL	0.001 (1.62)
ROA	0.057*** (10.84)
TOP	0.022*** (6.11)
GROWTH	0.007*** (10.63)
AGE	-0.014*** (-3.47)
TANG	-0.037*** (-4.55)
OCF	-0.013*** (-3.41)
GDP	-0.002 (-1.22)
_CONS	0.144*** (4.95)
ID fixed effect	YES
YEAR fixed effect	YES
N	30269
Adj. R ²	0.263

Note: The values in parentheses represent the robust t-statistics. *, **, *** indicate significance levels of 10%, 5%, and 1% respectively.

The regression in Table 4.5 was conducted by introducing the variable of regional economic development level (GDP, taking the natural logarithm) based on Model 1. At the same time, the fixed effects of industry (ID) and year (YEAR) were controlled. The sample size was 30,269. The adjusted R² was 0.263, indicating that the model could explain 26.3% of the variation of the dependent variable - enterprise investment efficiency - AINV, demonstrating a certain explanatory power.

The regression coefficient of the explanatory variable REFORM on the explained variable AINV (enterprise investment efficiency) is -0.004, and it is significant at the 1% level (t-value is -3.13). This indicates that the digital reform of tax collection and management (REFORM) has a significant impact on enterprise investment efficiency (AINV). In this part, a new control variable GDP is introduced, and its coefficient on the enterprise investment efficiency AINV is -0.002, with a t-value of -1.22, which is not significant. This suggests that in this model, the influence of regional economic development level (measured by the natural logarithm of regional GDP) on enterprise investment efficiency is not significant. Although economic development level theoretically may have an impact on enterprise investment, in the model setting and data of this study, this influence has not been reflected. This might be due to the fact that enterprise investment efficiency is more affected by other micro factors, and the role of regional economic development level is relatively weak.

In conclusion, after adding the control variable GDP, it is evident that the research conclusions of This research are relatively robust.



V. RESEARCH CONCLUSION

This research utilizes the tax digitalization policy pilot as a quasi-natural experiment to explore the impact of tax collection digitalization on enterprise investment efficiency using the multi-time-point DID model. The study finds that tax collection digitalization can enhance the investment efficiency of enterprises. After further distinguishing between insufficient investment and excessive investment, it is found that in the sample of excessive investment, the effect of tax collection digitalization on improving investment efficiency is more significant. Thus, it verifies that tax collection digitalization mainly exerts its effect on improving investment efficiency through the "governance effect", and this is more reflected in suppressing excessive investment by enterprises. Based on the test of differences in manager characteristics under the issue of principal-agent problem, it is discovered that in the case of a low proportion of manager's shareholding and a higher degree of manager's overconfidence, the effect of tax collection digitalization on improving investment efficiency is more significant. At the same time, based on the verification of "tax burden perception" and "tax practice", it confirms the possibility of tax collection digitalization exerting an external corporate governance effect. The "tax burden perception" of enterprises strengthens the effect of tax collection digitalization on improving investment efficiency, and "tax practice" also plays an important role in the process of tax collection digitalization enhancing investment efficiency. The relevant conclusions of This research hold true regardless of the economic development level of the control regions.

REFERENCES

- [1]. Meckling, W. H., & Jensen, M. C. (1976). Theory of the Firm. Managerial Behavior, Agency Costs and Ownership Structure
- [2]. Shleifer, A., & Vishny, R. W. (1989). Management entrenchment: The case of manager-specific investments. *Journal of financial economics*, 25(1), 123-139.
- [3]. Johnson, S., Boone, P., Breach, A., & Friedman, E. (2000). Corporate governance in the Asian financial crisis. *Journal of financial Economics*, 58(1-2), 141-186.
- [4]. Wang, S., Tian, W., & Lu, B. (2023). Impact of capital investment and industrial structure optimization from the perspective of "resource curse": Evidence from developing countries. *Resources Policy*, 80, 103276.
- [5]. Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of financial Economics*, 26(1), 3-27.
- [6]. Kedia, S., & Philippon, T. (2009). The economics of fraudulent accounting. *The Review of Financial Studies*, 22(6), 2169-2199
- [7]. Bushman, R. M., & Smith, A. J. (2001). Financial accounting information and corporate governance. *Journal of accounting and Economics*, 32(1-3), 237-333.
- [8]. Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency?. *Journal of accounting and economics*, 48(2-3), 112-131.
- [9]. Beck T., Demirgüç-Kunt, A., & Levine, R. (2010). Financial institutions and markets across countries and over time: The updated financial development and structure database. *The World Bank Economic Review*, 24(1), 77-92.
- [10]. Krejcie, D., & dan Morgan, R. V. (1970). Menentukan ukuran sampel untuk kegiatan penelitian. *Pengukuran Pendidikan dan Psikologis*.
- [11]. Chen, S., Sun, Z., Tang, S., & Wu, D. (2011). Government intervention and investment efficiency: Evidence from China. *Journal of Corporate Finance*, 17(2), 259-271.