

The Impact of Tax Administration Digitalization on New-Quality Productive Forces

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Abstract. Taking Chinese A-share listed companies from 2015 to 2024 as research samples, this study utilizes the Golden Tax Phase III Project as a quasi-natural experiment for tax administration digitalization practices to explore the impact of tax administration digitalization on enterprises' new-quality productive forces. Empirical findings indicate that tax administration digitalization exerts a positive effect on enterprises' new-quality productive forces by reducing their effective tax burden and enhancing information transparency. Theoretically, this research provides a new perspective for exploring the formation mechanism of enterprises' new-quality productive forces. Practically, it offers decision-making references for further promoting tax administration digitalization and fostering the development of enterprises' new-quality productive forces.

Keywords: enterprises' new-quality productive forces; tax administration digitalization; information transparency; effective tax burden.

1. Introduction

In recent years, with the in-depth advancement of the new round of scientific and technological revolution and industrial transformation, new-quality productive forces have emerged (Song Lujun et al., 2024). New-quality productive forces refer to a new form of productive forces that, driven and led by modern information technology innovation, boosts production efficiency and optimizes the economic structure (Liang Lijun et al., 2025). The State-owned Assets Supervision and Administration Commission of the State Council (SASAC) defines new-quality productive forces as having the essential connotation of the upgrading of laborers, means of labor, objects of labor, and their optimal combination, with a substantial increase in total factor productivity as the core symbol. It is characterized by innovation, focuses on high quality, and essentially represents advanced productive forces.

The Report to the 20th National Congress of the Communist Party of China (CPC) explicitly puts forward the initiative to "accelerate the development of new-quality productive forces and enhance the inherent driving force for high-quality development", identifying it as a crucial pillar for building a modern industrial system and advancing Chinese - style modernization. Both the 2024 Government Work Report and the Decision of the CPC Central Committee on Further Comprehensively Deepening Reform and Promoting Chinese - style Modernization adopted at the Third Plenary Session of the 20th CPC Central Committee emphasize the significance of developing new-quality productive forces. During the 11th collective study session of the Political Bureau of the CPC Central Committee, General Secretary Xi Jinping stressed that developing new-quality productive forces is an inherent requirement and a key focus for promoting high-quality development. Currently, new-quality productive forces serve as a concrete manifestation of advanced productive forces and a groundbreaking achievement resulting from the in-depth integration of scientific and technological innovation and industrial innovation (Lyu Wei, 2025). How to cultivate and develop new-quality productive forces more efficiently has become a core challenge for the industrial sector to tackle and a cutting-edge research focus for the academic community.

Enterprises are the core participants in tax administration digitalization, making it essential to conduct an in-depth exploration of the impact of tax administration digitalization on new-quality productive forces. Tax administration digitalization refers to a governance transformation and upgrading process that embeds digital and intelligent technologies into the organizations, rules, and

processes of tax administration, regulates the disorder of tax administration in the context of the digital economy, thereby better addressing the risks and challenges in tax administration and empowering tax governance efficiency (Zhu Luxi et al., 2025). As an innovative practice that deeply integrates digital technologies with tax administration processes, tax administration digitalization is highly consistent with the strategy of modernizing the national governance system and governance capacity. It also directly reflects the concept of high-quality development in the digital economy era within the tax field, and its core value has gained widespread attention and been extensively applied in multiple dimensions, such as government decision-making, enterprise compliance operations, and the rational allocation of social resources. A critical research question thus arises: Can tax administration digitalization promote the development of new-quality productive forces by reducing enterprises' effective tax burden and improving their information transparency? A review of the existing literature reveals two research gaps. On the one hand, most studies have focused on the micro - level impacts of tax administration digitalization on enterprises. For example, big - data - enabled tax administration has significantly improved enterprises' ESG performance (Chen Tengpeng & Tao Yitao, 2025); tax administration digitalization helps strengthen the positive impact of total factor productivity on enterprise performance (Yuan Jiao et al., 2025); studies have explored the impact of tax administration digitalization on enterprises' choices among accrual earnings management, real earnings management, and classification shifting earnings management (Fang Hongsheng & Xia Kai, 2025); and digital tax administration can significantly enhance enterprises' innovation capabilities (Zhang Kai, 2025). However, few studies have examined the impact of tax administration digitalization on enterprises' new-quality productive forces. On the other hand, there has been extensive research on the influencing factors of enterprises' new-quality productive forces. These include that scientific and technological innovation is the core element for developing new-quality productive forces (Sheng Chaoxun, 2025), fiscal policies empower new-quality productive forces (Li Haishen, 2025), and the integration of business and finance promotes the development of new-quality productive forces (Li Yun et al., 2025). Nevertheless, existing studies have only initially explored the relationship between tax administration digitalization and new-quality productive forces.

Given the above research status, this study, building on previous research, explores the impact of tax administration digitalization on enterprises' new-quality productive forces and conducts an empirical test using panel data of Chinese A-share listed companies from 2015 to 2024. The marginal contributions of this study are mainly threefold. First, it adopts a new perspective—the enterprise financial perspective. This perspective not only provides a micro - empirical setting of "enterprise financial behavior" for tax administration research but also injects a macro - background of "digital policy shocks" into enterprise financial research, offering theoretical references and methodological insights for subsequent related studies. Meanwhile, it provides enterprises with actionable financial - level action plans to assist them in nurturing new-quality productive forces. Second, by focusing on the mechanisms of reducing enterprises' effective tax burden and improving their information transparency, this study deepens the understanding of the "path mechanisms" through which tax administration affects new-quality productive forces.

2. Institutional Background and Research Hypotheses

2.1. Institutional Background

The "Golden Tax System Phase III Project" is a crucial initiative that relies on emerging information technologies such as big data and cloud computing, leverages massive data elements, constructs a digital tax incentive ecosystem through multi-level information sharing and mutual verification, further simplifies tax processes, optimizes tax services, and ultimately advances the digital upgrading and intelligent transformation of tax administration.

The Golden Tax System Phase III was proposed against the backdrop of the country's efforts to modernize the national governance system and governance capacity, which urgently required strengthening tax administration, maintaining tax order, ensuring the steady growth of fiscal revenue

through information and intelligent means, and providing accurate data support for macroeconomic regulation. This not only demonstrates the country's determination to strengthen tax administration and maintain tax order, reflects the concept of empowering governance capacity through technology and supporting macroeconomic regulation, but also creates a fair competitive market environment for enterprises, promotes standardized tax management and reduces tax risks for enterprises. Meanwhile, through convenient tax handling services, it improves enterprises' tax handling efficiency and promotes their compliant operation and sustainable development. From the perspective of construction process, the construction of the "Golden Tax" project was launched simultaneously with the tax system reform in 1994, undergoing three stages of evolution: exploration in Phase I, deepening in Phase II, and integration in Phase III. As a core project for the modernization of national tax administration, it has established a progressive development framework of "technology empowerment - business coverage - collaborative governance", gradually realizing the transformation from special invoice supervision to digital administration covering all taxes and the entire process.

Specifically, Phase I of the Golden Tax System took the informatization of value-added tax (VAT) administration as a breakthrough point. In March 1994, a pilot computerized cross-audit system for VAT was launched in 50 cities and put into operation in August of the same year. The VAT anti-counterfeiting tax control system was simultaneously piloted locally in Anshan (Liaoning), Zhenjiang (Jiangsu), and Zhuhai (Guangdong), and the online operation of 50 pilot units nationwide was completed in 1995. However, limited by the inherent flaws of the manual data collection model, problems such as high data error rates and limited coverage were prominent. This phase ceased operation at the end of 1996, accumulating crucial practical experience for subsequent projects. After being approved by the State Council in 1998 and its construction plan approved in 2000, Phase II of the Golden Tax System focused on the full-chain supervision of special VAT invoices. On the basis of the gradual promotion of the anti-counterfeiting tax control system in the early stage, it was required that all special VAT invoices of 100,000-yuan denomination and above be issued through this system starting from January 1, 2000. On July 1, 2001, the four major subsystems—invoice issuance, certification, cross-audit, and joint investigation—were fully put into operation nationwide, establishing a closed-loop supervision system for special VAT invoices and effectively curbing illegal and irregular activities such as tax evasion and fraud.

After completing preliminary preparations such as project approval, the Golden Tax System Phase III adopted a scientific implementation approach of "phased pilots and gradual promotion". It was first put into operation in the national and local tax bureaus of Chongqing, Shanxi, and Shandong in 2013; after optimization and upgrading in 2014, it was promoted to Guangdong, Henan, and Inner Mongolia, successfully completing the comprehensive acceptance of the first-phase project; in 2015, it was further expanded to 14 provinces (autonomous regions) including Jilin, Hainan, and Tibet Autonomous Region of China; in 2016, it was successively launched in 16 provinces and municipalities directly under the Central Government such as Shanghai, Beijing, and Jiangsu. In October of the same year, it achieved full coverage of national and local tax bureaus in all provinces (autonomous regions and municipalities directly under the Central Government) nationwide, marking that China's tax administration entered a new stage of unified national and data-driven digitalization.

Compared with the previous two phases, the Golden Tax System Phase III, relying on emerging information technologies such as big data and cloud computing, broke through the limitation of single tax supervision, fully covered all taxes, all administration links, and business areas of grassroots national and local tax authorities, and realized the accurate cross-verification of tax information and enterprise-related information. Through the construction of information networking with multiple departments such as social security, industry and commerce, and customs, it has established a multi-level information sharing and complementary mechanism, significantly strengthened tax compliance risk management, fundamentally improved the tax administration efficiency of tax authorities, and become a milestone event in the digital transformation of China's tax administration. Its implementation feature of phased pilots and gradual promotion also provides a natural quasi-natural experiment scenario for the evaluation of relevant policy effects.

2.2. Research Hypotheses

Under the traditional tax system, tax management was mostly manual, with problems such as scattered fiscal and tax data, disconnection of information between tax authorities and enterprises, unintelligent business management, and imperfect tax analysis, which made it difficult to meet the needs of the times (Gao Xiang et al., 2025). In recent years, digital technologies such as big data, cloud computing, and artificial intelligence have been widely applied in China's tax field, accelerating the digital transformation of tax administration (Liu Xiangling et al., 2025). Tax administration digitalization refers to an innovative process that relies on cutting-edge information technologies such as cloud computing, big data, and artificial intelligence to conduct intelligent and refined management of the entire process of business, including tax declaration and tax payment (Kong Rong et al., 2025). Tax administration digitalization is becoming a "key bridge" connecting efficient enterprise operation and the cultivation of new-quality productive forces, and its supporting and enabling role is becoming increasingly prominent. This study explores its direct impact on enterprises' new-quality productive forces from three key action paths of tax administration digitalization (cost reduction, avoidance of tax evasion, and information transparency). Based on the fact that cultivating new-quality productive forces is a complex process for enterprises, which requires considerations such as corresponding resource allocation, technological innovation, and information integration, this study further analyzes the indirect impact of tax administration digitalization on enterprises' new-quality productive forces through optimizing resource allocation, strengthening compliance management, and promoting collaborative innovation.

2.2.1 The Impact of Tax Administration Digitalization on Enterprises' New-Quality Productive Forces

Tax administration digitalization has a positive impact on enterprises' new-quality productive forces. Firstly, from the perspective of data factorization: the traditional tax administration model centered on forms and bills, with isolated and static data. However, the mandatory data interfaces and standards required by the tax system have forced enterprises to carry out standardized transformation of their financial and business systems, eliminating internal "data silos" and enabling data factors to shift from isolation to correlation. At the same time, the tax administration system aggregates massive, real-time, and authentic data of enterprises across the society, allowing data factors to move from static to circulation. Scientific and technological innovation is the core driving force of new-quality productive forces (Wang Hongyu, 2025), whose key production factors are high technology, high efficiency, and high quality. The market-oriented allocation of data factors can enhance enterprises' innovation capabilities and promote the development of new-quality productive forces through scenario-driven methods (Yan Runhan, 2025). Secondly, tax administration digitalization has a significant enabling effect on improving the efficiency of supply chain collaboration. In the supply chain system, information such as enterprises' tax credit and financial status is an important reference for cooperation between upstream and downstream enterprises. Digital tax administration can build a tax credit evaluation system. Studies have found that tax credit rating can significantly enhance enterprises' discourse power in the supply chain (Wang Ting et al., 2025), thereby exerting a significant impact on the development of enterprises' new-quality productive forces from multiple core dimensions such as resource acquisition, cost control, innovation collaboration, and risk resistance. Therefore, tax administration digitalization creates favorable conditions for the release of enterprises' new-quality productive forces by improving the efficiency of supply chain collaboration.

2.2.2 Tax Administration Digitalization Affects Enterprises' New-Quality Productive Forces by Reducing Their Effective Tax Burden

Taxation is the cornerstone of national modern governance (Kuang Haoyu, 2025). As the core pillar of national fiscal revenue, enterprise taxation plays a key role in optimizing resource allocation and regulating income distribution (Ji Yunyang et al., 2025). Tax administration digitalization is an innovative process that relies on cutting-edge information technologies such as cloud computing, big data, and artificial intelligence to conduct intelligent and refined management of the entire process of

business, including tax declaration and tax payment (Kong Rong, 2025). This change has standardized tax administration. Research by Tang Xiaojian et al. shows that the standardization of tax administration has significantly reduced the degree of corporate tax avoidance and effectively restrained bad behaviors such as tax evasion and fraud by enterprises (Tang Xiaojian et al., 2021). From the perspective of the constraint mechanism, tax administration digitalization has realized real-time and penetrating monitoring of enterprises' tax behaviors: relying on digital platforms such as the Golden Tax Project, tax authorities can integrate multi-source information such as enterprises' financial data, invoice flows, and capital flows, and accurately identify tax evasion behaviors such as false invoicing and false listing of costs through intelligent comparison and risk modeling, which significantly increases the exposure probability and violation costs of enterprises' bad behaviors, forcing enterprises to abandon short-term speculative business strategies and turn to the track of compliant operation. On this basis, enterprises' tax credit ratings are improved, which not only reduces financing interest rates but also enhances the cooperation trust with upstream and downstream enterprises, providing a stable capital and cooperation environment for technological research and development, supply chain collaboration, etc., which are needed for new-quality productive forces. This compliant operation orientation effectively reduces the actual tax burden of enterprises and provides institutional guarantee and motivation support for the cultivation and development of enterprises' new-quality productive forces.

2.2.3 Tax Administration Digitalization Affects Enterprises' New-Quality Productive Forces by Improving Information Transparency

In the modern market economy, information asymmetry among enterprises is a crucial factor affecting market efficiency, resource allocation, and investors' decisions (Lyu Wei, 2025). Information serves as a medium for communication between enterprises and external stakeholders as well as among various internal departments (Yang Jie & Yu Chaosheng, 2025). The quality and circulation efficiency of such information directly relate to the cultivation and development of enterprises' new-quality productive forces.

On the one hand, information asymmetry between enterprises and investors will reduce investors' trust in enterprises' new-quality productive force cultivation projects, leading to increased financing difficulties and insufficient capital supply, which restricts technological transformation and production capacity upgrading. On the other hand, information asymmetry among departments will cause imbalanced resource allocation and low collaboration efficiency, hinder the implementation of technological innovation required for new-quality productive forces, and impede cross-field integration in the process of cultivating new-quality productive forces.

Tax administration digitalization, relying on a new generation of information technologies such as big data, artificial intelligence, and blockchain, can break down information barriers between relevant subjects. By establishing a standardized information sharing mechanism, it realizes the real-time collection, intelligent verification, and efficient circulation of enterprise financial data, thereby promoting the comprehensive informatization upgrading of enterprise financial processes and forcing enterprises to disclose financial information transparently through digital supervision. In this process, first of all, it can stimulate enterprises' enthusiasm for R&D investment and enhance their innovation capabilities through clear financial data and a standardized internal control system; in addition, tax administration digitalization also makes enterprises more transparent in external information disclosure. External investors can obtain enterprise information through more extensive channels, which reduces information asymmetry (Wang Sha, 2025), enhances investor confidence, and broadens diversified financing channels. At the same time, standardized financial disclosure helps improve enterprises' image in the capital market, attract more high-quality partners, strengthen external cooperation opportunities, and thereby enhance enterprises' resource integration capabilities in the industrial chain. Ultimately, under the synergistic effect of innovation-driven development, capital guarantee, cooperation expansion, and resource aggregation, the improvement of enterprises' new-quality productive forces is promoted.

Based on the above analysis, the following research hypotheses are proposed:

H1: Tax administration digitalization affects enterprises' new-quality productive forces.

H2: Tax administration digitalization affects enterprises' new-quality productive forces by reducing their effective tax burden.

H3: Tax administration digitalization affects enterprises' new-quality productive forces by improving information transparency.

3. Research Design

3.1. Model Specification

To test the research hypotheses proposed earlier, this study utilizes the quasi-natural experiment of the Golden Tax System Phase III Project and adopts the staggered Difference-in-Differences (DID) estimation method to identify the impact of tax administration digitalization on enterprises' new-quality productive forces. The specific empirical model is constructed as follows:

$$ProductionTool = \alpha_0 + \alpha_1 did_{ct} + \alpha_2 Control + \delta_i + \mu_j + \gamma_c + \theta_t + \varepsilon_{it} \quad (1)$$

Herein, *ProductionTool* represents the new quality productive forces of enterprises. The subscripts *i*, *j*, *c*, and *t* denote the enterprise, industry, province, and year, respectively. The variable *did* indicates whether the region where the enterprise is located implemented the Golden Tax Project Phase III pilot in that year, which is used to measure the digitalization of tax collection and administration. Its coefficient α_1 captures the impact of digitalized tax collection and administration on the new quality productive forces of enterprises. *CV* represents the set of control variables. This paper controls for province fixed effects (γ_c), industry fixed effects (μ_j), and firm fixed effects (δ_i) to account for time-invariant factors at the regional, industry, and firm levels that may influence the empirical results. Additionally, year fixed effects (θ_t) are included to control for time-varying factors that affect the new quality productive forces of enterprises. Furthermore, standard errors are clustered at the firm level in this study.

3.2. Variable Definitions

(1) Enterprise New-Quality Productive Forces (*ProductionTool*)

This study evaluates enterprise new-quality productive forces from the perspective of new-quality labor tools, using the following four indicators:

R&D Investment: Adopting the commonly used input intensity indicator in academic research, measured as "R&D investment / operating income."

Fixed Asset Renewal Rate: Referring to the calculation logic of asset turnover efficiency, measured as "net fixed assets / original value of fixed assets."

Intangible Asset Renewal Rate: Based on the value depreciation characteristics of intangible assets, measured as "net intangible assets / (net intangible assets + intangible asset amortization)."

Digital Assets: Combining the digital attributes of new-quality productive forces, "digital assets" are defined as "intangible assets related to digitalization (including intelligent technologies, software, systems, information platforms, data, etc.) + fixed assets related to digitalization (including electronic equipment, computers, data devices, etc.)." On this basis, their proportion in total enterprise assets is measured as "digital assets / total assets."

(2) Digitalization of Tax Administration (*did*)

This study constructs an indicator for the digitalization of tax administration using the quasi-natural experiment of the Golden Tax Phase III Project. Since the project was promoted through phased implementation and batch pilots without a clear time breakpoint, a time-varying DID identification strategy is adopted. Specifically, the "did" variable takes a value of 1 if the enterprise's location was a pilot region for the Golden Tax Phase III Project in that year, and 0 otherwise. Notably, during the initial launch phase, the project generally operated in a dual-track mode with the China Tax Administration Information System (CTAIS) and the Golden Tax Phase III system. To identify

the net effect of the Golden Tax Phase III Project, the time node when each province switched to single-track operation of the project is designated as the pilot start time. Consistent with the approach of Zhang et al. (2020), regions where implementation occurred in the second half of the year are regarded as starting the pilot in the following year.

(3) Control Variables (Control)

Beyond the digitalization of tax administration, various firm characteristics also affect enterprise new-quality productive forces. Drawing on Liu and Kong (2018), the following firm characteristic variables are controlled for:

- ① Firm Size (Size): Measured as the natural logarithm of total assets.
- ② Leverage Ratio (lev): Measured as the ratio of total liabilities at the end of the period to total assets.
- ③ Cash Flow (Cashflow): Measured as the ratio of net cash flow from operating activities to total assets.
- ④ Firm Growth Capacity (Growth): Measured as the operating income growth rate.
- ⑤ Board Size (Board): Measured as the total number of board members.
- ⑥ Proportion of Independent Directors (Indep): Measured as the ratio of independent directors to the total number of board members.
- ⑦ CEO Duality (Dual): Dummy variable, where 1 indicates the chairperson and general manager are the same person, and 0 otherwise.
- ⑧ Ownership Concentration of Top 5 Shareholders (Top5): Measured as the ratio of the total shareholding of the top five shareholders to the total share capital.
- ⑨ Ownership Balance (Balance): Measured as the ratio of the total shareholding of the second to fifth largest shareholders to the shareholding of the largest shareholder.

3.3. Sample Selection, Data Sources, and Descriptive Statistics

This study selects Chinese A-share listed companies from 2015 to 2024 as the research sample. Among them, financial data are sourced from the CSMAR Database. To ensure the validity of the sample, the following screening procedures are implemented: ① Exclude samples from the financial industry; ② Eliminate samples with abnormal corporate finances; ③ Remove samples with incomplete key data.

To intuitively present the distribution characteristics of the main variables, this paper first conducts descriptive statistical analysis on the core variables, with the detailed results shown in Table 1. The results of descriptive statistics (①) show that during the sample period, the mean value of enterprise new-quality productive forces (ProductionTool) is 4.18. Meanwhile, the maximum and minimum values of enterprise new-quality productive forces are 0.38 and 0.00, respectively, with a difference of only 0.38, indicating little heterogeneity among enterprises in terms of new-quality productive forces. The standard deviation is merely 0.009, suggesting a small degree of dispersion, small gaps within the sample, and being impacted by policy homogenization. The mean value of the digitalization of tax administration (did) is 0.9599, indicating that most enterprise samples are affected by the Golden Tax Phase III Project.

Table 1 Descriptive Statistics

VarName	Obs	Mean	SD	Min	Median	Max
ProductivityLevel	35091	0.0069	0.010	0.00	0.00	0.29
ProductionTool	35091	0.0051	0.009	0.00	0.00	0.38
laborPproduction	35091	0.0069	0.013	0.00	0.00	0.17
did	35091	0.9599	0.196	0.00	1.00	1.00
Size	34227	22.3670	1.363	17.64	22.16	30.19
Lev	34226	0.3850	0.305	0.00	0.35	26.73
Indep	16017	1.6029	1.034	0.14	1.50	6.00
Top5	22223	0.0000	0.000	0.00	0.00	0.01
Balancel	32770	0.9953	0.722	0.01	0.82	4.00
Cashflow	33306	0.0493	0.072	-0.81	0.05	0.84
Growth	28365	0.1755	1.549	-2.73	0.08	96.02
Board	16017	2.9452	2.217	1.00	2.00	22.00
Dual	35091	0.3387	0.473	0.00	0.00	1.00

4. Analysis of Regression Results

4.1. Baseline Regression Results

To investigate the impact of digitalized tax collection and administration on firms' new quality productive forces, this study employs Model (1) for empirical causal testing. The regression results are presented in Table 2. Column (1) shows the results without control variables, indicating that digitalized tax collection and administration has a statistically significant positive effect on firms' new quality productive forces. The coefficient is 0.000 and is significantly positive at the 5% level. Building on this, this study further incorporates firm-level control variables. The results are shown in Column (2). After including these controls, the impact of digitalized tax collection and administration on firms' new quality productive forces remains significantly positive at the 1% level, with an estimated coefficient of 0.002. This implies that a higher level of tax collection digitalization is associated with an increase of 0.002 units in a firm's new quality productive forces.

Table 2 Baseline Regression Results

	(1)	(2)
	ProductionTool	ProductionTool
did	0.000**	0.002***
	(2.41)	(5.92)
Size		-0.001***
		(-10.65)
Lev		0.000
		(1.07)
Indep		-0.000
		(-0.04)
Cashflow		-0.001
		(-1.50)
Dual		0.000
		(0.64)
cons	0.005***	0.034***
	(30.26)	(12.07)
YEAR FE	YES	YES
INDUSTRY FE	YES	YES
ID FE	YES	YES
N	34766.000	15157.000
r2	0.679	0.780

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, in two-tailed t-tests.

4.2. Robustness Tests

(1) Adjustment of Fixed Effects

To verify whether the core findings are sensitive to the choice of fixed effects in the "time, individual" specification, this section conducts robustness tests by adjusting the dimensions of fixed effects. While the baseline regression employs both time and individual fixed effects, this section modifies these specifications in columns (1) through (3) as follows: "city, industry, time, individual," "city, time, individual," and "industry." The results shown in Table 3 indicate that the coefficient of the core explanatory variable, did (representing the policy shock of digitalized tax collection and administration), remains significantly positive at the level of 0.002, with no substantial fluctuations in magnitude. This indicates that, regardless of how fixed effects are adjusted, the positive effect of digitalized tax collection and administration on firms' new quality productive forces (ProductionTool) remains robust. This suggests that, after controlling for potential confounding factors such as firm size, leverage, and cash flow, digitalized tax collection and administration indeed significantly enhances firms' new quality productive forces.

Table 3: Results with Adjusted Fixed Effects

	(1)	(2)	(3)
	ProductionTool	ProductionTool	ProductionTool
did	0.002***	0.002***	0.002***
	(5.92)	(5.92)	(6.04)
Size	-0.001***	-0.001***	-0.001***
	(-10.65)	(-10.65)	(-10.88)
Lev	0.000	0.000	0.001
	(1.07)	(1.07)	(1.16)
Indep	-0.000	-0.000	-0.000
	(-0.04)	(-0.04)	(-0.14)
Cashflow	-0.001	-0.001	-0.001
	(-1.50)	(-1.50)	(-1.45)
Dual	0.000	0.000	0.000
	(0.64)	(0.64)	(0.59)
_cons	0.034***	0.034***	0.036***
	(12.07)	(12.07)	(12.27)
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES
ID FE	YES	YES	YES
N	15157.000	15157.000	15157.000
r2	0.780	0.780	0.781

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

(2) One-Period Lag

To mitigate potential endogeneity issues arising from reverse causality or omitted variables, this section conducts robustness tests by lagging the core explanatory variable did by one period (denoted as L.did). The results shown in Table 4 indicate that the coefficient of the one-period lagged L.did is 0.002, which is significantly positive at the 1% level (t-statistic = 6.83). This finding is entirely consistent with the significance level and coefficient direction of did in the baseline regression. This indicates that the positive effect of digitalized tax collection and administration on firms' new quality

productive forces is persistent. Furthermore, the one-period lag specification further reinforces the causal relationship between the two variables, confirming the robustness of the main conclusion.

Table 4: Results of One-Period Lag

	(1)
	ProductionTool
L.did	0.002***
	(6.83)
Size	-0.002***
	(-11.89)
Lev	0.000
	(0.08)
Indep	0.000
	(0.02)
Cashflow	0.000
	(0.07)
Dual	0.000
	(0.83)
_cons	0.044***
	(13.04)
YEAR FE	YES
INDUSTRY FE	YES
ID FE	YES
N	12159.000
r2	0.809

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

(3) Model Substitution

To assess the robustness of the findings concerning the model specification, this section performs robustness checks by substituting the fixed effects model with a random effects model. Estimation results are shown in Table 5. The results in Column (1) show that the coefficient of the core explanatory variable did is 0.0018, which is significantly positive at the 1% level. This aligns with the significantly positive impact of did observed in the baseline regression, with only minor fluctuations in the coefficient magnitude. This indicates that the core conclusion—that digitalized tax collection and administration promotes firms' new quality productive forces—remains valid and demonstrates strong robustness.

Table 5: Results of Model Substitution

	(1)
	ProductionTool
did	0.0018***
	(5.9209)
Size	-0.0014***
	(-10.6451)
Lev	0.0005
	(1.0672)
Indep	-0.0000
	(-0.0390)
Cashflow	-0.0012
	(-1.5039)
Dual	0.0001
	(0.6448)
cons	0.0344***
	(12.0772)
YEAR FE	YES
INDUSTRY FE	YES
ID FE	YES
N	15398
adj. R ²	-0.218

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3. Mechanism Test

To examine the impact of digitalized tax collection and administration on corporate new quality productive forces through enhanced information transparency, this study selects "Transparency" as the mediating mechanism proxy variable for mechanism testing. Estimation results are shown in Table 6. The results from Column (1) of the baseline regression show that digitalized tax collection and administration has a significantly positive impact on corporate new quality productive forces. In Column (2), the regression coefficient of digitalized tax collection and administration on the mediating variable, "Corporate Transparency," is significantly positive at the 1% level. This indicates that digitalized tax collection and administration can significantly enhance corporate information transparency by strengthening information disclosure constraints and reducing information asymmetry, among other channels. In Column (3), after simultaneously incorporating both digitalized tax collection and administration and transparency into the regression on new quality productive forces, the coefficient for digitalized tax collection and administration remains significantly positive at the 1% level. In summary, transparency serves as a mediating variable through which digitalized tax collection and administration influences corporate new quality productive forces—digitalized tax collection and administration enhances corporate transparency, thereby boosting corporate new quality productive forces.

Table 6: Regression Results of the Mediating Mechanism for "Transparency"

	(1)	(2)	(3)
	ProductionTool	Transparency	ProductionTool
did	0.002***	0.086***	0.002***
	(5.92)	(3.14)	(6.17)
Size	-0.001***	-0.070***	-0.001***
	(-10.65)	(-5.74)	(-8.01)
Lev	0.000	0.671***	0.000
	(1.07)	(16.72)	(0.87)
Indep	-0.000	-0.025	0.000
	(-0.04)	(-0.92)	(0.07)
Cashflow	-0.001	-0.500***	0.000
	(-1.50)	(-6.44)	(0.03)
Dual	0.000	0.005	0.000
	(0.64)	(0.31)	(1.18)
Transparency			0.000
			(0.53)
_cons	0.034***	3.215***	0.030***
	(12.07)	(12.06)	(9.01)
YEAR FE	YES	YES	YES
INDUSTRY FE	YES	YES	YES
ID FE	YES	YES	YES
N	15157.000	11722.000	11722.000
r2	0.780	0.533	0.794

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

To verify the impact of digitalized tax collection and administration on corporate new quality productive forces through the reduction of tax burden, this paper selects "actual tax burden" (Real_Tax) as the mechanism proxy variable for moderating effect analysis in mechanism testing. The results in Table 7 show that the interaction term coefficient between digitalized tax collection and administration and actual tax burden is -0.013. This finding indicates that actual tax burden exerts a negative moderating effect on the relationship between digitalized tax collection and administration and new quality productive forces. In other words, digitalized tax collection and administration enhances corporate new quality productive forces by reducing the actual tax burden level of enterprises.

Table 7: Regression Results of the Moderating Effect of "Actual Tax Burden"

	(1)
	ProductionTool
Real_Tax*did	-0.013*
	(-1.88)
did	0.004***
	(3.30)
Real Tax	0.005
	(0.75)
Size	-0.001***
	(-8.45)
Lev	0.001
	(1.59)
Indep	-0.000
	(-0.27)
Cashflow	-0.001
	(-0.56)
Dual	0.000
	(0.91)
_cons	0.031***
	(8.90)
YEAR FE	YES
INDUSTRY FE	YES
ID FE	YES
N	11993.000
r2	0.790

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusions and Policy Implications

5.1. Conclusions

Utilizing Chinese A-share listed companies from 2015 to 2024 as the research sample, this study leverages the quasi-natural experiment of the Golden Tax Project Phase III (GT3) to investigate the optimizing effect of digitalized tax collection and administration on firms' new quality productive forces through a difference-in-differences (DID) model. The empirical findings reveal the following: (1) Digitalized tax collection and administration has a positive impact on firms' new quality productive forces. (2) This positive effect is channeled through the mediating mechanism of reducing firms' effective tax burden, thereby enhancing their new quality productive forces. (3) It also operates through the mediating mechanism of improving corporate transparency, which in turn promotes firms' new quality productive forces.

5.2. Policy Implications

Based on the findings, this study proposes the following policy recommendations: First, deepen the development of digital tax collection infrastructure and technological applications. The baseline regression results indicate that the technological empowerment from digitalized tax collection is a key driver in enhancing firms' new quality productive forces. Therefore, it is crucial to further

strengthen the construction of digital tax collection infrastructure to achieve real-time sharing and dynamic monitoring of corporate tax-related information nationwide. Concurrently, efforts should be made to promote the iterative upgrading of tax risk assessment models, improving the accuracy and responsiveness in identifying corporate tax irregularities. Deepening technological applications will solidify the positive driving effect of digital tax collection on new quality productive forces and ensure the sustained release of its technological dividends. Second, the state should further optimize the implementation mechanism of digital tax collection policies. For the minority of firms and regions that have not yet fully benefited from the dividends of digital collection, targeted and differentiated promotion strategies should be formulated. Simultaneously, a dynamic assessment mechanism for the effectiveness of digital tax collection policies should be established. By incorporating data on changes in firms' new quality productive forces, policymakers can timely adjust policy implementation details to ensure a high degree of alignment between digital collection policies and the needs of cultivating new quality productive forces in enterprises. Third, firms should proactively leverage digital tax collection to improve their internal management systems. Digitalized tax collection fosters a stable environment for developing new quality productive forces through enhanced information transparency and compliance constraints. Firms should seize this opportunity to refine their internal governance. Specifically, they should upgrade financial systems to be compatible with the data interfaces and standards of digital tax collection, enabling automatic aggregation of tax data. Furthermore, firms can utilize the risk early-warning functions embedded in digital systems to establish internal self-inspection mechanisms for tax risks, thereby safeguarding operational stability. By embracing the transparency requirements driven by digital tax collection, firms can standardize their financial information disclosure processes.

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