The Impact of Digitalized Tax Administration on Stock Price Crash Risk

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Abstract: Since the 18th National Congress of the Communist Party of China, informatization initiatives have facilitated the stable and rapid transformation of China's tax administration. The "Golden Tax Phase III" project employs modern techniques to ensure the stability and sustainability of national fiscal revenue, progressively advancing the digitalization of tax administration. This study uses data from Shanghai and Shenzhen A-share listed companies between 2008 and 2020. Employing the Difference-in-Differences (DID) approach against the backdrop of the "Golden Tax Phase III" project, we examine the effect of digitalized tax administration on firms' stock price crash risk. The results indicate that digitalized tax administration significantly reduces the risk of corporate stock price crashes. This effect is particularly pronounced among firms with slower digitalization processes and those audited by non-"Big Four" audit firms. The paper enriches the existing literature on the economic consequences of the "Golden Tax Phase III" project and provides new insights for policy-making.

Keywords: Tax administration, Golden Tax Phase III, Stock price crash risk, Digitalization

1.   Introduction

In today's digital age, effective tax administration ensures the stability and sustainability of national fiscal revenues through rigorous oversight and enforcement by tax authorities. The digitalization of tax administration has become a significant global trend in tax management reforms. Meanwhile, the mechanism linking digitalized tax administration to stock price crash risk in listed companies warrants deeper investigation.

Grounded in the policy context of the Golden Tax Phase III, this paper explores the influence of digitalized tax administration on stock price crash risk among enterprises. Covering the period from 2008 to 2020, the study leverages the provincial-level policy implementation timeline to examine the resulting corporate changes, effectively addressing endogeneity concerns. Additionally, this research innovatively excludes data from the year 2015 to mitigate the effects of the 2015 stock market crash. Moreover, through heterogeneity analysis, the study investigates whether digitalized tax administration impacts stock price crash risk differently across varying firm characteristics, such as undergoing audits by "Big Four" firms and differing enterprise digitalization speeds, thereby enriching existing scholarship.

2.   Literature Review

From a governance perspective, digitalized tax administration generates deterrent effects that reduce managerial incentives for violating earnings forecast regulations [1]. It also strengthens the scrutiny of corporate accounting records [2]. Information asymmetry is one of the primary drivers behind agency problems between shareholders and managers, with executive perquisite consumption constituting a significant component of agency costs. Digitalized tax administration effectively curtails opportunistic managerial behaviors aimed at tunneling corporate resources, thereby restraining executives' on-the-job consumption [3]. Tax administration not only impacts firms' daily operations, internal management, and resource control but also significantly influences corporate tax avoidance behaviors [4].

Stock price crashes represent an extremely complex phenomenon in financial markets, characterized by abrupt and uncontrollable declines in stock prices, causing substantial financial losses to investors. Research by scholars such as Hutton, Marcus, and Tehranian [5] indicates that the accumulation of negative information is a critical factor triggering stock price crashes. Similarly, Kim, Li, and Zhang [6] argue that poor information disclosure quality not only leads to stock price overvaluation but also hampers timely correction of potential errors, increasing operational risks.

In summary, existing research primarily examines the positive economic effects of digitalized tax administration. Aligning with this trend, the present study explores how digitalized tax administration impacts stock price crash risk. While previous studies have documented that enterprises may conceal information regarding stock prices during their development, research explicitly investigating the relationship between digitalized tax administration and stock price crash risk—as well as the factors influencing this relationship—remains limited. This paper thus provides novel insights for mitigating stock price crash risk and enriches the policy implications of digitalized tax administration.

3.   Research Hypothesis

Based on the theoretical logic discussed above, this study proposes the following hypothesis:

H1: Digitalized tax administration significantly reduces corporate stock price crash risk.

4.   Research Design

4.1. Sample Selection and Variable Definitions

This study selects data from non-financial listed A-share companies in Shanghai and Shenzhen from 2008 to 2020. The data is obtained from the CSMAR database. After excluding ST-listed companies and samples with missing data, a total of 22,824 observations remain. The dependent variable in this research is stock price crash risk, measured by the negative conditional skewness of returns (NCSKEW) and down-to-up volatility (DUVOL); higher values represent higher crash risk [7]. The key explanatory variable is td, assigned the value of 1 if a company's region implemented the "Golden Tax Phase III" project between 2013 and 2017, and 0 otherwise [8].

4.2. Model Construction and Variable Definitions

Since the implementation of the "Golden Tax Phase III" big data tax administration system was not simultaneous nationwide, the application of a traditional Difference-in-Differences (DID) model is limited. Therefore, this study constructs the following model:

$$Crash\ Risk_{i,t} = \beta_0 + \beta_1 td_{i,t} + \beta_3 Control_{i,t} + u_i + u_t + \theta_{i,t}$$

If the coefficient β_1 is significantly negative, the hypothesis is supported. The model incorporates year and firm fixed effects to control their impacts. Additionally, following existing literature, control variables are defined as shown in Table 1.

Table 1: Definition of Control Variables

Variable Symbol	Variable Name
Sigma	Standard deviation of weekly stock returns
LEV	Debt-to-asset ratio
MTB	Market-to-book ratio
RET	Annual stock return (considering dividend reinvestment)
ROA	Return on Assets (profitability)
ABSDA	Information quality (absolute discretionary accruals)
Dturn	Excess turnover rate
SIZE	Firm size
SOE	Nature of ownership (state-owned enterprise)

4.3. Descriptive Statistics and Correlation Analysis

Table 2 presents the descriptive statistics of the key variables in this study. The statistics are consistent with the descriptive results reported by Li Ping [9]. Moreover, the correlations between explanatory and control variables are weak, indicating no significant multicollinearity issue within the specified model. Thus, the model structure is deemed reasonable, and the relationships among variables are clear and independent, strengthening the reliability and validity of the empirical findings.

Table 2: Descriptive Statistical Results

	e(count)	e(sum_w)	e(mean)	e(Var)	e(sd)	e(min)	e(max)	e(sum)
NCSKEW	22824	22824	-0.297589	0.4686738	0.6845976	-2.334616	1.462759	-6792.172
DUVOL	22824	22824	-0.1975924	0.2164557	0.465248	-1.300388	0.9263875	-4509.85
RET	22824	22824	0.1501947	0.3382557	0.5815975	-0.678055	2.436918	3428.044
Sigma	22824	22824	0.0629044	0.0005384	0.0232042	0.0269251	0.1395053	1435.731
ROA	22824	22824	0.0516461	0.0015971	0.0399637	0.0014968	0.1976213	1178.77
LEV	22824	22824	3.406785	8.360294	2.891417	1.178657	18.33924	77756.47
MTB	22824	22824	0.6264787	0.0602529	0.2454647	0.128949	1.162341	14298.75
Dturn	22824	22824	-0.1317841	0.2359646	0.4857619	-2.071305	1.00547	-3007.84
ABSDA	22824	22824	0.0505219	0.0023504	0.048481	0.0006168	0.2498577	1153.112
SIZE	22824	22824	22.23725	1.676418	1.294765	19.99014	26.30171	507543.1
SOE	22824	22824	0.4133368	0.2425001	0.492443	0	1	9434

5.   Empirical Results

5.1. Baseline Regression

The first column in Table 3 presents empirical test results of the primary research hypothesis. After controlling for individual and year fixed effects, the coefficient of the variable is significantly negative, indicating that following the official implementation of the "Golden Tax Phase III" project, the stock price crash risk of listed companies significantly decreased. Additionally, this study conducted a parallel trend test. Three dummy variables representing three years, two years, and one year prior to policy implementation were generated to observe whether their interaction terms were significant in the regression analysis. Results indicate that the coefficients of these three variables

were insignificant (with large p-values), supporting the parallel trend assumption, meaning trends for treatment and control groups were similar prior to the policy implementation.

Table 3: Main Regression Results

	(1)	(2)	(3)
	Model1	Model1	Model1
VARIABLES	y	y	y
td	-0.050**	-0.034**	-0.069**
	(-2.14)	(-2.14)	(-2.44)
RET	-0.102***	-0.101***	-0.134***
	(-7.84)	(-11.13)	(-9.36)
Sigma	-11.231***	-6.243***	-11.707***
	(-27.87)	(-24.17)	(-27.16)
ROA	0.136	-0.035	0.297
	(0.72)	(-0.27)	(1.52)
LEV	0.008***	0.005**	0.008***
	(2.83)	(2.43)	(2.66)
MTB	-0.403***	-0.201***	-0.380***
	(-9.30)	(-6.79)	(-8.48)
Dturn	0.009	-0.006	0.011
	(0.82)	(-0.81)	(0.91)
ABSDA	0.114	0.131*	0.110
	(1.10)	(1.80)	(1.01)
SIZE	0.035***	-0.004	0.035**
	(2.59)	(-0.43)	(2.50)
SOE	-0.034	-0.031	-0.034
	(-0.86)	(-1.14)	(-0.84)
Constant	-0.112	0.434**	-0.118
	(-0.37)	(2.08)	(-0.39)
Observations	22,824	22,824	21,187
Adjusted R-squared	0.155	0.149	0.166
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.2. Robustness Checks

1. Alternative Dependent Variable Measurement

As shown in Column (2) of Table 3, using the alternative dependent variable (DUVOL: the ratio of downward-to-upward volatility), the primary conclusion remains unchanged.

2. Excluding the Impact of Stock Market Crash

To mitigate the influence of the stock market crash in 2015 on empirical results, data from 2015 were excluded. The significance of the coefficient confirms the robustness of the research findings.

3. Placebo Test

To ensure the accuracy of research conclusions and control for potential endogeneity and other non-policy factors affecting the "policy effect," this study conducted a placebo test by artificially advancing the policy implementation period by two years and constructing a new dummy variable td_1. The results show that the coefficient of the new dummy variable is positive but insignificant, confirming the robustness of the primary conclusion.

6.   Further Research

Based on the main empirical findings, this study conducts further analysis from two additional perspectives: enterprise digitalization levels and external environmental quality, exploring how internal and external factors under different scenarios affect the relationship studied.

According to research by Ma Hui et al. on enterprise digitalization and internal control information transparency mechanisms [10], this study conducts heterogeneity tests based on enterprise digitalization progress. Results indicate a significantly greater mitigating effect of digitalized tax administration on stock price crash risk among firms with lower levels of digitalization. In contrast, the effect was insignificant for highly digitalized enterprises.

Considering governance quality differences associated with "Big Four" audits, group regressions reveal that the inhibitory effect of digitalized tax administration on stock price crash risk is significant only among enterprises audited by non-"Big Four" auditors. Firms audited by the "Big Four" did not exhibit statistically significant results. This indicates that the policy provides a risk compensation mechanism primarily for firms with weaker auditing supervision.

7.   Conclusions and Policy Recommendations

This study finds that digitalized tax administration significantly reduces corporate stock price crash risk, especially among firms with slower digitalization processes and those audited by non-"Big Four" firms. To promote the synergistic progress between digitalized tax administration reforms and enterprise digital transformation, this paper offers the following comprehensive policy recommendations: First, the government should further deepen digitalized tax administration reforms, enhance regulatory coordination, and effectively reduce corporate stock price crash risk. Given the finding that firms lagging in IT development benefit more substantially from tax administration digitalization, authorities should provide enhanced support—such as policy incentives and technological assistance—to accelerate these firms' digital transformation processes and narrow gaps with industry leaders. Implementing these measures will facilitate high-quality economic development, creating a win-win situation for both enterprises and the state.

References

[1]   Niu, B., Yu, L., Yin, Q., & Hu, S. (2023). Can digitalized tax administration reduce financial fraud risk? — A quasi-natural experiment based on the Golden Tax Phase III project. [Online]. https://doi.org/10.16716/j.cnki.65-1030/f.2023.06.006

[2]   Li, Z., & Zhu, J. (2021). The impact of the "Golden Tax Phase III" tax administration system on audit fees of listed companies. [Online]. https://doi.org/10.16538/j.cnki.fem.20210724.202

[3]   Sun, Q. (2024). Has the digitalization of tax administration suppressed executive perquisite consumption? — Empirical evidence from the Golden Tax Phase III project. West Forum, 34(1).

[4]   He, G. and Ren, H.M. (2022). Are financially constrained firms susceptible to a stock price crash? The European Journal of Finance, pp.1–26. doi:https://doi.org/10.1080/1351847x.2022.2075280.

[5]   Hutton, A.P., Marcus, A.J. and Tehranian, H. (2009). Opaque financial reports, R2, and crash risk. Journal of Financial Economics, 94(1), pp.67–86.

[6]   Kim, J.-B., Li, Y. and Zhang, L. (2011). Corporate tax avoidance and stock price crash risk: Firm-level analysis. Journal of Financial Economics, 100(3), pp.639–662. doi:https://doi.org/10.1016/j.jfineco.2010.07.007.

[7]   Jiang, X. Y. (2013). Tax administration, tax aggressiveness, and stock price crash risk. Nankai Business Review, 16(05), 152–160.

[8]   Ji, Y. F., Liang, R. X., & Chi, Y. N. (2023). Can big data tax administration restrain corporate violations? — A quasi-natural experiment based on the "Golden Tax Phase III." Contemporary Finance & Economics, (02), 43–54. https://doi.org/10.13676/j.cnki.cn36-1030/f.2023.02.004

[9]   Li, P., Song, Y., & Liu, C. (2023). Auditor decisions, executive compensation incentives, and stock price crash risk. Financial Development Research, (11), 67–76. https://doi.org/10.19647/j.cnki.37-1462/f.2023.11.008

[10] Ma, H., & Chen, S. L. (2022). Corporate digital transformation, bad news hoarding, and stock price crash risk. Accounting Research, (10), 31–44.