The Impact of Short-Selling Mechanisms on Corporate Tax Avoidance: Evidence from China

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Abstract: The concept of short selling, being a mainstream capital market mechanism, has attracted increased publicity concerning the role of its external governance. Based on the staggered expansion of margin trading and short-selling program of China, which serves as a kind of quasi-natural experiment, this paper investigates a set of 2008 to 2024 A-share listed companies by utilizing a staggered difference-in-differences (DID) design. We conclude that short sales substantially reduce corporate tax avoidance, a finding that holds under various robustness tests that stands strong to testing. According to the mechanism tests, better information disclosure, increased concentration of ownership and better asset turnover are some of the major channels. Heterogeneity analysis indicates more impacts in government owned businesses and big companies as well as those with increased institutional ownership. This paper offers some new facts about the role of short-selling mechanisms in governance.

Keywords: Short-Selling Mechanism; Margin Trading And Short Selling; Corporate Tax Avoidance; External Governance; Difference-In-Differences

1. Introduction

Through short selling, the investors are allowed to borrow funds, sell shares thus in anticipation that share prices can go down. Based on the fact that in many instances they are referred to as market watchdogs, short sellers ensure the corporate conduct is right and reduce the informational asymmetry by revealing the negative firm specific information (Karpoff and Lou, 2010)[16]. A pilot program, the margin trading and short selling pr-ogram in China, is expanding at a slow pace, thereby providing a quasi-natural setting, in which to explore the issue of governance implication of short-selling programs[2][7].

Corporate evasion of taxation has been one of the key areas of research. One of the perspectives is that it increases firm performance and managerial compensation (Armstrong et al. ,2012; Gaertner, 2014)[11][15], whereas another states that it contributes to the agency conflict and allows managers to engage in rent-seeking (Desai et al. , 2007, 2009)[12][13]. Bringing short selling and tax avoidance into a joint framework further enhances the knowledge of market supervision determining tax policies (Tian et al. , 2020)[8] and can be used to improve the regulation of short-selling and taxation (Li et al. , 2021)[5]. It is under this background that we consider data of A-share listed companies in 2008-2024, exploit the delayed expansion of margin trading eligibility as an exogenous shock, and utilize a staggered difference-in-differences (DID) design in investigating the effect of the short-selling mechanisms on the corporate tax avoidance.

2. Literature Review

International studies consistently show that short sellers target negative news, thereby constraining earnings management and improving corporate governance (Fang et al., 2016; Karpoff and Lou, 2010; Massa et al., 2015)[14][16][18]. Chinese studies yield certain unanimity that the introduction of margin trading and short selling reduces the accrual-based earnings management, the likelihood of financial restatements, and external financing needs and improves the governance (Chen and Liu, 2014; Gu and Zhou, 2017; Lu et al., 2018; Zhang et al., 2016)[2][3][7][9]. On tax avoidance, one view holds that it boosts performance (Armstrong et al., 2012; Gaertner, 2014)[11][15]; another sees it as a channel for managerial opportunism that increases crash risk (Desai et al., 2007, 2009; Kim et al., 2011)[12][13][17]. Domestic research shows tax avoidance impairs investment efficiency (Liu & Ye, 2013)[6], while tax enforcement and institutional investors can curb it (Cai & Rao, 2015; Jiang, 2013)[1][4].

Short selling alters managers' cost-benefit

calculus. While tax avoidance preserves cash, it also invites short sellers if used to conceal opportunism. The threat of short selling raises non-tax costs, thereby discouraging aggressive avoidance. Additionally, prior studies have documented that corporate governance mechanisms play a crucial role in constraining tax avoidance activities (Zhang et al., 2015)[10].

3. Research Design

3.1 Model Specification

We estimate a staggered DID model:

$$DDBTD_{i,t}=\alpha_0+\alpha_1 DID_{i,t}+\gamma' Controls_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (1)$$

A significantly negative α_1 supports our hypothesis.

To test mediation, we estimate:

$$Mediator_{i,t}=\beta_0+\beta_1 DID_{i,t}+\gamma' Controls_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (2)$$

$$DDBTD_{i,t}=\gamma_0+\gamma_1 DID_{i,t}+\gamma_2 Mediator_{i,t}+\gamma' Controls_{i,t}+\mu_i+\lambda_t+\varepsilon_{i,t} \quad (3)$$

$Mediator_{i,t}$ represents information disclosure quality (IDQ), ownership concentration (Top1), and asset turnover ratio (ATO). If α_1, β_1, and γ_2 are all significant and γ_1 is smaller in magnitude than α_1, partial mediation.

3.2 Variable Definitions

As shown in Table 1, the variables are categorized by type, symbol, name, and definition

Table 1. Variable Definitions

Variable Type	Symbol	Variable Name	Definition
Dependent Variable	DDBTD	Corporate Tax Avoidance	Book-tax difference adjusted for earnings management
	BTD	Corporate Tax Avoidance (Alternative)	Book-tax difference
Explanatory Variable	DID	Short-Selling Shock	Treat × Post; equals 1 if the firm is a margin trading and short selling eligible stock and the year is after inclusion, otherwise 0
Mediator Variables	IDQ	Information Disclosure Quality	4 = Excellent; 3 = Good; 2 = Pass; 1 = Fail
	Top1	Largest Shareholder Ownership	Shareholding ratio of the largest shareholder
	ATO	Total Asset Turnover Ratio	Operating revenue / average total assets
Control Variables	Size	Firm Size	Natural logarithm of total assets
	Lev	Leverage Ratio	Total liabilities / total assets
	Fixed	Fixed Asset Ratio	Net fixed assets / total assets
	Intangible	Intangible Asset Ratio	Net intangible assets / total assets
	BM	Book-to-Market Ratio	Book value of equity / market value of equity
	PB	Price-to-Book Ratio	Market value / book value of equity

3.3 Sample Selection and Data Sources

Our initial sample comprises all Chinese A-share firms listed on the Shanghai and Shenzhen Stock Exchanges between 2008 and 2024. We source all financial and governance data from the China Stock Market and Accounting Research (CSMAR) Database. The sample selection process involves several sequential exclusion criteria to ensure data integrity and the validity of our empirical tests.

We first exclude firms in the financial services sector due to their unique regulatory and capital structures, which render standard measures of tax avoidance incomparable. Second, we drop firm-year observations with negative pre-tax income, as their tax incentives and behaviors are fundamentally different. Third, we remove observations where the calculated effective tax rate falls outside the conventional [0, 1] interval, as these extreme values often indicate data errors or non-standard tax circumstances. Fourth, we exclude observations with missing data for any of the key variables required for the baseline regression model.

After applying the first three filters (excluding financials, negative income, and extreme ETRs), the aggregated dataset comprises 23,563 firm-year observations. This figure is the one reported in the initial data description of Section 3.3. However, the estimation of our high-dimensional fixed effects models, the results of which are presented in Tables 2 through 5, necessitates that a firm appears in the panel for at least two consecutive periods to contribute to the within-firm variation. The

automatic omission of singletons (firms observed only once after the application of all filters) by the fixed-effects estimator results in the loss of 209 observations, yielding the final estimation sample of 23,354 firm-years used in our primary analyses. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers.

4. Empirical Results

4.1 Baseline Regression Results

Table 2 presents the baseline regression. Columns (1) and (2) do not have the control variables whereas columns (3) and (4) do. We have fixed yearly and firm effects which are held in check.

Table 2. Baseline Regression Results

	(1)	(2)	(3)	(4)
	DDBTD	BTD	DDBTD	BTD
DID	-0.006**	-0.008***	-0.006**	-0.009***
	(-2.538)	(-2.973)	(-2.495)	(-2.936)
Size			0.001	0.001***
			(1.563)	(2.711)
Lev			-0.015***	-0.019***
			(-10.413)	(-11.604)
Fixed			0.002	-0.002
			(0.950)	(-0.883)
Intangible			-0.020***	-0.029***
			(-4.345)	(-5.603)
BM			-0.007***	-0.012***
			(-7.231)	(-9.903)
PB			0.000	0.000
			(0.501)	(0.201)
_cons	0.005***	0.007***	0.002	-0.004
	(3.706)	(4.130)	(0.273)	(-0.394)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	23354	23354	23354	23354
R^2	0.526	0.463	0.532	0.473
*Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.*				

The coefficient on DID, on both measures of tax avoidance is negative in all specification. DID in column (1), has a coefficient of -0.006 ($p<0.05$) of DDBTD; column (2), -0.008 ($p<0.01$) of BTD. Once some controls are added, the coefficients remain relatively unchanged: -0.006 ($p<0.05$) on column (3) and -0.009 ($p<0.01$) on column (4). This result endorses our assumption that short selling prevents corporate tax avoidance.

Shifting to the control variables, leverage (Lev), intangible asset ratio (Intangibles) are both negatively correlated with tax avoidance at the 1% level, and so does the book-to-market ratio (BM), which implies that those companies with higher debt, more intangible assets, or more value oriented profile will avoid taxes less.

4.2 Robustness Checks

4.2.1 Placebo test

To exclude the possibility of random determinants of the baseline results, we apply a placebo test, which usually picks the eligibility and timing of treatment at random between margin trading and short trading, and constructs an indicator of placebo treatment (DID_ fake) and re-regress 500 times. Figure 1 indicates that the distribution of the estimated coefficients on the placebo DID is centered to input zero, most of the estimates were statistically non-significant and the true coefficient of the baseline was way off-target in relation to the distribution, which verifies that it was not as a result of mere chance that the results were obtained.

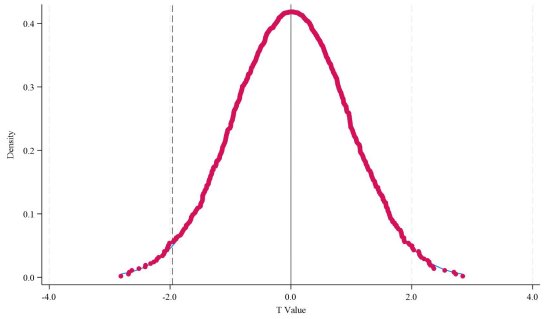

Figure 1. Placebo Test

4.2.2 PSM-DID estimation

To minimize the potential bias in the sampled in the potential sampling bias caused by non-random sampling of the eligible stocks we propensity score match (PSM) to pick control firms like the treatment firms and re-estimate the DID model on the matched sample. We use three methods which are compatible nearest-neighbor matching (1:1), radius matching and nearest-neighbor matching using kernel. Table 3 results show that the coefficient on DID is considerably negative in all three methods as per the results of the base and, therefore, the inhibitory effect of short selling on tax avoidance is high even with the selection bias held constant.

Table 3. PSM-DID Results

	(1)	(2)	(3)
	Nearest Neighbor1:1	Radius Matching	Kernel Matching
	DDBTD	DDBTD	DDBTD
DID	-0.007**	-0.007**	-0.006**
	(-2.532)	(-2.532)	(-2.495)
Size	0.001*	0.001*	0.001

	(1.950)	(1.950)	(1.563)
Lev	-0.016***	-0.016***	-0.015***
	(-9.137)	(-9.137)	(-10.413)
Fixed	0.003	0.003	0.002
	(1.490)	(1.490)	(0.950)
Intangible	-0.021***	-0.021***	-0.020***
	(-3.921)	(-3.921)	(-4.345)
BM	-0.006***	-0.006***	-0.007***
	(-5.213)	(-5.213)	(-7.231)
PB	0.000	0.000	0.000
	(0.190)	(0.190)	(0.501)
_cons	-0.004	-0.004	0.002
	(-0.422)	(-0.422)	(0.273)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	17167	17167	23354
R^2	0.523	0.523	0.532
*Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.*			

Table 4. Robustness Tests

	(1)	(2)	(3)
	Excluding COVID-19 Period	Industry FE	Placebo Treatment
	DDBTD	DDBTD	DDBTD
DID	-0.008**	-0.006**	-0.006**
	(-2.137)	(-1.982)	(-2.495)
DID_fake			-0.0002
			(-0.711)
Size	0.001	0.000	0.001
	(1.576)	(0.463)	(1.560)
Lev	-0.015***	-0.018***	-0.015***
	(-9.822)	(-11.321)	(-10.410)
Fixed	0.002	0.002	0.002
	(0.871)	(0.846)	(0.945)
Intangible	-0.020***	-0.017***	-0.020***
	(-4.273)	(-3.595)	(-4.336)
BM	-0.007***	-0.006***	-0.007***
	(-6.247)	(-5.398)	(-7.232)
PB	0.000	0.000*	0.000
	(0.545)	(1.822)	(0.498)
_cons	0.001	0.011	0.002
	(0.150)	(1.145)	(0.278)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	21178	23189	23354
R^2	0.533	0.566	0.532
*Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.*			

4.2.3 Additional robustness checks

We further perform several robustness tests, reported in Table 4. Excluding the COVID-19 pandemic period (2020–2022) yields a coefficient on *DID* of –0.008, significant at the 5% level, indicating that the results are not driven by the pandemic period. Controlling for industry fixed effects leaves the *DID* coefficient significantly negative. Including a placebo *DID_fake* alongside the true *DID* yields an insignificant coefficient on *DID_fake* while the true *DID* remains significantly negative. These findings collectively support the robustness of the main results.

4.3 Parallel Trends Test

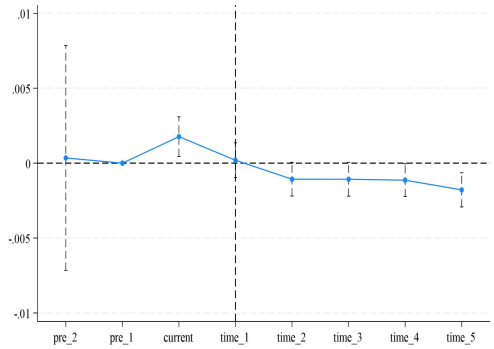

Figure 2. Parallel Trends Test

The validity of the *DID* design relies on the parallel trends assumption. We employ an event-study approach, interacting year dummies for three years before through five years after the event with a treatment indicator. Figure 2 shows that in the pre-treatment period (t–3 to t–1), the tax avoidance trends for treatment and control groups are not significantly different, satisfying the parallel trends assumption. In the post-treatment period (t+1 to t+5), the treatment group exhibits significantly lower tax avoidance relative to the control group, and this gap widens over time, suggesting a persistent effect of short selling on curbing tax avoidance.

4.4 Mediation Analysis

The results of mediation have been provided in Table 5. The estimate at the baseline is indicated in column (1). Columns (2) through to (4) check the impact of DID on each of the mediators: information disclosure quality (IDQ), largest shareholder ownership (Top1) and asset turnover ratio (ATO). These mediators are added to columns (5) -(7) in that order.

The effect of DID on IDQ, Top1 and ATO is significantly positive, which indicates that short selling enhances disclosure, ownership concentration and efficiency of operations. Once the mediators have been added, the DID coefficient on DDBTD is negative but decreases in size, but the coefficients on the mediators are large. Particularly, there is a coefficient of -0.0004 ($p<0.10$) in column (5), Top1 has a coefficient of -0.006 ($p<0.01$) in column (6), and ATO has a coefficient of -0.001($p<0.10$) in column (7). These results imply partial mediation: short selling deters tax avoidance

partially through enhancing the information environment, concentrating ownership, and increasing the efficiency of operations.

Table 5. Mediation Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	DDBTD	IDQ	Top1	ATO	DDBTD	DDBTD	DDBTD
DID	-0.0064**	0.173***	0.016***	0.039*	-0.0062**	-0.0062**	-0.0063**
	(-2.495)	(2.628)	(5.746)	(1.810)	(-2.473)	(-2.452)	(-2.463)
IDQ					-0.0004*		
					(-1.687)		
Top1						-0.006***	
						(-2.710)	
ATO							-0.001*
							(-1.902)
Size	0.001	0.170***	-0.009***	-0.071***	0.001*	0.001	0.001
	(1.563)	(15.344)	(-4.558)	(-12.786)	(1.732)	(1.416)	(1.283)
Lev	-0.015***	-0.352***	-0.005	0.253***	-0.016***	-0.015***	-0.015***
	(-10.413)	(-8.462)	(-0.771)	(12.800)	(-10.508)	(-10.442)	(-10.055)
Fixed	0.002	0.028	0.008	0.075***	0.002	0.002	0.002
	(0.950)	(0.554)	(1.004)	(3.160)	(0.956)	(0.979)	(1.013)
Intangible	-0.020***	-0.216	-0.021	-0.195***	-0.020***	-0.020***	-0.020***
	(-4.345)	(-1.598)	(-0.931)	(-3.805)	(-4.362)	(-4.375)	(-4.419)
BM	-0.007***	-0.187***	0.062***	-0.165***	-0.007***	-0.007***	-0.008***
	(-7.231)	(-6.578)	(16.169)	(-15.224)	(-7.300)	(-6.810)	(-7.464)
PB	0.000	0.007***	0.003***	0.002***	0.000	0.000	0.000
	(0.501)	(3.230)	(9.081)	(2.739)	(0.535)	(0.703)	(0.540)
_cons	0.002	-0.484**	0.496***	2.141***	0.002	0.005	0.006
	(0.273)	(-1.976)	(10.763)	(17.260)	(0.251)	(0.612)	(0.618)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	23354	23354	23354	23354	23354	23354	23354
R^2	0.532	0.463	0.897	0.838	0.532	0.532	0.532
*Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.*							

4.5 Heterogeneity Analysis

In order to investigate the heterogeneity of effects of short selling on governance, we undertake subsample analysis that involves ownership type, firm size, and institutional ownership. In Table 6, it can be seen that the coefficient of DID is -0.012 (1% significant) among state owned enterprises and -0.006 (5% significant) among the privates, which has greater significance in the former. The coefficient based on the size of firm is the companies with large size have coefficient of -0.022 (1% significance) and small and medium sized firms have no significant coefficient, indicating that the effect of governance is stronger among the companies with large size. Through institutional ownership, coefficient displays are; -0.011 (1% significant) in firms with high institutional ownership and no significance in firms with low institutional ownership meaning that institutional investors strengthen the external governance role of short selling.

Table 6. Heterogeneity Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	SOEs	Non-SOEs	Large Firms	SMEs	High Institutional Ownership	Low Institutional Ownership
	DDBTD	DDBTD	DDBTD	DDBTD	DDBTD	DDBTD
DID	-0.012***	-0.006**	-0.022***	-0.004	-0.011***	-0.003
	(-4.381)	(-2.063)	(-4.310)	(-1.262)	(-3.254)	(-0.728)
Size	0.002***	0.000	0.001*	-0.003***	0.001	-0.000

	(2.882)	(0.065)	(1.948)	(-3.463)	(1.375)	(-0.571)
Lev	-0.015***	-0.017***	-0.016***	-0.011***	-0.016***	-0.014***
	(-5.216)	(-9.472)	(-6.441)	(-4.312)	(-7.461)	(-6.046)
Fixed	0.007**	-0.001	0.008**	-0.006**	0.005**	-0.003
	(2.145)	(-0.242)	(2.531)	(-2.196)	(2.058)	(-0.896)
Intangible	-0.015**	-0.019***	-0.019***	-0.013*	-0.026***	-0.016**
	(-2.280)	(-2.956)	(-2.745)	(-1.784)	(-4.351)	(-2.209)
BM	-0.009***	-0.006***	-0.010***	-0.008***	-0.004***	-0.012***
	(-4.663)	(-4.660)	(-6.405)	(-4.791)	(-3.036)	(-7.405)
PB	-0.000	0.000	-0.000	0.000	0.000	-0.000
	(-0.030)	(0.953)	(-1.443)	(0.249)	(0.325)	(-0.291)
_cons	-0.029*	0.014	-0.001	0.076***	-0.001	0.025*
	(-1.691)	(1.321)	(-0.034)	(4.247)	(-0.091)	(1.766)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	6610	16670	11499	11472	11536	11514
R^2	0.519	0.543	0.543	0.593	0.555	0.540
*Notes: *** p < 0.01, ** p < 0.05, * p < 0.1.*						

5. Conclusion and Policy Implications

The study uses a quasi-natural experiment to implement the staggered implementation of the program of margin trading and short selling in China to draw inferences that short-selling at most has an influence on the suppression of corporate taxes. The end-result is robust on different tests. Three channels are revealed in the analysis of the mechanism, i.e. better information disclosure, greater ownership concentration, and greater asset turnover. The heterogeneity analysis shows that the effect is greater in state owned enterprises, large firms and more institutional ownership by firms.

These findings suggest several policy implications. First, further expand the scope and reduce costs of short selling to strengthen its governance role. Second, enhance information disclosure regulation and penalties to improve transparency. Third, encourage institutional investor participation in corporate governance. Fourth, adopt differentiated regulatory approaches tailored to firm characteristics.

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