

Audit Pricing Effects of the Short-selling Mechanism: Evidence from China

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Abstract

This paper analyzes whether easing short-sale restrictions changes the audit fees paid by Chinese listed companies. Using main-board A-share companies traded on the Shanghai and Shenzhen exchanges over 2013-2023 and treating the stepwise enlargement of the margin-financing and securities-lending program as an exogenous policy shock, the analysis estimates a difference-in-differences specification to evaluate how short-sale eligibility is reflected in audit pricing. The results show that firms granted short-selling eligibility face significantly higher audit fees, and this pattern is unchanged after multiple robustness exercises. Heterogeneity analyses further show that firms granted short-selling eligibility are associated with higher audit fees. By linking capital-market reform to auditor pricing decisions, this paper extends research on the economic consequences of short selling, clarifies how external market discipline reshapes auditors' risk assessment, and provides empirical evidence for regulators, listed firms, and accounting firms.

Keywords

Short-selling Deregulation; Audit Fees; Internal Control Quality; Ownership Structure; Difference-in-Differences.

1. Introduction

The Shanghai and Shenzhen stock exchanges began implementing the program on March 31, 2010 by formally launching margin financing and securities lending, which broke the long-standing one-way trading pattern in China's A-share market[1]. At the end of the day, the main role of the short-selling mechanism is to reflect some negative sentiments in the market into stock prices, thereby prompting market regulation to take effect. In this way, information disclosure and corporate governance of listed companies will become much stricter than before. So how are audit fees affected? Simply put, it really boils down to two basic considerations-how much groundwork they have to put in, and how much liability they face on the risk front. Therefore, once this system is introduced, auditors need to renegotiate audit pricing. In fact, when a company has financial fraud issues, auditors need to re-examine the risks, which consumes a lot of effort. Hence, auditors must carefully consider audit fees, and they cannot be careless.

If you look back at what's already been done, most studies have approached audit fees either from the angle of firm-level traits or from the auditor's side[2]. Honestly speaking, very few have asked whether short-selling has any effect on audit fees. Of course, a number of studies do suggest that the short-selling mechanism can exert a certain disciplinary effect[3], but how it hits audit fees, where it goes through, and when it bites hardest, yet the evidence remains insufficient. So far, the relationship between short-selling eligibility and audit pricing is still unclear, and we still don't know much about how internal control quality or ownership structure fits into the picture. Given that gap, this paper focuses on two questions: one is

whether relaxing short-selling restrictions fundamentally changes the level of audit fees for listed companies, and the other is whether that change, if any, plays out differently across firms with different internal control quality or ownership types.

This paper offers three main contributions to the literature. For one thing, it tests whether the liberalization of short-selling actually causes audit fees to change, and if so, whether that effect matters in economic terms. For another, we employ a DID framework and break the sample down by different governance features to pin down the channel through which the policy feeds through to audit pricing. Finally, given that China's short-selling regime is still a work in progress, our findings offer some useful takeaways—both for regulators who are fine-tuning the rules, and for accounting firms that want to price audit services in a more risk-sensitive way. Taken together, the analysis speaks to both the average effect of short-selling deregulation and how that effect varies across different segments of the audit market.

2. Literature Review and Hypothesis Development

2.1. Literature Review

Put simply, short selling breaks the informational imbalance that arises when investors can only buy and never sell. Since short sellers are allowed to sell shares they don't actually hold, they tend to go out looking for bad news—things like earnings manipulation, weak governance, or looming financial trouble—and in doing so, they help sharpen price efficiency and make the market more transparent, as earlier work by Miller (1977) and Karpoff and Lou (2010) has shown. According to classic audit-pricing theory, audit fees reflect the sum of audit effort, normal profit, and compensation for expected risk (Simunic, 1980)[4]. Combining these two strands of research suggests two likely channels. First, once short-selling pressure increases the scrutiny of a client, auditors may need to expand testing procedures and devote more staff time to high-risk accounts. Second, if short-selling activity heightens stock-price volatility and the probability of investor claims, auditors may demand a higher risk premium. Based on this logic, the short-selling mechanism should be associated with higher audit fees.

2.2. Discussion of Hypotheses

H1: Allowing stocks to be short sold raises the audit-fee level of listed companies.

Short-selling deregulation intensifies external supervision by making firms' financial weaknesses and operating problems easier for the market to detect. From a cost perspective, when short sellers focus on specific accounts or disclosures, auditors are more likely to widen sampling, perform additional procedures, and rely on more third-party verification, all of which raise engagement costs. From a risk perspective, stock-price declines triggered by adverse information can increase the probability of litigation against both the client and the auditor, thereby enlarging expected reputation loss and compensation risk. Under a cost-plus and risk-compensation pricing logic, auditors therefore have reason to charge higher fees to clients newly included in the short-sale eligible group. Hence, H1 is proposed.

H2: Compared with firms that have strong internal control quality, firms with weak internal control quality experience a larger increase in audit fees after short-selling deregulation.

The quality of internal control reflects how reliable a firm's reporting system is and how standardized its corporate operations. Firms with weak internal controls face a higher risk of material misstatement and have stronger incentives and opportunities to conduct earnings management or other opportunistic behavior, making them especially attractive targets that may attract short sellers' attention (Massa et al., 2015)[5]. When short-selling pressure becomes stronger, the risk exposure of these firms becomes more visible, so auditors must conduct more substantive testing and demand greater compensation for bearing engagement risk. By contrast, firms with stronger internal controls can better restrain reporting

irregularities and reduce the incremental uncertainty created by short-selling pressure. So we would expect audit fees to rise by a larger margin for firms whose internal controls are relatively weak.

H3: Non-state-owned firms are likely to see a bigger hike in audit fees than their state-owned counterparts when short-selling restrictions are relaxed.

State-owned enterprises tend to have the government standing behind them, implicitly at least. That gives them easier access to financing and makes their operating risk look comparatively low in the eyes of the market. So short sellers don't have much incentive to go after these firms, and even if they dig up something negative, the market impact tends to be muted. On top of that, SOEs are usually subject to tighter administrative oversight, which also helps keep auditors' perceived litigation and reputation risk in check. Non-SOEs, on the other hand, are much more exposed to market discipline. Their financing costs and stock performance can swing quite sharply when adverse news comes out—which means auditors who serve these firms find themselves taking on bigger professional risks once short-selling is deregulated, and they're therefore more inclined to charge higher fees to compensate for that added exposure. This chain of reasoning is what underpins H3.

Given all this, the short-selling mechanism is widely thought to have some bearing on audit pricing, but the evidence we have from China is still not all that solid—largely because the system only got started around 2010 and has been changing ever since[1]. That makes it all the more important to put both the average effect and the boundary conditions of the mechanism to the test with solid empirical work.

3. Research Design

3.1. Data Sources

Our sample starts with A-share main-board companies that were traded on the Shanghai and Shenzhen stock exchanges over the 2013–2023 period. Following the usual practice in the literature[6], we exclude financial firms, ST companies, and any firm-year observations that are missing data on key variables. What we end up with is a balanced panel of X firms and Y firm-year observations, which we think gives us a pretty good picture of the broad patterns in China's capital market across the sample period. The main data come from CSMAR and the DIB database on internal control and risk management.

3.2. Variable Setting

(1) Dependent variable

Audit fee (Lnfee). Following the mainstream audit-pricing literature[4] and considering the distribution of audit fees among Chinese listed firms[7], this paper uses the logarithmic form of the disclosed audit fee to construct the dependent variable. To check robustness, alternative measures such as audit fees scaled by firm size and industry-adjusted audit fees can also be considered in supplementary analyses.

Lnfee is computed as the natural logarithm of the audit fee reported in the listed company's annual report.

(2) Core explanatory variable

Short-selling mechanism (Shorti,t). This indicator is assigned 1 when a firm's stock is included on the eligible margin-trading and securities-lending list for more than three months in a given year, and 0 otherwise. For years before 2010, the value is set to 0.

(3) Control variables

Drawing on prior research[8], the model controls for firm size (Size, defined as the natural logarithm of total assets at fiscal year-end), internal-control quality (Control, proxied by the

DIB index), loss status (Loss, equal to 1 for loss-making firms and 0 otherwise), growth (Growth, measured by the growth rate of fixed assets), the ratio of accounts receivable (Reca), the ratio of inventory (Inva), audit opinion (Opin, equal to 1 for a non-standard opinion and 0 otherwise), leverage (Lev), auditor size (Big10, equal to 1 for top-ten firms and 0 otherwise), and ownership category (SOE, coded 1 for state-owned enterprises and 0 otherwise). Year and industry fixed effects are also controlled for.

4. Empirical Results

4.1. Descriptive Analysis

Table 1 summarizes the main variables. For audit fees (Lnfee), the sample mean is 13.657 and the standard deviation is 0.516, the values range from 12.206 to 16.169, indicating pronounced cross-firm differences in audit pricing[9]. The mean for the short-selling indicator (Short) is 0.308, suggesting that 30.8% of the firm-year observations in the sample fall into the short-sale eligible category, a pattern consistent with the gradual progressive enlargement of the margin-trading and securities-lending program[10].

Table 1. Descriptive statistics

	(1)				
	count	mean	min	max	sd
AuditFee	8192	13.657	12.206	16.169	0.516
did	8192	0.308	0.000	1.000	0.462
Lev	8192	0.344	0.053	0.907	0.186
INST	8192	0.289	0.001	0.914	0.224
Growth	8192	0.162	-0.603	2.267	0.381
Top1	8192	0.289	0.084	0.745	0.128
TobinQ	8192	2.335	0.849	7.885	1.298
ListAge	8192	1.713	0.693	2.773	0.593
Dturn	8192	-0.186	-2.128	1.090	0.649

4.2. Correlation Analysis

Table 2. Correlation matrix

	(1)								
	AuditFee	did	Lev	INST	Growth	Top1	TobinQ	ListAge	Dturn
AuditFee	1.000								
did	0.268***	1.000							
Lev	0.402***	-0.027**	1.000						
INST	0.096***	0.128***	0.014	1.000					
Growth	-0.015	-0.094***	0.069***	0.076***	1.000				
Top1	-0.121***	0.057***	-0.114***	0.358***	0.024**	1.000			
TobinQ	-0.139***	-0.060***	-0.173***	0.121***	0.114***	-0.058***	1.000		
ListAge	0.309***	-0.054***	0.236***	-0.173***	-0.103***	-0.358***	0.066***	1.000	
Dturn	0.106***	-0.122***	0.093***	-0.127***	-0.029***	-0.151***	0.088***	0.470***	1.000

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

So Table 2 shows the pairwise correlations for our main variables. The correlation between the short-selling indicator (Short) and audit fees (Lnfee) comes out at 0.268 and is positively signed

at the 1% significance level-for us, this already gives some preliminary backing to H1. On top of that, the correlations we see among the explanatory and control variables are all below the usual multicollinearity cutoffs[11], so we don't think multicollinearity is going to be a major concern for our regression analysis down the line.

4.3. Baseline Regression: Short-selling Deregulation and Audit Fees

Table 3 presents the baseline DID estimates. Once we factor in year and industry fixed effects along with the full set of controls, the coefficient on the short-selling dummy (Short) comes in at 0.0674. For us, this DID estimate suggests that relaxing short-sale constraints does push audit fees up for listed firms-which gives us direct backing for H1. On the control variables, the signs and significance levels we get, including those on leverage, internal control quality, and auditor size, all line up pretty well with what theory would predict[12]. That, in turn, gives us more confidence in our empirical setup.

Table 3. Baseline DID regression results

	(1)	(2)
	AuditFee	AuditFee
did	0.0622***	0.0674***
	(5.9224)	(6.5678)
Lev		0.3627***
		(13.5601)
INST		0.2080***
		(6.6262)
Growth		0.0127*
		(1.8655)
Top1		-0.3560***
		(-6.1830)
TobinQ		-0.0337***
		(-11.5306)
ListAge		0.1429***
		(8.1991)
Dturn		0.0057
		(1.1556)
_cons	12.8288***	12.7800***
	(187.6963)	(178.6212)
Year	Yes	Yes
Industry	Yes	Yes
N	8208	8208
adj. R ²	0.479	0.511

t statistics in parentheses

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

4.4. Further Analysis of Margin Financing, Securities Lending, and Audit Pricing

Building on the preceding hypotheses and theoretical discussion[13], this section examines. The observations are separated into state-owned and non-state-owned enterprises. Column (3) in Table 4 reports the SOE estimates, whereas column (4) presents the non-SOE estimates.

The estimates in Table 4 show that the estimated coefficient for the short-selling indicator is -0.0239 in the SOE subsample and lacks statistical significance, suggesting that the reform does

not materially affect audit fees for state-owned firms. By contrast, the coefficient for non-state-owned firms is 0.0659 with 1% statistical significance, indicating that short-selling deregulation coincides with a clear rise in audit fees in the non-SOE subsample.

Comparing the two columns suggests that the audit-fee premium associated with short-selling deregulation is mainly found among non-state-owned enterprises. In other words, audit fees of non-SOE audit fees respond more strongly to changes in short-selling eligibility than those of SOEs, which is consistent with H3.

Table 4. Heterogeneity by ownership type

	(3)state-owned enterprise	(4)non-state-owned enterprise
	AuditFee	AuditFee
did	-0.0239	0.0659***
	(-0.6201)	(6.1984)
Lev	0.3914***	0.3484***
	(3.7281)	(12.5173)
INST	1.0161***	0.1746***
	(7.3489)	(5.3365)
Growth	0.0323	0.0126*
	(1.4991)	(1.7875)
Top1	-0.4666*	-0.5592***
	(-1.9595)	(-8.8694)
TobinQ	-0.0429***	-0.0313***
	(-3.9182)	(-10.5123)
ListAge	0.0766	0.1448***
	(1.0600)	(8.1316)
Dturn	0.0222	0.0044
	(1.2265)	(0.8727)
_cons	12.5331***	12.6994***
	(96.8215)	(172.3677)
Year	Yes	Yes
Industry	Yes	Yes
N	655	7553
adj. R ²	0.374	0.519

t statistics in parentheses

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

The paper next explores heterogeneity by auditor type[14]. Specifically, the sample is divided into Big Four audits and non-Big Four audits. Column (5) of Table 5 presents the estimates for clients audited by Big Four firms, while column (6) reports the estimates for clients served by non-Big Four audit firms.

According to Table 5, the coefficient on the short-selling variable is 0.1426 for the Big Four subsample and is statistically significant at the 5% level. In the non-Big Four subsample, the coefficient is 0.0667 and reaches the 1% significance level. These findings indicate that short-selling deregulation increases audit fees under both auditor types.

Taken together, Table 5 therefore indicates that the fee response remains positive regardless of auditor type, but the association is more statistically prominent among non-Big Four audits. This suggests that non-Big Four auditors may adjust pricing more noticeably when client risk rises after short-selling deregulation[2].

Table 5. Heterogeneity by auditor type

	(5)The Big Four Audit Firms	(6)Non-Big Four audit
	AuditFee	AuditFee
did	0.1426**	0.0667***
	(2.4765)	(6.4690)
Lev	0.5131**	0.3564***
	(2.1125)	(13.3949)
INST	0.1336	0.2085***
	(0.4738)	(6.6711)
Growth	0.0522	0.0115*
	(1.4623)	(1.6740)
Top1	-0.4988	-0.3330***
	(-0.7734)	(-5.8118)
TobinQ	-0.0473***	-0.0324***
	(-2.8170)	(-11.0681)
ListAge	-0.0432	0.1375***
	(-0.3642)	(7.8960)
Dturn	0.0396	0.0052
	(1.3926)	(1.0590)
_cons	14.9085***	12.7541***
	(45.4607)	(180.1694)
Year	Yes	Yes
Industry	Yes	Yes
N	177	8031
adj. R ²	0.366	0.510

t statistics in parentheses

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

4.5. Robustness Checks

To mitigate endogeneity concerns, especially possible sample-selection bias[15], this paper conducts robustness checks using the difference-in-differences approach combined with propensity-score matching (PSM-DID). Treatment-group firms are paired with control-group observations that are similar in observable firms based on characteristics such as size, profitability, and growth. In addition, the baseline model is re-estimated under alternative time windows, with the results reported in models (7) and (8).

The alternative-time-window estimates show that the coefficient on did equals 0.0401 in model (7) and 0.0512 in model (8); both estimates are significant at the 1% level. Thus, even after changing the event window, the positive effect of short-selling deregulation on audit fees remains statistically significant, suggesting that the baseline conclusion is not driven by a particular sample window[16].

The PSM-DID results lead to the same conclusion. In model (9), the coefficient on did equals 0.0621 with 1% significance; in model (10), the coefficient equals 0.0674 and also reaches the 1% significance level. So even after we control for observable differences between the treatment and control groups, the positive relationship between short-selling deregulation and audit fees still holds up[17].

Table 6. Robustness test I: alternative time window

	(7)	(8)
	AuditFee	AuditFee
did	0.0401***	0.0512***
	(3.9122)	(5.1069)
Lev		0.3213***
		(11.6903)
INST		0.2377***
		(6.9686)
Growth		0.0178***
		(2.6444)
Top1		-0.2708***
		(-4.2727)
TobinQ		-0.0275***
		(-9.0371)
ListAge		0.1628**
		(9.7118)
Dturn		0.0016
		(0.3461)
_cons	13.1388***	12.9478***
	(182.5876)	(167.6769)
Year	Yes	Yes
Industry	Yes	Yes
N	7239	7239
adj. R ²	0.299	0.342

t statistics in parentheses

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

Table 6-1. Robustness test II: PSM-DID

	(9)	(10)
	AuditFee	AuditFee
did	0.0621***	0.0674***
	(5.9063)	(6.5561)
Lev		0.3607***
		(13.4363)
INST		0.2089***
		(6.6464)
Growth		0.0130*
		(1.8954)
Top1		-0.3572***
		(-6.1783)
TobinQ		-0.0338***
		(-11.5532)
ListAge		0.1435***
		(8.2168)
Dturn		0.0057
		(1.1573)
_cons	12.8289***	12.7806***
	(187.6174)	(178.5014)
Year	Yes	Yes
Industry	Yes	Yes
N	8192	8192
adj. R ²	0.478	0.511

t statistics in parentheses

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

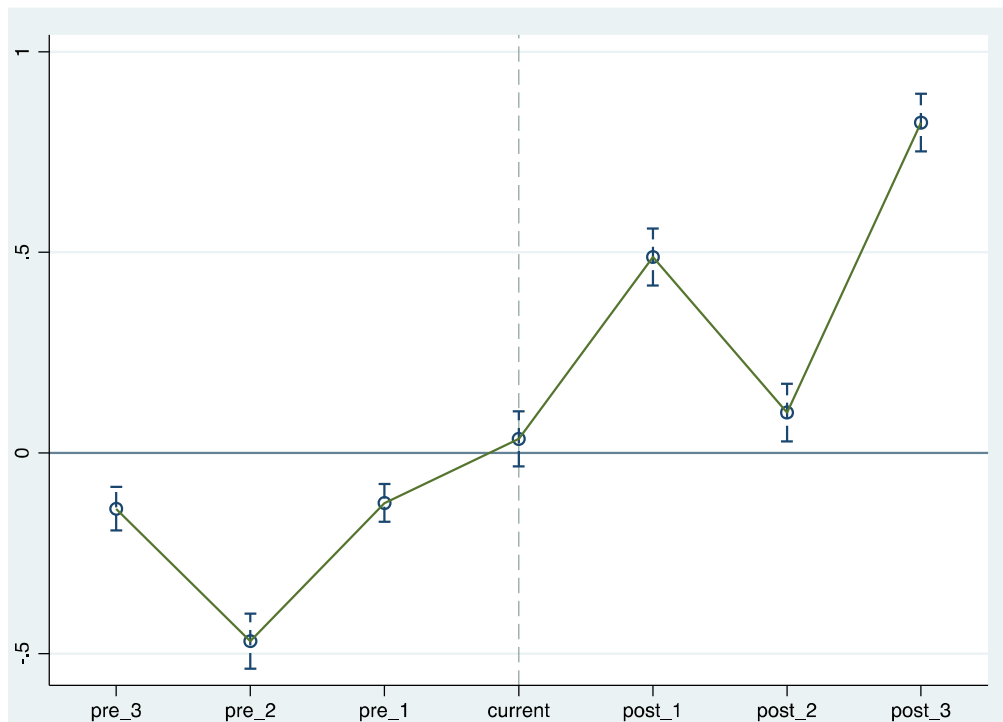


Figure 1. Parallel Trend Test

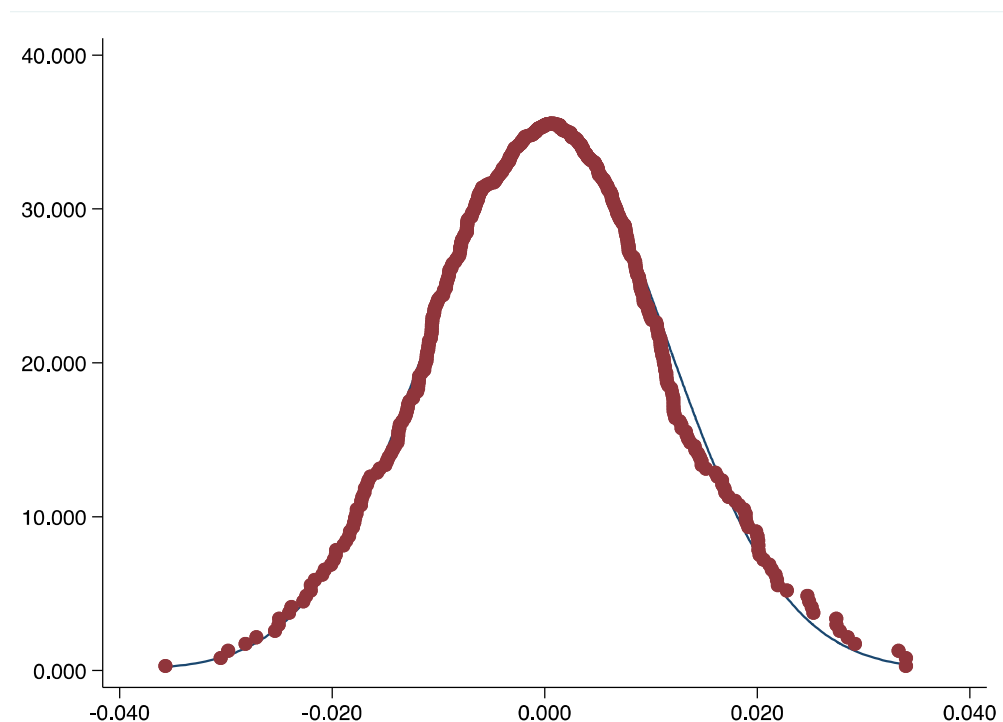


Figure 2. Placebo Test

5. Conclusion and Policy Implications

5.1. Discussion and Conclusion

We draw on a sample of main-board A-share firms listed on the Shanghai and Shenzhen exchanges over 2013–2023 and apply a DID design to see how the margin-trading and short-selling program affects audit fees. Our analysis yields three key findings. One, relaxing short-selling constraints does push up audit fees for listed companies, and this result holds up under various robustness checks-alternative time windows and PSM-DID matching included. Two,

internal control quality plays a clear moderating role: the upward pressure on audit fees is more pronounced in firms with weaker internal controls and shakier governance fundamentals. Three, ownership type also makes a difference. The expansion of the margin-trading and short-selling program has a visible effect on non-SOEs, but for SOEs, the impact is negligible-which suggests that non-state-owned firms are more responsive to the governance pressure generated by short-selling deregulation.

5.2. Government Suggestions

So what does all this mean in practice? Given China's institutional background, our findings carry a few practical takeaways. For regulators, the results suggest that the margin-trading and short-selling program can strengthen market discipline, but it also changes the governance landscape that listed firms operate in. For the firms themselves, the message is pretty clear: beefing up internal controls and sharpening disclosure practices should be high on their agenda. For accounting firms, the study offers guidance for client-risk assessment and for setting audit fees in a more risk-sensitive manner.

(1) From the perspective of regulators

In the short run, regulators should further improve disclosure requirements for short-selling transactions so that the market can assess related risks more transparently. In the long run, regulators should continue to promote a market-based pricing framework that better reflects risk, and make sure the capital market and the audit market evolve in tandem.

(2) What listed firms can do

Listed companies need to put in place internal control systems that can stand up to a more market-oriented short-selling environment-paying special attention to financial reporting and key decision-making processes along the way. They should also work on getting their disclosures out more quickly and more accurately, keep a close eye on market expectations, and get better at handling unusual share-price swings and any legal risks that might come with them.

(3) From the perspective of accounting firms

Accounting firms should incorporate clients' short-selling eligibility and related trading activity into their risk-assessment framework, adjust audit procedures in response to short-selling-related risk signals, and refine professional-judgment standards so that audit-fee decisions more accurately reflect the underlying risk premium.

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