

Research on the Impact of Shadow Banking Activities of Non-Financial Enterprises on Stock Market Volatility

-- Evidence from China's A - share Listed Companies

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Abstract: In the current context of financialization, non-financial listed companies are increasingly engaging in shadow banking activities, both as actual credit intermediaries and by indirectly participating in shadow credit markets. Shadow banking activities may not only have a significant impact on the stock prices of non-financial listed companies, but more importantly, they exert profound effects on the volatility and overall risk of the entire A-share market. This paper conducts an empirical examination using non-financial listed companies on China's A-share market from 2011 to 2020 as the research sample. The results show that non-financial listed companies engaged in shadow banking activities experience increased stock price volatility, which is detrimental to the stability of the A-share market. Group regression analysis reveals that this impact is particularly significant in companies with a higher degree of shadow banking activity, whereas the effect on stock price volatility is weaker in companies with lower levels of shadow banking involvement. Further mediation analysis indicates that the profit margin of a company's core business plays a mediating role in the relationship between shadow banking activities and stock price volatility. The shadow banking activities of non-financial enterprises negatively affect their core business profitability, which in turn exacerbates the volatility of their stock prices. Lastly, this paper conducts robustness tests using instrumental variable methods and alternative variables, and the results support the preliminary findings. These findings provide new insights into the shadow banking behavior of non-financial listed companies and its potential impact on stock market volatility, offering empirical evidence for regulatory policy formulation.

Keywords: Non-financial Listed Companies; Shadow Banking; Stock Price Volatility.

1. Introduction

Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping has repeatedly emphasized the importance of preventing systemic financial risks, with shadow banking being a critical area of concern. Since 2008, China's shadow banking sector has experienced rapid growth, with the broad and narrow definitions of shadow banking reaching 90 trillion RMB and 51 trillion RMB, respectively, by the end of 2016 (Liu et al., 2023; Li et al., 2022)[1][2]. These risks prompted the Central Economic Work Conference to implement a series of measures at the end of 2016. By 2019, these measures had yielded results, with the scale of shadow banking significantly declining, curbing its disorderly expansion, and creating favorable conditions for the healthy development of financial markets.

At the same time, the impact of shadow banking activities on the stock price volatility of non-financial enterprises warrants in-depth study. While shadow banking activities provide liquidity and financial stability to non-financial firms in the short term, long-term reliance may increase financial risks and exacerbate stock price volatility. Revenues generated from shadow banking may boost a company's profitability, but high-risk activities could also lead to losses, thus undermining stock price stability. Additionally, shadow banking activities increase information asymmetry, elevating the risk of debt defaults, which in turn intensifies stock price volatility.

Based on this, the present paper will conduct an in-depth exploration of the impact of non-financial enterprises' participation in shadow banking activities on stock market volatility, providing a theoretical foundation and policy

guidance for maintaining financial market stability.

2. Literature Review

2.1. Studies on Shadow Banking

Since the 2008 financial crisis, shadow banking has garnered widespread global attention. McCulley (2007)[3] defines shadow banking as financial institutions operating outside government regulation, while Adrian et al. (2012)[4] view it as institutions engaging in financial intermediation activities without the support of national financial institutions. Kodres and Bengtsson (2013)[5][6] argue that shadow banking businesses resemble commercial banks but lack regulatory oversight. In China, shadow banking activities have reduced the liquidity hoarding levels of banks, but regulatory efforts remain insufficient, particularly among small and medium-sized banks (Xiang Houjun and Zhou Xiong, 2022)[7]. During the financial crisis, policy stimulus accelerated the expansion of shadow banking (Xu Shaoqiang and Yan Yongjia, 2015)[8]. While shadow banking has had positive effects, such as improving pricing systems, its rapid growth has also increased the instability of the financial system (He Ping et al., 2018)[9]. The extended credit and guarantee chains in shadow banking exhibit "bank-like" characteristics (Wang Yongqin et al., 2015; Wang Jinbin and Li Bo, 2017)[10][11]. Chinese-style shadow banking, in particular, highlights the behavior of financial institutions in not bearing risks when engaging in entrusted loans (Serletis and Xu, 2019)[12]. Furthermore, Deng Yongliang and Zhang Hua (2022)[13] found that the development of shadow banking has had a negative impact on private enterprises' innovation investments.

2.2. Studies on the Shadow Banking Activities of Non-Financial Enterprises

Several researchers have provided valuable insights into non-financial enterprises' involvement in shadow banking. Wang Yao and Huang Huanxian (2023)[14] found that the development of digital finance significantly promoted the trend of shadow banking among non-financial enterprises, while Han Xun et al. (2017)[15] theoretically explored the internal and external driving factors behind enterprises' entry into shadow banking. Wu Anbing et al. (2023)[16] revealed that shadow banking activities increase corporate risk-taking and noted that expansionary monetary policy can alleviate these risks. Liu Lin and Wang Jinfeng (2022)[17] discovered a U-shaped relationship between social capital and shadow banking. Empirical analysis by Li Jianjun and Han Xun (2019)[18] demonstrated that shadow banking activities increase operational risks, especially for firms facing financing constraints and poor corporate governance.

From an international perspective, Baum et al. (2008)[19] suggested that during periods of economic turmoil, companies tend to increase liquidity as a hedge against risks. Gorton et al. (2012)[20] analyzed the relationship between the securitization trend and the financialization of corporate assets, while Bessembinder (1991)[21] argued that investments in financial derivatives can effectively reduce transaction risk, offering a new perspective on shadow banking.

2.3. Studies on Stock Market Volatility

The academic literature has extensively explored the various factors affecting stock market volatility and their relationship with financial market stability. Monahan (2011)[22] found that the correlation between stock prices and cash flows in high-tech companies is significantly higher than in other industries. Zhang Qianyu and Wang Guojun (2023)[23] pointed out that stock buybacks improve the quality of information disclosure and effectively suppress stock price volatility. Xin Qingquan et al. (2014)[24] found that earnings quality and the involvement of the Big Four international audit firms significantly reduce stock price volatility.

At the macro level, Sun Li and Zhu Yanliang (2021)[25] found that interest rates are negatively correlated with stock prices, and the impact of interest rates on stock prices is greater than that of the money supply. Gong Rukai (2021)[26] explored the impact of information asymmetry and investor overconfidence on stock prices, indicating that overconfidence has a positive effect on market efficiency but is detrimental to market depth. Cheng Fei and Zhang Qingjun (2018)[27] found that the pledging of shares by controlling shareholders exacerbates stock price volatility, while share increases help mitigate such volatility.

Additionally, factors such as the pandemic, geopolitical risks, and economic policy uncertainty have significant effects on market volatility. Margin trading has increased leverage risk, and investors' risk preferences play a key role in driving market fluctuations.

3. Impact Mechanism and Research Hypotheses

Although stock market volatility is a macro-level concept, it is composed of the aggregated volatility of individual stocks. Therefore, studying the volatility of individual stocks helps in

understanding the causes and effects of overall market volatility. This paper, by analyzing the volatility of individual stocks, further explores the impact of shadow banking activities of non-financial enterprises on the overall volatility of the stock market, thereby enriching the understanding of the economic consequences of shadow banking and providing empirical evidence for market regulation.

3.1. Shadow Banking Activities and Stock Market Volatility

Previous studies on shadow banking have primarily focused on macro-level analyses, with fewer studies examining micro-level impacts. Based on existing theoretical findings, the involvement of non-financial listed companies in shadow banking activities may influence stock price volatility through the following mechanisms, ultimately affecting overall stock market volatility.

Non-financial companies, by participating in shadow banking activities, can enhance financial stability in the short term and access additional funding sources, thus alleviating liquidity pressures and stabilizing or even boosting stock prices. However, as companies become increasingly reliant on shadow banking, their financial structures and operational models may be affected, especially when high-risk projects encounter difficulties. These activities may lead to financial instability, causing significant fluctuations in stock prices. Additionally, the opacity of shadow banking may exacerbate concerns about a company's financial health, eroding investor confidence and intensifying stock price volatility. Therefore, the short-term financial benefits of shadow banking may translate into financial risks over the long term, increasing stock price volatility.

Regarding the market reaction mechanism, the complexity and lack of transparency in shadow banking activities make it difficult for investors to accurately assess a company's risk exposure, leading to information asymmetry and misvaluation of the company's worth. The uncertainty surrounding these activities heightens concerns about the company's future performance, particularly during periods of financial instability, where negative news can easily shake investor confidence and trigger sharp price fluctuations. Moreover, high-risk financial activities could adversely affect the company's core business, further eroding investor confidence and driving stock prices down. Ultimately, the price volatility of individual companies will be reflected in overall market volatility.

Based on the above analysis, this paper proposes Hypothesis 1: The shadow banking activities of non-financial listed companies increase the risk of stock price volatility and, in turn, exacerbate overall stock market volatility.

3.2. Shadow Banking Activities, Core Business Profit Margins, and Stock Price Volatility

The impact mechanism of shadow banking activities on the stock price volatility of non-financial listed companies can be explained through internal management mechanisms and market reaction mechanisms. First, shadow banking activities may lead to the reallocation of resources from core business operations to higher-risk shadow banking ventures, weakening the competitiveness and stability of the core business. This reallocation of resources may exacerbate fluctuations in core business profitability, thereby triggering stock price volatility. Since the stability of core business operations is a key indicator used by investors to assess a

company's risk, a decline in core business profit margins signals heightened operational risk, thereby increasing stock price volatility.

On the other hand, market participants typically assess a company's performance through its financial statements. Although shadow banking activities may generate additional revenue for the company in the short term, the underlying risks gradually become apparent, and the market remains cautious about the uncertainty and potential impact of these activities. If shadow banking activities lead to fluctuations in core business profitability, investors may reassess the company's risk profile, resulting in stock price volatility. Core business profit margins serve as a mediating variable that links shadow banking activities to stock price volatility, reflecting the market's response to the uncertainty surrounding the company's risk.

Based on this, the paper proposes Hypothesis 2: The profitability of the core business mediates the impact of shadow banking on stock price volatility, and this effect is further reflected in the overall volatility of the stock market.

4. Research Design

4.1. Sample Selection and Data Sources

This study selects non-financial listed companies on China's A-share market from 2011 to 2020 as the research sample. The initial sample is filtered through the following steps: First, companies in the financial and insurance sectors are excluded to ensure consistency in the analysis. Second, companies in ST (Special Treatment) and *ST status are removed to avoid the potential influence of abnormal financial conditions and stock price volatility on the results. Third, samples lacking key financial indicators are eliminated. Finally, to reduce biases caused by extreme values, all continuous variables are Winsorized at the 1% and 99% levels, resulting in a final sample of 24,669 observations. The data for this study primarily come from the Wind database and the China Stock Market & Accounting Research (CSMAR) database, with certain data—such as entrusted loans, loan terms, and related party transactions—manually collected.

4.2. Model Design

As indicated by the theoretical analysis above, shadow banking activities by non-financial listed companies increase the risk of stock price volatility and, consequently, contribute to overall stock market volatility. To test the above hypotheses, this paper uses stock price volatility as the dependent variable and shadow banking scale as the key independent variable, constructing the following basic model:

$$Volatility_{i,t} = \alpha + \beta Shadow_{i,t} + \gamma Control_{i,t} + \varepsilon_{i,t} \quad (1)$$

In this model, $Volatility_{i,t}$ represents the stock price volatility, $Shadow_{i,t}$ represents the shadow banking scale, and $Control_{i,t}$ represents the control variables. The subscript i denotes the listed company, and t denotes time. β is the coefficient of interest, representing the impact of shadow banking activities on stock price volatility in non-financial enterprises. If β is significantly positive, it indicates that the higher the degree of shadow banking activity, the higher the stock price volatility. Based on the theoretical analysis, β is expected to be positive.

4.2.1. Dependent Variable

The dependent variable in this study is stock price volatility.

Volatility is calculated using the variance of daily returns, which provides the measure of stock price volatility. The formula is as follows:

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (2)$$

$$\delta_i = \sqrt{\frac{\sum_{t=1}^N (R_t - R_{t-1})^2}{N-1}} * 250 \quad (3)$$

R_t represents the logarithmic return of stock investment on day t , P_t represents the stock market closing price of the investment on day t , P_{t-1} represents the stock market closing price of the investment on day $t-1$, and δ_i represents the annualized volatility of the daily returns of the stock investment in year i .

4.2.2. Key Independent Variable

To calculate the shadow banking scale (Shadow), this study follows the method of Li Jianjun and Han Xun (2019)[18], summing entrusted loans, entrusted wealth management, and private lending, then taking the natural logarithm of the total. The data on entrusted loans are manually collected from announcements by listed companies on the Shanghai and Shenzhen stock exchanges. Data on entrusted wealth management are sourced from the CSMAR database's China Overseas Investment sub-database, while private lending data, based on Jiang et al. (2010)[28], use "other receivables" from the balance sheets of listed companies as a proxy variable, also sourced from the CSMAR database.

4.2.3. Control Variables

To assess the impact of shadow banking activities on stock price volatility in non-financial listed companies, this study introduces several control variables, considering that stock price volatility may be influenced by a range of factors (Zhao Lingdi et al., 2022; Chen Qian and Zhang Hui, 2021; Li Zhisheng and Jin Ling, 2019)[29][30][31]. These control variables include firm size, debt-to-asset ratio, interest coverage ratio, return on equity, price-to-book ratio, among others.

5. Empirical Results and Analysis

5.1. Descriptive Statistics

Table 1 reports the descriptive statistics of the key research variables. It can be observed that the mean value of stock price volatility is 0.812, with a standard deviation of 0.506, indicating a considerable variation among different individual companies. The trend in the interquartile range (P25–P75) shows a gradual increase in stock price volatility. The core independent variable, the shadow banking scale, has a mean value of 16.922. The 25th percentile (P25) is 16.483, the 50th percentile (P50) is 18.802, and the 75th percentile (P75) is 19.927, with a standard deviation of 5.520. Additionally, the interquartile range (IQR) is 3.444, indicating significant differences in the degree of shadow banking among the middle 50% of companies. The median value is higher than the mean (16.922), and the gap between the 75th percentile and the median (19.927 - 18.802 = 1.125) is smaller than the gap between the 25th percentile and the median (18.802 - 16.483 = 2.319), indicating a right-skewed distribution in shadow banking data. This reflects that while some companies are heavily involved in shadow banking activities,

most companies have a moderate level of shadow banking participation. Furthermore, the descriptive statistics for the control variables are consistent with previous research,

suggesting that the selected sample in this study is representative.

Table 1. Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max	P25	P50	P75
Stock Price Volatility (Volatility)	24669	0.812	0.506	0.299	3.284	0.527	0.661	0.887
Shadow Banking Scale (Shadow)	24669	16.922	5.520	0.000	30.807	16.483	18.082	19.927
Firm Size (Size)	24669	22.230	1.301	19.895	26.263	21.295	22.033	22.956
Debt-to-Asset Ratio (Lev)	24669	0.439	0.202	0.062	0.909	0.281	0.432	0.589
Cash Flow Interest Coverage (InterestCov)	24669	39.785	137.577	-73.689	1,075.296	1.293	6.296	22.228
Return on Equity (Roe)	24669	0.070	0.135	-0.709	0.380	0.033	0.076	0.125
Price-to-Book Ratio (Pb)	24669	3.423	2.782	0.590	17.397	1.682	2.610	4.145
Current Ratio (Flow)	24669	2.243	2.088	0.295	13.341	1.117	1.601	2.512
Revenue Growth Rate (Growth)	24669	0.358	0.913	-0.661	6.290	-0.024	0.130	0.397
Ownership Type (Nature)	24669	0.373	0.483	0.000	1.000	0.000	0.000	1.000
Ownership Concentration (Top10)	24669	59.823	15.479	23.381	90.814	48.738	61.166	72.110
Institutional Ownership (In_investor)	24669	36.337	24.139	0.020	88.100	14.425	36.420	55.500

5.2. Basic Regression Results Analysis

In this study, we empirically examine the impact of shadow banking activities on stock price volatility for non-financial firms using a fixed-effects panel data model. To account for individual characteristics and their dynamic changes over time that may affect stock price volatility, both individual and time effects are controlled for in the model. To address potential heteroscedasticity issues, we employ clustered

robust standard errors in the model estimation. The regression results are presented in Table 2.

Based on the regression results in the table, the following conclusions can be drawn: After accounting for the panel fixed effects with different information sets, there is a positive correlation between the degree of shadow banking activities and stock price volatility for non-financial listed companies in China. In other words, an increase in the extent of shadow banking activities leads to higher stock price volatility.

Table 2. Basic Regression Results Analysis

	(1)	(2)	(3)
	Stock Price Volatility (Volatility)	Stock Price Volatility (Volatility)	Stock Price Volatility (Volatility)
Shadow Banking Scale (Shadow)	0.015***	0.012***	0.013***
	(22.722)	(17.818)	(18.247)
Firm Size (Size)		0.035***	0.021*
		(2.884)	(1.681)
Debt-to-Asset Ratio (Lev)		-0.293***	-0.243***
		(-6.098)	(-5.108)
Cash Flow Interest Coverage (InterestCov)		-0.000	-0.000
		(-0.148)	(-0.189)
Return on Equity (Roe)		0.174***	0.152***
		(6.488)	(5.768)
Price-to-Book Ratio (Pb)		0.035***	0.034***
		(14.832)	(14.543)
Current Ratio (Flow)		0.013***	0.010***
		(3.903)	(3.207)
Revenue Growth Rate (Growth)		0.005	0.004
		(1.212)	(0.915)
Ownership Type (Nature)			-0.055
			(-1.628)
Ownership Concentration (Top10)			0.004***
			(6.513)
Institutional Ownership (In_investor)			-0.000
			(-0.683)
Constant	0.359***	-0.405	-0.277
	(24.456)	(-1.483)	(-1.018)
N	24669	24669	24669
adj. R ²	0.327	0.350	0.353

Specifically, when no control variables are included but individual and year fixed effects are considered, the

coefficient of the shadow banking scale (Shadow) is 0.015, showing a positive correlation at the 1% significance level. After adding control variables, the coefficient of shadow banking decreases slightly to 0.012 but remains significant at the 1% level. The control variables overall have a significant impact on the results: the debt-to-asset ratio (Lev) significantly reduces stock price volatility, while the coefficients for company size (Size), price-to-book ratio (Pb), and current ratio (Flow) are significantly positive, indicating that these factors exacerbate stock price volatility.

After controlling for other factors influencing stock price volatility in listed companies, an increase of 1% in the degree of shadow banking is associated with a modest increase of 0.013% in stock price volatility. Given that the average and median stock price volatilities in our sample are 0.812% and 0.661%, respectively, the increase of 0.013% may seem relatively small, but the empirical results still confirm that shadow banking activities have a positive effect on stock price volatility, rather than mitigating it. In summary, shadow banking activities have a positive impact on stock price volatility.

5.3. Subgroup Regression Results Analysis

When non-financial companies invest heavily in shadow banking activities, they may develop a strong dependence on this area, which could lead to significant changes in their operational strategies and financial structures, thereby increasing their risk levels. Furthermore, if a company's shadow banking activities become too large, it may provoke investor concerns and affect their confidence in the company. These changes in corporate behavior, as well as the market's reaction to them, may contribute to greater stock price volatility.

To further explore the impact of shadow banking on stock price volatility, this study divides the sample into subgroups based on the degree of shadow banking. Companies with a shadow banking scale above the median are placed in one group, while those with a shadow banking scale below the median are placed in another group. Subgroup regression analysis is conducted, and the specific results are displayed in Table 3. This subgroup analysis allows for a deeper understanding of how different levels of shadow banking affect stock price volatility, and provides a more detailed analysis of investor attention and expectations.

The regression results indicate that for non-financial companies with smaller shadow banking activity scales, shadow banking activities have no significant effect on stock price volatility. However, for companies with larger shadow banking activity scales, shadow banking has a significant positive impact on stock price volatility, with an impact coefficient of 0.12, significant at the 1% level. This finding suggests that when the scale of shadow banking activities in non-financial companies reaches a certain level, the negative impact on investor confidence and financial stability begins to manifest, leading to increased stock price volatility. This may be due to the fact that larger-scale shadow banking activities increase financial leverage and credit risk, heightening investor concerns about the company's future profitability and stability, thereby raising the risk of stock price volatility.

In summary, both the baseline regression and subgroup regression results indicate that shadow banking activities generally increase stock price volatility in non-financial companies, but this effect is only significant in companies with a high degree of shadow banking activities.

Table 3. Basic Regression Results Analysis

	(1)	(2)
	Stock Price Volatility (Volatility)	Stock Price Volatility (Volatility)
Shadow Banking Scale (Shadow)	-0.006 (-1.141)	0.012*** (11.324)
Firm Size (Size)	0.040* (1.897)	0.038** (2.269)
Debt-to-Asset Ratio (Lev)	-0.215*** (-2.734)	-0.218*** (-3.697)
Cash Flow Interest Coverage (InterestCov)	0.000 (0.107)	-0.000 (-0.651)
Return on Equity (Roe)	0.220*** (5.179)	0.106*** (3.003)
Price-to-Book Ratio (Pb)	0.033*** (9.217)	0.034*** (10.652)
Current Ratio (Flow)	0.007 (1.236)	0.012*** (2.927)
Revenue Growth Rate (Growth)	0.003 (0.605)	0.007 (1.258)
Ownership Type (Nature)	0.008 (0.186)	-0.153*** (-3.432)
Ownership Concentration (Top10)	0.002*** (2.918)	0.004*** (4.433)
Institutional Ownership (In_investor)	-0.000 (-0.320)	-0.000 (-0.886)
Constant	-0.331 (-0.701)	-0.579 (-1.594)
N	12334	12335
adj. R ²	0.408	0.282

5.4. Mediation Effect Test

The impact of shadow banking on the stock price volatility of non-financial listed companies can be explained through internal management and market reaction mechanisms. On the one hand, investment in shadow banking activities may lead to resource reallocation, weakening the stability and profitability of core business operations, thereby increasing the volatility of the core business. On the other hand, market investors may be concerned about the high-risk nature of shadow banking activities, which affects their expectations of the company's performance and leads to stock price volatility. Therefore, this paper selects core business profit margin (RMOP) as the mediating variable and, based on the mediation effect analysis by Wen Zhonglin et al. (2004) [32], employs a stepwise regression method to construct a

mediation effect model. The model is expressed as follows:

$$Volatility_{i,t} = \alpha + \beta Shadow_{i,t} + \gamma Control_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$RMOP_{i,t} = \alpha + \theta Shadow_{i,t} + \omega Controls_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$Volatility_{i,t} = \alpha + \rho Shadow_{i,t} + \lambda RMOP_{i,t} + \nu Controls_{i,t} + \varepsilon_{i,t} \quad (6)$$

Table 4 tests whether the core business profit margin mediates the impact of shadow banking on stock price volatility in non-financial companies using a three-step method. Columns (1), (2), and (3) respectively present the regression results of the first, second, and third steps of the three-step method.

Table 4. Shadow Banking and Stock Price Volatility: The Mediating Role of Corporate Operating Performance

	(1)	(2)	(3)
	Stock Price Volatility (Volatility)	Core Business Profit Margin (RMOP)	Stock Price Volatility (Volatility)
Shadow Banking Scale (Shadow)	0.012*** (17.380)	-0.004*** (-39.985)	0.011*** (14.655)
Core Business Profit Margin (RMOP)			-0.268*** (-2.827)
Firm Size (Size)	0.012 (0.994)	0.004*** (3.768)	0.013 (1.075)
Debt-to-Asset Ratio (Lev)	-0.220*** (-4.712)	-0.010** (-2.278)	-0.222*** (-4.766)
Cash Flow Interest Coverage (InterestCov)	-0.000 (-0.427)	0.000 (1.174)	-0.000 (-0.398)
Return on Equity (Roe)	0.120*** (4.570)	0.046*** (13.991)	0.132*** (4.957)
Price-to-Book Ratio (Pb)	0.030*** (13.470)	0.000*** (2.746)	0.030*** (13.524)
Current Ratio (Flow)	0.011*** (3.347)	0.000 (0.230)	0.011*** (3.352)
Revenue Growth Rate (Growth)	0.003 (0.861)	-0.000 (-0.693)	0.003 (0.841)
Ownership Type (Nature)	-0.052* (-1.678)	-0.000 (-0.081)	-0.052* (-1.681)
Ownership Concentration (Top10)	0.004*** (6.782)	0.000*** (3.060)	0.004*** (6.838)
Institutional Ownership (In investor)	-0.000 (-0.930)	-0.000 (-1.425)	-0.000 (-0.963)
Constant	-0.060 (-0.233)	0.046** (2.083)	-0.048 (-0.186)
N	24127	24127	24127
adj. R ²	0.335	0.276	0.335

In column (1), the regression results do not include the core business profit margin, and the coefficient of shadow banking is significantly positive. In column (2), we test the relationship between core business profit margin and shadow banking, finding that the coefficient of shadow banking is

significantly negative at the 1% level. This indicates that shadow banking activities in non-financial companies may reduce core business profitability. In column (3), both the shadow banking variable and the core business profit margin variable are introduced simultaneously, and their coefficients

are both significant at the 1% level. The coefficient of shadow banking remains positive, while the coefficient of core business profit margin is negative. This suggests that core business profitability plays a mediating role in the impact of shadow banking on stock price volatility, but it is not a complete mediation effect. Specifically, as shadow banking scale increases, the core business profitability of non-financial listed companies declines, ultimately leading to increased stock price volatility.

5.5. Robustness Test

5.5.1. Instrumental Variables Method

The study of the impact of shadow banking activities on stock price volatility in non-financial listed companies may encounter endogeneity problems. These problems could include omitted variable bias, bidirectional causality, measurement error, sample selection bias, and dynamic panel bias. On one hand, certain unobserved or unconsidered variables could potentially affect both shadow banking activities and stock price volatility in non-financial companies. If these variables are not included in the model,

the estimation results could be biased. On the other hand, there may be an interaction between shadow banking activities and stock price volatility—participation in shadow banking could lead to stock price volatility, and conversely, stock price volatility might influence a company's decision to engage in shadow banking. To address the impact of endogeneity on empirical results, this study adopts an appropriate instrumental variable strategy to strengthen the validity of the estimates. Following the methods of Faccio et al. (2006) and Li Jianjun and Han Xun (2019)[33][18], the average scale of shadow banking activities of other non-financial firms in the same industry (Shadow_IV) is used as an instrumental variable for the core variable. This instrumental variable is significantly correlated with the shadow banking activities of the firm being studied, but theoretically, it should not directly influence the firm's other decision-making behaviors. Estimation is conducted using the two-stage least squares (2SLS) method, which aims to mitigate endogeneity bias and enhance the robustness and reliability of the estimates.

Table 5. 2SLS Regression Results

	(1)	(2)
	Shadow Banking Scale (Shadow)	Stock Price Volatility (Volatility)
Average Scale of Shadow Banking Activities in Other Non-Financial Firms in the Same Industry (Shadow_IV)	1.005***	
	(156.311)	
Shadow Banking Scale (Shadow)		0.014***
		(18.339)
Firm Size (Size)	0.875***	0.020
	(14.440)	(1.570)
Debt-to-Asset Ratio (Lev)	-0.532**	-0.233***
	(-2.324)	(-4.860)
Cash Flow Interest Coverage (InterestCov)	-0.000	-0.000
	(-0.002)	(-0.179)
Return on Equity (Roe)	-0.417***	0.159***
	(-3.741)	(6.007)
Price-to-Book Ratio (Pb)	-0.008	0.033***
	(-0.838)	(14.436)
Current Ratio (Flow)	0.055***	0.010***
	(3.292)	(3.069)
Revenue Growth Rate (Growth)	0.012	0.004
	(0.560)	(0.863)
Ownership Type (Nature)	-0.049	-0.054
	(-0.323)	(-1.624)
Ownership Concentration (Top10)	0.002	0.004***
	(0.895)	(6.564)
Institutional Ownership (In_investor)	0.001	-0.000
	(1.459)	(-0.766)
Constant	-19.614***	-0.272
	(-14.018)	(-1.000)
N	24669	24669
adj. R ²	0.860	

In regression (1), the application of the 2SLS method shows that the instrumental variable, Shadow_IV, effectively predicts the level of shadow banking activities in non-financial companies, demonstrating the suitability and validity of the instrumental variable. In the subsequent regression (2), after adjusting for endogeneity issues, the

results still indicate that shadow banking activities have a positive impact on stock price volatility for non-financial companies. Although the magnitude of the estimates and their statistical significance differ slightly, the positive direction of the impact remains consistent, aligning with the previous findings. By adopting the two-stage least squares method, this

study effectively addresses potential endogeneity issues, ensuring the robustness and credibility of the research results, and further supports the conclusion that shadow banking activities increase stock price volatility in non-financial companies.

5.5.2. Alternative Variables Method

There are various metrics for measuring stock price volatility. In this study, following Wei Longfei et al. (2021)[34], the standard deviation of the annualized daily logarithmic return was chosen as an alternative volatility measure. To further verify the robustness of the results, this paper introduces the annualized standard deviation of daily returns (Volatility2) and the annualized standard deviation of monthly logarithmic returns (Volatility3) as alternative volatility measures. In addition, to control for the potential impact of overall market conditions and company characteristics, we include the following control variables: company size (Size), debt-to-asset ratio (Lev), cash flow interest coverage ratio (InterestCov), return on equity (Roe),

revenue growth rate (Growth), institutional shareholding ratio (In_investor), price-to-book ratio (Pb), ownership concentration (Top10), ownership nature (Nature), and current ratio (Flow). These control variables help improve the reliability and explanatory power of the research results.

The regression results are shown in Table 6. Regressions (1) and (4) demonstrate that even when using the alternative dependent variables Volatility2 and Volatility3, the shadow banking scale remains positively correlated with stock price volatility, and the results are significant at the 1% level. After adding control variables in regressions (2), (3), (5), and (6), the results remain significant, and the signs of the coefficients are consistent with those from the initial regressions. This indicates that whether stock price volatility is measured using daily or monthly return standard deviations, the findings remain consistent, without significant changes. Therefore, even when different volatility measurement methods and various control variables are introduced, the conclusions of this study remain robust.

Table 6. Replacing the Dependent Variable

	(1)	(2)	(3)	(4)	(5)	(6)
	Annualized Standard Deviation of Daily Returns (Volatility2)	Annualized Standard Deviation of Daily Returns (Volatility2)	Annualized Standard Deviation of Daily Returns (Volatility2)	Annualized Standard Deviation of Monthly Log Returns (Volatility3)	Annualized Standard Deviation of Monthly Log Returns (Volatility3)	Annualized Standard Deviation of Monthly Log Returns (Volatility3)
Shadow Banking Scale (Shadow)	0.016*** (20.781)	0.013*** (14.172)	0.014*** (14.582)	0.009*** (23.245)	0.008*** (16.965)	0.008*** (17.839)
Firm Size (Size)		0.030* (1.818)	0.017 (1.073)		0.035*** (4.161)	0.036*** (4.189)
Debt-to-Asset Ratio (Lev)		-0.299*** (-4.741)	-0.254*** (-4.204)		-0.139*** (-3.837)	-0.133*** (-3.828)
Cash Flow Interest Coverage (InterestCov)		-0.000 (-0.855)	-0.000 (-0.879)		-0.000 (-1.226)	-0.000 (-1.207)
Return on Equity (Roe)		0.275*** (3.496)	0.255*** (3.218)		0.083*** (3.536)	0.086*** (3.429)
Price-to-Book Ratio (Pb)		0.046*** (10.440)	0.045*** (10.008)		0.042*** (13.383)	0.043*** (13.180)
Current Ratio (Flow)		0.013*** (2.787)	0.011** (2.386)		0.002 (0.763)	0.001 (0.440)
Revenue Growth Rate (Growth)		0.008 (1.196)	0.007 (1.026)		0.009* (1.686)	0.009 (1.604)
Ownership Type (Nature)			-0.052 (-0.747)			0.019 (0.440)
Ownership Concentration (Top10)			0.003*** (4.095)			0.001 (1.524)
Institutional Ownership (In_investor)			-0.000 (-0.916)			-0.002*** (-6.154)
Constant	0.342*** (19.487)	-0.340 (-0.959)	-0.226 (-0.642)	0.385*** (36.466)	-0.456** (-2.482)	-0.468** (-2.557)
N	24669	24669	24669	24641	24641	24641
adj. R ²	0.232	0.255	0.256	0.131	0.169	0.173

6. Research Conclusion and Implications

Non-financial enterprises' participation in shadow banking activities opens new funding channels and profit opportunities, but it also introduces potential risks. The opacity and lack of regulation in shadow banking can exacerbate the fragility of the financial system, increasing systemic risk. Chinese regulatory authorities have strengthened oversight of shadow banking to maintain financial stability. Non-financial listed companies engaging in shadow banking activities may divert attention from core business operations and increase leverage, thereby posing a threat to stock market stability, which necessitates careful management.

Based on data from non-financial listed companies on the Shanghai and Shenzhen A-share markets from 2011 to 2020, the empirical analysis in this study indicates that the expansion of shadow banking activities generally increases stock market volatility, with core business profit margins playing a mediating role in this relationship. Further analysis reveals that this effect is more pronounced in companies with a higher degree of shadow banking involvement. This provides a new perspective on the impact of shadow banking activities on stock market volatility and offers guidance for regulatory policy and corporate risk management.

This study fills a theoretical gap and provides valuable references for policy formulation and corporate risk management. The results not only enrich the theoretical and empirical data but also offer practical insights for investor decision-making and corporate strategic planning, helping optimize capital structures and enhance market competitiveness.

Acknowledgments

May you always stay gold, pony boy.

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