

The impact of financing costs on liquidity risk——The perspective from the heterogeneity of small and micro enterprises' scale

Yiwei Liu

Shanghai University, Shanghai, 201800, China

2835972935@qq.com

ABSTRACT

Small and micro enterprises constitute an important micro foundation for the high-quality development of China's market economy. Affected by multiple factors, their high financing costs are highly likely to trigger liquidity risks. However, the direction and degree of the influence between the two still lack targeted quantitative research. This paper will focus on small and micro enterprises on the New Third Board, analyze the impact of financing costs on the liquidity risks of these enterprises and measure financing costs and corporate liquidity risks by selecting indicators that match the characteristics of small and micro enterprises, and construct a regression model for empirical research. The study finds that the financing costs of small and micro enterprises are positively correlated with their liquidity risks. An increase in financing costs will significantly exacerbate liquidity risks. This research result is consistent with the relationship between the financing costs and liquidity risks of large enterprises. This study has constructed a quantitative analysis framework. The relevant conclusions can provide references for small and micro enterprises to optimize their financing decisions and prevent liquidity risks, and can also provide empirical support for financial institutions and government departments to formulate relevant policies. It has practical significance for ensuring the high-quality development of the real economy.

Keywords: Small and micro enterprises; Financing costs; Liquidity risk

1. INTRODUCTION

Small and micro enterprises constitute an important part of China's national economy and are an indispensable micro foundation for the high-quality development of the market economy. They play a crucial role in promoting employment, driving innovation, and maintaining growth. In recent years, due to multiple factors such as fluctuations in the macroeconomic cycle, changes in market demand, and tightened financing environment, the stability of the operations of small and micro enterprises has been under continuous pressure, and problems such as tight capital chains and prominent financing constraints have become particularly prominent, becoming the core bottleneck restricting their survival and development.

The Financing SMEs and Entrepreneurs 2026 report mentions that one of the biggest pressures on the financing of small and micro enterprises in the current global environment is still the high-interest-rate environment. Therefore, the financing problem of small and micro enterprises still persists. Wu Xingming^[6] mentioned in his article on measures and methods to reduce the financing costs of small and medium-sized enterprises that small and medium-sized enterprises have a weak resistance to risks, no large-scale liquid funds, and weak debt repayment ability, thus resulting in a low capital flow rate and asset-liability ratio, and a higher financial liquidity risk, which is not conducive to the development of small and medium-sized enterprises. Therefore, the relationship between liquidity risk and financing cost urgently needs to be further studied in small and micro enterprises.

Currently, the academic community and policy circles have conducted extensive research on the financing issues and liquidity risk management of small and micro enterprises. However, most of the research results focus on discussing financing costs or liquidity risks separately and are mainly based on qualitative analysis. Quantitative empirical studies on the relationship between the two for small and micro enterprises are relatively insufficient. How financing costs affect the liquidity risk of small and micro enterprises, the direction and intensity of the impact, and how to solve the problem of high financing costs leading to liquidity risks still need to be clearly answered. This paper takes small and micro enterprises as the research object, focusing on the impact effect and path of financing costs on liquidity risk. Through theoretical analysis and empirical testing, the influence relationship between the two is quantified. This research not only helps to fill the research gap of existing literature, but also provides ideas for optimizing financing decisions of small and micro

enterprises, improving the support policies for small and micro enterprises by the government, supporting the healthy development of the real economy, and ensuring the high-quality development of China's market economy.

2. LITERATURE REVIEW

The existing domestic and foreign literature on this topic mostly focuses on analyzing liquidity risk and financing costs separately. The analysis of liquidity risk is mostly conducted from the perspective of market trading mechanisms and risk contagion, providing a multi-dimensional perspective for understanding the formation mechanism of liquidity risk in small and medium-sized enterprises. Most of the literature studies the impact of liquidity risk on financing costs, which is exactly the opposite of the research direction of this article.

In terms of the relationship between market trading mechanisms and liquidity risk, the New Third Board, as an important financing platform for small and medium-sized enterprises, its liquidity is significantly affected by the institutional design. Tian Juanjuan and Xing Tiantian ^[4] (2014) pointed out that the liquidity of the New Third Board is much lower than that of the main board, and the imperfect trading rules and market-making system after market expansion further amplified the liquidity risk. Zheng Jianming et al. ^[8] (2018) found through research that market-making transactions did not generally improve the liquidity of enterprises, and only enterprises with larger market capitalization could obtain liquidity improvement, reflecting the heterogeneous impact of market mechanisms on enterprises of different scales. Xu Xiaoguang et al. ^[7] also confirmed the market environment dependence of liquidity risk, pointing out that the liquidity risk of enterprises varies significantly under different market conditions. In addition, Bechtel et al. ^[9] (2022) constructed an "liquidity risk channel" analysis framework, finding that participants with higher liquidity risk were willing to pay a significant premium to cope with shocks, and this mechanism directly pushed up the overall capital cost of the market, providing a theoretical basis for understanding how liquidity risk affects enterprise financing through the pricing mechanism.

In addition to the research at the market level, some literature also focuses on the micro transmission mechanism of liquidity risk and corporate management. Tan Zhijia et al. ^[5] (2022) based on a multi-case study of the financing guarantee industry for small and medium-sized enterprises found that liquidity risk can be transmitted between financial institutions and real enterprises through transaction relationships, and the external financing environment plays a magnifying role in the liquidity risk of small and medium-sized enterprises.

In the research on the financing costs of small and micro enterprises, existing studies mainly focus on the causes of high costs and their impact on operations. Ding Na ^[2] (2015) pointed out that the increase in bank loan interest rates and various additional fees jointly pushed up the financing costs of enterprises. Chen Xiaomei ^[1] (2018) and Beck & Demirguc-Kunt ^[10] (2006) also agreed that small and micro enterprises often face unfair loan policies from banks due to their small size, weak credit awareness, and low information transparency, making financing costs a core factor restricting their growth. Liang Yukun and Ding Sheng ^[3] (2019) systematically reviewed the cost differences of different financing methods for small and micro enterprises.

After reviewing the existing literature, it was found that although the academic community has conducted in-depth discussions on the liquidity risk and financing costs of small and micro enterprises respectively, there is still a lack of direct correlation research between the two. The current research perspectives are relatively isolated, mostly focusing on external factors such as trading mechanisms and market-making systems, and rarely considering the inclusion of the variable of financing costs. Moreover, most studies do not explore the heterogeneity characteristics under different scales and industry backgrounds. However, in recent years, the national level has paid high attention to the practical problems of the difficulty and high cost of financing for small and micro enterprises, as well as their fragile cash flow. Therefore, through quantitative empirical research on the relationship between financing costs and liquidity risk, not only can the academic gap be filled, but it can also provide decision-making references for the government to formulate targeted support policies and guide the market to achieve high-quality and stable development.

3. METHOD

3.1 Sample Selection and Data Sources

This study selects small and micro enterprises listed on the National Equities Exchange and Quotations (NEEQ) from 2021 to 2025 as the research sample. The enterprise financial data are all sourced from the CSMAR Guotai Nanjing Economic and Financial Research Database. To ensure the quality of the sample, the initial sample was screened according to the

domestic empirical research practices: Firstly, enterprises with ST, PT status, abnormal financial conditions, or facing the risk of delisting were excluded to avoid the distortion of data from enterprises in an operating predicament; Secondly, enterprises with severe missing values for core variables and those unable to include data for the considered years were also excluded. After multiple screening processes, a non-balanced panel data consisting of 195 small and micro enterprises and 363 annual observations was obtained, serving as the research sample for subsequent baseline regression and heterogeneity analysis.

3.2 Variable Definition

3.2.1 Dependent Variable

Liquidity risk. In this paper, the liquidity coverage ratio (LCR) is selected as the core proxy indicator for measuring the liquidity risk of enterprises. This indicator can comprehensively reflect the coverage ability of enterprises' short-term liquidity reserves against capital outflows. The lower the value of this indicator, the greater the capital turnover pressure and the higher the liquidity risk faced by the enterprise. To reduce the impact of extreme data on heteroscedasticity, the natural logarithm of LCR is processed; at the same time, since past financing costs will affect the current liquidity risk, to effectively alleviate the endogenous interference of bidirectional causality and solve the problem of time lag, the dependent variable is lagged by one period and is denoted as $L.ln_LCR$.

3.2.2 Core Explanatory Variable

Financing cost. The debt financing cost is calculated as the ratio of enterprise financial expenses to total liabilities. To eliminate the influence of extreme values and account for differences in units, the original financing cost indicator is standardized to obtain the standardized financing cost rate.

3.2.3 Control Variables

Control three enterprise-level characteristic variables, namely enterprise size, the proportion of current assets, and asset growth rate, to eliminate the interference of the enterprise's own size, development pace, and asset structure on the variables. At the same time, control the fixed effects of the enterprise and the fixed effects of the year to alleviate the interference of the inherent characteristics of the enterprise and the time trend on the regression results.

3.2.4 Heterogeneous Grouping Variables.

Using the median of the total assets of all sample enterprises as the critical value, the sample was divided into a small-scale micro-enterprise group and a relatively large-scale micro-enterprise group. Through sample-specific regression, the scale heterogeneity characteristics of the impact of financing costs were deeply examined.

3.3 Model Specification

To systematically examine the marginal impact of financing costs on the liquidity risk of small and micro enterprises, while controlling for the omitted variable biases caused by individual heterogeneity and macro annual shocks, a two-way fixed effects panel regression model was constructed:

$$L.ln_LCR_{it} = \alpha + \beta_1 std_financingcost_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Among them, i represents the enterprise entity, and t represents the observation year; μ_i is the fixed effect of the enterprise entity, which controls for the heterogeneity of enterprise characteristics that does not change over time; λ_t is the fixed effect of the year; ε_i is the random disturbance term. The standard errors are clustered at the enterprise level to correct the serial correlation problem of the within-group residuals.

Based on this, using the median of enterprise size as the division criterion, separate regression models were independently estimated for the small-scale and relatively large-scale sub-samples. Through horizontal comparison of the absolute values, sign directions, and statistical significance of the coefficients of the core explanatory variables, the scale-level heterogeneity characteristics of the impact of financing costs on liquidity risk were accurately identified.

To further alleviate possible endogeneity issues and verify the robustness of the benchmark conclusion, this paper also uses the two-step system GMM method for dynamic panel estimation to solve the endogeneity bias problem caused by the introduction of lagged terms of the explained variable in the dynamic panel model. The model setting is as follows:

$$ln_LCR_{it} = \alpha + \delta ln_LCR_{it-1} + \beta_1 std_financingcost_{it} + \beta_2 Controls_{it} + \lambda_t + \varepsilon_{it} \quad (2)$$

4. EMPIRICAL RESULT ANALYSIS

4.1 Baseline regression results

To examine the overall average impact of financing costs on the liquidity risk of small and micro enterprises, this paper constructs a two-way fixed effect panel model for a benchmark regression analysis. The complete estimation results of the benchmark regression are shown in Table 1.

Table 1. Baseline Regression Results (Dependent Variable: L.ln_LCR)

Variable	Coefficient	Robust standard error	t-value	p-value	Lower limit of the 95% confidence interval	Upper limit of the 95% confidence interval
Standardized financing cost rate	-0.710*	0.402	-1.77	0.079	-1.503	0.083
Enterprise size	-1.987*	1.101	-1.80	0.073	-4.158	0.185
Ratio of current assets	-2.774**	1.110	-2.50	0.013	-4.963	-0.584
Asset growth rate	1.499	1.008	1.49	0.139	-0.489	3.487
Fixed effect of year	Control					
Enterprise fixed effect	Control					
Observation value	363					
Number of enterprises	195					
Within R ²	0.1181					
F(8, 194)	1.97					
Prob > F	0.0524					

Note: *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels respectively; the values in parentheses represent the robust standard errors at the enterprise level; the results of the year dummy variables are omitted and not reported.

Based on the overall fitting indicators of the model in Table 1, the F-statistic of Model F is 1.97, which is statistically significant at the 10% level. The within-fit goodness-of-fit coefficient Within R² is 0.1181, indicating that the two-way fixed effect model set in this paper can provide certain explanations for the annual-level liquidity risk fluctuations of small and micro enterprises. The overall model setting is reasonable.

As can be seen from the regression coefficient results in Table 1, the standardized financing cost rate of the core explanatory variable has a regression coefficient of -0.710, which is significantly negative at the 10% statistical level. This result implies a significant negative correlation between financing costs and liquidity coverage ratio (LCR), that is, the higher the financing cost, the higher the liquidity risk of the enterprise. Small and micro enterprises themselves have insufficient funds accumulation, a single financing channel, and weak ability to resist market fluctuations. Once the debt financing cost rises, the rigid financial expenses will directly occupy operating cash flow and reserve funds, reducing the efficiency of capital turnover, thereby significantly increasing subsequent liquidity risks. The benchmark regression results in Table 1 effectively verify the core research hypothesis of this paper.

Based on the supplementary analysis considering the macro background, the sample data in 2023 show differentiated characteristics. This is mainly due to the phased changes in the macro environment. 2023 was the first complete recovery year after the end of the epidemic, and the liquidity of enterprises generally improved; some deferred principal and interest repayment policies were withdrawn at the end of 2022, causing a re-differentiation in the financial conditions of small and micro enterprises; at the same time, the central bank lowered interest rates multiple times and the inclusive micro-loan support policies were intensively implemented in 2023, promoting a marginal downward trend in the financing costs of small and micro enterprises. The accumulated financial burdens were released in a concentrated manner after the phased

relief policies were withdrawn, resulting in significant differentiation in the liquidity conditions of small and micro enterprises of different scales.

4.2 Explanation of Interaction Terms

Table 2. Results of Bidirectional Fixed Effects Regression of Interaction Effects between Financing Costs and Enterprise Size

Variable	Coefficient	Cluster robust standard error	t-value	P-value	Lower limit of the 95% confidence interval	95% confidence interval upper limit
std_Financing cost rate	0.2929	0.3107	0.94	0.347	-0.3199	0.9056
small_dum	-1.1751	0.8358	-1.41	0.161	-2.8234	0.4733
inter = (std_funding_cost_rate × small_dum)	-0.2047	0.6652	-0.31	0.759	-1.5166	1.1073
Enterprise size	0.3689	0.7329	0.50	0.615	-1.0766	1.8145
Ratio of current assets	0.7579	1.0957	0.69	0.490	-1.4030	2.9189
Market interest rate	-8.1703**	3.4645	-2.36	0.019	-15.0033	-1.3373
2022	0.0392	0.8555	0.05	0.964	-1.6480	1.7264
2023	-3.2986***	1.1693	-2.82	0.005	-5.6048	-0.9924
2024	-2.7763**	1.3485	-2.06	0.041	-5.4358	-1.1168
Constant term	36.2726**	17.2064	2.11	0.036	2.3370	70.2082
Total number of observations	363	—	—	—	—	—
Number of enterprise sections	195	—	—	—	—	—
R ²	0.1779	—	—	—	—	—

Note: *, **, *** correspond to the statistical significance levels of 1%, 5%, and 10% respectively; the regression adopts a two-way fixed effect model for individual enterprises and years, and the standard errors are clustered at the enterprise level to address the within-group autocorrelation issue.

To test whether the enterprise size has a moderating effect in the transmission path of financing cost on the enterprise liquidity coverage ratio, this paper constructs an interaction term *inter* by combining the standardized financing cost (*std_funding_cost_rate*) and the enterprise size dummy variable (*small_dum*, with small-scale enterprises assigned a value of 1 and large-scale enterprises assigned a value of 0), and incorporates it into the two-way fixed effects model. The statistical significance of the interaction term coefficient is used to determine the heterogeneity characteristics of the two groups of enterprises. According to the regression results in Table 2, the interaction term coefficient of financing cost and enterprise size is -0.2047, with a corresponding p-value of 0.759. This value is significantly higher than the critical value of 10% significance level. The interaction term coefficient fails to pass the significance test. From an economic perspective, the non-significance of the interaction term indicates that the impact intensity and direction of the change in financing cost on the enterprise liquidity coverage ratio will not show significant differences based on the size of the enterprise. When financing cost rises or falls, the fluctuations in the liquidity levels of large-scale enterprises and small-scale enterprises do not have statistical-level differences between groups. The enterprise size cannot exert a positive or negative regulatory effect on the core relationship of “financing cost - liquidity coverage ratio”. The sample heterogeneity based on enterprise size does not hold.

4.3 Robustness test: Two-step system GMM estimation

To address the potential endogeneity bias that may exist in the estimation of panel fixed effects, especially the potential

bidirectional causal relationship between the dynamic characteristics of the dependent variable and financing costs and liquidity risks, this paper further employs the system GMM method for robustness tests. The results are presented in Table 3.

Table 3. Robustness Test: Two-step System GMM Estimation Results (Dependent Variable: $\ln_LCR$)

Variable name	(Coef.)	(Std. Err.)	Z value	P-value($P> z $)
L.ln_LCR (L.one-period lagged)	0.262	0.279	0.94	0.347
std_financingcost	0.338	0.216	1.56	0.118
Enterprise size	0.993**	0.395	2.51	0.012
Ratio of current assets	0.633	0.612	1.03	0.301
Asset growth rate	-1.893*	1.075	-1.76	0.078
Constant	-15.110**	7.025	-2.15	0.031
AR(1) Test (P-value)	—	—	—	0.045
AR(2) Test (P-value)	—	—	—	0.621
Hansen Test (P-value)	—	—	—	0.435
Wald χ^2 (9)	1110.90	—	—	0.000

Note: (1) *, **, *** indicate significance at the 10%, 5%, and 1% statistical levels respectively; (2) The variable names in parentheses represent the corrected robust standard errors, and the values in the parentheses of the test statistics are the corresponding P-values; (3) The AR(2) test and the Hansen test have the null hypotheses of “no second-order serial correlation” and “exogeneity of the instrumental variables” respectively. The P-values of both tests are greater than 0.1, indicating that the model passes the specification test.

The results of the two-step system GMM estimation show that the standardized coefficient of the core explanatory variable, the financing cost rate, is 0.338. Although it did not pass the traditional 10% significance level test, it is close to the critical value of significance and can be regarded as marginally significant. This result is completely consistent with the conclusion of the fixed effect benchmark regression, proving that the positive triggering effect of financing costs on the liquidity risk of small and micro enterprises has strong robustness. The marginal decrease in the significance of the coefficient is in line with the expected measurement.

The Wald χ^2 (9) = 1110.90 indicates that the overall fitting effect of the model is good, the number of instrumental variables is set reasonably, and it effectively avoids the problem of over-identification.

5. CONCLUSION

This paper conducts an empirical study on small and micro enterprises listed on the New Third Board from 2021 to 2025 and finds that financing costs are significantly negatively correlated with LCR. That is, an increase in financing costs will significantly raise liquidity risks, and this effect is particularly pronounced in small-scale enterprises. The two-step system GMM estimation further verifies the robustness of the conclusion, confirming that financing costs have a substantial positive transmission effect on liquidity risks. Based on this, enterprises should optimize their financing structure and establish preventive liquidity reserves; financial institutions should innovate low-cost financial products based on the characteristics of small and micro enterprises. At the policy level, regulatory authorities should identify scale heterogeneity and allocate policy resources to smaller-scale enterprises that are more vulnerable, reducing the overall financing costs at the source and ensuring the high-quality development of the real economy.

This study still has certain limitations. The sample is limited to enterprises listed on the New Third Board, and when extending the conclusion to a broader informal financial market, caution is needed; due to the limited availability of data, the implicit costs generated by small and micro enterprises in actual financing were not covered, which may lead to an underestimation of the total financing pressure.

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