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Financing constraints, financial flexibility and firm performance: Based on empirical data of listed A-share listed companies in Shanghai and Shenzhen enterprises in China

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Abstract: This paper investigates the concept of financial flexibility within the frameworks of financing hierarchy theory and agency theory. It analyzes the intricate relationships among financing constraints, financial flexibility, and firm performance, proposing an integrated research model to elucidate their interdependencies. Specifically, this study delves into the internal mechanisms through which financing constraints influence firms' capacity to sustain financial flexibility, particularly the utilization of operational cash flows as reserves under varying levels of financial constraints. Furthermore, the study reveals that financial flexibility exerts a significant yet context-dependent impact on firm performance. The extent of this impact is moderated by the degree of financing constraints, with higher levels of constraints amplifying the positive effect of financial flexibility on performance. These findings enrich the existing literature by offering fresh insights into how financing constraints shape firms' financial decisions and overall performance. The study emphasizes the importance of financial flexibility as a dynamic factor that varies in its impact based on the external financial environment and provides practical implications for managers aiming to optimize their firms' financial strategies.

Keywords: *Enterprise performance, Financial flexibility, Financing constraints, Interval effect.*

1. Introduction

The Financial Accounting Standards Board (FASB) defines financial flexibility as a company's capacity to take effective actions to adjust the amount and timing of cash flows in response to unforeseen future needs and opportunities. Byoun [1] shares a similar perspective, stating that financial flexibility represents a firm's ability to mobilize financial resources to address future uncertainties. Bereżnicka [2] highlights the financing dimension of financial flexibility, asserting that it refers to an enterprise's capability to access financing channels and adjust its capital structure. Western academic literature tends to define financial flexibility from the perspective of "mode of use," emphasizing its functional utility. In contrast, domestic research often conceptualizes financial flexibility as a comprehensive regulatory ability, focusing on its role within the broader financial management system. Zhan Zhewei [3] argues that financial flexibility is the overall capacity of the financial system to adapt to dynamic environmental changes, optimize the allocation of financial resources, and effectively manage financial risks.

Early investigations into financial flexibility were dispersed across the literature on capital structure. Foreign scholars have conceptualized financial flexibility in terms of two dimensions: excess cash reserves and low leverage. Based on the financing sequence theory proposed by Chang, et al. [4] companies should maintain adequate cash reserves under normal circumstances to avoid issuing equity at undervalued stock prices, thereby preventing the loss of favorable investment opportunities due to insufficient liquidity. Gounopoulos and Zhang [5] demonstrated that firms typically hold cash reserves above target levels in scenarios of inadequate cash flow or high external financing costs, ensuring

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sufficient funds for investment expenditures. Al Abbadi [6] revealed that when investment spending rises or earnings decline, low-leverage firms tend to experience a significant increase in long-term debt. [7]; Bereżnicka [2]; Byoun [1] and Arslan-Ayaydin, et al. [8] advocate for the integration of high cash reserves and low leverage as an overarching financial flexibility strategy, emphasizing that prior studies overlooked the intrinsic relationship between these two dimensions.

Li, et al. [9] put forward the financing constraint hypothesis, believing that the imperfect capital market leads to the difference in the internal and external financing costs of enterprises, and enterprises are faced with the trouble of financing constraint. The investment expenditure of enterprises with severe financing constraints has significant positive sensitivity to internal cash flow. However, Beladi, et al. [10] using different classification methods of financing constraints and the same sample, drew the opposite conclusion to Li, et al. [9] that companies with lower financing constraints have higher investment-cash flow sensitivity. It can be seen that financing constraints are not the only factor affecting investment-cash flow sensitivity. Ağca and Mozumdar [11] test the motivation of "abnormal" behavior and find that Chinese listed companies generally maintain high investment-cash flow sensitivity. Companies with small scale, low dividend payout ratio and low proportion of state-owned shares are prone to underinvestment, and the investment-cash flow sensitivity is mainly affected by financing constraints. Companies with large scale, high dividend payout ratio and high proportion of state-owned shares tend to over-invest, and the investment-cash flow sensitivity is mainly affected by the agency problem. It is concluded that the investment-cash flow sensitivity varies according to the characteristics of the company.

Lozano and Yaman [12] conducted an empirical study on cash flow sensitivity, revealing that firms subject to financing constraints need to withdraw more cash from their cash flows to enhance liquidity and establish reserve funds for future investments. The study also demonstrated a significantly positive sensitivity between cash holdings and internal cash flows. Palkar [13] empirically examined the sensitivity of cash to cash flow fluctuations, finding that firms with low financing constraints exhibited no significant relationship between cash reserves and cash flow volatility, whereas firms with high financing constraints showed a significantly positive correlation between cash and cash flow sensitivity. Ferrando, et al. [14] research further indicates that financially flexible firms typically adopt a low financial leverage policy, which facilitates their access to capital markets for fundraising and enables them to capitalize on favorable investment opportunities.

Financial flexibility can prevent adverse shocks and seize investment opportunities, thereby improving corporate performance. Fahlenbrach, et al. [15] found that during the global financial crisis, financial flexible companies had more frequent capital calls and investment expenditures, which greatly reduced the risk of companies falling into financial crisis, and the performance of such companies in the next two years was significantly improved. Ferrando, et al. [14] found that financial flexibility helps improve the long-term performance of companies. They studied the financial flexibility of companies in different time Windows and found that companies with high financial flexibility showed higher investment efficiency over time. However, greater financial flexibility is not always better. Bereżnicka [2] analyze the value of financial flexibility based on cash holdings. They found that when a company has external financing costs, the increase in cash holdings can increase the value of the company, until the financial flexibility value brought by cash holdings approaches the value when only the internal financing costs are involved.

2. Theoretical analysis and research hypothesis

2.1 Theoretical Basis

According to the financing priority theory, the high cost of external financing may cause companies to forgo valuable investment opportunities, potentially leading to financial distress. Enterprises with cash reserves face less pressure from external financing and are better positioned to seize investment opportunities, aligning with the expectations of the financial flexibility theory. In contrast to the

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financing priority theory, the financial flexibility theory underscores that maintaining financial flexibility is a proactive strategy to address future adverse shocks and capitalize on favorable investment opportunities. Consequently, a company that maintains financial flexibility is not necessarily one experiencing financial constraints. Moreover, the relatively low financial leverage levels observed among most listed companies in China can be explained by the trade-off theory, considering both the tax shield effect and bankruptcy costs. While maintaining an appropriate debt ratio can yield tax savings benefits, excessive debt may result in financial difficulties. Nevertheless, the trade-off theory fails to fully explain why well-managed firms maintain low financial leverage. Garmaise and Natividad [16] believe that this is because a company's debt level is not only affected by the tax shield effect and bankruptcy costs, but also maintains a low debt scale in order to improve its future debt financing ability.

Lozano and Yaman [12] built a model that innovatively analyzed cash-cash flow sensitivity from an empirical perspective. Regression results show that financing constraints are positively correlated with cash-cash flow sensitivity. Byoun [1] found through empirical test that companies use internal cash flow to retain the remaining debt capacity, and financial flexibility is a resource with lower holding cost. Therefore, companies frequently allocate a portion of their internal cash flow to maintain financial flexibility, including both cash and debt flexibility, in order to address financial crises and capitalize on investment opportunities. The issue of financial flexibility—cash flow sensitivity—is rooted in the problem of cash-cash flow sensitivity. The more severe the financing constraints, the more likely firms are to utilize internal cash flow to preserve financial flexibility. On the one hand, firms enhance cash flexibility by increasing their cash reserves. On the other hand, they improve future debt capacity by partially repaying existing liabilities. Based on this reasoning, Hypothesis 1 is proposed.

H1: The company's financial flexibility reserve is affected by financing constraints, and financial flexibility - cash flow sensitivity is positively correlated with the degree of financing constraints.

The financial flexibility of corporate reserves will affect corporate performance. According to the theory of financing order, maintaining a high degree of financial relaxation, increasing cash holdings and debt redundancy are conducive to grasping good investment opportunities and improving economic benefits. Financial flexibility includes, but is not limited to, financial relaxation. The uncertainty of the external environment brings uncertainty to the company's strategy and business decision making, which is easy to cause the company's financial fluctuation. The imperfection of the capital market causes the company to face the trouble of financing constraints, and financial flexibility can play a alleviating role in it, and play the "buffer effect" of financial flexibility. Magerakis, et al. [17] believe that the company's project investment with higher adjustment cost should be replaced by those with stronger liquidity and lower adjustment cost, while the financial flexibility has lower adjustment cost between storage and release. Companies with higher financial flexibility can call the required funds or borrow liabilities in a timely manner to ensure the continuity of project investment and prevent the loss of company value.

However, excessive financial flexibility may readily result in agency problems. According to agency theory, the objective functions of owners and managers are not aligned. While owners aim to maximize corporate value, managers may prioritize personal interests, leading to self-serving behaviors that trigger the "agency effect" of financial flexibility. On one hand, although maintaining low debt levels can mitigate financial risks for a company, it simultaneously weakens the stringent constraints on managerial behavior. Due to the inherent obligation of debt repayment, creditors possess the authority to initiate judicial procedures if timely repayments are not made, thereby directly threatening managerial control. A low debt level, however, diminishes this hard constraint, potentially encouraging self-serving actions by managers and negatively impacting corporate performance. On the other hand, managers may prefer to retain substantial cash reserves for personal gain. Yet, high cash holdings are prone to resource misallocation, making it challenging for external investors to effectively monitor potential asset erosion or transfer by corporate managers. Moreover, large cash reserves may lead

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managers to become overly optimistic, resulting in suboptimal decision-making that ultimately harms corporate performance.

Therefore, the author believes that the higher the financial flexibility is not the better, moderate financial flexibility plays a positive buffer effect, improve the performance of the company; However, excessive financial flexibility may produce negative agency effect, and then damage the performance of the company. Accordingly, hypothesis 2 is proposed.

H2: There is an inverted U-shaped relationship between financial flexibility and corporate performance.

As financial flexibility increases, its marginal contribution to firm performance diminishes. However, financing constraints serve as a buffer, causing the marginal contribution of financial flexibility to decline at a slower rate. Moreover, financing constraints partially mitigate the agency effect of financial flexibility, thereby constraining managers' self-interests through external environmental factors. Consequently, financing constraints enhance the buffering effect of financial flexibility while weakening its agency effect, leading to a more moderate impact on corporate performance and delaying the attainment of equilibrium in financial flexibility. Based on these considerations, Hypothesis 3 is proposed.

H3: The higher the financing constraint, the smoother the inverse U-shaped relationship between financial flexibility and corporate performance, and the equilibrium point shifts to the right.

3. Methodology

3.1. Data Source and Sample Selection

The author selects A-share listed companies in Shanghai and Shenzhen from 2018 to 2023 as research samples. To mitigate the impact of outliers, the analysis excludes firms in the financial and insurance sectors. Additionally, ST and *ST listed companies are removed for each year within the study period. Samples with missing data are also excluded to ensure data integrity. Furthermore, companies issuing B-shares and H-shares concurrently are omitted to maintain a consistent financial environment. Given that the incremental calculation of financial flexibility requires upward data, the actual study interval is adjusted to 2019–2022, resulting in a total of 4,496 sample observations. To minimize the influence of extreme values on regression results, all variables are Winsorized at the 1st and 99th percentiles. Industry classification adheres to the guidelines provided by the China Securities Regulatory Commission (CSRC). All financial data are sourced from the Wind Financial Database, and statistical analyses are conducted using Stata 12.0.

3.2. Model Design and Variable Definition

3.2.1. The Measurement of Financing Constraint and Financial Flexibility

There are two primary approaches to measuring corporate financing constraints: single-index judgment and multi-index judgment. The single-index judgment method typically categorizes companies with small scale, short listing time, and low dividend payout ratios as being subject to significant financing constraints. These companies often exhibit a relatively severe degree of information asymmetry, which is a major contributing factor to financing constraints. Consequently, the single-index judgment method can serve as an effective tool for assessing financing constraints in such companies. The multi-index judgment approach constructs financing constraint indices using various variables. Commonly used indices include the KZ index and WW index. Granzotto, et al. [18] defined five levels of financing constraints and highlighted certain limitations of the KZ and WW indices, such as issues of autocorrelation and inappropriate variable selection. Therefore, the author opts for the single-index judgment method to measure corporate financing constraints.

Firm size can be used to identify a firm's financing constraints. In credit markets, banks typically lend first to large companies with a low risk of default. In the capital market, because of information asymmetry, investors are more inclined to invest in large-scale companies with perfect information. Large-scale companies have many financing channels and low financing costs, which alleviates their

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financing constraints to a certain extent. In order to avoid endogenous problems, the author uses revenue scale instead of total assets to measure the financing constraints of the company. The duration of a company can be measured by the number of years it has been listed. Afrifa [19] believe that the listing period can reflect the degree of financing constraint of a company. Companies that have been listed for a short period of time disclose relatively little financial and other information, which makes the information asymmetry between the company and potential investors higher. This kind of information asymmetry makes the company need to pay "lemon cost", and the degree of financing constraint increases accordingly.

Referring to the method adopted by Fahlenbrach, et al. [15] to identify the financing constraints of companies, the author adopts three different classification methods to define the financing constraints: The first one is to identify the financing constraints by ordering the size of the income. The first 33% of the income scale is the low financing constraint group, and the last 33% is the high financing constraint group. The second is to identify financing constraints FC_A according to the sequence of duration. The samples of the first 33% of the duration are the low financing constraints group, and the samples of the last 33% are the high financing constraints group. The third is to identify the financing constraints by ordering the income scale and duration. At the same time, the first 33% of the income scale and duration are the low financing constraint group, and the last 33% are the high financing constraint group. The value of high financing constraint is 1, and the value of low financing constraint is 0.

There are three methods to measure financial flexibility: The first is the single index method, which defines financial flexibility as cash reserves or financial leverage. Ferrando, et al. [14] predicted the debt level of enterprises, took the real debt level as a reference, and finally defined the financial flexible company as the company with the remaining debt capacity for more than three consecutive years. The second method is multi-index judgment. Fahlenbrach, et al. [15] believe that financial flexibility can be understood as the sum of cash flexibility and debt flexibility, where cash flexibility = the company's own cash ratio - the average cash ratio of the industry, and debt flexibility = Max (0, the average debt ratio of the industry - the company's own debt ratio). The third method is multi-index method. Sreenivasulu and Mamilla [20] uses analytic hierarchy process to construct financial flexibility index, which includes three levels: cash, external financing cost and capital structure. The author draws on the definition method proposed by Fahlenbrach, et al. [15] in which both cash ratio and debt ratio are standardized by the total assets index, so cash flexibility and debt flexibility can be directly added to explain financial flexibility.

3.2.2. Regression Model Design

In order to study the impact of financing constraints on the company's financial flexible reserve behavior, the author constructs the following model based on the cash-cash flow sensitivity model of Lozano and Yaman [12].

$$\Delta FF_{it} = \alpha_0 + \alpha_1 CashFlow_{it} + \alpha_2 FC_{it} + \alpha_3 FC_{it} \times CashFlow_{it} + \alpha_4 SIZE_{it} + \alpha_5 Q_{it} + \alpha_6 \sum Year + \alpha_7 \sum Industry + e_{it} \quad (1)$$

In order to test the impact of financial flexibility on corporate performance, the author adds financial flexibility and its square term on the basis of the nonlinear model of ownership structure and corporate performance proposed by Kyere and Ausloos [21]. If β2 is significantly less than 0, there is an inverted U-shaped relationship between financial flexibility and firm performance.

$$ROA_{it} = \beta_0 + \beta_1 FF_{it-1} + \beta_2 FF_{it-1}^2 + \beta_3 SIZE_{it} + \beta_4 Growth_{it} + \beta_5 FSR_{it} + \beta_6 \sum Year + \beta_7 \sum Indust + \varepsilon_{it} \quad (2)$$

The variable definitions in the model are shown in Table 1:

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Table 1.
Variable definition table.

	Variable symbol	Variable name	Explain
Explained variable	Financial flexibility increment	ΔFF	The difference between the current financial flexibility and the previous financial flexibility
	Company performance	ROA	The ratio of EBIIT to average total assets
Explanatory variable	Cash flow	CashFlow	The ratio of cash flow from operating activities to total assets
	Financing constraints	FC	Virtual variable, the company faces high financing constraints to take 1, low financing constraints to take 0
	Financial flexibility	FF	The sum of cash flexibility and liability flexibility
	Financial flexibility of the square of the FF²		The square of the financial flexibility
Controlled variable	Investment opportunity	Q	Tobbin Q
	Asset size	SIZE	Natural logarithm of the total assets
	Ownership structure	FSR	The largest shareholder shareholding ratio
	Growth	Growth	Total asset growth rate
	Annual variable	Year	Virtual variable, the sample is 1 for the year, otherwise 0
	Industry variables	Industry	Virtual variable, the sample is the industry to take 1, otherwise take 0

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 presents the results of the descriptive statistical analysis of the primary variables. The financial flexibility increment ΔFF represents the level of financial flexibility in a company's reserves, with an average value of 0.011. This suggests that, from 2010 to 2014, the total amount of financial flexibility reserves held by listed companies in China exceeded the total amount released, potentially reflecting increased attention to financial flexibility following the global financial crisis. The mean financial flexibility (FF) is 0.104, indicating that listed companies generally maintain a certain degree of financial flexibility. This may be attributable to the underdeveloped nature of China's capital market and the volatility of the operating environment. The standard deviation of FF is 0.351, signifying substantial variation in financial flexibility across firms. The authors will further investigate the differential impacts of these variations on corporate performance. During the period from 2010 to 2014, the average return on assets (ROA) for listed companies in China was 0.047, reflecting relatively low overall performance. Additionally, the average shareholding ratio of the largest shareholder (TOP) is 0.363, highlighting the pronounced "one dominant shareholder" phenomenon in China. Furthermore, Pearson correlation analysis was conducted for all variables, revealing that the correlation coefficients between independent variables were all below 0.300, confirming the absence of multicollinearity issues in the model.

Table 2.
Descriptive statistics of main variables.

Variable	Mean	Standard error	Crest value	Least value	Observed value
FF	0.104	0.351	1.402	-0.365	4496
ΔFF	0.011	0.171	0.707	-0.385	4496
Q	1.862	0.857	6.775	0.938	4496
CashFlow	0.047	0.068	0.246	-0.166	4496
ASS	21.78	1.048	24.984	19.852	4496
FF²	0.069	0.127	1.697	0.014	5286
ROA	0.047	0.04	0.195	-0.07	5286
TOP	0.363	0.143	0.745	0.092	5286

Table 3 categorizes enterprises based on revenue scale and duration, and evaluates the impact of financing constraints on financial flexibility using an independent samples t-test. The results indicate that, at the 1% significance level, the financial flexibility of small enterprises (mean FF = 0.125) is

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significantly higher than that of large enterprises (mean FF = 0.076). This suggests that firms facing financing constraints should prioritize maintaining adequate financial flexibility. Furthermore, at the 1% significance level, Tobin's Q for small enterprises (mean = 2.028) is significantly higher than for large enterprises (mean = 1.668), implying that small enterprises possess more growth opportunities, necessitating greater investment expenditures and thus requiring higher reserves of financial flexibility. From a duration perspective, at the 1% significance level, companies with shorter durations exhibit greater financial flexibility (mean FF = 0.173) compared to those with longer durations (mean FF = 0.024). This indicates that firms experiencing financing constraints should preserve financial flexibility to mitigate potential adverse shocks. Additionally, the average change in financial flexibility reserve (ΔFF) for long-duration firms was 0.053, compared to 0.033 for short-duration firms. Companies with shorter durations demonstrate significantly lower financial flexibility reserves, likely due to rapid business growth requiring increased cash and liabilities to sustain expansion. Finally, at the 1% significance level, the quadratic term FF^2 for long-duration firms is significantly smaller than for short-duration firms, suggesting that the inverse U-shaped relationship between financial flexibility and firm performance is less pronounced in firms with high financing constraints.

Table 3.
Comparison of major variables of companies with high financing constraints and low financing constraints(*,**and***represent significance levels of 10%, 5%, and 1%, respectively.).

Variable	Grouped by revenue scale			Group by company duration		
	Mean		t	Mean		t
	Low financing constraints	High financing constraints		Low financing constraints	High financing constraints	
FF	0.076***	0.125***	-5.334	0.024***	0.173***	-16.747
ΔFF	-0.001**	0.018 **	-3.126	0.053***	0.033***	-4.401
Q	1.668***	2.028 ***	-11.485	1.823***	1.742***	2.821
CashFlow	0.053***	0.041***	4.71	0.051***	0.038***	5.129
FF^2	0.025**	0.006**	7.332	0.039 ***	0.004***	13.035
ROA	0.036	0.047	-5.88	0.039***	0.056***	-14.003

According to Figure 1.1, a comprehensive and in-depth analysis can be conducted regarding the specific impact of financing constraints on corporate financial flexibility, performance, and profitability. With respect to financial flexibility, there is a notable disparity between the low-financing constraint group (0.076) and the high-financing constraint group (0.125). The low-financing constraint group exhibits lower financial flexibility, implying that these firms do not need to excessively conserve cash flow to address future uncertainties and can instead allocate resources toward more productive activities or strategic investments. Conversely, companies within the high-financing constraint group require higher financial flexibility (0.125), likely due to restricted access to external financing and the necessity for greater financial security to accommodate sudden investment needs or market fluctuations. In terms of corporate performance, the performance metric for the low-financing constraint group is 0.05, while that for the high-financing constraint group is 0.10. Although firms in the high-financing constraint group demonstrate superior performance, this improvement is not attributable to increased capital investment but rather to their necessity to optimize resource allocation under limited financial resources and enhance operational efficiency. In contrast, firms in the low-financing constraint group, despite having the capacity to allocate more resources toward scale expansion, may not achieve significant performance growth in practice, suggesting that reduced financing constraints do not necessarily lead to optimal corporate performance. Additionally, regarding profitability, the profitability of the low-financing constraint group is 0.15, whereas that of the high-financing constraint group is 0.12. Although the profitability of the low financing constraint group is higher, the profitability of the high financing constraint group is slightly lower, indicating that the pressure of the high financing constraint group on the use of funds may affect its profit maximization. Although they may respond to funding risk

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through financial flexibility, it may be due to capital expenditure constraints, resulting in profitability that does not match the low financing constraint group.

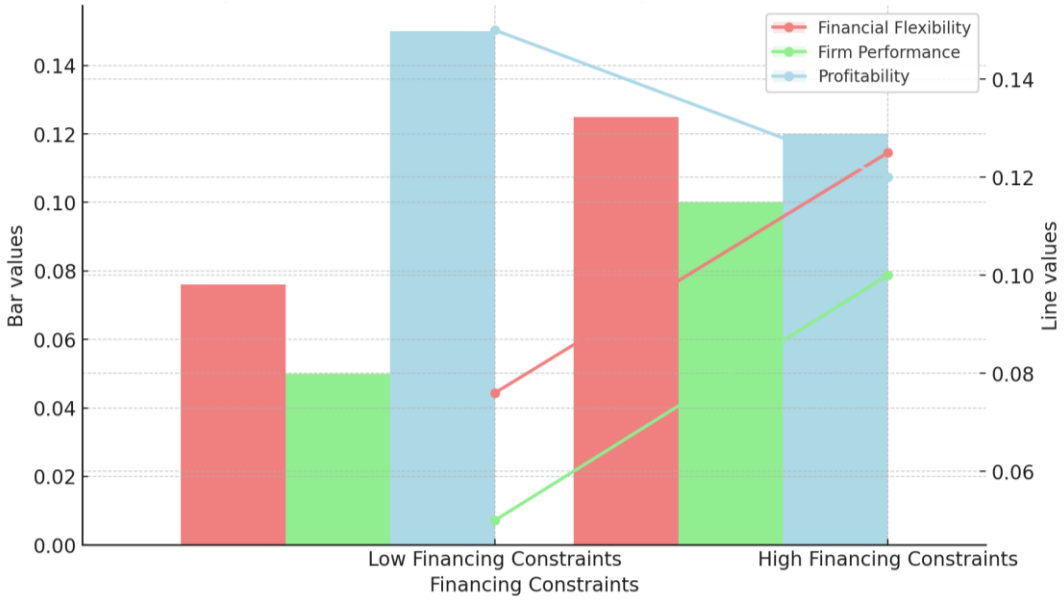

Figure 1.
Financial flexibility under different financing constraints.

4.2. Regression Analysis

Table 4 presents the panel data regression results of model (1), illustrating the relationship between financing constraints and financial flexibility, specifically the cash flow sensitivity of listed companies. Panel data regression methods include pooled OLS regression, fixed-effects regression, and random-effects regression. The selection between pooled OLS regression and fixed-effects regression can be determined by conducting F-tests for ui = 0 in the fixed-effects regression results. The choice between fixed-effects regression and random-effects regression can be guided by the Hausman test. In the fixed-effects estimation results, all F-tests for ui = 0 are rejected; at the 1% significance level, the Hausman test rejects the null hypothesis that individual effects are uncorrelated with explanatory variables. Therefore, we employ the fixed-effects regression method.

Table 4.
Financing constraints and financial flexibility - cash flow sensitivity regression results.

Variable	(1)	(2)	(3)	(4)
Q	0.015***(2.580)	0.022***(2.920)	0.009***(2.750)	0.033**(2.440)
CashFlow	0.205***(3.340)	0.093*(1.920)	0.163**(1.580)	0.136*(1.600)
ASS	-0.014**(-1.770)	-0.009(-0.350)	-0.005(-0.170)	-0.008(-0.180)
FC	——	-0.037(-0.510)	0.001(0.050)	0.002(0.110)
FC ×CashFlow	——	0.307(1.970)	0.230**(1.420)	0.554** (1.880)
R^2	0.06	0.062	0.039	0.063
Year	Control	Control	Control	Control
Trade	Control	Control	Control	Control
F price	29.91	13.84	9.12	7.35
Observed value	4496	2968	2403	1003

Regression (1) examines a company's financial flexibility in the absence of financing constraints, specifically its sensitivity to cash flow. Regressions (2)-(4) incorporate dummy variables for financing constraints defined by three methods and their interaction terms with operating cash flows. Based on

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the regression results, the cash flow coefficient derived from Regression (1) is 0.205, which exhibits a significantly positive correlation with the incremental ΔFF of financial flexibility at the 1% significance level. This suggests that Chinese listed companies generally allocate a portion of their operating cash flow to reserve financial flexibility. Given the underdeveloped nature of China's capital markets, firms need to maintain financial flexibility to address financing constraints. Furthermore, financing constraints influence a company's ability to sustain financial flexibility. In Regressions (2)-(4), the interaction term between financing constraints and operating cash flow is significantly positive, indicating that among samples defined by different financing constraint methods, the financial flexibility-cash flow sensitivity of samples with high financing constraints is significantly greater than that of samples with low financing constraints. These findings remain consistent across all three definitions, thereby validating Hypothesis 1 (H1). Specifically, Regression (2) reveals that the regression coefficient of FC_S × cash flow is 0.307, suggesting that the financial flexibility-cash flow sensitivity of small businesses is, on average, 30.7% higher than that of large enterprises. This discrepancy arises from the limited financing channels available to small enterprises, which predominantly rely on internal financing mechanisms. Regression (3) indicates that the regression coefficient of FC_A × cash flow is 0.230, demonstrating that the financial flexibility sensitivity to cash flow for enterprises with shorter durations is 23.0% higher on average compared to those with longer durations. This phenomenon can be attributed to the tighter financing constraints faced by companies that have been publicly listed for a shorter period, leading them to prioritize maintaining financial flexibility through reliance on internal cash flow. Finally, Regression (4) shows that the regression coefficient of FC_SA × cash flow is 0.554, indicating that the sensitivity of financial flexibility to cash flow for small companies with shorter establishment times is 55.4% higher on average than that of large companies with longer establishment histories. This highlights the more severe financing constraints faced by smaller, younger firms, which leads them to prefer retaining financial flexibility. Furthermore, incremental financial flexibility exhibits a significantly positive correlation with Tobin Q, a measure of a firm's investment opportunities. A higher Tobin Q value suggests that the company requires greater financial flexibility to capitalize on future favorable investment opportunities.

For model (2), Table 5 employs the judgment criteria established in model (1) and selects the fixed-effects regression model. Regression (5) presents the panel data regression results regarding the impact of financial flexibility on corporate performance, while regressions (6)-(8) report the group regression results for the moderating effects of different financing constraint classification methods on the relationship between financial flexibility and corporate performance.

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Table 5.
Regression results of financial flexibility and corporate performance.

Variable	(5)	(6)		(7)		(8)	
		Divided by revenue size		Divided by duration		By revenue size- -Duration period	
		Low financing constraint group	High financing constraint group	Low financing constraint group	High financing constraint group	Low financing constraint group	High financing constraint group
FF	0.097*** (2.480)	0.137*** (2.820)	0.125*** (2.130)	0.170*** (2.840)	0.160*** (2.400)	0.103*** (2.840)	0.094** (2.050)
FF²	-0.051*** (1.800)	-0.114*** (-2.430)	-0.096*** (-2.770)	-0.104*** (-2.390)	-0.029** (-2.360)	-0.184*** (-2.960)	-0.062** (-2.470)
ASS	0.060*** (3.130)	0.065** (1.790)	0.012*** (2.740)	0.054** (1.070)	0.041** (1.560)	0.031** (1.650)	0.097** (0.980)
Growth	0.015*** (6.420)	0.016*** (3.860)	0.019*** (3.820)	0.018*** (4.020)	0.006* (1.210)	0.024*** (4.160)	0.021*** (2.620)
Top	0.072*** (6.350)	0.028 (1.740)	0.108** (4.230)	0.049* (2.580)	0.039 (1.010)	0.028 (1.120)	0.058* (1.320)
Year	Control	Control	Control	Control	Control	Control	Control
Industry	Control	Control	Control	Control	Control	Control	Control
R^2	0.119	0.161	0.13	0.078	0.132	0.15	0.219
F price	67.22	31.18	20.81	14.08	185.38	14.49	18.52
Observed value	5286	2062	2062	1833	1769	1028	1170

As can be seen from the results of regression (5), the coefficients of financial flexibility level FF and its square term FF2 are 0.097 and -0.051 respectively, both of which are significant at the 1% level, indicating that corporate performance increases first and then decreases with the increase of financial flexibility, which verifies H2's view. There is an inverted U-shaped relationship between financial flexibility and corporate performance. Financial flexibility is not the higher the better, moderate financial flexibility plays a positive buffer effect; excessive financial flexibility will bring negative agency effect. Only when financial flexibility is kept below the equilibrium point can corporate performance be improved. In order to test H3, the author used three classification methods of financing constraints and grouped the samples according to the level of financing constraints. The results of regression (6) -- (8) show that the coefficient of FF2 of the square term of financial flexibility is significantly less than 0 at the level of 1% or 5% for both the low financing constraint group and the high financing constraint group, indicating that the influence of financial flexibility on corporate performance presents an inverted U-shaped relationship, and the interval effect of financial flexibility is generally present in listed companies in China. H2 is further verified. In addition, the samples were grouped by different financing constraint classification methods, and according to the vertex coordinate formula of the curve, compared with the low financing constraint group, the equilibrium point of the high financing constraint group shifted to the right and the curve was smoother, which was consistent with H3. Specifically, regression (6) shows that the FF2 coefficient of the sample of large-scale companies is -0.114, while the FF2 coefficient of the sample of small-scale companies is -0.096, indicating that the inverted U-shaped curve of small-scale companies is more gentle. This is because with the improvement of the financial flexibility level of small-scale companies, financing constraints play a buffer effect, and the marginal contribution of financial flexibility decreases gradually. According to the vertex coordinate formula of the curve, the financial flexibility equilibrium point shifts to the right, because the agency effect of financial flexibility of small scale companies is weaker than that of large scale companies. Financing constraints inhibit the self-interested behavior of managers of small-scale companies, thus weakening the agency effect of financial flexibility, which further validates H3. Regression (7) shows that the FF2 coefficient of companies with long duration is -0.0104, the FF2 coefficient of companies with shorter listing years is -0.029, and the company with shorter listing years has an inverted U-shape slowdown. Moreover,

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according to the vertex coordinate formula of the curve, the equilibrium point of financial flexibility shifts to the right. This is because the financing constraints of short-duration companies weaken the agency effect of financial flexibility. Regression (8) shows that the FF coefficient of large-scale companies with long listing years is 0.103 and FF2 coefficient is -0.184; the FF coefficient of small-scale companies with short listing years is 0.094 and FF2 coefficient is -0.062. According to the vertex coordinate formula of the curve, the equilibrium point of financial flexibility shifts to the right. This is because small-scale companies with a short listing life face more serious financing constraints, and managers are less self-interested and cautious in making financial decisions and using financial flexibility, which weakens the agency effect of financial flexibility and further validates H3. In addition, most of the other independent variables controlled have passed the significance test, and the coefficient symbols are in line with practical significance.

From the aforementioned test results, it can be observed that, in general, the financing constraints and financial flexibility of listed companies are closely associated with corporate performance. More specifically, companies experiencing more severe financing constraints tend to exhibit higher financial flexibility in terms of cash flow sensitivity. These firms place greater emphasis on utilizing internal cash flows for cash reserves or debt repayment, thereby enhancing their financial flexibility to mitigate adverse shocks and capitalize on investment opportunities. Furthermore, there exists an inverted U-shaped relationship between financial flexibility and corporate performance, with financing constraints playing a positive moderating role in this relationship.

As illustrated in the figure above, there exists an inverted U-shaped relationship between financial flexibility (FF) and corporate performance (ROA). When financial flexibility is relatively low (FF = 0.1 ~ 0.3), corporate performance (ROA) remains relatively stable, with ROA fluctuating within the range of 0.05 to 0.18. This suggests that insufficient financial flexibility constrains a firm's capacity to capitalize on market opportunities and meet financial demands. However, as financial flexibility improves (FF = 0.4 ~ 0.6), corporate performance significantly enhances, with ROA increasing from 0.18 to 0.28. This indicates that moderate financial flexibility enables firms to secure better financial support, optimize capital allocation, and thereby improve overall performance. Conversely, when financial flexibility reaches higher levels (FF = 0.7 ~ 1.0), ROA begins to decline, decreasing to 0.15. This may result from excessive capital reserves leading to resource wastage, overly conservative investment decisions by management, and potential "agency problems," wherein managers prioritize personal benefits over corporate development. Therefore, enterprises should strive to maintain an optimal level of financial flexibility to enhance corporate performance while mitigating the adverse effects associated with excessive cash reserve accumulation.

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Figure 2.
The impact of financial flexibility on firm performance (ROA).

4.3. Robustness Test

Two alternative variables were used to verify the robustness of the regression results. Compared with western developed countries, China's capital market is not mature enough, it is difficult to meet all the four preconditions of using Tobin Q, and there are limitations in evaluating the investment opportunities of listed companies in China. Drawing on the research of Beladi, et al. [10] the author uses the growth rate of operating income instead of Tobin's Q to measure investment opportunities in model (1). The CashFlow coefficient of the regression result is 0.124, and the size and significance of the regression result are almost unchanged from the previous regression (1). The size, symbol and significance level of the cross-term coefficients of financing constraints and cash flow are also almost unchanged, which is consistent with H1 conclusion.

In model (2), given that the future residual debt capacity of financial flexibility should exclude non-interest-bearing liabilities, the author adjusts the measurement by removing non-interest-bearing liabilities from return on total assets and instead employs return on invested capital (ROIC) as a proxy for firm performance. The regression analysis results indicate that the coefficients of financial flexibility (FF) and its quadratic term (FF^2) are 0.084 and -0.062, respectively, both significant at the 1% significance level. This suggests a significant inverse U-shaped relationship between financial flexibility and firm performance, consistent with Hypothesis H2. To further investigate the moderating effect of financing constraints, the sample is segmented based on revenue size, firm duration, and their combination. The regression findings reveal that the curve for the high-financing-constraint group is less steep, and the timing of the financial flexibility equilibrium point occurs later compared to the low-financing-constraint group. This corroborates Hypothesis H3, demonstrating the robustness of the conclusion.

5. Conclusion

This study selects A-share listed companies in Shanghai and Shenzhen from 2018 to 2023 as research samples, with a focus on corporate financial flexibility. It theoretically analyzes and empirically examines the relationship among financing constraints, financial flexibility, and firm performance. The regression results indicate that financing constraints, as defined by three distinct methods, significantly

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influence the sensitivity of financial flexibility to cash flow. Furthermore, the relationship between financial flexibility and firm performance exhibits an inverted U-shaped pattern: as financial flexibility increases, its marginal benefit diminishes. However, financing constraints contribute to mitigating performance declines by alleviating agency effects, thereby providing novel insights and robust evidence for comprehending the dynamic interplay among financing constraints, financial flexibility, and firm performance.

This study integrates the financing sequence theory and agency theory to investigate the impact of financing constraints on financial flexibility and elucidate the mechanism through which financial flexibility affects firm performance, thereby enriching both theoretical and empirical research in this domain. The findings suggest that firms, particularly those subject to financing constraints, should prioritize the development of financial flexibility. In more uncertain external environments, firms need to maintain flexibility to manage risks and capitalize on future opportunities. Nevertheless, it is equally critical for firms to monitor their level of financial flexibility to avoid over-provisioning, which may result in agency problems and heightened agency costs. Future research should delve deeper into the interaction between financing preference theory and agency theory, while also considering macroeconomic factors such as monetary policy and environmental uncertainty to further assess their influence on financial flexibility.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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