



Information Transparency and Financial Flexibility: Empirical Analysis Based on the Dual Perspectives of Digital Transformation and Financing Constraints

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Abstract. In the fierce competition of the capital market, one of the crucial elements for enterprises to achieve sustainable growth lies in ensuring the reliability and stability of funding supply, which constitutes an indispensable foundation. This paper empirically examines the relationship between corporate information transparency and financial flexibility using a sample of listed A-share companies in Shenzhen and Shanghai Stock Exchanges from 2009 to 2023. The study finds that information transparency reduces firms' financial flexibility reserves and its mechanism of action is to alleviate financing constraints. By focusing on information transparency as a corporate governance indicator, this paper offers a fresh perspective on the research of corporate financial flexibility and broadens the scope of studies on information transparency in terms of corporate behaviors and other aspects.

Keywords: Information Transparency; Financial Flexibility; Pecking Order Theory.

1 Introduction

Ensuring that enterprises possess moderate and stable financial flexibility implies that in the face of highly uncertain market environments, they can agilely adjust strategies and effectively respond, timely capturing growth and investment opportunities. Conversely, inadequate financial flexibility may lead to funding shortages during emergencies or dramatic environmental changes, making it difficult for enterprises to withstand crises, potentially triggering internal capital depletion and external financing difficulties, as well as a dual rise in costs, thereby exerting dual pressures and hindering corporate performance. Information transparency refers to the extent to which external information users can effectively access specific information about publicly traded listed companies^[1]. This accessibility encompasses two levels: financial information transparency and governance information transparency. Previous studies have found that information transparency significantly impacts capital allocation efficiency, corporate financing costs, stock price volatility, and stock liquidity. Zhang Yuming et al. (2023)^[2]

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found that information transparency is positively related to the green innovation performance of heavily polluting firms. Therefore, this paper adds financing constraints and firms' digital transformation to the study of information transparency and financial flexibility to delve into the mechanism path between the two.

2 Theoretical Analysis and Research Hypothesis

2.1 The Impact of Information Transparency on Financial Flexibility

Based on the Pecking Order Theory proposed by Myers and Majluf (2001) from an information asymmetry perspective, there exists a significant asymmetry in the comprehensive information available to internal management and external capital providers. This asymmetry gives rise to adverse selection effects and moral hazard issues, which constitute obstacles for companies seeking external financing. To avoid adverse impacts on future investment capabilities, companies tend to accumulate higher levels of cash reserves to support internal financing needs. A high degree of information transparency implies a superior accounting information disclosure mechanism, which effectively weakens internal and external information barriers by conveying more transparent and detailed information on corporate operations and financial status to external investors. This reduces the negative effects of information asymmetry, not only leading to a reduction in the premium cost of external financing but also alleviating the financing constraints faced by companies. Consequently, it provides companies with strategic flexibility to adjust their strategies, enabling them to reduce cash flexibility and debt financing flexibility when necessary and optimize resource allocation.

Hypothesis 1. There is a negative correlation between corporate financial flexibility and information transparency, implying that the higher the level of information transparency of a company, the lower its financial flexibility.

2.2 Financial Flexibility of Information Transparency under Financing Constraints

Information transparency can potentially reduce the level of corporate financial flexibility by mitigating financing constraints. In examining the relationship between corporate financing costs and information disclosure, Zhang Xuan and Rao Bin (2023)^[3] argued that the disclosure quality of listed companies is significantly and negatively related to the cost of debt financing. Sub-industry disclosure regulation can significantly reduce the cost of equity financing for firms^[4]. Similarly, Meng Xiaojun et al. (2010) further pointed out that enhancing the disclosure of corporate social responsibility information serves as an effective means to significantly reduce information asymmetry, thereby optimizing the cost of capital. Furthermore, Harford et al. (2007)^[5], drawing on the theoretical framework of the "cash-out hypothesis," offered a unique insight: firms facing high financing constraints tend to adopt rapid investment strategies to deplete their cash reserves, which can be seen as a strategic response to address funding tightness. This suggests that, in the face of constrained financing environments, companies may prioritize immediate investments to avoid the potential risks associated

with holding large cash balances, which could be subject to increased scrutiny and constraints under conditions of high information transparency.

Hypothesis 2. The transparency of corporate information can alleviate financing constraints, thereby reducing the level of financial flexibility.

2.3 Financial Flexibility of Information Transparency under Digital Transformation

An organization's digital transformation strategy can significantly improve the effectiveness of internal controls. As one of the core elements of the internal governance framework, internal control mechanisms mitigate the need for precautionary measures to maintain a high level of financial flexibility reserves while reducing business operational risks. By strictly regulating, monitoring and timely adjusting the internal distribution of power, internal controls effectively curb management's possible tendency to engage in agency behavior, thereby mitigating the negatively distorting effects of agency conflicts on the financial flexibility decision-making process^[6].

Hypothesis 3. Transparency of company information can increase the degree of digital transformation and thus reduce the level of financial flexibility.

3 Research Designs

3.1 Data Sources

This paper employs A-share listed companies from the Shanghai Stock Exchange and Shenzhen Stock Exchange in China from 2009 to 2023 as the research sample. All empirical data required for this study were obtained from the China Stock Market & Accounting Research (CSMAR) database.

3.2 Variable Selection and Definition

3.2.1 Dependent Variable: Financial Flexibility (FI).

An integrated strategy is adopted, which combines cash flexibility and debt flexibility to create a comprehensive evaluation index for financial flexibility. This strategy builds upon the research findings of Zeng Aimin et al. (2013)^[7]. The specific calculation process is as follows: Financial flexibility = cash flexibility + debt flexibility; Cash Flexibility = Firm Cash Holding Ratio - Industry Cash Holding Ratio, Debt Financing Flexibility = Max(0, Average Debt Ratio in Industry - Firm's Debt Ratio).

3.2.2 Independent Variable: Company Information Transparency (KV).

This paper adopts the quantification strategy proposed by Kim and Verrecchia (2001)^[8] to evaluate corporate information transparency. As the transparency of corporate disclosure increases, investors pay less attention to trading volume and rely more on direct disclosure content, a phenomenon that weakens the impact of trading volume on return on capital. A quantitative indicator of the extent of this impact, the coefficient of the

impact of trading volume on return on capital, is often referred to in the industry as the KV indicator, the level of which maps out the exhaustiveness of a company's disclosure, and a rise in its value tends to imply a relative decline in the transparency of listed companies' information. The model for the KV measurement method is as follows:

$$\ln|(P_t - P_{t-1})/P_{t-1}| = \mu_0 + \mu(Vol_t - Vol_0) + \varepsilon \quad (1)$$

$$KV = 1000000 * \mu \quad (2)$$

3.2.3 Intermediary Variables.

Enterprise Digital Transformation. In this paper, keywords and phrases related to the theme of "digital transformation" in the annual reports of listed companies were systematically cleaned up using Python, and the frequency of occurrence of these keywords and phrases was counted and analyzed. These keywords were carefully categorized into five core areas: artificial intelligence, blockchain, cloud computing, big data, and practical application of data technology. The final result was the Enterprise Digital Transformation Gauge (DCG).

Financing Constraints. Drawing on the methodology of WANG Zhenyi et al. (2024)^[9], we use the WW index to measure financing constraints.

3.2.4 Control Variables.

Drawing on the existing literature, this paper controls for the following variables: Return on Assets (ROA), Book-to-Market Ratio (BM), Revenue Growth Rate (Growth), Herfindahl Index of the top 5 shareholders (Herf5), Cash Flow from Operations (CFO), Leverage Ratio (LEV), Tobin's Q (TobinQ), and Duality of CEO and Chairman roles (Dual)^[10,11]. To mitigate the potential influence of industry characteristics and time trends on the research conclusions, this study also controls for industry effects (IND) and year effects (Year).

4 Model Construction

This study constructs Model (3) to examine the relationship between information transparency and corporate financial flexibility. Models (4) - (5) are constructed to test Hypothesis 2 and Hypothesis 3.

$$FI_{i,t} = \beta_0 + \beta_1 KV_{i,t} + \beta_2 Control_{i,t} + Year_{i,t} + Industry_{i,t} + \varepsilon_{i,t} \quad (3)$$

If $\beta_1 > 0$, it indicates that the information transparency of the company has an inhibitory effect on corporate financial flexibility. To account for variations among different firms, this study adjusts for clustering at the firm level.

$$WW_{i,t} = \theta_0 + \theta_1 KV_{i,t} + \theta_2 Control_{i,t} + Year_{i,t} + Industry_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$DCG_{i,t} = \gamma_0 + \gamma_1 KV_{i,t} + \gamma_2 Control_{i,t} + Year_{i,t} + Industry_{i,t} + \varepsilon_{i,t} \quad (5)$$

5 Analysis of Empirical Results

5.1 Data and Sample Summary Statistics

As evident from the descriptive statistics in Table 1, the mean value of financial flexibility (FI) is 0.282, which is positive, indicating that listed companies in the sample generally maintain a certain level of financial flexibility and demonstrate an overall awareness of reserving financial flexibility in their financial decision-making. However, the minimum value being negative and the standard deviation of 0.176 suggest significant variations in financial flexibility among the samples, with some firms needing to enhance their financial flexibility. The average value of information transparency (KV) is 0.078, with a standard deviation of 0.094, indicating relatively small differences in information transparency among companies.

Table 1. Summary statistics

Variables	N	Mean	SD	Min	Max
FI	19313	0.035	0.176	-0.288	1.180
KV	19313	0.078	0.094	0.001	0.961
CFO	19313	0.066	0.098	-0.248	0.600
BM	19313	0.650	0.265	0.067	1.297
Growth	19313	0.408	1.227	-0.800	17.590
ROA	19313	0.034	0.057	-0.422	0.222
LEV	19313	0.479	0.202	0.054	0.901
TobinQ	19313	1.978	1.361	0.771	14.84
Herf5	19313	0.509	0.155	0.177	0.888
DUAL	19313	0.184	0.388	0.000	1.000

5.2 Regression Analysis

This paper uses Model (3) to examine the relationship between information transparency and corporate financial flexibility. The regression results are shown in Table 2. Column (1) reports the regression results without control variables, and Column (2) reports the regression results with all control variables included. The coefficients of information transparency (KV) are significantly positive at the 1% level, indicating that information transparency has an inhibitory effect on corporate financial flexibility, which is consistent with Hypothesis 1. The coefficient of KV in column (3) is significantly positive at the 5% level, and the above data indicate that information transparency can alleviate corporate financing constraints and reduce the level of corporate financial flexibility, which verifies Hypothesis 2. The coefficient of KV in column (4) is significantly negative at the 1% level, indicating that information transparency is positively associated with firms' digital transformation and reduces firms' financial flexibility, corresponding with Hypothesis 3.

Table 2. Information transparency, financing constraints and financial flexibility

Variables	(1)	(2)	(3)	(4)
	FI	FI	WW	DCG
KV	0.4231*** (13.5532)	0.1756*** (7.8461)	0.0067** (1.9713)	-6.3056*** (-4.3417)
CFO		0.3236*** (16.0213)		
BM		0.0344*** (2.7609)		
Growth		0.0050*** (4.0815)		
ROA		-0.1098*** (-3.4099)		
LEV		-0.5691*** (-36.5707)		
TobinQ		0.0082*** (3.3821)		
DUAL		0.0060 (1.2569)		
Herf5		0.0265* (1.8508)		
Controls	NO	YES	YES	YES
Constant	0.0019 (0.5439)	0.2212*** (14.6832)	0.1526*** (14.0676)	-16.4494*** (-4.5034)
IND & Year	YES	YES	YES	YES
N	19,313	19,313	16,423	19,181
R-squared	0.096	0.472	0.787	0.368

Note: t values in brackets are *** p<0.01, ** p<0.05, * p<0.1.

5.3 Robustness Testing

Model (3) was estimated using financial flexibility FI as the dependent variable and changing the independent variable to Opaque, the sum of the absolute value of the firm's manipulative accruals over the past three years. Opaque is a negative indicator, and the higher its value is, the lower the information transparency is. Since the impact of information transparency on corporate financial flexibility may have a lag effect, that is to say, information transparency in the current year may have an impact on corporate financial flexibility in the next year. Based on this, this paper chooses to lag the explanatory variables by one period, constructs FIL, and empirically tests the impact of information transparency on corporate financial flexibility. Drawing on the method of Shao Jianbing and Li Na (2023), in order to eliminate the 2009 financial crisis event, the 2015 stock market crash, and the 2020 New Crown Epidemic outbreak shock bias, this paper excludes the 2009, 2015, and 2020 data to regress again^[12]. The regression results are shown in Table 3. The results show that the core explanatory variables are still significantly positive, the conclusion remains unchanged.

Table 3. Robustness testing

Variables	(1)	(2)	(3)
	FI	FIL	FI
Opaque	0.0817*** (6.1620)		
KV		0.2059*** (8.0690)	0.1328*** (5.9861)
Controls&IND&Year	YES	YES	YES
N	17,705	16,814	15,470
R-squared	0.459	0.404	0.471

Note: t values in brackets are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.4 Further Analysis

In order to verify the representativeness and generalizability of the conclusions of this article, the samples are grouped and tested in terms of the nature of property rights, whether it is a high-tech enterprise or not, and capital intensity, respectively. The regression results show that the conclusions of the article remain unchanged regardless of whether the sample firms are state-owned enterprises, high-tech industries or capital-intensive firms, and the coefficients of KV are all significantly positive at the 1% level as can be seen in Table 4, which suggests that information transparency is negatively correlated with firms' financial flexibility in all of these six sub-samples.

Table 4. Further testing

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	SOE=0	SOE=1	HT=0	HT=1	CI=0	CI=1
KV	0.2141*** (7.2198)	0.0893*** (2.9687)	0.1893*** (6.5787)	0.1109*** (3.7893)	0.1518*** (6.0785)	0.2492*** (5.1281)
Controls& IND& Year	YES	YES	YES	YES	YES	YES
N	7,794	11,103	9,156	11,186	15,161	4,149
R-squared	0.510	0.461	0.530	0.507	0.466	0.561

Note: t values in brackets are *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6 Conclusion

Based on the data of A-share listed companies in Shanghai and Shenzhen from 2009 to 2023, this paper empirically tests the impact of corporate information transparency on corporate financial flexibility. It is found that with the improvement of information transparency, enterprises will reduce financial flexibility reserves. Companies with high information transparency ease financing constraints, improve the degree of digital transformation, partially replace the preventive role of financial flexibility, and help improve agency problems, which leads to a reduction in financial flexibility reserves. Companies should take targeted measures to balance risks and costs, such as analyzing

their size and operational capabilities, and tailoring financial flexibility strategies. Considering the dual attributes of financial flexibility - resistance to risks and potential resource consumption, enterprises should prudently allocate financial flexibility, strive to find the best balance between risk avoidance and opportunity, and ensure that the financial flexibility reserve is neither too much nor insufficient. Enterprises should continuously improve the transparency of information, reduce the degree of information asymmetry in the entire capital market by disclosing high-quality accounting information, improve the distortion of key resource allocation in the capital market, integrate more qualitative information into stock prices, and provide a better investment environment for investors.

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