

Article

Influence of Financial Shared Services on the Corporate Debt Cost under Digitalization

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Abstract: Information technologies such as big data and artificial intelligence promote the development of the digital economy, accelerate the digital transformation of enterprises, and continuously facilitate the reform of enterprise production, organization, and management. This study takes Chinese A-share listed companies on the Shanghai and Shenzhen stock exchanges as a sample to examine the influence of financial shared services on the corporate debt cost under the digitalization background based on the perspectives of stakeholders such as creditors, shareholders, and society. This study found that financial sharing can reduce the corporate debt cost. The path mechanism test finds that financial sharing reduces the corporate debt cost mainly by improving the quality of corporate accounting information and decreasing financial risk. The result shows that the effect of financial sharing on reducing the corporate debt cost is positively moderated by enterprise digitalization. Further analysis based on the stakeholder perspective shows that the effect of financial shared services on reducing the corporate debt cost is enhanced by the equity balance and social responsibility fulfillment. The findings provide insights and evidence on how to use financial shared services to improve debt management and enhance creditor protection in the digital context.

Keywords: digitalization; financial shared services; corporate debt cost; corporate social responsibility



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1. Introduction

Since the 21st century, emerging digital technologies such as big data, cloud computing, the internet, and artificial intelligence have developed rapidly. Driven by the deep integration of the new generation of digital technologies with the real economy, the digital economy has become a new engine for macroeconomic development. It has been shown that digitalization affects stakeholders such as shareholders, customers, suppliers, regulators, and the public, which enables business models' innovation [1], reconfigures internal value chains [2], promotes innovation [3,4], increases productivity [5] and investor returns [6], improves financial performance [7], and ultimately contributes to the fulfillment of social responsibility [2,8]. However, less attention has been paid to the impact of digitalization on creditor interests. Digitalization promotes both business digital transformation [2] and financial digital transformation [7], but current studies mainly focus on business digital transformation and its impact on the efficiency of capital use. There is lack of research on the influence about digitalization's effect on the capital use and supervision, which is related to the safety of funds lent by creditors and affects the vital interests of creditors and the debt cost of enterprises. Therefore, it is necessary to study the impact of financial digitalization on the cost of debt capital of enterprises.

Financial Service Sharing Centers (referred to as FSSC) are a specific application of digital technology in the field of finance and an important element of financial digitalization [7]. FSSC are established in a coordinated manner within enterprise groups based on IT technology [9] to integrate [10], reengineer [11], and share [12] financial processes, thereby achieving the purpose of strengthening control, reducing costs, and improving

efficiency [13,14]. For financial shared services, their integration and control functions complement each other. Financial sharing has led to profound changes in the financial organization structure of parents and subsidiaries, enables the centralization of subsidiaries' information at the parent company level, which is subject to the unified supervision and control by the parent company. Can financial sharing optimize the debt cost by reducing information asymmetry and agency problems of parents and subsidiaries, enhancing internal capital allocation and reducing financial risks? This is a realistic issue that deserves attention and is of great significance for promoting the well-ordered development of enterprise groups.

Financial sharing provides unified services for subsidiaries through a sharing platform held by the parent company. On the one hand, it will improve the quality of the parent company's access to subsidiary information, which not only helps to reduce the degree of information asymmetry between the parent company and subsidiaries, enhances effective control over subsidiaries, and reduces management agency costs, but also facilitates the parent company's internal capital allocation through the sharing center. The internal capital market allocation is conducive to enhancing the risk-taking capacity of subsidiaries [15] and providing financial support for subsidiaries in financial distress [16], which in turn helps reduce the cost of debt capital. On the other hand, financial sharing strengthens the parent company's control over subsidiaries, while group control may generate more serious agent problems [17]. Especially when the objectives of the parent and subsidiary are not aligned, the information centralization function of the information system provides convenience for controlling shareholders or management to engage in entrenchment behaviors [18], making the parent company more motivated and capable of entrenching and hollowing out the subsidiary [19]. Thus, financial sharing may cause the deterioration of the subsidiary's operating properties, increase of financial risks, and low information quality, leading to a subsequent increase in the debt cost. The impact of financial sharing on the debt cost may be uncertain, and the existing literature neglects the linkage between the two. Therefore, it provides significant theoretical value to study the impact of financial sharing on the cost of debt based on the digital context.

Based on the practical and theoretical values of exploring the impact of financial sharing on corporate cost of debt, we empirically investigate the impact of financial sharing on corporate cost of debt using a sample of Chinese A-share listed companies. We choose China as the context for this study for the following reasons. First, the Chinese government highlights the importance of the digital economy strategy and has intensively introduced several initiatives to promote it. With China's digital economy reaching \$7.1 trillion in 2021 and becoming the second largest digital economy in the world, the Chinese market provides an ideal scenario to test the impact of financial sharing on the cost of corporate debt capital in the digital context. Second, a distinctive feature of most Chinese listed companies is the presence of a single dominant shareholder whose ownership far exceeds that of the second largest shareholder [20]. The agent problems caused by FSSC are differences compared with Western economies. Chinese experience, as a unique representative of a new type of market, can provide a useful reference for other developing countries. Finally, China has published research reports on the shared services sector in China in recent years, revealing several cases of large conglomerates implementing financial shared services and related information, which provides us with rich and reliable data to conduct this study.

This study makes the following contributions: Firstly, bridging the gap in existing studies related to financial sharing. The existing literature has mainly focused on its effects on process change, operational efficiency, cost savings, audit efficiency, competitive advantage, and business performance [14,21–23], while ignoring the impact of financial sharing on the cost of corporate debt capital. This paper explores the linkage between the two to enrich the research related to the economic consequences of financial sharing. Secondly, enhancing the research related to the corporate debt cost: The existing literature on the cost of corporate debt has focused on firms' own financial status and financial strategies [24,25], information disclosure and information quality [26,27], auditor selection and audit quality [28,29], risk

and corporate governance [30,31], social responsibility fulfillment and disclosure [32,33], etc., with less attention to the impact of specific digital technologies on the cost of corporate finance in a macro-technological environment. This paper closely integrates digital technologies with other elements of the firm to explore the impact of financial digitalization on the cost of corporate capital, enriching the existing research on the corporate debt cost at the information technology level. Thirdly, uncovering the black box of financial sharing affecting the corporate debt cost: This paper finds that financial sharing can improve the quality of accounting information, reduce corporate financial risks, and thus promote the reduction of corporate debt costs. It reveals the mechanisms through which financial sharing affects corporate debt costs from the information perspective and the risk perspective. Fourthly, unlike previous studies that focused on the impact of business digitalization on capital efficiency and stakeholders such as shareholders, customers, suppliers, regulators, and the public [1,2,5,7], this paper focuses on the impact of financial digitalization on the regulation and security of capital and the protection of creditors' rights and interests, and further examines the impact of financial sharing on corporate debt from the perspective of agency conflicts between large and small shareholders and corporate social responsibility. This paper not only expands the study of financial sharing and its stakeholders, but also provides references and considerations on how to use financial sharing to improve debt management and strengthen creditor protection in the current digital context.

The remaining arrangement of this paper is as follows: the second part is the theoretical analysis and research hypothesis; the third part is the research design; the fourth part is the empirical analysis; the fifth part is a further analysis; and the last part is the research conclusion and implication.

2. Theoretical Analysis and Research Hypothesis

The debt cost has been a topic of academic and theoretical interest. It has been shown that information asymmetry [34], agency problems [17], default risk [35], etc., are important factors that affect the corporate debt cost. From the information perspective, when a firm conducts debt financing, since corporate insiders have an information advantage over creditors, in order to prevent the loss of their own property due to the information disadvantage, creditors will demand additional debt security or increase the required rate of remuneration for the lent assets [36], which will increase the cost of debt financing for the firm. From the risk perspective, the agency problems of shareholders and creditors increase the risk of debt default of the firm [17]. To safeguard their own interests, creditors will compensate and control their risks by increasing the interest rate on borrowing, or imposing restrictive terms on the company, resulting in increasing the difficulty of financing and the cost of debt capital [37]. Therefore, this study attempts to explain the impact of financial sharing on the cost of debt capital of firms from both the information perspective and the risk perspective.

2.1. *The Impact of Financial Sharing on the Cost of Debt Capital of Enterprises*

Financial sharing provides unified, professional, standardized, and efficient services to internal customers through IT systems [7], and centralizes the accounting work of the whole group, which was originally scattered in different regions and departments, to a shared platform for unified processing [9]. From the information perspective, on the one hand, financial sharing is conducive to the parent company strengthening its unified control over subsidiaries, improving the quality of the parent company's access to subsidiary information, reducing the degree of information asymmetry between the parent company and the subsidiaries, improving the quality of the group's overall accounting information, further reducing the degree of information asymmetry between enterprises and creditors, and thus reducing the cost of debt capital of enterprises. On the other hand, it has been shown that the use of information systems can increase the power of agents to access and control information and surplus management opportunities, leading to a decrease in the effectiveness of internal controls and audit quality, resulting in a decrease in the

quality of accounting information [38]; it may also lead to increased interlocking and interdependence of business processes, relational databases, and re-engineering processes, increased systemic unique risks and decreased reliability, and the lack of assurance in financial reporting, which in turn may also lead to a decrease in the quality of accounting information [39,40]. The financial sharing system, as a new type of information system, may also increase the degree of information asymmetry between enterprises and creditors, which in turn raises the cost of debt capital of enterprises.

From the risk perspective, financial sharing is conducive to strengthening the control of the group's parent company over its subsidiaries. On the one hand, group control will promote the effective operation of the internal capital market, which is conducive to optimizing the allocation of capital [15] and reducing the operational risk and the risk of debt default of subsidiaries [16], which in turn will help reduce the overall group's cost of debt capital; on the other hand, group control will exacerbate the agency problem of the majority shareholder or the effective controller. When the parent company faces financial distress, it will encroach more on the internal funds of the group [19], which will increase the risk of bond default and the cost of debt capital of the group as a whole. Therefore, when financial sharing strengthens group control, it has both the potential to raise and lower the cost of debt capital. Based on the above analysis, this study puts forward the following competing hypotheses.

Hypothesis 1a. *Financial sharing can reduce the debt cost of enterprises.*

Hypothesis 1b. *Financial sharing can raise the debt cost of enterprises.*

2.2. Path Mechanisms of Financial Sharing Affecting Corporate Debt Cost

This study argues that financial sharing affects the cost of debt capital of enterprises mainly through the information path and the risk path.

First, based on the information perspective, on the one hand, financial sharing promotes the integration of business and finance through process reengineering and information system integration, making finance extend to the front end of business, breaking the boundary between finance and business, enterprise, and external stakeholders, enabling the organic integration of the enterprise and external customers, suppliers, and markets [14]. Integrating the enterprise's internal procurement, R&D, production, and sales with the production activities directly generates financial data and transforms material activities in physical form directly into financial activities in value form, thus realizing real-time reflection of logistics, capital flow, work flow, and information flow [41], enabling the enterprise to grasp the real information of each unit within the group from the source. This helps the parent company of the group to be able to know all the operating information of its subsidiaries in real time, reduces the information asymmetry between the parent company and the subsidiaries and the room for managers' surplus manipulation, promotes the quality of accounting information, which in turn alleviates the information asymmetry between shareholders and creditors, and thus reduces the cost of debt capital. On the other hand, the parent company itself has advantages over its subsidiaries in accessing operating and performance information and in implementing desired changes in the company, and the parent company can further expand these advantages through financial sharing. While financial sharing promotes greater knowledge of the parent company's operating and financial information about its subsidiaries, it makes it easier to carry out actions to extract private benefits at the expense of the subsidiaries, which will exacerbate agency conflicts between the parent and subsidiaries, make accounting information less transparent and of lower quality, and thus raise the cost of debt capital.

Second, based on the risk perspective, on the one hand, financial sharing solves the problem of duplication of group financial departments and streamlines the organizational structure, enabling enterprises to focus their efforts and limited resources to quickly support profit-creating businesses [21], which can effectively support the information technology,

finance, procurement, and marketing activities of enterprises [7]; it combines management systems, financial management systems, senior management support, internal control, and other management factors together to provide a secure platform for group risk management and performance management [42], which enhances the enterprise's risk management control [22]. This will help the group parent company to unify the deployment of corporate resources within the group through the financial sharing service center, improve the overall capital allocation efficiency of the group and reduce financial risks, and thus reduce the cost of debt capital. On the other hand, financial sharing enhances group control through unified work standards and processes, unified systems and information systems, and unified capital management control and scheduling. In contrast, group control may exacerbate agency problems between parents and subsidiaries, making the group parent more capable of appropriating and hollowing out subsidiaries [19], which may lead to distortion of financial data and deterioration of operating performance of subsidiaries, which is detrimental to the sound development of group enterprises and raises the risk of bond defaults and the cost of debt capital of group enterprises. Therefore, financial sharing may reduce the quality of accounting information and enhance financial risk through group control, which in turn raises the cost of debt capital. Based on the above analysis, this study puts forward the following hypotheses.

Hypothesis 2. *Financial sharing affects the cost of debt capital of the firm through the quality of accounting information.*

Hypothesis 3. *Financial sharing affects the cost of corporate debt capital through corporate financial risk.*

2.3. The Moderating Role of Enterprise Digitalization

It has been shown that digitalization can be both a driver of productivity improvement [5] and a possible barrier to productivity improvement [43]. On the one hand, enterprise digitalization can enhance information processing capabilities [44], reduce information asymmetry [6], and improve information transparency [45]. In turn, it can provide the financial sharing center with more business and financial data on the value chain links, making the group parent company more capable of supervising the internal governance of subsidiaries, reducing the agency problems of subsidiary executives, and alleviating the information asymmetry between parents and subsidiaries; it can also facilitate creditors' in-depth understanding and supervision of the financial status and resource allocation of enterprises through the financial sharing platform, making them more willing to provide more flexible, preferential financing terms, which is conducive to reducing the information asymmetry between enterprises and creditors. In turn, it helps to strengthen the financial sharing to reduce the cost of debts. In addition, digitalization promotes financial and treasury integration [7] while also enhancing systemic risk [46]. The rapidity of digitalization and its unique systemic risk provide more opportunities for the parent company to increase the degree of information access and surplus management behavior of the subsidiary; especially when the objectives of the parent and subsidiary are not consistent, financial sharing may turn into a tool for the parent company to encroach on the interests of the subsidiary, leading to a decline in the quality of accounting information of the subsidiary and an increase in financial risk, which further enhances the overall cost of debt capital of the enterprise group by using financial sharing.

On the other hand, the information overload and the disorderly operation of data brought by digitalization [43] have become objective and social facts in digital existence that do not depend on individual will. The large amount of redundant, duplicated, poor quality, and fragmented information not only far exceeds the ability of enterprises to accept and process it, but also increases the difficulty of obtaining effective information. Faced with the large amount of invalid information brought by digitalization, the financial sharing center needs to spend a lot of time and cost to screen and process the data in order to

convert it into useful information for the enterprise, which will result in digitalization not only failing to turn into effective productivity, but also becoming a barrier that restricts the financial sharing from performing its proper function, thus weakening the impact of financial sharing on the cost of debt capital of the enterprise.

It follows that the digitalization of enterprises may both enhance the effect of financial sharing on the reduction or enhancement of the cost of debt capital of enterprises at the information and risk levels, and weaken the effect of financial sharing on the cost of debt capital of enterprises due to problems such as information overload and disorderly operation of data. As a result, this study proposes the following hypotheses.

Hypothesis 4a. *Enterprise digitalization can strengthen the impact of financial sharing on the cost of debt capital of the enterprise.*

Hypothesis 4b. *Enterprise digitalization can weaken the impact of financial sharing on the cost of debt capital of enterprises.*

3. Study Design

3.1. Sample Selection and Data Sources

This study uses all Chinese A-share listed companies from 2009–2018 as the research samples. The financial sharing data were obtained mainly from Sina Finance, annual reports of listed companies, China Shared Services Research Reports, and the website of the International Financial Shared Services Management Association, etc. The keywords “shared services”, “financial sharing”, etc., were extracted by using python and other crawler software and were obtained manually. The other data were mainly obtained from the CSMAR database. These were screened according to the following principles: (1) exclude the financial industry samples; (2) exclude the ST category samples; (3) exclude the samples with missing relevant data during the study period; (4) the financial and governance data in this study were obtained mainly from the CSMAR database; (5) to eliminate the influence of extreme values, all continuous variables were Winsorized at the 1–99% level. After a series of data processing procedures, a total of 13,313 study samples were obtained in this paper.

3.2. Model Setting and Variable Selection

Firstly, in order to test Hypotheses 1a and 1b, this study establishes model (1):

$$\text{Debt} = \alpha_0 + \alpha_1 \text{FSSC} + \sum \text{Control} + \epsilon \quad (1)$$

In model (1), Debt is used to measure the cost of corporate debt capital; FSSC is used to measure financial sharing, which is assigned the value of 1 if the listed company has implemented financial sharing, and 0 if it has not; $\sum \text{Control}$ represents the control variables, including revenue size (Lnsale), gearing ratio (Lev), and total net asset margin (ROA), growth (Growth), nature of business (Soe), proportion of tangible assets (PPE), asset turnover ratio (TATR), cash ratio (Cash), enterprise risk (Risk), time to market (Age), and equity concentration (Top1), in addition to controlling for the effects of industry and year in this study. If the sign of α_1 is negative, it indicates that financial sharing can reduce the cost of debt capital of the firm; if the sign of α_1 is positive, it indicates that financial sharing raises the cost of debt capital of the firm.

Secondly, in order to test Hypothesis 2 and Hypothesis 3, this study develops model (2) and model (3) based on model 1:

$$\text{AQ} = \gamma_0 + \gamma_1 \text{FSSC} + \sum \text{Control} + \theta \quad (2)$$

$$\text{Debt} = \mu_1 + \mu_1 \text{FSSC} + \mu_2 \text{AQ} + \sum \text{Control} + \rho \quad (3)$$

In models (2) and (3), AQ represents the mediated path indicator, which is used to measure the accounting quality and financial risk of the firm, respectively, expressed as surplus management (DA) and probability of bankruptcy (Zscore). Referring to the study by Wood et al. [47], using the mediation test procedure, model 1 should be used first to test the effect of the implementation of financial sharing on the cost of corporate debt capital, examining whether α_1 is significant. If α_1 is significant, it is then tested with models (2) and (3). Under the condition that both γ_1 and μ_2 are significant, if μ_1 is (not) significant, it indicates that the quality of accounting information partially (fully) mediates the effect of the implementation of financial sharing on the cost of debt capital of the firm. In addition, to ensure the reliability of the test results, the Sobel Z statistic should be used to determine the existence of mediating utility and the magnitude of the mediating effect.

Finally, to test Hypotheses 4a and 4b, this study develops model (4):

$$\text{Debt} = \beta_0 + \beta_1 \text{FSSC} + \beta_2 \text{Digital1} + \beta_3 \text{FSSC} \times \text{Digital1} + \varepsilon \quad (4)$$

In model (4), Digital1 is used to measure the degree of digitalization of the firm, and FSSC*Digital1 is used to test the moderating role played by the digitalization of the firm in financial sharing and the debt cost of enterprises.

The table of variable definitions is shown in Table 1.

Table 1. Variable definition table.

Variable Type	Variable Sign	Variable Name and Variable Definition
Explanatory Variable	<i>Debt</i>	Debt cost, interest expense/(opening interest-bearing liabilities + closing interest-bearing liabilities)/2. Where interest-bearing liabilities = short-term borrowings + long-term borrowings + non-current liabilities due within one year + bonds payable [28,29]
Explanatory variables	<i>FSSC</i>	Financial sharing, if the company has implemented financial sharing, the value is 1, otherwise it is 0
Intermediate variables	<i>DA</i>	Surplus management, referring to Jones' [48] measure
	<i>Zscore</i>	Financial risk, with reference to Altman's [49] measure, expressed as bankruptcy risk
Regulating effect	<i>Digital1</i>	The degree of digitalization of enterprises, referring to the measurement [2]. It is measured by adding 1 to the logarithm of the number of digitalization-related word frequencies
	<i>Digital2</i>	The degree of regional digitalization, used the entropy value method to construct a comprehensive evaluation index system for the development of digital economy in the prefecture-level cities where listed companies are located.
Control variables	<i>Lnsale</i>	Income size, equals to operating income as natural logarithm
	<i>Lev</i>	Gearing ratio, equals to total liabilities/total assets
	<i>ROA</i>	Return on Assets, equals to $100 \times \text{net profit} / \text{total assets}$
	<i>Growth</i>	Growth, equals to operating income growth
	<i>Soe</i>	Enterprise nature, state-owned enterprises take the value of 1, otherwise 0
	<i>PPE</i>	Proportion of tangible assets, equals to $(\text{inventory} + \text{fixed assets}) / \text{total assets}$
	<i>TATR</i>	Asset turnover ratio, equals to $\text{operating income} / \text{total assets}$
	<i>Cash</i>	Cash ratio, equals to $\text{net cash flow from operating activities} / \text{total assets}$
	<i>Risk</i>	Enterprise risk, rolling standard deviation of total net asset margin for five consecutive years
	<i>Age</i>	Issue time, equals to the difference between the current year minus the year to market
	<i>Top1</i>	Shareholding concentration, percentage of shares held by the largest shareholder

4. Empirical Analysis

4.1. Descriptive Statistical Analysis

The results of descriptive statistical analysis are seen in Table 2, which shows that the mean value of debt cost (Debt) is 6.025%, the median is 5.374%, and the standard deviation is 4.269, indicating that there are some differences among listed companies in China. The mean value of financial sharing is 0.041, indicating that about 4.1% of listed companies have implemented financial sharing. The mean value of the level of surplus

manipulation is 0.052, the median value is 0.031, the minimum value is 0, and the maximum value is 7.092, which indicates that there is a large difference in the quality of accounting information among listed companies. The mean value of Zscore is 4.823, which is greater than 2.675, indicating that the overall financial condition of listed companies is better and the possibility of bankruptcy is less. The mean value of the degree of enterprise digitalization (Digital1) is 0.795, the median value is 0, and the maximum value is 5.823, indicating that there is a large degree of variation in the degree of digitalization among different enterprises. The mean value of regional digitalization (Digital2) is 0.147 and the standard deviation is 0.163, indicating a regional imbalance in the level of digital economic development in China. In addition, the values of other control variables in this paper are in general agreement with the existing literature [2,7] and are within the normal range.

Table 2. Descriptive statistics results.

Variable	Mean	p50	min	max	Sd	N
Debt	6.025	5.374	0.610	34.690	4.269	13313
FSSC	0.041	0.000	0.000	1.000	0.198	13313
DA	0.052	0.031	0.000	7.092	0.121	13313
Zscore	4.823	2.810	−0.118	37.234	6.150	13313
Digital1	0.795	0.000	0.000	5.823	1.264	13313
Digital2	0.147	0.0870	0.0110	0.745	0.163	13313
Lnsale	21.950	21.790	16.390	28.690	1.375	13313
Lev	0.481	0.482	0.095	0.887	0.191	13313
ROA	0.037	0.033	−0.194	0.198	0.052	13313
Growth	0.189	0.111	−0.542	2.783	0.431	13313
Soe	0.458	0.000	0.000	1.000	0.498	13313
PPE	0.387	0.378	0.029	0.816	0.179	13313
TATR	0.706	0.574	0.005	9.516	0.575	13313
Cash	0.044	0.042	−0.169	0.239	0.067	13313
Risk	0.033	0.024	0.001	0.666	0.033	13313
Age	12.400	12.000	3.000	24.000	5.902	13313
Top1	0.343	0.322	0.088	0.750	0.150	13313

4.2. The Effect of Financial Sharing on the Cost of Debt Capital of Firms

First, to test hypothesis 1a and hypothesis 1b and verify the effect of financial sharing on the cost of debt capital of firms, we apply model (1) for empirical testing. The empirical results are shown in Table 3; columns (1) and (2) of Table 3 show that financial sharing and debt cost have a significant negative relationship, regardless of controlling for industry and year, indicating that the implementation of financial sharing can significantly reduce the debt cost. Hypothesis 1a is verified.

4.3. Robustness Tests

To ensure the robustness of the conclusion of the main Hypothesis (H1a), a series of robustness tests was conducted for this paper.

First, replacing the explained variables, we re-measured the cost of corporate debt capital by interest expense/(short-term borrowing + long-term borrowing + long-term borrowing due within one year), respectively, and also replace the current period with the cost of corporate debt capital in the future period, put it into model (1) and re-ran the regression. The regression results are shown in column (1) and (2) of Table 4, and the regression coefficient of financial sharing and cost of debt capital remains significantly negative, which again verifies hypothesis 1A.

Table 3. Financial sharing and the cost of corporate debt.

	(1)	(2)
	Debt	Debt
FSSC	−0.295 ** (−2.15)	−0.283 ** (−2.05)
Digital2	−0.971 *** (−4.34)	−0.498 ** (−2.13)
Lnsale	−0.311 *** (−8.81)	−0.300 *** (−8.16)
Lev	−1.438 *** (−5.05)	−1.085 *** (−3.60)
ROA	−3.672 *** (−3.68)	−2.617 ** (−2.52)
Growth	0.267 ** (2.33)	0.448 *** (3.96)
Soe	−0.145 * (−1.70)	−0.278 *** (−3.11)
PPE	−1.852 *** (−8.18)	−1.454 *** (−5.90)
TATR	1.272 *** (13.06)	0.986 *** (9.75)
Cash	2.417 *** (3.80)	1.739 *** (2.67)
Risk	3.476 *** (2.85)	2.520 ** (2.12)
Age	0.017 ** (2.29)	0.040 *** (5.04)
Top1	−0.145 (−0.53)	0.059 (0.21)
_cons	13.283 *** (19.38)	12.116 *** (16.35)
Industry	NO	YES
Annual	NO	YES
N	13313	13313
R ²	0.049	0.072
adj. R ²	0.048	0.069
F	39.483	35.688

Note: ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively, with the corresponding *t*-values in parentheses.

Secondly, to overcome the endogeneity problem caused by the sample self-selection bias of the model, a Heckman two-stage regression is conducted in this study. In the first stage, a probit model of financial shared choice was constructed, and the inverse Mills ratio (IMR) was calculated. In the second stage, IMR was added to model (1) as a control variable to control for possible sample selection bias. The regression results, as shown in column (5) of Table 4, show that the IMR is not significant, indicating that there is no self-selection bias in the sample, again demonstrating the robustness of the conclusion of hypothesis 1a.

Thirdly, propensity score matching (PSM) can effectively address the endogeneity problem caused by possible omitted variables. Although this study has controlled for common variables, the problem of omitted variables may still exist. Therefore, this study will further adopt the PSM method to obtain a total of 1065 samples from the treatment and control groups after 1-to-1 nearest neighbor matching. The relationship between financial sharing and corporate cost of debt capital is tested again using the matched samples, and the results are shown in column (5) of Table 4. The regression coefficient of financial sharing and cost of debt capital remains significantly negative at the 5% level. Hypothesis 1a is verified.

Table 4. Robustness tests.

	Replace the Explained Variable		Heckman Two-Stage Regression		PSM	Replaced Sample	Placebo Test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Debt	Debt	FSSC	Debt	Debt	Debt	Debt
FSSC	−1.942 ** (−1.98)	−0.210 ** (−2.12)		−0.281 ** (−1.99)	−0.674 ** (−2.49)	−0.285 * (−1.95)	−0.087 (−0.49)
Digital2	−2.132 * (−1.80)	−0.007 *** (−5.13)	0.363 *** (2.86)	−0.534 (−0.95)	0.660 (1.02)	−0.298 (−1.16)	−0.504 ** (−2.16)
Lnsale	1.179 ** (2.27)	−0.001 *** (−7.84)	0.424 *** (21.86)	−0.342 (−0.59)	−0.521 *** (−6.13)	−0.242 *** (−5.21)	−0.313 *** (−8.83)
Lev	−3.971 * (−1.75)	0.044 *** (27.22)	−0.840 *** (−5.37)	−1.002 (−0.86)	0.492 (0.53)	−1.012 *** (−2.80)	−1.064 *** (−3.54)
ROA	13.902 (1.35)	−0.047 *** (−9.36)	−0.871 * (−1.69)	−2.533 * (−1.65)	7.419 ** (2.04)	−1.466 (−1.17)	−2.588 ** (−2.49)
Growth	−0.504 (−1.21)	0.000 (0.57)	−0.068 (−1.24)	0.455 *** (3.16)	0.183 (0.56)	0.370 *** (2.96)	0.451 *** (3.98)
Soe	0.339 (0.78)	−0.005 *** (−11.34)	−0.273 *** (−5.36)	−0.251 (−0.63)	−0.094 (−0.27)	−0.324 *** (−2.78)	−0.272 *** (−3.05)
PPE	−2.852 *** (−3.65)	0.022 *** (17.89)	−0.775 *** (−5.73)	−1.377 (−1.25)	−1.512 * (−1.79)	−1.050 *** (−3.40)	−1.440 *** (−5.85)
TATR	−1.439 * (−1.71)	0.001 ** (2.09)	−0.195 *** (−4.79)	1.005 *** (3.57)	1.159 *** (4.83)	0.773 *** (6.58)	0.993 *** (9.83)
Cash	3.904 (0.97)	0.016 *** (5.12)	0.785 ** (2.07)	1.660 (1.32)	0.887 (0.31)	1.323 (1.54)	1.719 *** (2.64)
Risk	7.122 (1.10)	−0.006 (−0.74)	−1.638 ** (−2.51)	2.683 (1.06)	−3.706 (−0.81)	6.431 *** (3.63)	2.566 ** (2.16)
Age	0.038 ** (2.47)	0.000 *** (3.88)	0.022 *** (5.63)	0.038 (1.16)	0.032 (1.39)	0.036 *** (3.84)	0.040 *** (4.99)
Top1	3.157 * (1.73)	−0.008 *** (−6.08)	0.138 (0.91)	0.045 (0.14)	0.054 (0.07)	0.314 (0.86)	0.051 (0.19)
IMR		0.027 *** (7.35)		−0.114 (−0.07)			
_cons	−23.793 ** (−2.13)	0.027 *** (7.35)	−10.617 *** (−27.69)	13.240 (0.85)	16.904 *** (7.66)	11.512 *** (11.93)	12.368 *** (17.33)
N	13313	13024	13313	13313	1065	9071	13313
R ²	0.006	0.236		0.072	0.121	0.055	0.072
adj. R ²	0.003	0.234		0.069	0.091	0.052	0.069
F	1.309	87.837		35.352	22.660	23.876	35.598

Note: ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively, with the corresponding *t*-values in parentheses.

Fourthly, the regression sample was also replaced in this study. Since the number of companies implementing financial sharing was small and growing slowly before 2014, while the number of companies implementing financial sharing began to increase rapidly starting from 2014, this study kept only the sample from 2014 and beyond for the regression test, and the results are shown in column (6) of Table 4, where the negative relationship between financial sharing and the cost of debt capital of enterprises is still significant. Hypothesis 1a is verified.

Fifthly, given that the implementation of financial sharing may only be an incidental event that affects the cost of debt capital of firms, the factors that really lead to the reduction in the cost of debt capital of firms are not truly observed. To control for certain unobserved individual factors, a placebo test is conducted in this study. The specific steps are as follows: (i) randomly assign the explanatory variable financial sharing (FSSC) to each listed company; (ii) regress the randomly assigned FSSC on the corresponding debt capitalization; (iii) repeat steps (i) and (ii) 1000 times. Column (7) of Table 4 shows that the regression coefficient between financial sharing and the cost of corporate debt capital is no longer

significant, thus indicating that it is indeed financial sharing, rather than other factors, that affects the cost of corporate debt capital. Hypothesis 1a is again verified.

4.4. Path Mechanisms of Financial Sharing Affecting the Cost of Debt Capital of Firms

In order to test Hypotheses 2 and 3, the path mechanism of financial sharing affecting the cost of debt capital of enterprises is explored. We applied model (2) and model (3) for empirical testing, and the empirical results are shown in Table 5. Columns (1) and (2) of Table 5 show that there is a significant mediating effect of accounting information quality in the relationship between financial sharing and firms' cost of debt capital, and the Sobel Z test shows that the mediating effect is -0.014 , which is significant at the 1% level, indicating that financial sharing can reduce firms' cost of debt by significantly improving the quality of accounting information. Columns (3) and (4) of Table 5 show that there is also a significant mediating effect of financial risk in the relationship between financial sharing and corporate cost of debt capital, and the Sobel Z test shows that the mediating effect is -0.011 , which is significantly negative at the 5% level, indicating that financial sharing can also contribute to the reduction of corporate cost of debt capital by reducing financial risk. The above results collectively suggest that financial sharing can reduce information asymmetry between parents and subsidiaries and between enterprises and creditors by improving the quality of accounting information, and reduce creditors' concerns by reducing inter-group financial risks so that they are willing to lend funds at a lower price, which in turn promotes the reduction of the debt cost. The above empirical results show that accounting information quality and financial risk play a significant mediating role in the relationship between financial sharing and the cost of corporate debt capital, and Hypotheses 2 and 3 are verified.

Table 5. Path mechanisms of financial sharing affecting the cost of debt capital of firms.

	(1)	(2)	(3)	(4)
	Zscore	Debt	DA	Debt
FSSC	-0.012^{***} (-3.83)	-0.273^{**} (-1.98)	-0.023^{**} (-2.10)	-0.268^{**} (-2.17)
Zscore		-4.298^{***} (-3.50)		
DA				0.353^{**} (2.30)
Digital2	0.003^{**} (2.28)	-0.500^{**} (-2.14)	0.004^{**} (2.14)	-0.503^{**} (-2.15)
Lnsale	0.011^{***} (5.61)	-0.304^{***} (-8.24)	-0.051^{***} (-108.10)	-0.083 (-1.10)
Lev	0.016 (1.11)	-1.090^{***} (-3.62)	0.264^{***} (98.64)	-2.222^{***} (-4.95)
ROA	-0.540^{***} (-11.63)	-2.426^{**} (-2.33)	-0.028^{***} (-3.33)	-2.450^{**} (-2.36)
Growth	-0.018^{***} (-3.08)	0.455^{***} (4.01)	-0.000 (-0.53)	0.446^{***} (3.97)
Soe	-0.039^{***} (-7.84)	-0.265^{***} (-2.94)	0.001^{**} (1.98)	-0.280^{***} (-3.13)
PPE	-0.113^{***} (-9.02)	-1.414^{***} (-5.74)	0.016^{***} (7.87)	-1.526^{***} (-6.19)
TATR	-0.010^{**} (-2.22)	0.989^{***} (9.78)	0.046^{***} (24.72)	0.793^{***} (6.77)
Cash	-0.145^{***} (-4.33)	1.790^{***} (2.74)	0.063^{***} (12.44)	1.476^{**} (2.25)
Risk	-0.032 (-0.60)	2.531^{**} (2.12)	-0.021 (-1.49)	2.576^{**} (2.17)
Age	-0.001^{*}	0.040^{***}	-0.000^{**}	0.040^{***}

Table 5. Cont.

	(1)	(2)	(3)	(4)
	Zscore	Debt	DA	Debt
Top1	(−1.70) −0.026 *	(5.06) 0.068	(−1.97) −0.006 ***	(5.02) 0.073
_cons	(−1.79) 4.410 *** (104.82)	(0.25) 10.560 *** (10.84)	(−2.64) 0.884 *** (97.47)	(0.26) 8.313 *** (6.07)
indirect effect	−0.014 ***		−0.011 **	
direct effect	−0.269 **		−0.275 **	
Total effect	−0.283 **		−0.286 **	
N	13313	13313	13313	13313
R ²	0.819	0.073	0.089	0.072
adj. R ²	0.818	0.070	0.087	0.070
F	759.567	35.972	37.169	34.946

Note: ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively, with the corresponding *t*-values in parentheses.

4.5. The Moderating Role of Enterprise Digitalization

Finally, to test Hypotheses 4a and 4b, we further investigate the moderating role of corporate digitalization in the relationship between financial sharing and corporate cost of debt capital. We apply model (4) for empirical testing. The empirical results are shown in Table 6. The coefficient of FSSC is significantly negative at the 10% level, and the coefficient of FSSC $\times$ Digital1 is also significantly negative at the 10% level, indicating that corporate digital transformation can strengthen the moderating effect of financial sharing on corporate debt cost reduction, and hypothesis 4a is also verified.

Table 6. The moderating effect of enterprise digitalization.

	(1)
	Debt
FSSC	−0.032 ** (−2.23)
Digital1	−0.069 * (1.80)
FSSC $\times$ Digital1	−0.209 *** (−2.61)
Digital2	−0.564 ** (−2.36)
Lnsale	−0.305 *** (−8.28)
Lev	−1.078 *** (−3.58)
roa	−2.628 ** (−2.53)
Growth	0.445 *** (3.91)
Soe	−0.269 *** (−2.96)
PPE	−1.393 *** (−5.57)
TATR	0.984 *** (9.79)
Cash	1.787 *** (2.74)
Risk	2.547 ** (2.14)

Table 6. Cont.

	(1)
	Debt
Age	0.041 *** (5.17)
Top1	0.065 (0.24)
_cons	12.150 *** (16.43)
N	13313
R ²	0.073
adj. R ²	0.070
F	34.143

Note: ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively, with the corresponding *t*-values in parentheses.

5. Further Analysis

The implementation of financial sharing closely integrates the firm with its stakeholders [14], and it is necessary to further examine the impact of financial sharing on the cost of debt capital of the firm based on the stakeholders' perspective.

Firstly, from a shareholder's perspective, a good level of corporate governance is an effective tool to reduce information asymmetry between the enterprise and debtors and can reduce adverse selection by creditors, which in turn can help reduce the debt cost [50]. Second, from the stakeholders' overall perspective, companies with better social responsibility fulfillment have higher stakeholder protection, higher social reputation [51], easier access to external financing, and less financing pressure [32]. Based on the above analysis, this paper groups the samples according to the degree of equity checks and balances and the degree of social responsibility fulfillment, respectively. The empirical results are shown in Table 7.

Table 7. Further analysis based on the stakeholders' perspective.

	Equity Balance		Degree of Social Responsibility Fulfillment	
	Strong	Weak	High	Low
	(1) Debt	(2) Debt	(3) Debt	(4) Debt
FSSC	−0.470 *** (−2.66)	−0.141 (−0.64)	−0.492 ** (−2.14)	−0.185 (−1.11)
Digital2	0.053 (0.15)	−1.026 *** (−3.47)	−0.259 (−0.53)	−0.626 ** (−2.37)
Lnsale	−0.400 *** (−7.69)	−0.202 *** (−3.78)	−0.254 *** (−4.38)	−0.296 *** (−6.10)
Lev	−0.949 ** (−2.04)	−1.261 *** (−3.24)	−1.648 *** (−3.16)	−0.631 * (−1.71)
ROA	−1.176 (−0.77)	−3.880 *** (−2.79)	3.600 * (1.86)	−4.219 *** (−3.26)
Growth	0.573 *** (3.60)	0.282 * (1.76)	0.346 * (1.95)	0.533 *** (3.68)
Soe	−0.386 *** (−3.04)	−0.145 (−1.14)	0.034 (0.22)	−0.432 *** (−3.87)
PPE	−1.147 *** (−3.09)	−1.694 *** (−5.08)	−1.839 *** (−4.87)	−0.984 *** (−3.07)
TATR	1.114 *** (7.00)	0.834 *** (6.68)	1.032 *** (5.38)	0.912 *** (7.61)

Table 7. Cont.

	Equity Balance		Degree of Social Responsibility Fulfillment	
	Strong	Weak	High	Low
	(1) Debt	(2) Debt	(3) Debt	(4) Debt
Cash	0.899 (0.89)	2.638 *** (3.16)	1.112 (1.17)	1.145 (1.30)
Risk	3.631 ** (2.35)	0.215 (0.11)	−2.913 ** (−2.27)	5.787 *** (3.06)
Age	0.053 *** (4.53)	0.027 ** (2.48)	0.036 ** (2.45)	0.038 *** (3.94)
Top1	0.426 (0.81)	0.073 (0.18)	0.284 (0.65)	−0.119 (−0.34)
_cons	13.984 *** (13.40)	10.158 *** (9.53)	10.967 *** (8.98)	13.045 *** (13.51)
N	6695	6618	4556	8757
R ²	0.080	0.074	0.115	0.052
adj. R ²	0.075	0.068	0.107	0.048
F	21.208	13.40	25.168	12.041

Note: The degree of equity balance is obtained by the sum of the shareholding ratio of the first largest shareholder/the shareholding ratio of the second to tenth largest shareholder and grouped according to the median; the degree of social responsibility fulfillment uses the CSR index in Hexun.com (<https://www.hexun.com/>, accessed on 15 December 2022), grouped according to the median. ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively, with the corresponding *t*-values in parentheses.

Columns (1)–(2) of Table 7 show that the effect of financial sharing on reducing firms' debt cost is more pronounced when equity checks and balances are strong. It indicates that when corporate governance is better, financial sharing is more effective in reducing information asymmetry and agency costs, which, in turn, is more helpful in reducing the debt cost. Columns (3)–(4) of Table 7 show that the effect of financial sharing on reducing the debt cost is also more pronounced when the degree of social responsibility fulfillment is higher. The above regression results show that, on the one hand, when shareholders, society, and other stakeholders have a higher degree of protection, it is more conducive to the implementation and enforcement of financial sharing; on the other hand, at this time, the implementation of financial sharing is more conducive to alleviating the information asymmetry between enterprises and creditors, reducing the operational risk of enterprises, which in turn promotes the reduction of the cost of debt capital.

6. Research Conclusions and Implications

6.1. Conclusions

Under the digitalization background, this paper takes a sample of Chinese A-share listed companies from 2009–2018 and empirically examines the impact of financial sharing on the debt cost. The results of the study indicate that financial sharing can reduce the debt cost. The path mechanism test finds that financial sharing reduces the cost of debt mainly by improving the quality of accounting information and reducing financial risk. The moderating effect shows that the digital transformation of enterprises can strengthen the effect of financial sharing on reducing the cost of debt. Further analysis based on the stakeholders' perspective finds that the effect of financial sharing on reducing the cost of debt capital is also more significant when there is a higher degree of equity checks and balances and a higher degree of social responsibility fulfillment.

6.2. Theoretical Implications

This paper make several contributions based on the research on digital transformation of enterprises and cost of debt capital. Firstly, this study highlights that enterprise digitalization drives both business digital transformation and financial digital transformation.

While a large number of studies have focused on business digital transformation and its impact on the efficiency of capital use and stakeholders such as shareholders, customers, suppliers, regulators, and the public, less attention has been paid to the impact of financial digitalization on capital regulation and security and the impact on creditor protection. This paper explores the impact of financial sharing on the cost of debt capital of enterprises, which not only makes up for the lack of research related to financial digitalization and enterprise creditor protection, but also enriches the research related to the cost of debt capital. Secondly, it enriches stakeholder research. Based on the stakeholders' perspective, this paper further explores the impact of financial sharing on the cost of corporate debt under different degrees of shareholder conflict and corporate social responsibility fulfillment, and improves the research on the influencing factors of stakeholder protection under different scenarios.

6.3. *Impact on Practice*

This study has important practical implications. Firstly, digitalization can empower both business and finance, and enterprises should actively use digital technology to build a financial sharing platform, and should give full play to the advantages of financial sharing in information integration and management control through process reengineering and financial integration, optimize internal capital allocation, continuously improve debt management, and realize refined cost management, thus promoting the well-ordered development of the enterprise group. Secondly, financial sharing is also conducive to strengthening the protection of creditors' rights and interests while achieving financial cost savings. Enterprises should give full play to the information governance and risk control functions of financial sharing and make it serve the financial decision-making and stakeholders of the enterprise, ultimately achieving the harmonious unification of economic and social values. Thirdly, the digital transformation of finance, as an important part of the digital transformation of enterprises, is an important guarantee for high-quality development of enterprises in the digital era. Enterprises should steadily promote their own financial digital transformation through financial shared services and accelerate the overall digital transformation process of the enterprise.

6.4. *Shortcomings and Extensions*

The study may have the following shortcomings. Due to the limited number of listed companies currently implementing financial sharing and the fact that financial sharing involves company trade secrets, the limited data on financial sharing available in this paper leads to a single way of measuring financial sharing. Thus, it is impossible to make detailed distinctions within the core independent variable (financial shared services) based on the scale of investment, the degree of construction, and implementation. In the future, as the number of companies implementing financial sharing services grows and the voluntary disclosure of financial sharing implementation by companies improves, we will conduct an in-depth measurement of financial shared services in order to deepen the research related to financial shared services. As the scope and impact of financial sharing implementation continues to grow, in addition to the social responsibility of creditors, financial sharing will also have a profound impact on the social responsibility of stakeholders, such as shareholder responsibility, employee responsibility, and public responsibility. We will gradually expand the research related to financial sharing and corporate debt costs to the whole corporate social responsibility research area in the future.

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