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Data Resources Empowering Enterprise Financial Activities and Financing Costs: An Empirical Analysis

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Abstract: With the rapid development of China's digital economy, at present, harnessing the power of data resources has become a key factor in the improvement of enterprise competitiveness and financial health. The economic effect of the use of data resources on the financial activities and financing costs of enterprises will be studied in this paper. Based on the theory of information asymmetry and the resource-based view of the firm, we believe that enterprises with strong data resource capabilities can reduce information asymmetry with creditors and investors to lower both the cost of debt and the cost of equity. Based on the panel data of 1,654 Chinese A-share listed companies from 2020 to 2023, and after obtaining 5,847 firm-year observations, we construct a Data Resource Index to measure the data resource intensity of enterprises. OLS regression with industry and year fixed effects shows that a 1 standard deviation increase in the Data Resource Index is associated with a 0.20% decrease in the cost of debt and a 0.43% drop in the cost of equity. Due to various reasons, although the financing costs of non-state-owned enterprises have fallen to some extent, they still have a higher degree of information asymmetry than that for state-owned enterprises. The above results provide new empirical evidence of the financial value of data resources and offer some references for the strategies of digital transformation in enterprises, capital market disclosure regulations, etc.

1. Introduction

The Digital Economy has changed the Competition of enterprises around the world. Data has been officially included in the list of new factors of production for the Digital Economy in China according to the Fourteenth Five-Year Plan, and regulatory departments have promoted the institutionalisation of data resources via specific accounting rules. In August 2023, the Ministry of Finance released the Interim Regulations on Accounting Treatment of Enterprise Data Resources; it took effect on January 1, 2024, and this will be an important change in how enterprises recognise, measure and report data assets in their balance sheets. Therefore, it can be asked what impact the data resource has on a company's financial activities and how changes in financing costs will occur.

Financing cost is one of the most typical forms that affects a company's value and use of capital. High financing costs will limit investment in research and development and weaken the overall competitiveness of the company. The financial economics community has long believed that the reason for higher financing costs at enterprises and other parties in the capital market is information

asymmetry [1][2]. When creditors and equity investors do not have enough information on a company's operating conditions, risk factors and future plans, they are more reluctant to lend or invest due to uncertainty [3]. The difference between the true cost of capital and the actual financing rate paid is a significant welfare loss that obstructs the efficient allocation of capital in the economy.

The Data Resource is an important way to reduce the problem of information asymmetry. Firms with extensive data accumulation and superior data management capabilities can substantially improve their internal information environment. This enables them to produce more accurate operational forecasts, reduce earnings volatility, and provide external stakeholders with credible signals of firm performance and risk, thereby mitigating information asymmetry[4] [5].

Data resources have gradually gained some attention in the digital economy, but how they are connected with corporate financing costs has not been studied systematically so far. Most studies on the impact of digitalisation on capital structure have used a single indicator of IT investment or a general index of digitalisation and have not taken into account the different reasons within enterprises related to data resources [7-8]. With the 2023 amendment to China's Accounting Standards, a good policy environment has been created for the valuation of capital market value of data-resource disclosures. Based on the institutional environment mentioned above, this paper will first organise the data from various sources and financing costs of enterprises. The remainder of this paper is as follows: Section 2 is the review of related literature and research hypotheses; Section 3 is the design of the study; Section 4 presents empirical results; Section 5 discusses the implications of the results; and Section 6 is the conclusion.

2. Literature Review and Hypotheses

2.1 Information Asymmetry and the Cost of Capital

The theoretical foundation for this study rests on information asymmetry theory. Akerlof[6]demonstrated that quality uncertainty arising from information gaps between buyers and sellers can lead to adverse selection and market failure. Applied to credit markets, Stiglitz and Weiss[2]showed formally that information asymmetry causes credit rationing and raises borrowing costs: lenders cannot perfectly distinguish high-quality borrowers from risky ones and respond by raising interest rates uniformly. Myers and Majluf[1]formalized the pecking order theory, establishing that information asymmetry between corporate insiders and outside investors creates an underpricing discount that makes external financing systematically more costly than internal financing.

In capital market settings, Easley and O'Hara[3]demonstrated theoretically that firms with greater information heterogeneity between informed and uninformed investors face higher costs of capital, as uninformed investors require compensation for the risk of adverse selection. Lambert, Leuz, and Verrecchia[4] extended this argument by showing that accounting information quality affects the cost of capital through two channels: changing investors' assessments of future cash flow distributions and reducing the component of risk that cannot be diversified. Botosan[5] provided empirical evidence that voluntary disclosure quality is negatively associated with the cost of equity capital, particularly for firms with lower analyst coverage, confirming that information transparency has measurable capital market benefits.

2.2 Data Resources and Enterprise Finance

The literature of financial economics has begun to study the strategic value of intangible assets and digital capabilities. Lev [9] believes that the old accounting system has systematically understated the amount of intangible assets, such as information systems and data management

capabilities, and as a result, there has been a prolonged gap between book value and market value. Due to the different values, the cost of capital for companies with a large amount of unrecognised intangible assets has increased; thus, accounting standard-setters are strengthening the recognition and measurement of data assets. Aboody and Lev [11] have found that companies with a large amount of unregistered intangible assets are relatively more informationally asymmetric, and thus, the benefits from insider trading and the cost of external financing are higher.

Goldfarb and Tucker [7] are of the view that digital goods are non-rivalrous, can produce continuous, real-time performance data with nearly zero marginal costs, and are therefore a type of information structure distinct from that of physical goods and capital. Brynjolfsson and Hitt [8] have found that enterprise investment in IT can enhance productivity; at the same time, to achieve this increase in productivity, a firm needs to make other investments in data analysis and human resources. Berger and Udell [12] pointed out that the information asymmetry of small and new enterprises is relatively high; therefore, good signs of their operating conditions can significantly lower financing costs. The above theory and practice together indicate that, through the provision of audit data, companies can enhance the credibility of their operations and thus reduce the information cost of both debt and equity financing.

2.3 Hypotheses Development

Based on the above theoretical and empirical results, we put forward the following three hypotheses. First, enterprises with a high intensity of data resources will have a lower cost of debt financing because the quality of borrower signals will be better and adverse selection in the credit market will be reduced by data assets (H1). Second, a company that is more reliant on data will have a lower cost of equity because it can obtain more information about all kinds of problems and thus requires a smaller risk premium from shareholders (H2). Thirdly, the reduction in financing costs achieved through the use of data resources will be much higher for non-state-owned enterprises as they do not have implicit government credit guarantees and need to rely more on public information signals in the market (H3).

3. Research Design

3.1 Sample Selection and Data Sources

The sample comprises A-share listed companies on the Shanghai and Shenzhen Stock Exchanges over the period 2020 to 2023. Data resource disclosure information is collected from annual reports through text mining of the management discussion and analysis sections, supplemented by the formal data resource balance sheet disclosures available from fiscal year 2023 onward following the implementation of the Interim Regulations on Accounting Treatment of Enterprise Data Resources[10]. Financial accounting data are obtained from the China Stock Market and Accounting Research (CSMAR) database. We exclude financial and insurance firms due to their distinct capital structure characteristics, firms with missing key financial variables for any year in the sample period, and firm-years with negative equity or extreme outliers in key variables (beyond the 1st and 99th percentiles). After applying these filters, the final sample contains 1,654 unique listed companies and 5,847 firm-year observations.

3.2 Variable Measurement

We employ two complementary measures of financing cost. The cost of debt (COD) is calculated as total interest expense in the income statement divided by the average of beginning-of-

period and end-of-period interest-bearing liabilities, capturing the effective rate paid on total debt obligations (Formula 1). The cost of equity (COE) is estimated using the price-earnings-growth (PEG) ratio model, which relates forward-looking earnings growth to current market price and is widely used in Chinese capital market research (Formula 2). Analyst earnings per share forecasts are sourced from the China Stock Market and Accounting Research database.

The Data Resource Index (DRI) is constructed to capture enterprise data resource intensity. For fiscal year 2023 observations, DRI equals the ratio of formally disclosed data resource assets (as recognized under the 2023 accounting standard) to total assets. For earlier observation years, DRI is approximated using a principal components analysis of three sub-indicators: the ratio of intangible assets attributable to software and information systems to total assets, the cumulative number of data-related patent applications filed by the firm, and the proportion of information technology capital expenditure in total capital expenditure. The first principal component, explaining 58.4% of the combined variance, is used as the pre-standard DRI proxy and is standardized to be directly comparable with the post-standard DRI measure.

Control variables include the natural logarithm of total assets (Size) to capture firm scale; total liabilities to total assets (Lev) to control for financial leverage; net income to total assets (ROA) to measure profitability; the year-over-year revenue growth rate (Growth) to account for business momentum; the natural logarithm of years since initial public offering (Age) as a proxy for firm maturity; and a binary indicator for state ownership (SOE), defined as more than 50% of shares held by state entities, which controls for the differential access to bank credit enjoyed by state-owned enterprises. Table 1 provides variable definitions and descriptive statistics for all variables.

3.3 Model Specification

To test our three hypotheses, we estimate the following panel data regression model with both industry and year fixed effects (Formula 3). Industry fixed effects at the two-digit classification level control for unobserved time-invariant industry characteristics that may affect both data resource adoption and financing costs. Year fixed effects control for economy-wide shocks and macroeconomic trends common to all firms. Standard errors are clustered at the firm level to address within-firm serial correlation.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 is the definition and descriptive statistics of variables in the full sample. The mean DRI is 0.034 and the standard deviation is 0.028; therefore, data resources account for about 3.4% of the total assets of the company on average. It is right-skewed, and the maximum value of 0.187 shows that the firms' data resource intensity is distributed unevenly. The mean cost of debt (COD) is 4.2%, which is generally in line with the financing rates of many Chinese corporate bonds and loans. The mean cost of equity (COE) is 9.2 per cent. The proportion of SOEs in the sample is 41.2 per cent, and the proportion of non-SOEs is 58.8 per cent; both are relatively large.

4.2 Baseline Regression Results

We estimate the baseline OLS regression model with industry and year fixed effects to examine the relationship between data resource intensity and financing costs. Across all specifications, the coefficient on DRI is negative and statistically significant at the conventional level. In the fully specified model, the DRI coefficient for COD is -0.072 ($t = -3.24$, $p < 0.01$); for COE, it is -0.154 (t

= -4.12, p < 0.01). Given the DRI standard deviation of 0.028, a one-standard-deviation increase in data resource intensity is associated with a reduction of approximately 0.20 percentage points in COD and 0.43 percentage points in COE. These findings strongly support H1 and H2, confirming that firms with greater data resource capabilities enjoy lower financing costs.

Regarding control variables, firm size (Size) is negatively associated with both financing costs, consistent with the notion that larger enterprises benefit from greater information transparency and market recognition. Leverage (Lev) exhibits a positive coefficient across all columns, reflecting higher financial risk and default probability associated with increased debt levels. Profitability (ROA) is negatively correlated with financing costs, as high-profit firms tend to have lower credit risk and thus command lower risk premiums. Revenue growth (Growth) and firm age (Age) are not statistically significant in most specifications. The SOE dummy is negative and marginally significant, suggesting that state-owned enterprises benefit from implicitly lower financing costs due to government backing. The model yields adjusted R^2 values of approximately 0.218 for COD and 0.247 for COE, indicating reasonable explanatory power.

4.3 Heterogeneity Analysis

To test H3, we split the sample by ownership type and re-estimated the baseline model. Table 3 presents the results for the two subgroups. In the non-SOE subsample, the coefficient on DRI is -0.098 (t = -3.87, p < 0.01) for COD and -0.196 (t = -4.31, p < 0.01) for COE. In the SOE subsample, the corresponding coefficients are -0.041 (t = -1.48, p > 0.10) for COD and -0.087 (t = -1.92, p = 0.06) for COE, indicating substantially weaker and often statistically insignificant effects. A Chow test for the equality of DRI coefficients between subgroups yields F = 4.23 (p < 0.05) for COD and F = 3.91 (p < 0.05) for COE, confirming statistically significant differences. These results are consistent with H3: data resources deliver greater financing cost reductions for non-SOEs, where investors and creditors must rely more heavily on publicly available information rather than the implicit quality guarantee of state ownership. In non-SOE settings, data transparency functions as a credibility substitute for government backing.

4.4 Robustness Tests

Table 4 presents four robustness checks to verify the reliability of the main findings. In Column (1), we use the one-year-lagged DRI (DRI_{t-1}) as the independent variable to address potential reverse causality, under the assumption that financing costs in year t cannot cause data resource investment in year t-1. The coefficient remains significantly negative (COD: -0.068, t = -3.01, p < 0.01). In Column (2), we replace the cost of debt with the inverse of the interest coverage ratio as an alternative financing cost proxy, yielding consistent results. In Column (3), we include additional controls for board size, institutional shareholding ratio, and R&D intensity; the coefficient on DRI is materially unchanged. Column (4) restricts the sample to fiscal years 2022 and 2023, when data resource disclosures are more mature and standardized; the coefficient magnitudes increase slightly, suggesting that cleaner measurement of the DRI strengthens the estimated effect. Collectively, these robustness checks confirm that the negative association between data resource intensity and financing costs is a robust empirical regularity.

5. Discussion

Based on the above empirical results, it is proposed that the information asymmetry channel is the main path of influence of data resources on financing costs. By providing more rich and reliable operational data for the company, it will be easier for creditors and equity investors to judge the

health of the company and how it will distribute funds in the future; thus, less information asymmetry and a lower financing premium will arise. This mechanism is more characteristic of non-SOEs; that is to say, without the implicit government credit guarantee, market participants need to be guided by more obvious information signals and are therefore required to have a high degree of data transparency in the capital market.

The above are in line with the idea of the resource-based view. Data resources of a particular company that are used for its own analysis system and difficult to obtain in a short time are a type of strategic asset that can yield two kinds of dividends: improved operating efficiency by making more rational decisions internally and reduction in capital cost by lowering it. Building upon the previous studies of resources, it has concentrated more on the operational and product-market effects of digital and intangible assets, and also revealed that these assets have visible and significant impacts on capital market indicators.

Based on the above results, it is proposed that China's 2023 data resource accounting rules should be revised. Have enterprises list the data assets in the balance sheet to reduce information asymmetry about the utilisation of data resources and enable creditors and investors to better grasp the risks and value of the investment. Based on the above evidence, it can be concluded that standardised disclosure of data resources will improve the efficiency of capital markets by reducing the average information premium enterprises with large but previously unknown data assets need to pay. The externality will be more favourable to non-SOEs, and in general, these organisations have a relatively high base financing cost; thus, they will pay more attention to reliable information disclosure.

6. Conclusion

Based on the panel data of the 1,654 A-share listed companies in China from 2020 to 2023, this paper studies the economic effect of enterprise data resources on financing costs. The first three are as follows: First, a higher Data Resource Index is significantly and negatively correlated with both the cost of debt and the cost of equity; thus, it can be seen that data resources help reduce the information premium required by creditors and equity investors. An increase of one standard deviation in DRI is associated with a decrease of 0.20% in COD and a decrease of 0.43% in COE. Secondly, the scale of the impact on non-state-owned enterprises is relatively large, and in the absence of implicit credit guarantees from the government, information asymmetry will likely be one of the main reasons for differing financing terms. Third, the results are in line with the other definitions of the alternative variable, added control variables and sample restrictions.

This paper contributes to some sections of the literature. From the perspective of information economics, it can be seen that data resources serve as a way to reduce information asymmetry between enterprises and capital markets; this aligns with the theoretical predictions by Easley and O'Hara and empirical results showing that disclosure quality is related to the cost of capital . In terms of the accounting for intangible assets, the results support Lev's[9] idea that data and information assets are financially significant and that accounting standards which can highlight such assets will enhance the efficiency of capital markets. According to the analysis of the digital economy policies in China above, it is expected that the new data resource accounting standard in 2023 will have a positive capital market externality by reducing information asymmetry for data-intensive enterprises.

There are some restrictions on the range of the present results. The sample period is only four years, which covers the beginning of formal data resource accounting in China, and the DRI construction for the pre-standard years is based on approximations that may contain measurement errors. In addition, only the listed companies in this paper have been included; thus, it may not be

representative of the situation of private and small and medium-sized enterprises that are more susceptible to financing difficulties. In the future, more time will be taken to observe how long the effect of data resource disclosure lasts, and the analysis will also include private enterprises and small and medium-sized enterprises to explore whether data resource disclosure affects specific terms and covenants of debt contracts in other ways besides interest rates. Further research will also be carried out across the country to study the spread of data asset accounting standards in other places.

There are still deficiencies in the above; nevertheless, it will help. Companies should know that data resources are to be employed for the benefit of the company and strengthen their own financial foundation. To reduce borrowing costs and the equity risk premium, firms should improve their financial position by investing in data governance infrastructure, establishing robust data management systems, and developing high-quality data assets. Policymakers should continue to improve the data resource accounting and disclosure system, strengthen the uniformity of standards and increase transparency to extend the positive capital market externalities shown in this study and promote efficient capital allocation for the digital economy.

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