

Uncertain Supply Chain Management

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The technological enhancement and its impact on corporate financial performance in the context of the industrial revolution 4.0: The case of Vietnam

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ABSTRACT

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Businesses play an important role in the economy in most countries. Businesses contribute to increased productivity, output and jobs for the economy. Therefore, governments of countries always create favorable business environments to help businesses operate more efficiently, and thereby contribute to the economy. Transforming the industrial revolution 4.0 has brought businesses certain benefits to operations, improving productivity and efficiency. Using data in real estate businesses, through regression analysis, the research results confirm the technology factor has not yet affected the financial performance of enterprises, which can show that businesses need enough time to absorb technology in production activities to have a change in its output. In addition, there exists the negative relationship of leverage in the business and financial performance. Or it can also be confirmed that enterprises that choose their own capital are often more effective than enterprises that choose capital from loans and external financing. The study also confirms that enterprises with the ability to manage total asset turnover have higher financial efficiency. However, the research shows that interest rates have a negative effect on business operations, businesses with high interest rates have a negative effect on business operations, and vice versa.

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1. Introduction

In today's socio-economic development, the supply chain needs to play a broader role to connect socio-economic activities. A highly developed economy requires a large role of the supply chain, especially the low-cost supply chain that can reduce the transaction costs of businesses and the costs of the economy, thereby improving the performance of businesses and the economy (Kauffman & Mukhopadhyay, 1993). Normally, a country with a high level of development has many large supply enterprises and therefore the economy is well operated and has low supply connection costs and helps businesses reduce a lot of costs that businesses must spend (Kapopoulos & Lazaretou, 2007). The industrial revolution 4.0 has made many changes in improving productivity and operational efficiency for businesses. The achievements of the technological revolution help businesses implement and deploy advanced production techniques, save energy, maintain green growth, and maintain sustainable development (Mwangi et al., 2014). Therefore, businesses have many opportunities and potential to apply technological revolution achievements to increase their operational efficiency, including real estate businesses. Real estate is an important economic sector that contributes a lot to the GDP of the country and is also an industry that creates the physical foundation for society, meeting housing needs and social security. Each country implements a policy of taking care of the development of the real estate market, which means an increase in the contribution of this industry to the economic development of the country, which are steps to help improve the infrastructure. quality and improve the productivity of the economy. Under the influence of the technological revolution, real estate businesses are constantly applying technological advances in production, forming smart, environmentally friendly, and low-energy houses and apartments, promoting sustainable economic growth. In the real estate industry, the industry's supply chain is associated with construction material suppliers, wood and furniture businesses, and plastic, electricity, air-conditioning industries, etc. of the real estate business in

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general. Usually, when the supply chain is optimized, it means that real estate businesses have access to low-cost materials in the industry, then it is easier for businesses to achieve higher profits.

The specificity of the real estate industry is cyclical development, so between the growth stages, the market also reveals inadequacies in the market operation mechanism, the legal system, and the market participants. about the market, about the structure of goods, about transactions, about information, about management. Normally, the growth phase is often associated with the expansion of money supply and credit through falling interest rates, capital inflows, and increased debt flows into construction. When investors can borrow money at low interest rates, they are ready to enter the market and thereby lead to a rapid increase in house and real estate prices. When the market expands, asset bubbles often appear, and so the asset market grows hot and precarious, which affects the macro economy, and the economy can fall into a recession. The real estate crisis can have far-reaching impacts on society: Production and business activities stagnate, causing many businesses to downsize, reducing economic growth. Since the end of 2019 and the beginning of 2020, the global outbreak of the Covid-19 pandemic has increased difficulties for the real estate market. After this period, the market will screen and reposition businesses in the real estate industry clearly, real estate businesses with weak financial backgrounds will find it difficult to survive in the market. Meanwhile, the epidemic is an opportunity for other businesses to restructure to prepare for the next phase soon.

The study of financial performance is studied by many previous studies. Studies provide controversial evidence that capital structure has both positive and negative effects on financial performance. That is, there are businesses that increase the use of leverage, the business performance will increase, but there are other businesses that use increased leverage, the financial performance may decrease. Still, well-run real estate companies can create value, create jobs, drive innovation, and pay taxes from which we all benefit. Having experienced many quiet cycles of the market, businesses have had many strategies such as restructuring their investment portfolios towards centralizing resources, ensuring on-time progress of ongoing projects, positioning products, segments and markets when shifting to developing mid-segment apartments. In addition, businesses are focusing on improving product quality, focusing on serving the real needs of customers. Effective enterprise is also a deeper goal to maintain and contribute more to the economic development of the country.

2. Literature review

Discussing the debt level of enterprises with the social activities of enterprises under the impact of the Covid pandemic and the institutional environment (Qing et al., 2016), Bai and Ho (2022) examined the relationship between corporate social activities (Corporate Social Performance -CSP) and corporate debt levels and explore the channels between them by focusing on the COVID-19 pandemic. The authors used a large sample of public companies from 31 countries from 2002 to 2020. Using pooled ordinary least squares and fixed effects models, after controlling for endogeneity and sampling bias, the authors found that in pre-COVID economic conditions, CSP had a significant positive effect on firm debt levels by reducing financial constraints and increasing participation. by stakeholders. During outbreaks, however, CSPs become more expensive and expose more regulatory problems to companies that weaken those associations. Furthermore, empirical evidence suggests that in countries with a better institutional environment, the debt level relationship of CSP firms is less clear.

Thanks to the ratio of CEO's equity to internal debt and firm performance, Pollock et al. (2023) looked for evidence on the effects of debt and equity compensation. CEO's ownership of firm performance as measured by Tobin's Q. The authors found significant empirical evidence supporting the classical premise of Jensen and Meckling (1976) that managers will receive the debt against the equity premium corresponding to the capital structure of the company. It also provides new evidence that the impact of CEO compensation structure on firm performance depends on the CEO's tenure, as measured by the length of time expected to work until retirement. The authors also showed that the incremental benefit of equity compensation on performance increases with the expected time of CEO retirement. A similar, but insignificant relationship is observed for debt compensation within CEOs, and cash compensation is more beneficial to the company when concentrated near the end of the CEO's term.

Although Bui et al. (2021) studied legal and financial barriers and business growth for small and medium enterprises (SMEs) compared to large enterprises, the growth of the business depends on the size of the business. Specifically, the authors studied the impact of financial and regulatory constraints on firm growth at different firm sizes before and after the global financial crisis (Global Financial Crisis - GFC). Using two enterprise surveys in Vietnam, the authors found that firms with higher financial difficulties had lower revenue and employment growth. The smallest companies are most adversely affected by financial constraints. Regulatory obstacles impede employment growth for small and medium-sized enterprises more than large enterprises, which may be because companies tend to avoid high opium poppy syndrome and scrutiny closely by tax officials. Furthermore, the authors found that the negative effects of financial constraints on revenue growth and employment of small businesses will decrease in the post-GFC period. The authors suggested that a higher percentage of small businesses can get loans from commercial banks after the financial crisis, in part due to the issuance of new policies by the Government of Vietnam to support SMEs.

Assessing solvency versus performance and different organizational and marketing forms in property insurers - US liability is a study by Brockett et al. (2004). Solvency is a primary concern for regulators of insurance companies, claims solvency is

a primary concern for policyholders, and return on investment is a primary concern for policyholders. the investors. These interests have the potential to conflict, and corporate decision-makers must trade off one concern for another. The authors studied the performance of insurance companies through data inclusion analysis using solvency, claim solvency, and return on investment as outputs and using the model. Financial intermediaries for insurance companies. The effect of solvency on efficiency is then examined. These performance ratings are further tested for stock research against the general form of organization and agency structure versus direct marketing arrangements, tested separately and in combination. This study is a demonstration of the impact of solvency on company performance.

Discussing the impact of fixed assets on firm performance, Aboody et al. (1999) argued that the revaluation of fixed assets of UK firms is significantly positively related to future changes in operating performance, as measured by operating income and cash from operations, indicating that revaluation reflects changes in asset values. Current year revaluation (revalue balance) is also significantly positively related to annual return (price). The relationship between revaluation and future performance and price is weaker for firms with higher debt-to-equity ratios, suggesting that incentives influence how revaluations reflect change in asset value. Relationships are also weaker for cross-listed companies and during more volatile economic times.

Meanwhile, the relationship between business performance and economic growth is discussed the most. Ahmed et al. (2014) considered the importance of marketing activities and functions affecting their capabilities and, therefore, the overall performance of the company. Using Resource-Based Theory (RBT) and documents of the senior management team as a foundation, the authors study the relationship between business factors in other economic conditions. each other using panel data, to examine whether the importance of marketing activities and functions leads to capacity development in those functions. The authors also examined whether these capabilities explain differences in performance across firms under different economic conditions. The results showed that marketability and operations both improve a company's performance, although operability is more important during an economic downturn. In addition, the authors find that the importance of marketing activities and functions affects their ability to perform during periods of economic growth.

Also discussing the determinants of corporate performance and growth, but during the economic downturn in Central and Eastern European countries, Burger et al. (2017) analyzed what characteristics make some companies in Central and Eastern European countries (CEEC) have better crisis resistance than others. Using the panel VAR system on a large corporate-level dataset, the authors estimated firms' responses in employment and investment to cyclical demand shocks and financial shocks. Controlling for industry, time and country differences, they segmented companies by size, age, export status, foreign versus domestic ownership, and pre-crisis growth versus growth during the crisis to compare firms' responses across different divisions. The authors found that cyclically falling demand will reduce firms' employment in subsequent periods, but there is considerable heterogeneity between different types of firms. Older firms and especially older small firms are more responsive, while the job decline is less severe in exporters and foreign-owned firms. Investment, on the other hand, does not respond to demand shocks but to the free cash flow component of the business cycle. Differences in the specific context of each country also show an important impact on the ability of companies to cope with the crisis. This is a typical study when considering many factors affecting the company's performance, in the context of economic recession in Central and Eastern European countries.

Recently, following this theme, on business, kinship networks and economic growth in the context of the Kyrgyz Republic, Dower et al. (2022) argued that while kinship ties support private sector development, they can also lead to economic inefficiencies. The paper examines the impact of kinship networks on corporate performance and growth based on an initial survey of 1000 company owners in the Central Asian Republic of Kyrgyzstan. The authors collected detailed information about respondents' business networks, the resources they received from (in-network) and made it available to their relatives and other contacts (out-of-network) grid) and their company's performance. The results showed that in-network returns increase, outside-network returns decrease, and these two types of network usage are positively correlated, but not completely correlated. The authors also showed that kin-dependent firms grow more slowly than firms that have access to the help of non-relatives, but faster than firms that do not. access to any business network. The authors found evidence that a slower growth mechanism is a lower level of reinvestment. The research concludes that considering in- and out-of-network networks helps to resolve ambiguous messages from the broader empirical literature about the impact of kinship networks on firm performance: two forms network usage was positively correlated, most likely due to general reciprocity in network kinship, but had the opposite effect.

Another factor affecting the performance of the business that is also interested in studying is the interest rate. Tarkom and Ujah (2023) discussed the relationship between inflation, interest rates and firm performance under the influence of policy uncertainty. This study investigated the impact of inflation and interest rates on firm performance while also exploring the role of policy uncertainty. Not a misnomer, important macroeconomic conditions and their impact on business strategy are inherently observed either directly or indirectly. With 92,293 observations from 12,207 US firms, the authors found that inflation positively affects firm performance and interest rates negatively affects firm performance. Likewise, the moderating effect of policy uncertainty amplifies the importance of inflation and interest rates. Further examination of the regulatory effect reveals a positive direction for both macroeconomic conditions for larger firms, dividend-paying firms, and firms with higher costs of goods and services. higher and higher revenues, and companies in the Midwest region.

3. Data sources and research methods

The study collected 52 enterprises on the Vietnam stock exchange with activities related to real estate. This data source is collected from audited annual financial statements. Vietnam's stock market currently has two exchanges, including the Ho Chi Minh City Stock Exchange and the Hanoi Stock Exchange.

The study uses business performance as measured by return on total assets (ROS), this has been confirmed in the study of Tariq et al (2014). Moreover, the ROS index is an appropriate indicator when studying factors related to shareholders' interests, debt and total assets in relation to profit after tax.

As for the independent variables, the study inherits the results of previous studies on business performance, using 6 main factors affecting the financial performance of real estate companies, including: Debt ratio (DEBT), firm size (SIZE), total asset turnover (TURNOVER), quick solvency (QR), technology (TECH) and bank interest rate (INTEREST)).

The research model proposed by the author is as follows:

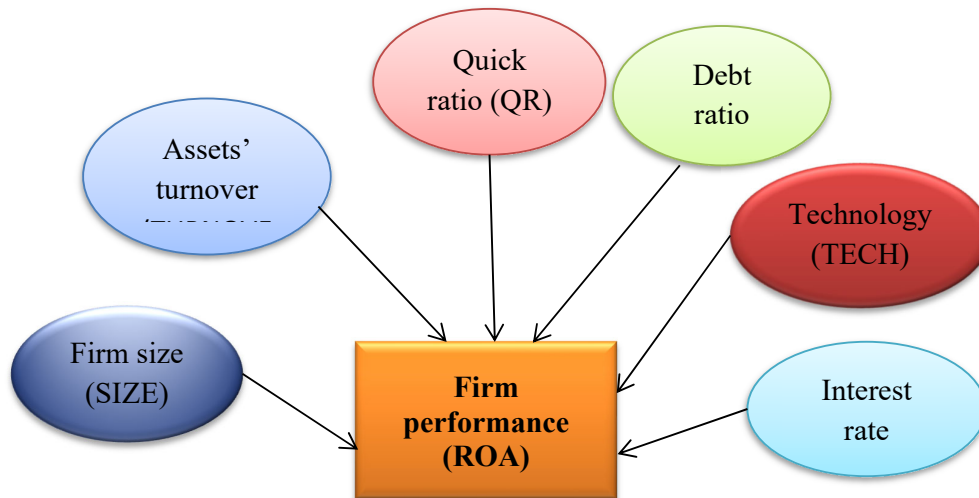


Fig. 1. Research model
Source: Authors' analysis

Table 1

Description of the model variables

Variable	Sign	Description
Debt ratio	DEBT	Debt/asset ratio
Firm size	SIZE	Logarithm of total assets
Total assets turnover	TURNOVER	Net sales/average assets
Quick ratio	QR	(Current assets – inventory) /current liabilities
Technology	TECH	High-technology exports (% of manufacturing exports)
Interest rate	INTEREST	Average lending interest rate announced

Source: Authors' analysis

From the proposed research model, the equation has the following form:

$$ROS_{it} = \alpha + \beta_1 DEBT_{it} + \beta_2 SIZE_{it} + \beta_3 TURNOVER_{it} + \beta_4 QR_{it} + \beta_5 TECH_t + \beta_6 INTEREST_t + u_{it}$$

where:

- ROS_{it} is the dependent variable measuring the business performance of enterprise i at time t ;
- $DEBT_{it}$ is the independent variable representing the debt ratio of enterprise i at time t ;
- $SIZE_{it}$ is the independent variable representing the size of enterprise i at time t ;
- $TURNOVER_{it}$ is the independent variable representing the total asset turnover of enterprise i at time t ;
- QR_{it} is the independent variable representing the quick payment ability of enterprise i at time t ;
- $TECH_t$ is the independent variable representing the technology rate at time t ;

- $INTEREST_t$ is the independent variable representing the bank interest rate at time t ;
- u_{it} is the random error of the model for enterprise i at time t .

The study used a quantitative regression analysis method. The method used for the analysis is FGLS, because this method can provide the best quality of regression, while avoiding possible defects of the estimated model, especially the problem of autocorrelation. and variance changes. In addition, for the stability of the study, the author uses the ROE variable to replace ROA in the regression analysis.

4. Results

4.1. Descriptive statistics of the study sample

Table 2

Descriptive statistics of the study sample

Variable	Mean	Max	Min
ROA	0.0421	0.4432	-0.4124
ROE	0.1112	11.1214	-4.0952
DEBT	0.5213	0.9764	0.0121
SIZE	12.9221	18.8235	9.1157
TURNOVER	0.5325	3.0003	0.0002
QR	0.1523	0.9097	0.0000
TECH	0.3624	0.5653	0.2447
INTEREST	0.1074	1.1613	0.900

Source: Authors' analysis

Table 2 shows that the average business efficiency is 4.21% for ROA and 11.12% for ROE, which is a relatively low level of enterprises in the industry. As for the debt ratio, there is an average of 52.13%, which means that firms in the industry are being financed with more debt than with equity. Regarding the total asset turnover ratio, it has a relatively low value when it is only 0.5325 rounds. Quick ratio of real estate businesses is also low.

4.2. Correlation analysis

Table 3

Correlation analysis

Variable	ROA	ROE	DEBT	SIZE	TURNOVER	QR	TECH	INTEREST
ROA	1.0000							
ROE	0.7855	1.0000						
DEBT	-0.4355	-0.3420	1.0000					
SIZE	0.3896	0.2103	0.1043	1.0000				
TURNOVER	0.7532	0.1593	0.3201	0.6531	1.0000			
QR	-0.1269	-0.1242	0.3948	0.4291	0.1002	1.0000		
TECH	0.0412	0.1132	0.2134	0.2103	0.1039	0.6552	1.0000	
INTEREST	-0.1021	-0.1031	0.2562	0.2019	0.4302	0.3742	0.2103	1.0000

Source: Authors' analysis

Table 3 shows that the pairs of independent variables have a relatively low correlation level and are all less than 0.8, which reflects that the independent variables included in the regression model do not affect multicollinearity in the regression equation. regulation. In addition, Table 4 also shows that the VIF coefficients of the component variables are all less than 10, so it can once again confirm that there is no multicollinearity in the regression model.

Table 4

VIF analysis

Variable	VIF	1/VIF
DEBT	1.32	0.7575
SIZE	1.18	0.8474
TURNOVER	1.15	0.8695
QR	1.14	0.8771
TECH	1.08	0.9259
INTEREST	1.02	0.803
VIF mean		1.14

Source: Authors' analysis

4.3 Results

The results of the regression are shown in Table 5 below:

Table 5
Regression results

Variable	ROA	ROA	ROE	ROE
DEBT	-0.0112*** (0.000)	-0.0103*** (0.000)	-0.0212** (0.000)	-0.0235** (0.000)
SIZE		0.0135 (0.653)		0.0054 (0.532)
TURNOVER		0.125*** (0.001)		0.1257*** (0.000)
QR		-0.3302 (0.101)		-0.3215 (0.106)
TECH		0.0532 (0.432)		0.0532 (0.421)
INTEREST		-0.2145** (0.012)		-0.2155** (0.016)
_cons	-1.5436 (0.430)	-1.3459 (0.210)	-0.3116 (0.443)	-0.3158 (0.476)

Note: ***, ** denoting for the significance level of 1%, 5%. The number in the bracket is P-value

Source: Authors' analysis

Through the regression results, it can be seen that:

The study confirms that the technology factor has not yet affected the financial performance of enterprises, which can show that businesses need enough time to absorb technology in production activities. In addition, debt ratio has a negative impact on business performance of enterprises. That is, when the enterprise uses increased debt, the efficiency of the business will be reduced. This result has been explained that enterprises can experience financial distress and risk when enterprises rely too much on external debt. For a real estate enterprise with a large business capital and a lot of cash demand, if the enterprise cannot manage the ability to use capital effectively, the enterprise may not achieve the expected profit. . Through the research, it is suggested that businesses should finance investment with internal capital, which is a source of capital with high safety and ability to withstand higher risks. Research results find a positive impact of total asset turnover and profitability of the business. That is, when the enterprise has a high asset turnover, which means that the enterprise implements higher asset management, the enterprise is more efficient. The study found a negative impact of interest rates on business performance, which reflects that businesses that can access capital with low interest rates help businesses achieve higher investment efficiency.

5. Conclusions

Real estate businesses have many contributions to create the infrastructure foundation for society and contribute to the economic growth of the country. High efficiency enterprises mean their contributions to the country's economy. Studying the factors affecting financial performance by using the analysis of real estate businesses, through regression analysis, the research results confirm the technology factor has not yet affected the financial performance of enterprises. Further, there exists the negative relationship of using leverage in enterprises and financial performance. Enterprises that choose their own capital are often more effective than enterprises that choose capital from debt and external funding. The study also confirms that enterprises with the ability to manage total asset turnover have higher financial efficiency. Moreover, interest rates have a negative effect on business operations, businesses with high interest rates adversely affect business operations, conversely, businesses with low interest rates often help businesses invest. more effective.

References

- Aboody, D., Barth, M. E., & Kasznik, R. (1999). Revaluations of fixed assets and future firm performance: Evidence from the UK. *Journal of Accounting and Economics*, 26(1–3), 149-178. [https://doi.org/10.1016/S0165-4101\(98\)00040-8](https://doi.org/10.1016/S0165-4101(98)00040-8).
- Ahmed, M. U., Kristal, M. M., & Pagell, M. (2014). Impact of operational and marketing capabilities on firm performance: Evidence from economic growth and downturns. *International Journal of Production Economics*, 154, 59-71. <https://doi.org/10.1016/j.ijpe.2014.03.025>
- Bai, M., & Ho, L. (2022). Corporate social performance and firm debt levels: Impacts of the covid-19 pandemic and institutional environments. *Finance Research Letters*, 47, 102968. <https://doi.org/10.1016/j.frl.2022.102968>.
- Brockett, P. L., Cooper, W. W., Golden, L. L., Rousseau, J. J., & Wang, Y. (2004). Evaluating solvency versus efficiency performance and different forms of organization and marketing in US property—liability insurance companies. *European Journal of Operational Research*, 154(2), 492-514. [https://doi.org/10.1016/S0377-2217\(03\)00184-X](https://doi.org/10.1016/S0377-2217(03)00184-X).
- Bui, A. T., Pham, T. P., Pham, L. C., & Van Ta, T. K. (2021). Legal and financial constraints and firm growth: small and medium enterprises (SMEs) versus large enterprises. *Helicon*, 7(12), e08576. <https://doi.org/10.1016/j.helicon.2021.e08576>
- Burger, A., Damijan, J. P., Kostevc, Č., & Rojec, M. (2017). Determinants of firm performance and growth during economic recession: The case of Central and Eastern European countries. *Economic Systems*, 41(4), 569-590. <https://doi.org/10.1016/j.ecosys.2017.05.003>

- Dower, P. C., Gerber, T. P., & Weber, S. (2022). Firms, kinship networks, and economic growth in the Kyrgyz Republic. *Journal of Comparative Economics*, 50(4), 997-1018. <https://doi.org/10.1016/j.jce.2022.08.001>.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X).
- Kapopoulos, P., & Lazaretou, S. (2007). Corporate ownership structure and firm performance: evidence from Greek firms. *Corporate Governance: An International Review*, 15(2), 144-158.
- Kauffman, R. J., & Mukhopadhyay, T. (1993). Realizing value from information technology investment. *Journal of Management Information Systems*, 10(1), 7-10.
- Mwangi, L. W., Makau, M. S., & Kosimbei, G. (2014). Relationship between capital structure and performance of non-financial companies listed in the Nairobi Securities Exchange, Kenya. *Global Journal of Contemporary Research in Accounting, Auditing and Business Ethics*, 1(2), 72-90.
- Pollock, S., Switzer, L. N., & Wang, J. (2023). The dynamics of CEO equity vs. inside debt and firm performance. *Research in International Business and Finance*, 64, 101891. <https://doi.org/10.1016/j.ribaf.2023.101891>.
- Qing, C., Xinyuan, L., Yi, S., & Kun, G. (2016). The Performance Analysis of Real Estate Listed Firms Based on the Sliding Time Window. *Procedia Computer Science*, 91, 1038-1043.
- Tariq, W., Usman, M., Mir, H. Z., Aman, I., & Ali, I. (2014). Determinants of commercial banks profitability: Empirical evidence from Pakistan. *International Journal of Accounting and Financial Reporting*, 4(2), 1-22.
- Tarkom, A., & Ujah, N. U. (2023). Inflation, interest rate, and firm efficiency: The impact of policy uncertainty. *Journal of International Money and Finance*, 131, 102799. <https://doi.org/10.1016/j.jimonfin.2022.102799>.



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