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Research on the Role Played by Media Attention in the Relationship between Financialization and Research and Development Investment

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Abstract: Research and development investment is crucial to the innovation and sustainable development of enterprises. Taking the data of A-share listed companies from 2012 to 2020 as samples, this paper finds that the impact of corporate financialization on research and development investment is influenced by the degree of media attention to enterprises. The conclusion of the study provides some enlightenment for the government and enterprises to promote research and development investment from the perspective of media governance.

Keywords: Financialization; Research and Development; Media Attention.

1. Introduction

The report to the 19th National Congress of the Communist Party of China pointed out that innovation is the primary driving force for leading development and the strategic support for building a modern economic system. China's economic development stage has changed from high-speed growth to high-quality development, giving full play to the innovation ability of enterprises is the key to enhancing their own market competitiveness and improving national innovation capacity.

Research and development (R&D) investment is the key path to improve the technological innovation ability of enterprises. However, at present, both developed and emerging economies in Europe and America are having an impact on Chinese enterprises at the same time. On the one hand, developed countries in Europe and the United States have implemented the "re-industrialization" strategy, aiming to control advanced technology, attract the return of high-end manufacturing, and occupy the high-end of the industrial chain. On the other hand, emerging economies are speeding up the transfer of medium and low-end manufacturing industries and becoming new labor-intensive industrial bases to replace China. Under the influence of this dual impact, China's real economy sector faces problems such as overcapacity, slow growth, and products at the low end of the industrial chain, resulting in a significant decline in the return on investment of the real economy sector and structural imbalance in the real economy. The key to solving the problem lies in the enterprise's innovation ability and research and development investment. Overall research and development investment intensity is at a relatively low level. But increasing the intensity of research and development investment requires long-term investment of large amounts of money. Many experiences show that the most important reason for many research and development failures is insufficient follow-up funds. Lack of funds has been a common problem in enterprise research and development.

At a time when profit margins are falling, and innovation is expensive and risky, financial investment can pay off handsomely. Driven by profit-driven capital, a lot of money has poured into the lucrative financial and real estate industries. From 2007 to 2014, an average of 19.93% of listed non-financial companies held shares in banks, securities, insurance, funds and other financial institutions every year. According to Wind database statistics, about 1,186 listed companies bought financial products in 2019, with a total amount of 1.27 trillion yuan. By 2022, the total amount will reach 14.3765 trillion yuan. This change in corporate behavior can be called Financialization. But there is no consensus among academics on the exact definition of financialization.

What effect will financialization have on real businesses? On the one hand, it will greatly enhance the company's financing ability, provide financial support for the rapid development of enterprises, and become the source of large-scale capital investment required for enterprises' innovation and research and development investment activities. However, on the other hand, excessive participation in financial activities by real enterprises will cause them to deviate from their main business and gradually hollow out, which will cause instability in the national economy and lay hidden dangers for the emergence of economic crisis and social instability. In addition, Media is an important channel for transmitting and obtaining information, and an important way for information users to obtain information, media reports can build an information communication platform for the capital market and alleviate the phenomenon of information asymmetry among stakeholders. When media reports are linked with corporate governance, media attention can play a role in extrajudicial supervision by discovering the malpractices of corporate management. At the same time, a higher degree of information disclosure is also a new and effective channel to protect investors in addition to the law.

So does the financialization of the entity play a "reservoir" role (crowding in effect) of financial support for R&D investment, or does it have a crowding out effect on R&D investment? What role does media attention play in the relationship between financialization and R&D investment? This is the aspect that this paper needs to explore in depth.

2. Theoretical Analysis and Research Hypothesis

2.1. The Relationship between Financialization and Research and Development Investment

Enterprises are the main body of innovation research and development, and capital is an indispensable element for enterprises to invest in research and development. First of all, according to the resource-based theory, every resource in an enterprise is fungible, and resources for financialized investment will inevitably crowd out other resources. Such as research and development. Especially under the constraint of limited resources, there is a certain relationship between financial investment and real investment. With the deepening of enterprise financialization, enterprises will invest more internal funds in virtual industries such as finance and real estate that can obtain excess returns. Especially in the operating environment of oversupply, excess products and declining profits, enterprises are increasingly deviating from their main business [1], and the development focus has shifted from production and research and development to financial investment, reducing the support for research and development activities. Secondly, according to the principal-agent theory, enterprise management faces the pressure of short-term performance assessment, which will force the management to invest funds in the financial field rather than research and development projects with a longer return period. Yang & Zhao (2021) studies the data of A-share listed companies and NEEQ listed companies and finds that financialization behavior of entity enterprises significantly inhibits enterprise innovation [2]. Hao & Yang(2022) also verified that financialization has a significant negative impact on R&D investment in the data of listed manufacturing companies[3].

Based on the above analysis, this paper proposes hypothesis 1.

H1: Financialization can restrain research and development investment.

2.2. The Role of Media Attention in the Relationship Between Financialization and Research and Development Investment

Media attention plays an important role in enterprise behavior. First, the large amount of money invested in research and development often means the large scale of financing; Compared with internal managers, external investors have asymmetric information. According to the signal transmission theory, media reports will enable external investors to have more information about the company's research and development projects, which is conducive to their decision-making, solving the problem of financing constraints encountered in the process of research and development, and promoting the progress of research and development. Secondly, media attention can also play an external governance role to reduce the opportunistic behavior of management. He, Ren & Zhang(2022) found that official media publicity of intellectual property protection can positively promote enterprise innovation, and considered the impact of institutional environment and economic environment heterogeneity [4]. Yang & Zhang (2021) analyze high-tech enterprises and believe that media reports can restrain enterprises' research and development manipulation and improve their research and development performance, and this effect is more obvious in private enterprises, companies with high analyst coverage, government quality and regions with high marketization level. Moreover, it is found that original news and in-depth report contain incremental information and play a stronger supervisory role; News reporting by authoritative media is more credible and has a more supervisory role [5]. Jiang, Zheng & Pei (2019) took Chinese A-share listed companies as samples to demonstrate the influence of media attention on the relationship between government subsidies and enterprise innovation performance. The research shows that media attention strengthens the positive effect of government subsidies on enterprise innovation input and innovation output [6].

Based on the above analysis, this paper proposes hypothesis 2.

H2: Media attention plays a moderating role in corporate financialization and research and development investment.

3. Study Design

3.1. Data and Research Samples

Based on China's unique practice environment, this study intends to use the sample data of China's A-shared listed companies selected during the statistical period to consider the relationship between corporate social responsibility and research and development investment by using regression analysis method and panel data model.

In this paper, the A-shared listed companies in Shanghai and Shenzhen from 2012 to 2020 are selected as the initial research samples, and on this basis, the sample data are screened as follows:

(1) Financial enterprises and real estate enterprises are excluded;

(2) ST and ST* companies are excluded;

(3) Excluding companies listed in the B share market or the H share market at the same time, because the listed companies of "A + B" or "A + H" shares face the dual regulatory environment at home and abroad, and the enterprises may have to bear additional social responsibilities or only bear very little social responsibilities due to legal provisions;

(4) Eliminate companies with missing data and outliers.

Finally, a total of 2435 sample companies were obtained, with a total of 15,435 sample observations. To eliminate the effect of extreme outliers, we winsorize all continuous variables at 1% and 99% levels.

3.2. Primary Variable Definition

Explained variable: research and development investment (rd), measured as the logarithm of a firm's annual research and development investment plus one.

Explanatory variable: financialization (Fin). Since financialization is mainly reflected in the behavior of enterprises allocating more resources to financial assets, this paper draws uses the ratio of current financial assets to the total starting output of enterprises at the end of the year to represent the financialization behavior of enterprises in the operation process based on the account of balance sheet. The financial assets in this paper include: transactional financial assets, derivative financial assets, net loans and advances, net available-for-sale financial assets, net hold-to-maturity investment, and net investment real estate.

Moderating variable: media attention. For reference to the current common practice, the number of annual media reports of listed companies is added by 1, and then the natural logarithm is taken.

Control variables: In terms of the basic situation of companies, this paper selects two indicators, Size and FirmAge, as control variables. Large companies have deeper resource base, while companies in growth stage have stronger growth and flexibility. At the financial level, the company's research and development activities require large and continuous capital investment, so the company's financial and cash flow situation will affect the resource allocation decision of the company. At the financial level, we selected Roa, FIXED assets and TobinQ. At the level of corporate governance, a company's management structure and incentive mechanism are also important factors affecting corporate behavior. This paper selects two indicators, Indep and Dual, as control variables to reflect corporate governance information. In addition, this paper also controls the industry effect and the annual effect.

3.3. Model assumption

First, in order to verify the relationship between financialization and research and development investment, regression model (1) is set as follows:

$$R\&D_{i,t} = \gamma_0 + \gamma_1 Fin_{i,t} + \gamma_i \sum CONTROL_{i,t} + \delta_{i,t} \quad (1)$$

Where i represents the individual listed company, t represents the year, $\alpha_i CONTROL_{i,t}$ represents the sum of the product of the control variables. If γ_1 is significantly negative, hypothesis 1 "financialization can restrain research and development investment." can be verified, that is to say, the higher the degree of financialization, the less research and development investment.

Secondly, in order to verify hypothesis 2: media attention plays a moderating role in the relationship between corporate financialization and research & development investment, model (2) is set first, and model (2) is set on the basis of regression model (1):

$$R\&D_{i,t} = \eta_0 + \eta_1 Fin_{i,t} + \eta_2 Midea_{i,t} + \eta_3 Fin_{i,t} * Midea_{i,t} + \eta_i \sum CONTROL_{i,t} + \delta_{i,t} \quad (2)$$

If η_3 is significantly, the moderating effect of "media attention can weaken the impact of financialization and research and development investment" is verified; If η_3 is negative significantly, it means that more media attention can reduce the crowding out effect of financialization on research and development investment; in other words, the more media attention there is, the less financialization there is and the more research and development investment there is.

4. Empirical Analysis

4.1. Descriptive Analysis

The purpose and function of descriptive statistics is to sort out, summarize and summarize the data of each variable, so that its overall picture and distribution characteristics can be clearly and clearly displayed.

Table 1. Descriptive Statistics

VarName	Obs	Mean	Median	SD	Min	Max
rd	15435	17.79	17.872	1.572	12.997	21.486
Fin	15435	0.03	0.006	0.062	0.000	0.334
media	15435	1.18	1.099	1.145	0.000	4.174
Size	15435	22.25	22.118	1.161	19.879	25.629
ROA	15435	0.04	0.039	0.063	-0.225	0.217
FirmAge	15435	2.89	2.944	0.314	1.946	3.497
FIXED	15435	0.22	0.197	0.149	0.003	0.710
Dual	15435	0.27	0.000	0.446	0.000	1.000
Indep	15435	0.37	0.333	0.053	0.333	0.571
TobinQ	15435	2.00	1.588	1.270	0.852	8.911

The descriptive statistics in Table 3 show that the mean value of research and development (rd) is 17.79, the median is 17.872, the standard deviation is 1.572, the minimum value is 12.997, and the maximum value is 21.486, indicating that there are certain differences in the research and development level of various companies. The mean value of corporate financialization (Fin) is 0.03, the median is 0.006, the minimum value is 0, the maximum is 0.334, and the standard deviation is 0.063, indicating that the degree of corporate financialization fluctuates greatly. The mean of media attention is 1.18, the median is 1.099, the minimum is 0 and the maximum is 4.174, and the standard deviation is 1.145. The mean value of enterprise Size is 22.25, the median is 22.118, the standard deviation is 1.161, the minimum value is 19.879, the maximum is 25.629, and the fluctuation is relatively small. The mean net profit margin on total assets (ROA) is 0.04, the median is 0.039, the standard deviation is 0.063, the minimum is -0.225, and the maximum is 0.217. The average value of FirmAge is 2.89, the median is 2.944, the standard deviation is 0.314, the minimum value is 1.946, the maximum value is 3.497, and the dispersion degree is the lowest. The mean value of FIXED assets (FIXED) is 0.22, the median is 0.197, the standard deviation is 0.149, the minimum value is 0.003, and the maximum value is 0.710. The mean value of Dual is 0.27, the median is 0.000, the standard deviation is 0.446, and the minimum and maximum values are 0 and 1 respectively, indicating that the number of dual jobs in the sample is smaller than that of non-dual jobs.

4.2. Analysis of the Impact of Financialization on Research and Development Investment

In order to answer research question: Can financialization curb research and development? Hypothesis 1 is adopted: Financialization can restrain research and development investment. Table 2 shows the test results.

Table 2. Regression Analysis of the Relationship Between Financialization and Research and Development Investment

Number of obs					15435	
F (90, 12467)					230.07	
Prob > F					0.0000	
R-squared					0.5682	
Root MSE					1.0359	
rd	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Fin	-1.353807	.1603677	-8.44	0.000	-1.668146	-1.039467
Size	.8639375	.0089055	97.01	0.000	.8464816	.8813934
ROA	2.802404	.1548745	18.09	0.000	2.498832	3.105977
FirmAge	-.2690446	.0294564	-9.13	0.000	-.3267825	-.2113066
FIXED	.0527555	.0811119	0.65	0.515	-.1062335	.2117445
Dual	.0724389	.0182515	3.97	0.000	.0366637	.1082141
Indep	-.2747719	.1616028	-1.70	0.089	-.5915326	.0419889
TobinQ	.0504437	.0083106	6.07	0.000	.0341539	.0667335
_cons	-1.97704	.2557459	-7.73	0.000	-2.478333	-1.475748

Table 2 shows the regression results of financialization on research and development investment, where F=230.07 and the corresponding probability value =0.0000 is less than 0.05, indicating that the regression effect is significant. Goodness of fit R-squared=0.5682 for linear regression. The regression coefficient of financialization is -1.3538, which is significant at the 1% confidence level. It shows that the financialization behavior of enterprises has a "crowding out" effect on research and development investment. This empirical result solves question and confirms null hypothesis 1, the conclusion is consistent with the views of Shu & Yu (2020) [7]. The reason is that financialization is more of a short-sighted arbitrage behavior, which cannot provide funds for research and development and innovation, but make the entity enterprises deviate from the main business. In addition, based on the view of limited resources, enterprises put their energy and resources on investment financial products, which will inevitably reduce their attention and investment in research and development.

4.3. Regression Analysis of Moderating Effects

In order to answer research question: What role does media attention play in the relationship between corporate financialization and research and development investment? Hypothesis 2 is adopted: Media attention plays a moderating role in corporate financialization and research and development investment. Table 3 shows the test results.

Table 3. Regression Analysis to Verify the Moderating Role of Media Attention in the Relationship Between Financialization and Research and Development Investment

Number of obs					15435	
F (90, 12467)					243.07	
Prob > F					0.0000	
R-squared					0.5688	
Root MSE					1.0353	
rd	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Fin_media	-.6507513	.1731	-3.76	0.000	-.9900478	-.3114548
Fin	-.8824169	.1734349	-5.09	0.000	-1.22237	-.5424639
media	.0018661	.0118739	0.16	0.875	-.0214082	.0251404
Size	.869691	.009265	93.87	0.000	.8515305	.8878515
ROA	2.771566	.1553543	17.84	0.000	2.467053	3.076079
FirmAge	-.2623682	.0294997	-8.89	0.000	-.3201911	-.2045453
FIXED	.0367953	.0812198	0.45	0.651	-.1224052	.1959957
Dual	.0721619	.0182289	3.96	0.000	.0364311	.1078927
Indep	-.2594404	.1619167	-1.60	0.109	-.5768163	.0579355
TobinQ	.0526903	.0083311	6.32	0.000	.0363604	.0690203
_cons	-2.124604	.258821	-8.21	0.000	-2.631924	-1.617284

Table 3 shows the regression results of media attention on the role played between financialization and research and development investment. Where, F=243.07, the corresponding probability value =0.0000 is less than 0.05, indicating that the regression effect is significant. Goodness of fit R-squared=0.5688 for linear regression. In this test, the coefficient of financialization (Fin) on research and development investment(rd) is -0.8824, and the regression coefficient is

significant at the level of 1%, indicating that the inhibitory effect of financialization (Fin) on research and development investment(rd) is still significant after adding the media attention of the moderating variable. The coefficient of Fin_media, the interaction term between financialization and media attention, which represents the moderating effect, is -0.65075, which is significant at 1% confidence level, indicating that media attention has a negative moderating effect. Specifically, media attention will reverse regulate the inhibitory effect of financialization on research and development investment: the more media attention, the less financialization behavior of enterprises, and the more research and development investment. This empirical result solves question and confirms null hypothesis 2: media attention plays a moderating role in the relationship between financialization and research and development investment. External supervision can promote corporate governance, as demonstrated by Wang, Guo & Lu (2022), find that official media can effectively promote corporate innovation. This study attempts to add media attention as a moderating variable in the regression analysis of the relationship between financialization and research and development investment, and the results verify that media attention can indeed play a significant moderating role [8]. The correctness of null hypothesis 2 is supported. The explanation for this result may be that media attention can act as external oversight. Because of the supervision, the short-term arbitrage behavior of the management will be restricted, and the management will be more concerned about the long-term healthy development of the enterprise, increase the investment in research and development, and improve the level of innovation.

5. Conclusion and Recommendations

As can be seen from the above research conclusions, Financialization can restrain research and development investment, and media attention can play a role of external supervision and reverse regulate the inhibitory effect of corporate financialization on research and development investment. Based on the above conclusions, this paper puts forward the following suggestions:

Firstly, the empirical conclusion of hypothesis 1: financialization can restrain research and development investment. Because of the principal-agent relationship, the interests of managers and shareholders of enterprises are not completely consistent. In order to maximize their own interests, the former pay more attention to investment activities with speculative behavior, and the willingness to research and development investment with high risk and uncertainty is not very strong. When the quality of internal and external supervision and internal control is low, the market competition is fierce, and the economic policy uncertainty is increased, the management's willingness to financialize is stronger. Due to the limited resources of the enterprise, under this condition, the excessive financial assets owned by the enterprise will crowd out part of the research and development investment. Therefore, it is necessary to improve the quality level of internal control, improve the corporate governance structure, and prevent, detect and correct the short-sighted behavior of the management.

Secondly, the empirical conclusion of hypothesis 2: media attention plays a moderating role in corporate financialization and research and development investment. This result suggests that a new perspective on corporate governance - media attention - can be added, and external supervision - media attention can be used to restrain the crowding out effect of corporate financialization on research and development spending. Therefore, mainstream media and other forms of media should pay attention to the dynamic development of enterprises, and enhance the objectivity, authenticity and independence of media reports, so that they can better play the role of information intermediary and external governance. In addition, media is an important medium for enterprises to publicize themselves. Enterprises should be good at using news media to convey the information of research and development activities to investors, alleviate the information asymmetry with external investors, enhance investors' confidence in enterprises and improve the value of enterprises.

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