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Preferential Interest Rate, Financing Constraints and Enterprise Innovation Capability

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Abstract: *This paper takes my country's Shanghai and Shenzhen A-share non-financial listed companies as the research object, selects their data from 2016 to 2020, and discusses the impact of preferential interest rates and financing constraints on corporate innovation capabilities. Empirical analysis finds that most enterprises generally have financing constraints, and financing constraints will inhibit the improvement of corporate innovation capabilities; and preferential interest rates can alleviate the financing constraints in corporate innovation investment through direct channels and indirect channels. Therefore, this paper puts forward suggestions from the aspects of implementing differentiated policies, combining "before" and "after", reducing information asymmetry, and establishing and improving the effect evaluation mechanism, hoping to alleviate the financing constraints of Chinese enterprises and improve their innovation capabilities useful reference.*

Keywords: *preferential interest rate, financing constraints, innovation ability*

1. Introduction

Technology is the foundation of a country's prosperity, and innovation is the soul of a nation's progress. With the successful conclusion of the "13th Five-Year Plan", my country has ushered in the "14th Five-Year Plan" period of comprehensive planning. High-quality economic development is an important goal of my country's economic and social development during the "14th Five-Year Plan" period. It is not enough to rely solely on factor-driven and investment-driven methods. The key lies in the need for my country to take innovation as the primary driving force to achieve economic Change and transformation of development dynamics. The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China also pointed out that "it is necessary to adhere to the core position of innovation in the overall situation of my country's modernization drive, and to make science and technology self-reliance and self-improvement as the strategic support for national development." It can be seen that innovation plays a vital role in the sustainable and healthy development of my country's economy. Enterprises are the main body of innovation activities, a new force to promote innovation and creation, and an important driving force for national technological innovation and economic progress. Therefore, how to improve the innovation ability of enterprises is a problem that must be solved in the economic development during the "14th Five-Year Plan" period, and it is also a problem that scholars at home and abroad should focus on and study. Existing literatures have discussed the factors influencing enterprise innovation from different perspectives.

In 1942, the "Schumpeter Hypothesis" pointed out the important influence of market power and firm size on the innovation capability of firms. For a long time after that, most scholars conducted further empirical tests and extended research around the "Schumpeter Hypothesis". However, with the continuous prosperity and progress of the market, scholars have begun to explore the important factors affecting enterprise innovation at the micro level. In terms of corporate governance, venture capital, working capital management, and corporate governance levels have a significant impact on the innovation activities of enterprises [1-3]. In terms of employee incentives, senior management's option incentives have a significant positive impact on the improvement of the company's innovation ability [4], while non-executive employees holding stock options is a governance mechanism that cannot bring incentive effects [5]; Zhou Donghua (2019) believe that employee incentives are conducive to the establishment of a benefit-sharing mechanism between employees and owners, thereby enhancing the innovation capability of enterprises [6]. In addition, a large number of literatures have studied the influence of executives' overseas experience, professional experience and managerial ability on enterprise innovation from the factors of managers themselves [7-9]. In addition to the influence channels

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at the micro level, a mature external macro environment and a favorable political and economic environment will also play a crucial role in the innovation of enterprises. Therefore, more and more scholars have begun to pay attention to the influencing factors of enterprise innovation at the macro level. The relationship between the uncertainty of economic policies and the innovation activities of enterprises will be restricted by different factors, which will encourage enterprises to innovate and have a selective effect [10]; Deng Xinchen et al. (2021) found that the promotion of interest rate liberalization can improve the innovation ability of enterprises. The impact is achieved by alleviating financing constraints [11]. Factors such as local government debt, government subsidies, and fiscal and tax incentives all have an impact on the innovation activities of enterprises. In addition, a small number of scholars have studied the influence of banking competition and bank association on enterprise innovation [12-13]. The above studies have been analyzed from different research perspectives and research scenarios, providing ideas and inspiration for the improvement of enterprises' innovation capabilities.

Financing constraints are a "stumbling block" for corporate innovation. Innovation investment has the characteristics of long cycle, high risk and great uncertainty. Compared with other investments, innovation investment often requires a large amount of capital investment [14]. It is difficult to achieve this only by relying on market forces and internal financing of enterprises. a goal. Therefore, it is necessary for the state to implement macro-control policies such as government subsidies, low-interest loans, and fiscal and tax incentives to help enterprises solve the problem of insufficient funds, thereby promoting the improvement of enterprise innovation capabilities [15]. Existing literature studies the impact mechanism of government subsidies and financial incentive policies on enterprise innovation from multiple perspectives, and has obtained a consistent understanding, but there are few studies on the impact of preferential interest rates on enterprise innovation. Although China's capital market has developed greatly in recent years, it is still not perfect. Bank loans still play an important role in easing corporate financing constraints and promoting corporate innovation. Therefore, this paper attempts to explore the inherent relationship between preferential interest rates and corporate innovation capabilities from the perspective of financing constraints.

The possible marginal contributions of this paper are: First, this paper studies the impact of preferential interest rates on the innovation activities of listed companies, enriching the relevant literature on the economic consequences of preferential interest rate policies; From the perspective of in-depth discussion of the impact mechanism of preferential interest rate on enterprise innovation ability, it lays a certain theoretical foundation for alleviating corporate financing constraints and improving innovation ability. Finally, this paper confirms that preferential interest rate is one of the important factors affecting the improvement of enterprise innovation ability. , improve and enrich the relevant research on the factors affecting the innovation ability of enterprises.

2. Theoretical Analysis and Research Hypotheses

2.1. Financing constraints hypothesis

First, as an investment activity, the development of innovative projects by enterprises is characterized by high investment and long cycle [16]. On the one hand, the development of innovative projects is a long process, from the R&D process to the commercialization of the R&D results, it takes a long time, and there will be unknown problems and risks in the production process [17]. On the other hand, stable and continuous capital investment is indispensable for each stage of the enterprise's innovation and R&D process. Once there is a problem with the capital investment in one of the stages, the development of the enterprise's innovation project may face a situation where it is difficult to ride a tiger, or even wipe out the entire army. , which will lead to unreasonable losses for the enterprise [18]. Therefore, if the funds are not enough to maintain the expenditure of enterprise innovation projects, the enterprise will consider giving up some R&D projects with positive net present value to support the daily operation of the enterprise, which will undoubtedly weaken the initiative and enthusiasm of enterprise innovation [19-20] .

Secondly, there is a problem of information asymmetry in the process of enterprise innovation investment, which is easily subject to financing constraints [21]. Relying on the economic benefits brought by the enterprise's own profitability is only a drop in the bucket for the enterprise's innovation activities. Therefore, external financing is the only way for enterprise financing. However, innovation investment is a technology-intensive activity, and it is difficult for external investors to judge the profitability of R&D innovation projects and understand the development status of enterprises. The reason why the external financing cost of enterprises is generally higher than the internal financing cost

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is to make up for the loss caused by information asymmetry to investors [22]. If the cost of external financing is high, the company's innovation activities may be less enthusiastic for innovation activities due to factors such as insufficient R&D investment and capital chain breakage.

Finally, when companies conduct external financing, they often prefer to use physical mortgage loans, and the products of corporate innovation activities are mostly intangible assets in the short term, which cannot be used as collateral for collateral, which increases the difficulty of loans. At this time, keen venture investors will demand to increase the rate of return on capital, the financing cost of enterprises will only increase, and enterprises will also face corresponding difficulties in financing constraints.

Based on the above analysis, this paper proposes research hypothesis 1:

H_1: Financing constraints will inhibit the improvement of corporate innovation capabilities.

2.2. Assumption of direct effect of prime rate

In order to support the business development of enterprises, financial institutions provide loans to enterprises at preferential interest rates, which are lower than the loan interest rates of the market or other commercial banks. The direct effect of the preferential interest rate means that it can directly increase the innovation investment of enterprises, thereby alleviating the phenomenon of insufficient innovation investment to a certain extent. Enterprises are not very enthusiastic about the development of innovative projects, which are affected by the characteristics of externalities and risks. As a supportive industrial policy, the preferential interest rate will greatly reduce the cost of enterprises to develop innovative projects, which will stimulate and encourage the improvement of enterprises' innovation ability to a large extent [15]. Therefore, the preferential interest rate directly reduces the cost of improving the innovation ability of enterprises, provides the required funds for enterprises, and can alleviate the financing constraints they face.

From the perspective of the characteristics of enterprise innovation activities, as an investment project, it has the characteristics of long investment cycle, uncertainty and high risk. The improvement of an enterprise's innovation capability is a long process, which includes multiple stages such as initial investment, achievement transformation, and post-maintenance. Each stage requires continuous introduction of new equipment, new technologies and talents. Therefore, enterprises need to prepare sufficient funds at all times to ensure the normal operation of each stage, so as to avoid huge losses [23]. At the same time, the inflow of economic profits brought by the transformation of achievements also takes a certain amount of time, and the innovation activities of enterprises also face high investment risks. Without sufficient capital chain, it is difficult for enterprises to carry out innovative business activities. of. For most enterprises, it is impossible to support the financing needs of R&D activities solely by relying on internal funds. External financing has become an important source of funds for enterprises to invest in innovation. The implementation of the preferential interest rate policy can not only reduce the cost of external financing of enterprises, but also promote the innovation investment of enterprises by ensuring the liquidity of enterprise cash flow.

From the perspective of financing methods for enterprise innovation activities, bank loans are an important external financing method for enterprise innovation [24], and low-cost bank loans are conducive to enterprises' investment in innovation activities with long-term benefits. By implementing preferential interest rate policies, the government positively stimulates the enthusiasm of financial institutions to lend, so the availability of loans and the bargaining power of enterprises investing in innovative projects will also increase with the degree of incentives for market competition among financial institutions.

Based on the above analysis, this paper proposes research hypothesis 2:

H_2: The preferential interest rate can directly alleviate the financing constraints of enterprises.

2.3. Indirect effect assumption of prime interest rate

Interest rate discount has played an important signaling role in the process of improving the innovation ability of enterprises, that is, the indirect effect of interest rate discount. When external investors invest in projects, they will not make decisions blindly, but will make corresponding judgments based on the implementation of the preferential interest rate policy, which may alleviate the financing constraints faced by enterprises to a certain extent. At the same time, due to the problem of information asymmetry in the process of corporate innovation investment, investors cannot fully grasp the relevant

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information of the project and make risk assessments, which may make investors more inclined to other low-risk investments. However, the implementation of interest rate preferential policies can help enterprises attract external investment, solve the problem of financing difficulties, and indirectly alleviate the financing constraints faced by enterprises in the process of improving their innovation capabilities.

On the one hand, although the implementation of interest rate preferential policies can directly alleviate the financing constraints of enterprises to a certain extent, it is still far from enough compared with the demand for innovation investment. The implementation of the preferential interest rate policy reflects the financial institutions' affirmation of the innovation ability of the beneficiary enterprises. This affirmation enables the enterprise to obtain implicit credit support and enhances the social recognition of the enterprise [25]. When this positive signal is received, investors in the market will recognize and trust the company's innovative investment projects more, thus allowing the company to obtain more financial support. Therefore, the ability of enterprises to obtain external financing is improved, and the problem of financing constraints in enterprise innovation activities will be solved.

On the other hand, before implementing the preferential interest rate, financial institutions will conduct a comprehensive evaluation of the enterprises in the industry, especially the innovation ability and future development prospects of the enterprises. At the same time, because enterprises want to obtain low-cost financial support, they are more inclined to provide financial institutions with detailed information about the innovation activities of enterprises, which also provides convenience for financial institutions to evaluate the overall capabilities of enterprises [18]. Therefore, the preferential interest rate alleviates the problem of information asymmetry, helps enterprises to raise the required external funds, and also indirectly alleviates the financing constraints of enterprises.

To sum up, this paper proposes research hypothesis 3:

H_3: The preferential interest rate can indirectly alleviate the financing constraints of enterprises.

3. Research design

3.1. Sample selection and data sources

This paper takes my country's Shanghai and Shenzhen A-share non-financial listed companies as the research object, and uses their data from 2016 to 2020 to verify the relationship between preferential interest rates, financing constraints and corporate innovation capabilities. The data comes from the Oriental Wealth Database (Choice), and a small part of the data is selected from the Cathay Pacific Database (CSMAR). Stata15.0 and Excel are used for analysis. In order to ensure the scientificity, comparability and integrity of the data, the data was preprocessed before the model was established: first, financial enterprises were excluded; secondly, ST, *ST and other improperly managed enterprises were excluded during the sample period; finally, the sample was excluded Data sets with severe missing data during the period. After sample removal, a total of 9450 enterprise observations were finally obtained. In order to avoid the influence of outliers on the research results, this paper conducts Winsorize processing of 1% above and below the explained variables, explanatory variables and control variables in the model.

3.2. Variable definitions

3.2.1. Explained variable

Enterprise Innovation Capability (IP). Referring to the existing literature, the current academic circles have different measures of enterprise innovation capability indicators. Many scholars use the method of composite total indicator system to measure, and some scholars use innovation input and output indicators to measure the innovation activities of enterprises. This paper finally chooses to use the ratio of R&D expenses and operating income as the input index of innovation to measure the innovation activities of enterprises. The reasons for selecting this indicator are as follows: First, R&D expenses can accurately reflect the investment of enterprises in innovation activities, which is the most direct reflection of enterprise innovation activities. Secondly, R&D expenses can avoid the problem of differences caused by non-enterprise's own innovation activities, and it is more rigorous and reliable to use it as a measurement index. Finally, data on corporate R&D expenditures are more readily available. Therefore, this paper argues that it is reasonable to use R&D expenses to measure the innovation capability of enterprises. In addition, this paper uses operating income to normalize R&D expenses.

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3.2.2. Explanatory variables

Financing Constraint (FC). Scholars generally divide financing constraints into two methods: one is to use a single indicator such as the cash holding ratio of enterprises at the end of the period to measure financing constraints; the other is to use KZ index, SA index and WW index, etc. To measure the index constructed by various indicators, the KZ, SA and WW indexes are all obtained by using the model based on the data of foreign companies, which do not conform to the status quo of Chinese enterprises, and there are certain problems in the KZ, SA and WW indexes. The measurement of corporate financing constraints is not rigorous. In R&D and innovation, the most fundamental thing is to obtain sufficient funds, and what can provide a stable source of funds for corporate innovation activities is the net cash flow formed in corporate operating activities. Based on this, this paper uses the ratio of the net cash flow at the end of the period to the total assets at the end of the period to measure the financing constraints. The larger the ratio of the two, the smaller the financing constraints of the company.

Prime rate (Loan). In a sense, a prime rate is a low-interest rate loan. Therefore, referring to the research of Aghion et al. [26], this paper defines low-interest-rate loans as the difference between the industry average loan interest rate and the enterprise loan interest rate, and uses the ratio of interest expenses to current liabilities to measure the enterprise loan interest rate. If the difference between the average loan interest rate of the industry and the loan interest rate of the enterprise is smaller, it indicates that the loan interest rate obtained by the enterprise is higher. Due to the large differences between various industries, it is not accurate to directly take the average loan interest rate of all listed companies as the industry average loan interest rate. Therefore, this paper selects the listed companies in the sample according to the industry classification of the CSRC, and then selects them according to the industry classification. The loan interest rates of listed companies are averaged according to the industry classification, and then the average loan interest rate of the industry is obtained.

3.2.3. Control variable

Referring to the measurement indicators commonly used by scholars in the existing literature on enterprise innovation, this paper selects the asset-liability ratio (Lev), the total asset turnover ratio (Turn), the current ratio (Liq), the company registration period (Age), the total net profit rate (Roa), the shareholding ratio of the largest shareholder (Top1) and the company's growth (Growth) are used as control variables. At the same time, this paper also controls industry (Industry) and year (Year) as dummy variables. The definitions and descriptions of the main variables are shown in Table 1.

Table 1: Variable definitions.

variable category	variable name	variable symbol	variable description
Explained variable	Enterprise innovation ability	IP	R&D expenses/operating income
Explanatory variables	Prime rate	Loan	Industry Average Lending Rate - (Interest Expense/Current Liabilities)
	financing constraints	FC	Net cash flow at the end of the period/total assets at the end of the period
control variable	Assets and liabilities	Lev	Total Liabilities/Total Assets
	total asset turnover	Turn	Operating Income/Total Assets
	Current ratio	Liq	Current Assets/Current Liabilities
	Company registration period	Age	The age of the company
	Net interest rate on total assets	Roa	Net profit/Total assets
	Shareholding ratio of the largest shareholder	Top1	Number of shares held by the largest shareholder/total share capital
	company growth	Growth	The company's operating income growth rate
	industry	Industry	virtual variable
	year	Year	virtual variable

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3.3. Model construction

After sorting out and learning from relevant literature, this paper demonstrates the proposed three research hypotheses by establishing the financing constraint model, the direct effect model of the preferential interest rate and the indirect effect model of the preferential interest rate. First, to test whether the innovation ability of listed companies in my country is restricted by financing constraints. Build Model 1:

$$IP_{i,t} = \alpha_0 + \beta_1 FC_{i,t} + \beta_2 Lev_{i,t} + \beta_3 Turn_{i,t} + \beta_4 Liq_{i,t} + \beta_5 Age_{i,t} + \beta_6 Roa_{i,t} + \beta_7 Top1_{i,t} + \beta_8 Growth_{i,t} + \beta_9 Year_{i,t} + \beta_{10} Industry_{i,t} + \varepsilon_{i,t} \quad (1)$$

Secondly, the preferential interest rate is used as an explanatory variable to test the effect of the preferential interest rate in compensating for the social cost of enterprise innovation ability. Build Model 2:

$$IP_{i,t} = \alpha_0 + \beta_1 Loan_{i,t} + \beta_2 FC_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Turn_{i,t} + \beta_5 Liq_{i,t} + \beta_6 Age_{i,t} + \beta_7 Roa_{i,t} + \beta_8 Top1_{i,t} + \beta_9 Growth_{i,t} + \beta_{10} Year_{i,t} + \beta_{11} Industry_{i,t} + \varepsilon_{i,t} \quad (2)$$

Finally, the preferential interest rate is used as an adjustment variable, and the cross product term of the preferential interest rate and financing constraints is introduced into the model to test the effect of the preferential interest rate in making up for the signal transmission of the innovation ability of enterprises. Build Model 3:

$$\mathrm{IP_{i,t}} = \alpha_0 + \beta_1 \mathrm{Loan_{i,t}} \times \mathrm{FC_{i,t}} + \beta_2 \mathrm{Loan_{i,t}} + \beta_3 \mathrm{FC_{i,t}} + \beta_4 \mathrm{Lev_{i,t}} + \beta_5 \mathrm{Turn_{i,t}} + \beta_6 \mathrm{Liq_{i,t}} + \beta_7 \mathrm{Age_{i,t}} + \beta_8 \mathrm{Roa_{i,t}} + \beta_9 \mathrm{Top1_{i,t}} + \beta_{10} \mathrm{Growth_{i,t}} + \beta_{11} \mathrm{Year_{i,t}} + \beta_{12} \mathrm{Industry_{i,t}} + \varepsilon_{i,t} \quad (3)$$

4. Empirical Results and Analysis

4.1. Descriptive statistics

Table 2 shows the results of descriptive statistical analysis of the main variables. It can be seen from Table 2 that the level of innovation capability of listed companies in Shanghai and Shenzhen A shares from 2016 to 2020 is quite different, the maximum value is 0.1119, and the minimum value is only 0.0002; Capacity is still weak, and R&D activities are still greatly constrained. The maximum value of the corporate preferential interest rate (Loan) is 0.0430, the minimum value is -0.0679, and the mean value is 0.0011, which indicates that the interest rate of enterprises obtaining loans varies greatly. The maximum value of the financing constraint (FC) is 0.3298, the minimum value is -0.2222, and the mean value is 0.0170, indicating that the data distribution difference is relatively large. The minimum age of company registration is 6 years, and the maximum is 36 years. It can be seen that the age distribution of companies is relatively reasonable. The average shareholding ratio of the largest shareholder (Top1) is 32.71%, and the highest shareholding ratio reaches 72.84%, showing the characteristics of the company's centralized ownership structure.

Table 1: Sample Descriptive Statistics.

Variable	N	Mean	Std.	Min	Max
IP	9450	0.0253	0.0207	0.0002	0.1119
Loan	9450	0.0011	0.0184	- 0.0679	0.0430
FC	9450	0.0203	0.0914	-0.2256	0.3983
Lev	9450	0.4319	0.1767	0.0911	0.8697
Turn	9450	0.6139	0.3571	0.1124	2.1501
Liq	9450	1.9924	1.3770	0.3892	8.7993
Age	9450	18.1040	5.6195	6 .0000	36.0000
Long	9450	0 .0357	0 .0725	- 0.3408	0 .2041
Top1	9450	0. 3271	0. 1 454	0.0809	0 .7284
Growth	9447	0.1791	0.3480	- 0.4864	1.9366

4.2. Regression analysis

4.2.1. Test results and analysis of financing constraints

According to Table 3, the variance inflation factor VIF in the model is all less than 10, and the

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collinearity between variables is not strong, so the variable selection is effective. According to Table 3, it can be found that financing constraints are significantly positively correlated with corporate innovation investment, indicating that the R&D investment of sample companies is positively sensitive to its cash flow. The analysis shows that the innovation investment of enterprises has the characteristics of long cycle, high risk and great uncertainty, and the internal funds of enterprises are often difficult to meet the financing needs of their R&D investment. Therefore, companies generally choose to obtain loans from external financial institutions through physical mortgages, and the problem of information asymmetry in corporate innovation activities makes it very difficult to raise funds, leading companies to abandon promising innovation activities or suspend ongoing innovation projects. thereby inhibiting the enthusiasm of enterprises to carry out innovation activities. This validates the H1 of this paper.

The content in Table 3 also shows that there is a significant negative correlation between the company's innovation ability and the company's age, asset-liability ratio, and the shareholding ratio of the largest shareholder. This shows that the longer the registration period of the enterprise, the worse the solvency, and the more concentrated the equity, the worse the innovation ability of the enterprise will be. Other variables, total asset turnover ratio, current ratio, and total asset net interest rate have a significant positive correlation, which confirms that the company's strong profitability and better asset liquidity are conducive to the improvement of its innovation ability.

Table 3: Empirical Test Results of Financing Constraint Model.

	standard error	Standard coefficient	P >|t|	t	Collinearity Statistics	
					VIF	Tolerance
FC	0.0024	0.0051	0.037	2.08	1.01	0.9950
Debt	0.0015	-0.0086	0.000	-5.57	2.14	0.4672
Turn	0.0008	0.0134	0.000	17.04	1.09	0.9170
Liq	0 .0002	0 .0012	0 .000	6.01	1.99	0 .5017
Age	0 .0001	- 0.0006	0 .000	- 15.73	1 .11	0 .9039
Long	0 .0037	0 .0143	0 .000	3.82	1 .30	0.7692
Top1	0.0001	-0.0001	0.000	-9.19	1.08	0.9227
Growth	0.0006	0.0004	0.493	0.68	1.15	0.8698
Year	Control					
Industry	Control					
Adj-R^2	0.1123					
F	33.26					
Obs	9447					

4.2.2. Test result and analysis of direct effect of preferential interest rate

From the data in Table 4, it can be seen that the model does not have a collinearity problem, because the variance inflation factor VIF of the model is less than 10. The reason for the low R2 value after model adjustment is that there are many factors affecting the innovation ability of listed companies, so this result is acceptable.

As can be seen from Table 4, after controlling for annual variables and industry variables, the preferential interest rate is significantly positively correlated with the innovation investment of enterprises. Compared with other projects, enterprises need a lot of capital investment to invest in innovation, and relying only on internal financing of enterprises is more risky; and the implementation of preferential interest rate policies can increase the availability of loans for enterprises to invest in innovative projects, and then reduce the cost of loans. Costs can alleviate the financing problems of enterprises, thereby promoting enterprises to invest in innovation. In addition, through the implementation of the preferential interest rate policy, the market competition among financial institutions has become more intense, and the availability of loans and the negotiating power of corporate loans have also improved, thereby promoting enterprises to invest low-cost debt financing in long-term returns. innovation activities. The implementation of the preferential interest rate policy can directly and effectively alleviate the financing constraints in the innovation activities of enterprises, and H2 has been verified.

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Table 4: The empirical test results of the direct effect model of the prime interest rate.

	standard error	Standard coefficient	P >|t|	t	Collinearity Statistics	
					VIF	Tolerance
Loan	0.0102	0.0426	0.000	4.19	1.14	0.8804
FC	0.0023	0.0040	0.079	1.76	1.01	0.9947
Debt	0.0016	-0.0075	0.000	-4.80	2.21	0.4516
Turn	0.0008	0.0130	0.000	16.41	1.12	0.8931
Liq	0.0002	0.0012	0.000	6.08	1.99	0 .5015
Age	0 .0001	- 0.0006	0 .000	- 15.81	1 .11	0 .9035
Long	0 .0037	0 .0134	0 .000	3.57	1 .31	0 .7644
Top1	0 .0001	-0 .0001	0.000	-9.57	1.10	0.9100
Growth	0.0006	0.0003	0.550	0.60	1.15	0.8693
Year	Control					
Industry	Control					
Adj-R^2	0.1135					
F	32.89					
Obs	9447					

4.2.3. Test result and analysis of indirect effect of preferential interest rate

From the data in Table 5, it can be found that the variance inflation factor VIF of the model is less than 10, the collinearity between variables is not strong, and the model has no collinearity problem; the R2 value after model adjustment is 0.1139, which is acceptable.

From Table 5, it can be concluded that after controlling the annual variables and industry variables, the corporate innovation investment is significantly positively correlated with the financing constraint variable, while the regression coefficient of the cross product of the preferential interest rate and the financing constraint is negative. This shows that the preferential interest rate plays a positive role in regulating the innovation investment of enterprises. With the implementation of the preferential interest rate policy, the negative impact of financing constraints on the innovation ability of enterprises will gradually weaken. That is to say, the preferential interest rate can indirectly alleviate the financing constraints of enterprises when they invest in innovation, so the hypothesis H3 proposed in this paper is verified.

Table 5: Empirical Test Results of Indirect Effect Model of Prime Rate.

	standard error	Standard coefficient	P >|t|	t	Collinearity Statistics	
					VIF	Tolerance
Loans	0.0118	0.0568	0.000	4.82	1.62	0.6162
FC	0.0023	0.0040	0.077	1.77	1.01	0.9946
Loan *FC	0.1323	- 0.2833	0.032	- 2.14	1.49	0.6693
Debt	0.0016	-0.0075	0.000	-4.86	2.22	0.4513
Turn	0.0008	0.0130	0.000	16.43	1.12	0.8930
Liq	0.0002	0.0012	0.000	6.03	2.00	0 .5011
Age	0 .0001	- 0.0006	0 .000	- 15.79	1 .11	0 .9034
Long	0 .0037	0 .0134	0 .000	3.57	1 .31	0 .7644
Top1	0 .0001	-0 .0001	0 .000	- 9.58	1.10	0.9100
Growth	0.0006	0.0003	0.554	0.59	1.15	0.8693
Year	Control					
Industry	Control					
A dj-R^2	0.1139					
F	32.08					
Obs	9447					

4.3. Robustness test

In the empirical test, if there is a problem with the model setting, it may lead to the phenomenon of "pseudo-regression" in the model. Therefore, in order to ensure the reliability and accuracy of the regression results, this paper uses the method of surrogate variables to test the robustness of the above regression results. Referring to the practice of the existing literature, this paper uses the KZ index as a

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substitute variable for the ratio of net cash flow to total assets at the end of the period, and adopts the same research method for empirical analysis, and the main conclusions are almost the same as the above results. [1]Therefore, the conclusions of this study are relatively robust.

5. Conclusions and Recommendations

This paper takes my country's Shanghai and Shenzhen A-share non-financial listed companies from 2016 to 2020 as the main sample, and empirically tests the impact of preferential interest rates and financing constraints on corporate innovation capabilities. The research results show that most enterprises generally have financing constraints, and financing constraints will inhibit the improvement of corporate innovation capabilities; preferential interest rates can alleviate the financing constraints in corporate innovation investment through direct channels and indirect channels. Enterprises are the main body of innovation and have an important impact on promoting technological innovation and economic progress in my country. Therefore, this paper has the following implications for improving the innovation capabilities of listed companies in my country:

First, the preferential interest rate can give full play to the social cost effect and signal transmission effect, and directly and indirectly enhance the innovation ability of enterprises. Therefore, the government should implement the preferential interest rate policy in all walks of life in my country, but at the same time, it should also implement differentiated preferential interest rate policies according to the characteristics of the industry. For example, green environmental protection enterprises and strategic emerging industry enterprises with better future development prospects should be given better policy preference.

Second, combine "preferential benefits" with "post-event benefits". Although the preferential interest rate policy can promote the improvement of the innovation ability of enterprises, it can only support enterprises from the source. Due to the large amount of funds required for enterprises' innovative business activities, the government can implement preferential tax policies for enterprises, and then give enterprises policy support from the results, provide a good development environment for enterprises to carry out innovative activities, and realize "pre-preferential" and "ex-post preferential" organic combination.

Third, the financing constraints of listed companies in my country are no trivial matter. Policy makers should issue targeted policies to continuously relax the financing constraints of corporate innovation. At the same time, regulators should strengthen the protection of investors, minimize the degree of information asymmetry in the capital market, and promote the efficient allocation of capital market resources.

Fourth, the government should establish a complete supervision and effect evaluation mechanism for the use of corporate funds. In order to improve the utilization rate of funds, the government should establish a preferential interest rate policy tracking system to supervise and evaluate the use of special funds for enterprises. If the use of funds of enterprises is inefficient or does not achieve the expected policy effect, the government can reduce or even cancel the assistance to enterprises.

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[1] Due to limited space, the relevant results are not presented in detail.

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