



Do social insurance contribution rates affect firms' investment in innovation?-Based on the empirical analysis of listed companies in Beijing

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Abstract. Facing the burden of social insurance costs and innovation challenges faced by firms during China's economic transformation, this paper focuses on the Comprehensive Program for Reducing Social Insurance Premium Rates, which will be implemented in 2019, and examines its potential impact on firms' investment in innovation. Based on the panel data of 317 listed companies in Beijing from 2018 to 2022, this paper analyzes the impact of pension insurance contribution rate adjustment on enterprises' innovation investment through two-way fixed effect model. The results of the study reveal that under China's current social insurance investment, the incentive effect of social security contributions is greater than the cost effect, and a reasonable increase in social security contributions will "force" enterprises to expand their R&D investment, and there is a certain degree of heterogeneity in the response of different types of enterprises' innovation investment to social security contributions. The findings of this paper are important for understanding the impact of social insurance policy adjustments on firms' innovative behavior, which is conducive to the government's formulation of more effective social security policies to promote the optimization of economic structure and the enhancement of firms' efficiency.

Keywords: Pension insurance contribution rates; Enterprise innovation inputs; fixed effects model; Beijing Listed Companies

1 INTRODUCTION

This paper contributes to the existing literature in two main ways [1]. First, the paper approaches the study from a more specific perspective. Most of the existing relevant literature starts from a number of provinces and municipalities across the country, with fewer studies targeting specific provinces and municipalities [2]. By focusing the research perspective on Beijing and examining a specific scope, this paper is able to more precisely capture and understand the impacts of social security policies on firms' innovation inputs under specific economic and policy environments [3], and to provide more specific and targeted policy recommendations for local governments and firms. Second, this paper selects a more time-sensitive research period. Most of the existing

literature stops at 2017, and with the policy adjustment and the impact of the new crown epidemic on enterprises, social insurance contributions may more significantly affect the innovation investment of enterprises, and this paper selects the time variable as 2018 to 2022, which improves the accuracy and timeliness of the empirical analysis.

2 LITERATURE REVIEW AND RESEARCH HYPOTHESES

2.1 Literature review

Scholars at home and abroad have extensively studied the influencing factors of corporate innovation behavior, pointing out that the uncertainty of market environment, financing channels, corporate governance structure and compensation incentives have a significant impact on corporate innovation investment. In terms of market environment, when the degree of environmental uncertainty is low, environmental uncertainty is positively correlated with enterprise technological innovation; when the degree of environmental uncertainty is high, environmental uncertainty is negatively correlated with enterprise technological innovation [4], in terms of financing channels, scholars mainly analyze the impact on enterprise innovation investment from the aspects of equity financing and debt financing, and both aspects have different conclusions on the direction of the impact on enterprise innovation R&D investment. Scholars mainly analyze the influence of equity financing and debt financing on enterprise innovation investment, and the direction of the influence of these two aspects on enterprise innovation R & D investment have different conclusions [5]. In terms of corporate governance, a certain range of equity concentration can drive larger R&D investments [6], and combining the roles of chairman and general manager can inhibit firms from investing in innovation [7]. In terms of compensation incentives, reasonable compensation incentives in high-tech enterprises are positively related to corporate innovation [8].

2.2 Theoretical mechanisms and hypothesis development

The level of social insurance contribution rates has a direct impact on the cost of labor and thus on business innovation in two ways. On the one hand, the rise of labor factor costs, enterprises will adjust the input ratio of different factors through the price mechanism, which has a positive impact on the enterprise innovation investment; on the other hand, the rise of labor costs squeezed the enterprise's net profit, which can be used for innovation and R & D investment in the cash flow pressure increases, and inhibit the enterprise innovation and R & D investment [9].

2.3 Significance

1. Guaranteeing a basic life: the establishment of a social security system by the State to guarantee the basic life of citizens and relieve workers of their worries is not only a

necessity for economic development and social stability, but also an important element of human rights protection and a manifestation of social progress.

2. **Maintaining social stability:** China is a socialist country, and the essence of a socialist country is to emancipate and develop the productive forces, eliminate exploitation and polarisation, and ultimately achieve common prosperity. The implementation of social security is conducive to narrowing the gap between the rich and the poor in society and promoting the overall welfare of society, and is an important means for socialist countries to achieve the goal of common prosperity, thus fundamentally maintaining social stability.

3. **Promoting economic development:** Firstly, social security can regulate aggregate social demand and smooth out economic fluctuations. Secondly, the long-term accumulation and investment operation of social security funds can help improve the capital market. Thirdly, social security ensures that workers can maintain the basic livelihood of themselves and their family members in the event of a loss of economic income or labour capacity, and that the process of labour reproduction is not blocked or interrupted. At the same time, the State can also provide financial support for labour reproduction in the form of maternity, child-rearing and education allowances, so as to improve the overall quality of labour resources.

4. **Maintaining social equity:** Social security is an important means of maintaining social equity in a market economy. Its role is mainly manifested in two aspects: firstly, by guaranteeing the basic life of all members of society, it eliminates to a certain extent the inequality of opportunity caused by accidental disasters, unemployment, illness and other factors in the process of social development, and enables members of society to participate in the fair competition in the market without any worries; secondly, by sharing risks among all members of society, it realises the redistribution of national income, narrows the The second is to redistribute national income through risk sharing among all members of society, narrowing the gap between the rich and the poor and reducing the unfairness of social distribution results.

5. **Promoting national welfare:** modern social security not only assumes the responsibility of 'saving the poor' and 'preventing the poor', but also provides a wider range of benefits, infrastructure and public services for all members of society, so that people can enjoy the fruits of economic and social development as fully as possible, and continuously improve their material life and social well-being. This will enable people to enjoy the fruits of economic and social development to the fullest extent possible and to continuously improve the quality of their material and spiritual lives.

3 RESEARCH DESIGN

3.1 Sample selection and data sources

Based on the operating basis of the ongoing business cooperation model, which is based on the complementary strengths of resources and competencies, after shifting to project-based business cooperation, natural resources become a kind of transactional cooperation and often become the constraints of project-based business cooperation, and one party tends to seek for an effective transaction of resources and take the initiative

to cooperate with the other party who possesses the resources to form the cooperation model in a transactional manner. This paper selects a sample of listed companies listed on the A-share market, headquartered in Beijing or registered in Beijing from 2018 to 2022, and all the data are originated from the CSMAR database and the Wind database, among which the metrics of innovation R&D investment, pension insurance contribution rate and average salary are from the CSMAR database, and the rest are from the Wind database. Since there may be differences in the way different listed companies record their social security contributions, this paper organizes and calculates the social security contribution data of each company to ensure the accuracy of the study. In order to enhance the data validity, there are the following requirements for the sample selection of listed companies: firstly, non-ST companies and non-*ST companies; secondly, the listed company does not have abnormal or missing key variables; thirdly, the number of employees of the listed company in the range of time variable selection is not less than 50. At the same time, in order to reduce the influence of extreme values and enhance the reliability of the conclusion, all continuous variables are subjected to an upper and lower 1% shrinkage treatment [10]. After carrying out the above processing, the panel data of 317 samples of A-share listed, headquartered in Beijing or registered in Beijing listed companies from 2018-2022 are finally obtained, totaling 16,296 observations.

3.2 Model Setting and Variable Definition

To test hypothesis H1, this paper constructs the following panel two-way fixed effects model:

$$R\&D_{it} = \alpha + \beta Rate_{it} + \gamma Control_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

Where i denotes publicly traded companies, t denotes year, β is the coefficient of the core explanatory variable, γ is the vector of coefficients of the control variables, α denotes the constant term, μ_i represents the firm fixed effect, λ_t represents the time fixed effect, and ε_{it} is the random perturbation term.

Explained variable: $R\&D_{it}$ denotes the innovation R&D investment of firm i in year t . Referring to Liu Chen et al. (2022), the ratio of R&D investment to operating revenue is used to measure the firm's innovation R&D investment, which is a regular reporting indicator in the accounting statement, and the higher the ratio indicates the greater the firm's innovation R&D investment efforts.

3.3 Descriptive statistics

The descriptive statistics of the main variables are shown in Table 1. The mean value of the innovative research and development (R&D) investment of enterprises in Beijing is 0.0938, the minimum value is 0.0003, and the maximum value is 0.7852, which indicates that there are large differences in the strength of the investment in the process of innovative R&D among different enterprises. The mean value of the pension insurance contribution rate (Rate) is 6.72%, which is a large difference from the statutory

contribution rate, and this difference is related to the fact that the pension insurance contribution rate measure in this paper is not the statutory policy contribution rate, the strength of social security contribution collection varies from place to place, and the listed companies have a certain degree of autonomy and self-governance to pay social insurance. The minimum value of the pension insurance contribution rate (Rate) is 0.27%, and the maximum value is 11.73%, which indicates that there are differences in the pension insurance contribution rate among different enterprises in Beijing and some enterprises have serious shortfalls in the pension insurance contribution rate. The mean values of profitability (Roe), capital intensity (Cap), and gearing ratio (Lev) are 0.0588, 0.0083, and 0.3856, respectively, and the statistical results of other control variables are basically in line with the expectation during the sample period.

Table 1. Descriptive statistics

variant	observed value	average value	standard deviation	minimum value	maximum values
R&D	1,476	0.0938	0.1112	0.0003	0.7852
Rate	1,233	0.0672	0.0281	0.0027	0.1173
Roe	1,584	0.0588	0.1947	-1.1132	0.5795
Cap	1,583	0.0083	0.0274	0.0000	0.2033
Lev	1,585	0.3856	0.2161	0.0414	0.9410
lnAge	1,585	2.8402	0.3751	1.6094	3.5835
Size	1,585	592.3751	2177.1270	1.6480	15923.0800
Equ	1,336	62.4367	17.5465	19.8700	97.2800
Cfo	1,585	0.0520	0.0828	-0.2242	0.3277
lnBoa	1,511	2.0969	0.2135	1.6094	2.7081
lnWage	1,233	12.2705	0.4084	11.3482	13.3245

4 CONCLUSIONS AND RECOMMENDATIONS

The survival and development of enterprises is a major issue. For example, if an enterprise implements the strategy of improving competitiveness, its decision-making focuses on improving the efficiency of scale and enhancing competitiveness, and it must be clear that what it is pursuing is sufficient 'efficiency' rather than 'scale', and that it is enhancing competitiveness for the sake of 'improving efficiency' rather than merely for the sake of 'expanding scale'; therefore, the key element of decision-making is efficiency, and the related issue is scale. For the high-level decision-making of enterprises, innovation decision-making includes how to find the breakthrough of innovation and forecast the opportunities of innovation; how to ensure the market share, and decision-making on various business activities to improve market competitiveness on the basis of innovation; how to keep the enterprise in good organisational form through innovation, and how to establish the best incentive mechanism to stimulate the vitality of the enterprise's management decision-making.

The research in this paper also has certain shortcomings. First of all, the geographical scope of the study mainly focuses on Beijing, while the social insurance system and

economic environment of other provinces and cities may differ greatly. Therefore, the generalizability of the paper's findings to the national level may be limited. Second, this paper employs a two-way fixed-effects model with panel data for the study, but there are still some potential methodological limitations. For example, the availability and quality of data may have an impact on the results of the study, in addition, there may be some limitations in the model setting and the selection of control variables in this paper, which may lead to the lack of precision in the analysis of the relationship between social insurance contributions and innovation investment. To summarize, although the research in this paper has some value, it still needs to be further improved and refined in order to explain the complex relationship between social insurance contributions and enterprise innovation input more comprehensively and accurately.

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