

Does Enterprise Annuity Alleviate the Principal-agent Problem?

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Abstract: The pressure on social pensions can be reduced by actively encouraging businesses to join corporate pension plans. This study uses data from A-share listed firms from 2012 to 2022 to empirically evaluate the relationship between corporate pension and corporate agency problem and its mechanism of action from the perspectives of financial performance and innovation performance. The study's findings demonstrate that the corporation can reduce the agency problem by implementing a corporate annuity system. Additional investigation into the fundamental connection between agency problems and corporate annuities reveals that, when viewed through the lens of financial success, financial performance can amplify the corporate annuities' deterrent effect on agency problems. The study indicates that companies can enhance their innovation performance by participating in annuities, which can have the effect of reducing agency difficulties. The data's heterogeneity analysis shows that, in the eastern and central regions, the mediating role of innovation performance is highly important whereas, in the western region, the moderating effect of financial performance on the agency problem is not always significant. After dividing the sample based on the type of state-owned business, it was discovered that the findings from these entities mostly agreed with the paper's overall conclusions.

Keywords: enterprise annuity, agency problem, innovation performance, financial performance

1. Introduction

The growing number of elderly people in China has led to an ever-increasing demand for pension insurance. China has actively responded to the aging of the population by adopting a series of measures, such as the parallelization of pensions and the adjustment of contribution rates, but still has not fundamentally solved the problem. In the face of the growing demand for retirement life of Chinese residents and the imbalance in the structure of pension insurance, the vigorous development of enterprise annuity is a powerful measure to actively respond to the aging of the population.

At present, scholars have conducted a lot of research on enterprise annuity. Drawing on the lessons learned from the development of enterprise annuity business in other countries, study the problems existing in the development of enterprise annuity in China at this stage, and put forward policy recommendations. Secondly, the investment returns and investment management effects of Chinese enterprise annuities are evaluated from multiple dimensions; in addition, the impact on performance is considered from the perspective of personal attributes.

The marginal contributions of this paper include the following: first, there are few studies in the existing literature that study corporate agency problems from the perspective of corporate annuities. This paper categorizes agency problems into two types and studies the relationship between corporate annuities and these two types of agency problems separately. Second, from the perspective of financial performance and innovation performance, the study of the relationship between corporate annuities, innovation performance, and agency problems is conducive to exploring the mechanism of corporate annuities' impact on agency problems. Third, the effects of enterprise nature and regional heterogeneity are further tested to provide targeted opinions on agency problems in different regions and enterprises of different natures.

2. Theoretical Analysis and Hypothesis

As a secondary subject of employee compensation, enterprise annuity is often based on the performance of employees and has the characteristics of salary and salary.

Shan [2] pointed out that the occupational pension is a salary that employees can only receive after retirement. It has the characteristics of social endowment insurance. It has a post-incentive effect by providing employees with retirement benefits. In 1983, Lazear proposed that the length of employees' working hours is proportional to the annuity rights and interests received by employees, and the annuity rights and interests received by employees with longer working hours are higher than their marginal output, increasing the cost of employees with short working years who do not work hard, thereby improving the efficiency of employees. Compared with explicit monetary compensation, enterprise annuities tend to have higher performance sensitivity [3]. The enterprise annuity system helps to encourage the long-term behavior of senior managers and is of great significance in solving agency problems and protecting the interests of shareholders [4]. Yu Xin liang [5] proposed that if the company where the senior managers are located joins the annuity plan, the improvement of the company's operating performance will also increase the economic benefits brought by the enterprise annuity, which will directly alleviate the conflict of interest between executives and shareholders. Therefore, the enterprise annuity can alleviate the principal-agent problem within the enterprise to a certain extent. Based on this, the following hypothesis is proposed:

H1: Enterprises joining an annuity plan can reduce internal agency problems.

Reviewing the previous literature, the reasons for the formation of internal agency problems are diverse. Exploring the causes of agency problems in companies from the perspective of endogeneity is often caused by the inability of managers and shareholders to reach an agreement on their interests. Some scholars have pointed out that not all agency problems will be reflected in financial performance indicators, but enterprises with serious agency problems often cannot have good financial performance, so the company's financial performance is lower than expected, which can be used as a signal that agency problems need to be regulated to a greater extent. Wang Shuangjin et al. [6] also pointed out that agency problems have weakened the long-term role of ESG responsibility performance in improving financial performance, so financial performance and agency problems are often negatively correlated. When discussing the influencing factors of enterprise annuity, it can be found that enterprises with good financial performance will have more funds and will be more willing to join enterprise annuity. Therefore, increasing corporate financial performance can effectively inhibit the occurrence of corporate agency problems. There is also a negative impact between enterprise annuity and agency problems. Based on this, the hypothesis is proposed:

H2: Corporate financial performance can further increase the inhibitory effect of corporate annuity on agency problems.

Innovation is an effective way for enterprises to achieve technological transcendence and gain competitive advantage. Taking innovation performance as the standard to measure the innovation level of enterprises, Zhang Dongxu and Ning Meijun [7] found through empirical test that the

implementation of annuity plan was significantly positively correlated with the number of patent applications and the number of invention patent applications. Enterprise annuity promotes the improvement of enterprise innovation performance by optimizing human capital structure and increasing human capital investment. As a post-incentive policy, enterprise annuity will attract and retain talents and provide welfare guarantee for talents.

To sum up, enterprise annuity can have a positive impact on enterprise innovation by affecting the human capital structure of enterprises. The research results show that the enterprise annuity is significantly positively correlated with the enterprise innovation performance, and the enterprise annuity has a promoting effect on the enterprise innovation. The company's participation in the enterprise annuity can attract more talents to the company, and high-quality talents can improve the innovation level for the company. The company's participation in the enterprise annuity is conducive to reducing the executives' abandonment of innovative projects that require a large amount of capital investment because of myopia, thereby reducing the company's agency problems. Therefore, it can be shown that the probability of serious agency problems in enterprises with good innovation performance will be smaller. This leads to the hypothesis that:

H3: Enterprises joining the annuity plan will increase innovation performance, thereby reducing agency problems.

3. Research Design

3.1. Variable definition

3.1.1. Explained Variables

Based on the existing literature, this paper divides the agency problem into two categories: the first type of agency problem (AC1) and the second type of agency problem (AC2). The first type of agency problem refers to the agency problem between shareholders and managers due to the separation of the two positions. The second type of agency problem refers to the agency problem between major shareholders and minority shareholders. Drawing on the literature of Shleifer and Vishny, this paper uses total asset turnover to measure the first type of agency problem. The total asset turnover rate is equal to the ratio of main business income to total assets, which represents the willingness and ability of enterprise managers to comprehensively utilize shareholders' assets to create income. It is the main indicator to measure the first type of agency problem. In the robustness test, the ratio of operating income to average total assets is used as a measure of total asset turnover to measure the first type of agency problem, which is recorded as AC3. The greater the total asset turnover rate, the higher the agency efficiency of the manager, and the smaller the first type of agency problem. The second type of agency problem (AC2) is measured by the capital occupation of the controlling shareholder. The controlling shareholder's embezzlement of listed company funds is mainly reflected in other receivables in the financial report. Therefore, the second type of agency problem is measured by the ratio of other receivables to total assets. The larger the value, the more serious the second type of agency problem.

3.1.2. Explanatory Variables

The core explanatory variable is enterprise annuity (Pension). Referring to Yang Ni [1]'s measurement method of enterprise annuity, this paper takes enterprise annuity as a dummy variable. According to 'Accounting Standards for Business Enterprises No.30-Financial Statement Presentation', enterprise annuity, as a kind of supplementary pension insurance, should be listed in the detailed account of 'employee compensation payable' in the notes to the financial statements. The accounts of 'annuity payment', 'enterprise annuity payment' and 'supplementary pension

insurance' are listed in the details of employee compensation payable in the annual report of the year. When the 'current increase' is greater than 0, it is considered that the company has paid the enterprise annuity, and the Pension value is 1, otherwise it is 0.

We use financial performance as a moderating variable. At present, the more commonly used indicators of corporate financial performance measurement in the academic community mainly include Tobin's Q value, economic value added, return on total assets, sales profit margin, etc. Only when the market efficiency is high, the application of Tobin's Q value is effective. However, at this stage, there is still controversy over the effectiveness of China's capital market. Although economic added value will not be affected by external factors, it is necessary to adjust the financial statement items when calculating economic added value. Artificial adjustment may lead to distortion of data, thereby reducing the reliability and objectivity of data. Therefore, the total return on assets calculated by the basic data of financial statements is simple to calculate and has higher reliability. Li Xiangrong's [8] study also used this indicator. Therefore, this paper selects the return on total assets (ROA) as an alternative variable of corporate financial performance. The larger the index value, the better the financial performance of the enterprise.

Finally, we use innovation performance (Innovation) as a mediating variable. The addition of enterprise annuity can attract more talents. High-level talents are conducive to the company's innovation performance, thus reducing the negative impact of agency problems on the company. Since the number of patents can reflect the R & D and innovation of enterprises more comprehensively than other innovation indicators, this paper draws on Zhang Dongxu's [7] measurement of innovation performance. The total number of patent applications of listed companies and their subsidiaries, joint ventures and joint ventures is used to measure the innovation performance of enterprises, which is calculated by the natural logarithm of the total number of patent applications of enterprises in the year plus 1.

3.1.3. Control Variables

To make the results more robust, referring to the literature, we also added some control variables in the empirical test to avoid the interference of these factors on the results. Including enterprise age (Age), asset-liability ratio (Lev), operating income growth rate (Growth), Tobin's Q, operating net cash flow (OCF), average salary of managers (M_pay), total number of employees (Staff), proportion of independent directors (Indep) and board size (Size). In addition, this paper also controls the industry and province fixed effects in the test.

Table 1: The definition and description of variables.

Variables		Statement
The first type of agency problem	AC1	revenue / total assets
The second type of agency problem	AC2	Other receivables / total assets
Join or not	Pension	Joining the annuity, the value is 1, otherwise it is 0
Financial performance	ROA	ROA
Innovation performance	Innovation	The total number of patent applications of listed companies ,their subsidiaries and joint ventures
Corporate age	Age	Company listing years
Board size	Size	Log the total number of board members
Financial level	Lev	Total liabilities / total assets
Corporate value	Tobin_q	Tobin Q
Staff number	Staff	Log the total number of workers
Managerial pay	M_pay	Total pay of managers / total number of managers
Revenue growth rate	Growth	(Current operating income - previous operating income) / Current operating income

Table 1: (continued).

OCF proportion of NED	OCF Indep	Net cash flow /total assets Total number of ID / BOD
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3.2. Sample and data sources

In this paper, all A-share listed companies in China from 2012 to 2022 are selected as the research samples, and the selected samples are processed as follows : ST companies and ST * companies are excluded ; excluding financial companies ; exclude samples with net assets less than 0 ; exclude samples with missing variable data in regression ; in order to avoid the influence of outliers on the regression results, 1 % and 99 % of the data were indented. The data comes from the CSMAR database. Table 2 gives a simple descriptive statistic of all the data and variables used in this paper.

Table 2: Descriptive statistics

Variable	Obs	Mean	Std.	Min.	Max.
AC1	31946	.52	.358	0	9.399
AC2	31946	.173	.149	.002	3.378
Pension	31946	.135	.342	0	1
ROA	31946	.043	.078	-2.834	.786
Innovation	25217	4.112	1.594	.693	11.35
Age	31946	7.735	6.626	1	32
Size	31946	22.05	1.197	18.429	28.607
Lev	31946	.375	.192	.008	1.685
Tobin_q	31946	2.215	1.522	.641	27.338
Staff	31945	7.576	1.169	3.434	13.215
M_pay	31921	13.285	.643	10.145	16.725
Growth	31946	.398	3.261	-28.589	422.966
OCF	31946	.05	.071	-.662	.726
Indep	31946	37.639	5.449	16.67	80
Industry	31946	35.116	23.289	1	73
Province	31946	13.906	7.541	1	32

3.3. Model design

In this paper, two models are used in the test process. The first model is to test the relationship between enterprise annuity and agency problems. The model is as follows:

$$Y_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \phi_{i,t} + \varepsilon_{i,t} \quad (1)$$

Among them $Y_{i,t}$ is the explained variable, that is, the agency problem. We first use AC1 and AC2 to represent the first type of agent problem and the second type of agent problem respectively, and then use AC3 to represent the agent problem in the robustness test part. $X_{i,t}$ is the core explanatory variable, for the enterprise annuity. $\phi_{i,t}$ represents the control variables, and all the control variables mentioned above are included in each test to ensure the robustness of the results. $\varepsilon_{i,t}$ is a random error term.

The second model is based on the first model, adding the cross term of financial performance and enterprise annuity, as shown in Equation (2):

$$Y_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \alpha_2 \varphi_{i,t} + \phi_{i,t} + \varepsilon_{i,t} \quad (2)$$

Among them, $\varphi_{i,t}$ is the intersection of financial performance and enterprise annuity, and the other variables are the same as formula (1). This model is to test whether financial performance has an impact on the relationship between enterprise annuity and agency problems.

The following models are used to test the mediating effect of innovation performance, and the stepwise regression test method is used to test the mediating effect. The model is:

$$Y_{i,t} = \alpha_0 + \alpha_1 X_{i,t} + \phi_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$INNOVATION_{i,t} = b_0 + b_1 X_{i,t} + \phi_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$Y_{i,t} = \beta_0 + \beta_1 X_{i,t} + \beta_2 INNOVATION_{i,t} + \phi_{i,t} + \varepsilon_{i,t} \quad (4)$$

Among them, $INNOVATION_{i,t}$ represents the innovation performance of enterprise i in year t . If α_1 and b_1 is not significant, it indicates that there is no mediating effect. If α_1 and b_1 is significant, it is observed that β_1 and β_2 , if β_1 and β_2 are significant, it indicates that there is a partial mediating effect. If β_1 is not significant, β_2 is significant, indicating that there is a complete mediating effect.

4. Empirical Testing

Through the above models and data, this paper studies the impact of enterprise annuity on agency problems from the perspectives of innovation performance and financial performance and discusses the relationship between various variables in detail. The following empirical test results are obtained and analyzed.

4.1. Enterprise Annuity and Agency Problems

First, we examine the impact of enterprise annuity on two types of agency problems. As mentioned above, whether an enterprise participates in annuities will have an important impact on the company's agency problems, but the specific impact needs to be tested in detail using data. The empirical results are shown in Table 3.

Table 3: Enterprise annuity and agency problems

Variables	(1) AC1	(2) AC2	(3) AC1	(4) AC2	(5) AC1	(6) AC2
Pension	0.092*** (0.006)	-0.055*** (0.002)	0.027*** (0.006)	-0.017*** (0.003)	0.038*** (0.006)	-0.010*** (0.003)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Industry	No	No	No	No	Yes	Yes
Province	No	No	No	No	Yes	Yes
Constant	0.507*** (0.002)	0.181*** (0.001)	1.750*** (0.056)	0.501*** (0.024)	2.053*** (0.063)	0.596*** (0.027)
Observations	31,946	31,946	31,920	31,920	31,920	31,920
R-squared	0.008	0.016	0.149	0.132	0.311	0.368

Note: The standard error is within brackets. * * *, * * and * are significant at 1 %, 5 % and 10 %, respectively. The following is the same.

In Table 3, the enterprise annuity is empirically tested for the two types of agency problems. The first column is the panel regression of enterprise annuity and the first type of agency problem. After controlling the industry fixed effect and the provincial fixed effect, the addition of enterprise annuity will increase the total asset turnover rate and reduce the first type of agency problem, and the effect is very significant. The willingness and ability of companies with enterprise annuity to comprehensively utilize shareholders' assets to generate income will also be higher, improving the efficiency of managers' agency and reducing the first type of agency problem. The second type of agency problem is significantly negatively correlated with the addition of enterprise annuity, which shows that the addition of enterprise annuity will reduce other receivables, that is, the capital occupation of controlling shareholders, thus reducing the second type of agency problem.

Table 3 presents the empirical testing of the enterprise annuity for the two categories of agency challenges. The enterprise annuity panel regression and the first kind of agency problem are shown in the first column. The addition of enterprise annuity will raise the overall asset turnover rate and decrease the first kind of agency problem after adjusting for the industry fixed effect and the province fixed effect. This is a highly important effect. Enterprise annuity providers will also be more willing and able to fully employ shareholders' assets for income generation, which will increase managers' agency efficiency and lessen the first kind of agency difficulty.

5. Moderating Effect of Financial Performance

The company's agency problem is influenced by its development model and direction, both of which are significantly influenced by its financial performance. Consequently, it is imperative to investigate the correlation between agency issues and enterprise annuities from the standpoint of financial performance. In this article, the empirical test is conducted using the model of formula (3), and the intersection of financial performance and enterprise annuity is included to the regression test. Test results are shown in Table 4.

Table 4: Moderating effect of financial performance

VARIABLES	(1) AC1	(2) AC2
Pension	0.0266*** (0.00802)	0.0149** (0.00704)
ROA_Pension	0.281** (0.117)	-0.622*** (0.131)
Control	Yes	Yes
Industry	Yes	Yes
Province	Yes	Yes
Constant	2.061*** (0.0622)	0.580*** (0.0278)
Observations	31,920	31,920
R-squared	0.311	0.373

Table 4 displays the enterprise's participation in the financial performance adjustment in each column. The cross-multiplication term between annuity and financial performance is included to each regression test group. When the cross-multiplication term is added, the enterprise annuity coefficient increases significantly when compared to the coefficient in the benchmark regression results. This suggests that the stronger the enterprise annuity's positive impact on agency problems, the better the financial performance. The coefficient of the cross-multiplication term to the first type of agency

problem in Table 4's model (1) is significantly positive, suggesting that strong financial performance will encourage an increase in the enterprise annuity to total assets turnover rate, which will lower the first type of agency problem. The coefficient of the cross term to the second kind of agency problem in Model (2) of Table 4 is significantly negative, suggesting that the second type of agency problem will decrease with an increase in enterprise annuity. In keeping with the original hypothesis of this paper, the cross term between enterprise annuity and financial performance is also negative, and the coefficient grows larger, suggesting that financial performance can further increase the inhibitory effect of enterprise annuity on the second type of agency problem.

5.1. The Mediating Effect of Innovation Performance

Since the enterprise annuity has a positive effect on talent attraction, talent joining the enterprise can bring more patent innovation to the enterprise and improve the innovation performance of the enterprise, thus reducing the agency problem of the company. To verify whether the enterprise annuity can affect the agency problem of the enterprise by improving the innovation performance of the enterprise. This paper conducts an empirical test through the mediating effect model, as shown in table 5.

Table 5: The mediating effect of innovation performance

VARIABLES	(1) AC1	(2) Innovation	(3) AC1	(4) AC2	(5) AC2
Innovation			0.00669*** (0.00131)		0.00235*** (0.000545)
Pension	0.0379*** (0.00625)	0.0806*** (0.0281)	0.0428*** (0.00677)	-0.0101*** (0.00251)	-0.00804*** (0.00279)
Control	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes	Yes
Constant	2.053*** (0.0625)	-10.58*** (0.305)	2.122*** (0.0710)	0.596*** (0.0269)	0.614*** (0.0325)
Observations	31,920	25,196	25,196	31,920	25,196
R-squared	0.311	0.293	0.333	0.368	0.356

In Table 5, model (1) and model (4) are the benchmark regression results of enterprise annuity and agency problems. Model (2) is the regression result of the impact of enterprise annuity on innovation performance. Models (3) and (5) are the regression results of the impact of enterprise annuity and enterprise innovation performance on enterprise agency problems after adding the intermediary variables of innovation performance. According to the mediating effect test logic proposed by Baron and Kenny, it can be seen from the main regression results that the company has a significant positive impact on alleviating the agency problem by adding enterprise annuity. Model (2) shows that the regression coefficient of enterprise annuity is 0.0806, and it is significant at the 5 % significance level. Enterprise annuity has a positive impact on enterprise innovation performance. Through the model (3) and (5), the coefficient of innovation performance as an intermediary variable is still significant, and it will slow down the first type of agency problem, indicating that innovation performance plays a significant part of the intermediary effect in the inhibition of enterprise annuity on enterprise agency problem.

5.2. Endogenous Test

To eliminate the impact of endogeneity on our results and make the results more robust, we conducted an endogeneity analysis of the results. Because financing constraints do not directly affect the agency problem of the enterprise and are not related to the education level of the managers in the error term, but the free cash flow of the company with high financing constraints is less, and the willingness to join the enterprise annuity will be smaller. Therefore, using financing constraints (KZ) as an instrumental variable, it can be found from the test in Table 6 that after eliminating the influence of endogeneity on the results, adding enterprise annuity can still reduce the agency problem of the enterprise, and the impact on the two types of agency problems is significant.

Table 6: Endogenous test

VARIABLES	(1) AC1	(2) AC2
Pension	0.0379*** (0.00625)	-0.0138 (0.0919)
Control	Yes	Yes
Industry	Yes	Yes
Province	Yes	Yes
Constant	2.053*** (0.0625)	0.592*** (0.0966)
Observations	31,920	31,920
R-squared	0.311	0.368
One-stage F test value(P-value)	24.469 0.000	24.469 0.000
Cragg-Donald Wald F statistic	24.469	24.469
10% maximal IV size	16.38	16.38

To ensure the accuracy of the endogeneity test, it is necessary to test whether the instrumental variable is a weak instrumental variable. We use the `ivreg2` command for instrumental variable regression. The first column of the results lists the first stage F value and the corresponding p value of the two-stage least squares estimation. The table shows that the F statistic of the first stage is 24.469, and the corresponding p value is 0.000, which proves that the instrumental variable used in this paper is not a weak instrumental variable.

5.3. Robustness Test

To further ensure the robustness of the results, we replace the dependent variables of the model. Compared with the use of total assets at the end of the period to calculate the total asset turnover rate, by calculating the average value of total assets, we can more effectively analyze the asset operation ability of the enterprise. Therefore, we use the ratio of operating income to average total assets as a measure of total asset turnover rate, to measure the agency problem, recorded as AC3. Among them, the average total assets are calculated by the average of the total balance of assets at the end of the period and the total balance of assets at the beginning of the period. Similar to the first type of agency problem, the higher the total asset turnover rate, the higher the agency efficiency of the representative manager, and the smaller the first type of agency problem.

Table 7: Substitution of explanatory variables for robustness test

VARIABLES	(1) AC3	(2) AC3	(3) Innovation	(4) AC3
Pension	0.0238*** (0.00687)	-0.0240*** (0.00867)	0.0806*** (0.0281)	0.0319*** (0.00726)
ROA_ Pension		1.187*** (0.126)		
LNAPPLY				0.00402*** (0.00138)
Control	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Constant	1.405*** (0.0712)	1.436*** (0.0712)	-10.58*** (0.305)	1.454*** (0.0736)
Observations	31,920	31,920	25,196	25,196
R-squared	0.326	0.329	0.293	0.372

To make the test results more robust and eliminate the potential problems of other control variables, this paper uses the method of one-period lag to test the relationship between enterprise annuity and agency problems and incorporates the independent variable enterprise annuity one-period lag into the model to solve the endogenous problem. The test results are shown in Table 8 and Table 9.

Table 8: AC1 lags one-stage test

VARIABLES	(1) AC1	(2) AC1	(3) Innovation	(4) AC1
L.Pension	0.0247*** (0.00686)	0.00971 (0.0111)	0.0842** (0.0351)	0.0298*** (0.00755)
L. ROA_ Pension		0.362** (0.176)		
Innovation				0.00756*** (0.00148)
Control	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Constant	2.102*** (0.0757)	2.111*** (0.0758)	-10.50*** (0.382)	2.159*** (0.0860)
Observations	22,203	22,203	17,620	17,620
R-squared	0.306	0.307	0.295	0.332

Table 9: AC2 lags one-stage test

VARIABLES	(1) AC2	(2) AC2	(3) Innovation	(4) AC2
L.Pension	-0.0154*** (0.00212)	-0.00534 (0.00325)	0.0842** (0.0351)	-0.0149*** (0.00227)
L. ROA_ Pension		-0.244*** (0.0490)		

Table 9: (continued).

Innovation				0.00242*** (0.000574)
Control	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Constant	0.639*** (0.0284)	0.633*** (0.0285)	-10.50*** (0.382)	0.645*** (0.0319)
Observations	22,203	22,203	17,620	17,620
R-squared	0.416	0.417	0.295	0.410

As can be seen in Tables 7-9, the conclusion that a firm's inclusion of a corporate annuity can mitigate the firm's agency problem still holds after the robust-type test is conducted. And the moderating effect of financial performance is more robust after adding the lagged one-period term lag. However, the magnitude of the coefficients shows that the moderating effect of financial performance and the mediating effect of innovation performance have a greater impact on the first type of agency problems.

5.4. Heterogeneity Test

China has a vast territory, and there are great differences between different regions. There are certain differences in both regional economic level and local culture, and these two differences are likely to have an impact on our results. This paper divides China's regions into three parts: East, Central and West, and discusses the relationship between enterprise annuity and agency problems in these three regions.

Table 10: Regional heterogeneity test

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Variable	AC1	AC1	Innovation	AC1	AC2	AC2	AC2
East region	Pension	0.037***	0.028***	0.090***	0.042***	-0.002	0.029***	-0.005
	ROA_Pension		0.215				- 0.724***	
	Innovation				0.007***			-0.001
Middle region	Pension	0.053***	0.044***	0.149**	0.064***	- 0.013**	0.021**	-0.000
	ROA_Pension		0.222				- 0.883***	- 0.036***
	Innovation				0.003			- 0.053***
Western region	Pension	0.055***	0.035**	0.056	0.056***	- 0.008**	0.005	-0.006
	ROA_Pension		0.566**				- 0.343***	
	Innovation				0.002			0.007***
	Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes

An increase in corporate annuity is known to lessen the corporate agency problem, based on an analysis of empirical results from the central and eastern regions. In the western region, financial performance has a more significant moderating effect, while in the eastern and central regions, innovation performance has a more significant mediating effect. The financial performance of the enterprise's total asset turnover and shareholders' asset encroachment behavior are not sensitive, but because the eastern region has a more developed economy than the central and eastern regions, more attention is paid to the level of financial performance. However, because the western region's economic development is slower than that of the central and eastern regions, increasing the enterprise's total return on assets can inhibit the agency problem. Enterprise annuities have a significant impact on the agency problem in the eastern region through innovative performance. Businesses that prioritize innovation will be more inclined to join enterprise annuities in order to retain exceptional talent, which will increase the level of company income and strengthen managers' willingness and ability to generate income using shareholders' capital.

Property rights theory holds that the nature of property rights is one of the most basic institutional arrangements for modern enterprises. When discussing many social problems in China's economic and social transition period, the phenomenon of 'dominance' of state-owned enterprises is more obvious, and the principal-agent problem may be more prominent. According to the nature of the enterprise, Chinese enterprises are divided into two categories: state-owned enterprises and non-state-owned enterprises.

Table 11: Heterogeneity test of state-owned enterprises and non-state-owned enterprises

	Variable	(1) AC1	(2) AC1	(3) Innovation	(4) AC1	(5) AC2	(6) AC2	(7) AC2
SOE	Pension	0.021**	0.002	0.074*	0.028***	-0.008***	0.007**	-0.010***
	ROA_Pension		0.542***				-0.413***	
	Innovation				0.004			0.002***
NSOE	Pension	-0.010	-0.018*	0.201***	-0.016*	0.022***	0.075***	0.029***
	ROA_Pension		0.167				-1.157***	
	Innovation				0.008***			0.002***
	Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Province	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11 shows the empirical results by nature of enterprises, from the model (1), (5) can be seen, the inhibitory effect of enterprise annuities on the agency problem is more significant for state-owned enterprises, and non-state-owned enterprises can reduce the second type of agency problem by the moderating effect of the financial performance of the enterprise annuities, the mediating effect of innovation performance between the two types of companies are significant. The increase of state-owned assets embodied in state-owned enterprises has public welfare, usually to achieve the goal of national regulation of the economy, regulating the development of all aspects of the national economy; and non-state-owned enterprises mainly for the purpose of profitability, the pursuit of profit maximization, and to win the wealth for the actual controllers. Therefore, the moderating effect of financial performance on the agency problem of non-state-owned enterprises reaches saturation, but the inhibiting effect of enterprise annuities on the agency problem of state-owned enterprises can still be increased by increasing the rate of return on total assets. The increase of enterprise annuity can help enterprises to retain high-quality talents, which is favorable to the development of the company's innovative performance. And to improve the innovation performance, enterprises need to have

enough funds, which can reduce the occupation of funds by the shareholders of listed companies, so enterprises can increase the innovation performance of the company by joining the enterprise annuity to achieve the purpose of reducing the agency problem of the company.

6. Conclusion and Suggestion

This paper examines agency issues and corporate annuities using data from listed companies. The study demonstrates that, from the standpoint of financial performance, financial performance can further increase the inhibitory effect of enterprise annuity on the agency problem. The empirical analysis results indicate that an increase in enterprise annuity will decrease the agency problem. The study also demonstrates that, to test the mediating effect of innovation performance, enterprises can enhance their innovation performance by joining the annuity in order to achieve the effect of suppressing the agency problem.

This leads to the following recommendations: first, promote increased investment in corporate annuities to lessen agency issues; second, concentrate on the company's financial performance and the growth of corporate talent; third, differentiate management based on the various stages and characteristics of the company; and, finally, pursue innovation to boost the competitiveness of the business.

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