ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

Impact of ageing population on entrepreneurship -- an empirical analysis based on the ethnic areas in northwest China

Yunqing Su

Qinghai Nationalities University, Qinghai, Xining 810007, China

Abstract: *the article examined the impact of ageing population on the innovation in entrepreneurship based on the ethnic areas in northwest China Using provincial panel data from 2004 to 2019. The results show that The relationship between aging population and innovation in entrepreneurship presents an inverted U-shaped curve and "Human capital accumulation" and "Urban unemployment rate" are the two mediating effects of the ageing population on the entrepreneurial innovation. Thus, With the deepening ageing population, it is necessary to improve human capital investment and control unemployment to promote the collaborative innovation of regional enterprises.*

Keywords: *ageing population, entrepreneurship, Human capital, Urban unemployment rate*

1. Introduction

Since Schumpeter first introduced the concept of entrepreneurship in 1934, Scholars gradually put the research perspective on entrepreneurship[1].the number of patent applications and its applications granted in China in 1985 from 14,372 and 138 adding to 4380468 and 2591607 in 2019 respectively, the development of the innovation in Chinese entrepreneurship is from weak to strong. However, since 2000, China's ageing process has been accelerating. As of 2019, there were about 176 million aged 65 or more, accounting for 12.60 % of the total population, and the old-age dependency rate of the whole society reached 17.80 %. However, human resource is the most active factor in enterprise innovation, thus, it is important to check the effects of aging population on enterprise innovation in China.

Previous studies on the effects of ageing population on entrepreneurial innovation has already yielded fruitful results, but there is still gap for further improvement and deepening, it is of great academic importance to explain clearly the mechanism of the effect of aging population on Entrepreneurship. Based on this, this article focuses on the role of ageing population in entrepreneurial innovation in the northwest ethnic minority areas of China.

2. Literature Review and research assumptions

Scholars at home and abroad have yet to reach a unified conclusion on the relationship between ageing population and the innovation of entrepreneurship. After analyzing the Previous literature, it is found that there are three different viewpoints in the academic circle. Early scholars had a more negative view of the role of ageing population in the innovation of entrepreneurship (Czaja S J,Lee C C,2007[3]; Wei Lue Hu,1991[4]) , later scholars came to believe that he relationship between aging population and innovation in entrepreneurship presents an inverted U-shaped curve relationship (Skirbekk V 2004[5]; Feyrer J,2008[6]) , but recent scholars have found that With the deepening of the aging population, it will inhibit the innovation in entrepreneurship (Parker,2004[7]; Gao Yue, 2017[8]; Shen Lei et al.,2020[9];Suishumin et al.,2020[10]).Although the conclusions of this study are still controversial, the following hypotheses have been put forward from the empirical studies at home and abroad:

H1: The relationship between population aging and entrepreneurship presents an inverted U-shaped curve

Schultz, a famous American economist, put forward that human capital includes human knowledge, skills, experience, experience and proficiency[11]. There are abundant research results on the role of ageing population in human capital, and most scholars believe that ageing population can increase the family's medical burden (Li Hao, 2021[12]), increase the family's pension burden (Hsu,2018[13]) , and

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

so on, in this way, the investment of human capital in education will be squeezed out and the improvement of the level of human capital will not be promoted. Meanwhile, some studies suggest that ageing population is beneficial to the accumulation of human capital (Mincer,1996[14]; Lu Jin et al.,2018[15]) . To be sure, with the accumulation of human capital, enterprise innovation capacity will also be strengthened. But whether it is the abundant physical strength, or the rich experience knowledge has the vital role to the enterprise innovation.

Urban unemployment leads to an outflow of talent from a city, which in turn affects the output of the region's enterprise innovation capacity. On the whole, most scholars generally believe that ageing population will drive up the unemployment rate (Li Jianwei, 2020[16]).In addition, the ageing population will continue to provide companies with an abundant work experience, and will not have a negative impact on the vitality output of new employees, but as the ageing population deepens, not only becomes the enterprise's endowment burden, but also will produce "Crowding out effect" to the new employees, and then weaken the innovation in entrepreneurship[17].Thus, The assumptions are as follows:

H2: human capital accumulation plays an intermediary role between ageing population and the innovation in entrepreneurship.

H3: Urban unemployment has the mediating effect between ageing population and the innovation in entrepreneurship.

3. Model

3.1 Data Collection

The sample data studied is a non-equilibrium panel data set based on provinces, the sample range is from 2004 to 2019 in six provinces of northwest China (Including Qinghai Province, Yunnan Province, Inner Mongolia, Guangxi Zhuang Autonomous Region, Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous region). All data come from "Chinese Statistical Almanacs", "Chinese Science and Technology Statistical Almanacs", "Chinese Demographic Statistical Almanacs", "Chinese Demographic and Employment Statistical Almanacs", Statistical Almanacs and Statistical bulletin at the provincial level, and China Economic and Social Development Statistical Database.

3.2 Definitions of Variables

Based on the research practice at home and abroad[18,19], The number of patent applications authorized per 10000 people is a measure of entrepreneurship and innovation(LnEntre_Innov), The number of patent applications granted includs the number of patent applications for invention, utility model and design divided. The proportion of the population over 65 years old in the total population is used to measure the aging population index, (LnOld), and the dependency ratio (LnOdr) of the elderly is used as the substitute index for the robustness test[20]. The control variables are selected as follows[21,22,23,24,25,26,27] :(1) Using the proportion of government budget expenditure in GDP to measure macro-control(LnGov); (2) The proportion of loan balance of financial institutions in deposit balance of financial institutions is used to measure the level of financial development(LnFinance); (3) Measuring the level of infrastructure(LnTraffic) with the proportion of highway mileage in the total land area of the whole provinceis; (4) Measuring the level of ecological construction(LnEcology) with the rate of harmless treatment of domestic waste. In addition, The mediation variables are selected as follows[28,29]: Measuring human capital (LnHuman_Capital)by the number of students at all levels;The urban unemployment(LnU_Unemploy) is measured by the urban unemployment rate.

The mean value of innovation in entrepreneurship (LnEntre_Innov) is 0.1896, the median value is -0.0384, and the SD value is 0.8966, which suggests that the innovation in entrepreneurship in Northwest China provinces is highly dispersed. The mean value of ageing population (LnOld) is 2.0850, the mean is 2.0801, and the standard deviation is 0.1649, indicating that there was no significant difference in ageing population among the Northwest China. The other variables are within a reasonable range(Table 1).

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

Table 1. Descriptive statistics of variables

variables	Mean	SD	median	Min	Max
LnEntre_Innov	0.1896	0.8966	-0.0384	-1.9282	2.1065
LnOld	2.0850	0.1649	2.0801	1.7732	2.5392
Ln(Old^2)	1.4633	0.1584	4.8535	1.14563	1.8637
LnOdr	2.3609	0.1655	2.3495	2.0068	2.6892
Ln(Odr^2)	1.7132	0.1392	4.6990	1.3931	1.9785
LnGov	3.4200	0.3168	3.4295	2.7311	4.1382
LnFinance	4.4037	0.1564	4.3743	3.9579	4.7395
LnTraffic	3.0344	0.8081	2.8873	1.3610	4.1452
LnEcology	4.3184	0.3260	4.4478	3.3393	4.6052
LnHuman_Capital	5.8090	0.8940	5.9278	4.4567	6.9827
LnU_Unemploy	1.3038	0.1531	1.3550	0.7884	1.5239

Note: the data in the table are estimated by STATA15.1 software.

3.3 Empirical Model

Based on literature review, the following benchmark models are established:

$$LnEntre\_Innov_{i,t} = \alpha_0 + \alpha_1 Ln\mathrm{Old}_{i,t-1} + \alpha_2 LnOld^2{}_{i,t-1} + \alpha_3 LnGov_{i,t-1} + \sum_k w_k\, LnControl_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

In the equations above, $LnEntre\_Innov_{i,t}$ indicates innovations in entrepreneurship for the *t*th province in the *i*th year. $Ln\mathrm{Old}_{i,t-1}$ denotes ageing population for the *t-1*th province in the *i*th year. $\varepsilon_{i,t}$ represents a disturbance term. In view of the possible nonlinear effect of the ageing population on the innovations in entrepreneurship, the square term of ageing population is included in equation (1).In addition, the control variables include macro-control(LnGov), financial development (lnfinance), infrastructure (lntraffic) and ecological construction (lnecology), which affect the innovations in entrepreneurship. From equation (1), if $\alpha_1 > 0$ 、 $\alpha_2 < 0$,the relationship between aging population and innovation in entrepreneurship presents an inverted U-shaped curve. All explanatory variables are taken with values lagging one period to avoid endogenous bias in the regression results [30].at the same time, considering the problems of eliminating heteroscedasticity and unifying variables, all explained variables and explanatory variables are treated logarithmically.

The direct impact of ageing population on innovations in entrepreneurship show in model (1). However, ageing population can also have an indirect impact on innovations in entrepreneurship through intermediary variables. For examining the mediating role of human capital and urban unemployment between ageing population and entrepreneurial innovation, based on the model (1) , the following mediating effect model is constructed[31]:

$$LnEntre\_Innov_{i,t} = \beta_0 + \beta_1 Ln\mathrm{Old}_{i,t-1} + \beta_2 LnOld^2{}_{i,t-1} + \sum_k \beta_k\, Control_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

and

$$M_{i,t} = \gamma_0 + \gamma_1 Ln\mathrm{Old}_{i,t-1} + \gamma_2 LnOld^2{}_{i,t-1} + \sum_k \gamma_k\, Control_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

and

$$LnEntre\_Innov_{i,t} = \varphi_0 + \varphi_1 Ln\mathrm{Old}_{i,t-1} + \varphi_2 LnOld^2{}_{i,t-1} + \varphi_3 M_{i,t} + \sum_k \beta_k\, Control_{i,t-1} + \varepsilon_{i,t} \quad (4)$$

In the equations above, β_1 and φ_1 refer to the total effect and direct effect respectively, and the mediating effect is represented by $\gamma_1 \times \varphi_2$ or $\varphi_1 - \beta_1$, which means that the aging population affects the innovations in entrepreneurship through the mediating variables. $M_{i,t}$ refer to the mediating variable, including the human capital and urban unemployment. When $\varphi_1 - \beta_1 \neq 0$, the mediating effects are significant. Meanwhile, all explained variables and explanatory variables are the same as equation (1).

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

4. Results

4.1 unit root test

Unit root test for long panel data to avoid false regression of long panel data. There are many methods of unit root test for long panel data. This article uses LLC Unit root test, IPS test and Fisher ADF test, and the original assumption of these three test methods is that there is a unit root. Due to the Unit root test results of the original sequences of all variables reject the original assumption, which suggests that the level values of all variables are stable (table 2) .

Table 2. Panel unit root test results

variables	Stationarity	Check type	Significance	result
LnEntre_Innov	Pass IPS and Fisher-ADF test	LLC (c, t, 1), IPS(c, t, 0), Fisher-ADF(c, 0, 1)	IPS**, Fisher-ADF***	The original sequence is stationary
LnOld	Pass LLC,IPS,Fisher-ADF test	LLC(c, t, 1), IPS(c, t, 0), Fisher-ADF(c, 0, 1)	LLC***, IPS***, Fisher-ADF***	
$Ln(Old^2)$				
LnOdr				
$Ln(Odr^2)$				
LnTraffic				
LnEcology				
LnHuman_Capital				
LnGov			LLC*, IPS**, Fisher-ADF***	
LnFinance			IPS*, LLC、Fisher-ADF***	
LnU_Unemploy			LLC、IPS**, Fisher-ADF*	

Note: “C” in test type (C, t, L) stands for intercept term, “0” means no intercept term; “t” means trend term, “0” means no trend term; “L”means lag order. ***, **, * refer to the significance level of 1%, 5%, 10% respectively.

4.2 Cointegration test

In the case of single integration of panel data, it is necessary to further test whether the panel data has a long-term co-integration relationship. Cointegration test uses Kao test and Pedroni test methods. From the cointegration test results, the P values corresponding to the Kao test and Pedroni test statistics of the panel data respectively strongly reject the null hypothesis (H0: there is no cointegration relationship) and pass significance at the 1% statistical level,indicating that aging Population and the innovation in entrepreneurship have a long-term co-integration relationship

Table 3. Panel cointegration test results

Test method	Test statistics	Statistics value	Concomitant probability	result
KAO homogeneity test	Modified Dickey-Fuller t	-3.6232	0.0001	There is a cointegration relationship
	Dickey-Fuller t	-3.1885	0.0007	
	Augmented Dickey-Fuller t	-2.0440	0.0205	
Pedroni heterogeneity test	Modified Phillips-perron t	4.5774	0.0000	
	Phillips-perron t	-10.123	0.0000	
	Augmented Dickey-Fuller t	-3.5386	0.0002	

Note: the data in the table are estimated by STATA15.1 software.

4.3 Regression results and analysis

The results of F test and Hausman test of panel data show that the original hypothesis is rejected at 1% significance level, thus, the optimal model is chosen as fixed effect model(Table 4).

According to the estimation result of the fixed effect model (model I),the R^2 of the regression model is 0.8926, The equation fit well.the estimate coefficient of LnOld and Ln(Old2)are significantly positive and negative respectively, and preliminary verification suggests that The aging population and innovation in entrepreneurship show an obvious inverted U-shaped relationship. Thus, “New and old people”hold the comparative advantage instead, and the knowledge spillover effect will not slow down the process of

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

innovation in entrepreneurship. But when the ageing population level exceeds a certain threshold, its "Crowding-in effect"on the innovation in entrepreneurship becomes "Crowding-out effect". In addition, the level of government Macroeconomic regulation and control, financial development, and infrastructure has a positive impact on entrepreneurship.

The robustness test uses two methods, replacing the fixed effects model with the FGLS model and replacing the LnOdr index with the LnOld index. Firstly, the Model II shows that the standard error of regression coefficient of each variable is effectively reduced, and the direction of regression coefficient is consistent with model I. Secondly, from Model III, the regression results are basically consistent with model I. In summary, the hypothesis that ageing population has a nonlinear effect on the innovation in entrepreneurship is established, and the estimation results are robust.

Table 4. Regression results and robustness test

variables	model I	Model II	Model III
	FE	FGLS-PSAR1	FE
LnOld	5.4692*** (1.0766)	3.2679*** (0.5987)	
Ln(Old^2)	-2.8891*** (0.5895)	-1.7243*** (0.3171)	
LnOdr			7.6502** (3.4455)
Ln(Odr^2)			-5.9986 (3.7484)
LnGov	1.8010*** (0.3071)	1.6481*** (0.2317)	1.7777*** (0.3263)
LnFinance	1.2723*** (0.3991)	0.3159 (0.2369)	1.2874*** (0.4259)
LnTraffic	0.8526*** (0.2859)	0.1401** (0.0681)	1.0264*** (0.2993)
LnEcology	-0.0207 (0.1604)	0.1532 (0.0993)	-0.0092 (0.1664)
Cons	-21.2482*** (1.4582)	-12.1767*** (1.4061)	-22.3173*** (2.0974)
R^2	0.8926		0.8845
F test	34.62 [0.0000]		47.53 [0.0000]
Wald test		115.52 [0.0000]	
Hausman test	173.11 [0.0000]		237.63 [0.0000]

Note: ***, **, * refer to the significance level of 1%, 5%, 10% respectively.The internal value of () represents the standard error of the estimation coefficient, and the internal value of [] represents the p value.

4.4 Mechanism test: mediating effect analysis

This article constructs an intermediary effect model to test the existence of two mechanisms: human capital and urban unemployment. Tables 6 and 7 show estimates based on formulas (2),(3),and (4) .

As can be seen from Table 6, first, column (1) results show that ageing population significantly reduces human capital. Secondly, by comparing column (2) and column (3),we can find that the difference between the direct effect (φ_1= 8.5814) and the overall effect ($\beta_1 = 7.2326$) of the ageing population is not 0, and it has passed Sobel test. Therefore, part of the intermediary role of human capital is significant. Finally, after adding path variable human capital, the estimated coefficient of LnOld is obviously positive, rising from 5.4692 to 8.5814, and the estimated coefficient of Ln(Old^2) is obviously negative, decreasing from -2.8891 to -4.4251, and the estimated coefficient of LnHuman_Capital is obviously positive, which further confirms that, as ageing population levels continue to increase, they will weaken the investment of human capital in the ethnic minority areas of northwest China and further inhibit the innovation in entrepreneurship.

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

Table 5. Regression results of the impact of aging population on entrepreneurship through human capital

variables	(1)	(2)	(3)
	LnHuman_Capital	LnEntre_Innov	LnEntre_Innov
LnOld	-2.0049* (1.0947)	7.2326*** (1.1888)	8.5814*** (0.9578)
Ln(Old^2)	1.1317* (0.6375)	-3.6638*** (0.6923)	-4.4251*** (0.5571)
LnHuman_Capital			0.6727*** (0.0941)
LnGov	-1.2904*** (0.2419)	2.0864*** (0.2627)	2.9545*** (0.2404)
LnFinance	-2.5384*** (0.4495)	-1.7809*** (0.4882)	-.0733 (0.4536)
LnTraffic	0.6095*** (0.0978)	0.0319 (0.1062)	-0.3780** (0.1016)
LnEcology	0.8188*** (0.2096)	0.2510 (0.2276)	-0.2997 (0.1956)
Cons	18.5427*** (1.5797)	-10.0001*** (1.7156)	-22.4742*** (2.2099)
R^2	0.7162	0.6673	0.7949
Sobel [P-value]			-1.3488 [0.0761]
Observations	90	90	90

Note: ***, **, * refer to the significance level of 1%, 5%, 10% respectively.The internal value of () represents the standard error of the estimation coefficient, and the internal value of [] represents the p value.

It can be seen from table 6 that firstly, the result of column (1) shows that with the deepening of aging population, the urban unemployment rate will increase significantly. Secondly, the comparison between column (2) and column (3) shows that, we can find that the difference between the direct effect (φ_1=5.9647) and the overall effect ($\beta_1 = 7.2326$) of LnOld is not 0, thus the mediating effect (estimated coefficient is 1.2678) exists, and it passes the Sobel test, meanwhile, 17.53% of the inverted U-shaped effect of LnOld on LnEntre_Innov is caused by the mediating effect of the urban unemployment rate.

Table 6. Regression results of the impact of aging population on entrepreneurship through urban unemployment rate

variables	(1)	(2)	(3)
	LnU_Unemploy	LnEntre_Innov	LnEntre_Innov
LnOld	-0.5364* (0.2822)	7.2326*** (1.1888)	5.9647*** (1.0114)
Ln(Old^2)	0.2647 (0.1643)	-3.6638*** (0.6923)	-3.0379*** (0.5855)
LnU_Unemploy			-2.3636*** (0.3851)
LnGov	-0.1552** (0.0624)	2.0864*** (0.2627)	1.7195*** (0.2268)
LnFinance	0.4011*** (0.1159)	-1.7809*** (0.4882)	-0.8330* (0.4349)
LnTraffic	0.0501** (0.0252)	0.0319 (0.1062)	0.1503 (0.0905)
LnEcology	-0.1982*** (0.0540)	0.2510 (0.2276)	-0.2175 (0.2043)
Cons	1.5032*** (0.4072)	-10.0001*** (1.7156)	-6.4468*** (1.5415)
R^2	0.3572	0.6673	0.7720
Sobel [P-value]			1.2678 [0.0694]
Observations	90	90	90

Note: ***, **, * refer to the significance level of 1%, 5%, 10% respectively.The internal value of () represents the standard error of the estimation coefficient, and the internal value of [] represents the p value.

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

5. Conclusions

In summary, there is a positive correlation between short-term population aging and the innovation in entrepreneurship, however, in the long run, when the aging population Reaches a critical value, it will have an inhibitory effect on innovation in entrepreneurship. Human capital and urban unemployment rate are two ways to effectively strengthen the inverted U-shaped curve relationship between population aging and the innovation in entrepreneurship.

Therefore, we can promote the sustainable development of entrepreneurship through the following ways: Increase human capital investment, reasonable development of resources for the elderly. Strengthen the "talent attraction" policy, enhance the attraction of high-level talents, increase education and training expenditure, and constantly improve the quality of labor force. Moreover, effectively control the urban unemployment rate and effectively allocate the labor supply. Third, expand the scope of employment and service industry. Lower the threshold of entrepreneurship and developing flexible and diverse forms of employment.

Acknowledgement

Fund projects: The key cultivation project of Humanities and social sciences of Qinghai Nationalities University in 2019: Research on the system drive and path of entrepreneurship cultivation in ethnic minority areas in the new era; Project number: 20190515.

References

[1] Schumpeter J A. The Theory of Economic Development [M].Cambridge, MA: Harvard University Press, 1934.
[2] Peng Du. Further discussion on whether China is "old before getting rich" [J].Population research, 2007 (04): 46-56.
[3] Czaja S J, Lee C C. The impact of aging on access to technology [J].Universal Access in the Information Society, 2007, 5(4): 341.
[4] Weilue Hu. On the relationship between population aging and technological progress [J]. Research on quantitative economy and technological economy, 1991 (11): 27-34.
[5] Skirbekk V. Age and individual productivity: A literature survey [J].2004.
[6] Feyrer J.Aggregate evidence on the link between age structure and productivity [J]. Population and Development Review, 2008, 34:78-99.
[7] Parker S C. The economics of selfe-mployment and entrepreneurship [M].Cambridge University Press: Cambridge, UK, 2004.
[8] Yue Gao. Does aging population affect scientific and technological innovation?: An Empirical Study Based on China's Provincial Panel Data [J]. Scientific and technological progress and countermeasures, 2017, 34 (17): 46-51.
[9] Lei Shen, Yan Guo.Research on the influence of aging on technological innovation of high-tech industry -- Based on the analysis of heterogeneity of sub industries and enterprise scale [J]. Industrial technology economy, 2020, 39 (12): 78-87.
[10] Shumin Sui, Zenghua he. The impact of aging population on Enterprise Innovation: An Empirical Analysis Based on census data and micro industrial enterprise data [J]. Population research, 2020, 44 (06): 63-78.
[11] Schultz T W. Investing in people: The Economics of Population Quality [M].California: University of California Press, 1982.
[12] Hao Li. Population aging, medical burden and micro human capital investment [J]. Statistics and decision making, 2021, 37 (02): 88-92.
[13] Hsu M, Liao P J, Zhao M. Demographic change and long-term growth in China: past developments and the future challenge of aging [J].Review of DevelopmentEconomics, 2018, 22 (3):928-952.
[14] Mincer J.Economic development, growth of human capital, and the dynamics ofthe wage structure[J].Journal of Economic Growth, 1996, 1(1):29-48.
[15] Jin Xu, Lu Liu, Zhiyi Guo. The impact mechanism of China's aging population on industrial structure: An Empirical Analysis Based on synergy and mediation effect [J]. China Population Science, 2018 (03): 15-25 + 126.
[16] Jianwei Li. Labor supply and demand pattern, technological progress and potential economic growth rate in China [J]. Management world, 2020, 36 (04): 96-113.

ISSN 2616-5902 Vol. 3, Issue 4: 63-70, DOI: 10.25236/AJBM.2021.030413

[17] Lixin Wang, Yong Li. Research on risk management in the process of enterprise technological innovation [J]. Scientific and technological progress and countermeasures, 2007 (02): 84-87.
[18] Hebert R, Linka. In search of the Meaning of Entrepreneurship [J].Small Business Economics, 1989, 1, (1):39-49.
[19] Hongbin Li, Xing Li, Xianguo Yao, Haifeng Zhang, junsen Zhang. The impact of entrepreneurship and innovation on China's economic growth [J]. Beijing: economic research, 2009, (10): 99-108.
[20] Jin Yu, Hongying Yang, Dahui Zhou, Mingxiang Chen. Spatial temporal differences and path mechanism of population aging and Entrepreneurship: a regression model based on Provincial Panel Data [J]. Exploration of economic problems, 2020 (12): 66-78.
[21] Junjie Cheng. Institutional change, entrepreneurship and the development of private economy [J]. Economic management, 2016, 38 (08): 39-54.
[22] Tao Feng, Meisha Zhang. Business environment, financial development and enterprise technological innovation [J]. Scientific and technological progress and countermeasures, 2020, 37 (06): 147-153.
[23] Haijun Long. The impact of institutional environment on the allocation of Entrepreneurship: the regulatory role of financial market [J]. Scientific and technological progress and countermeasures, 2017, 34 (07): 94-99.
[24] Jixin Tong, Qingqing Wang. Haze pollution, environmental regulation and high quality economic development of key urban agglomerations in China [J]. Management modernization, 2018, 38 (06): 59-61.
[25] Lei Huang, Chuanqing Wu. Research on the efficiency and dynamic mechanism of urban green technology innovation in the Yangtze River economic belt [J]. Journal of Chongqing University (SOCIAL SCIENCE EDITION), 2021, 27 (01): 50-64.
[26] Feldman M P. The character of innovative places: entrepreneurial strategy, economic development, and prosperity [J].Small Business Economics, 2014, 43(1):9-20.
[27] Woolley J L. The creation and configuration of infrastructure for entrepreneurship in emerging domains of activity [J].Entrepreneurship Theory & Practice, 2014, 38(4):721–747.
[28] Yanbing Mao, Danhui Li. Research on the hedging effect of population aging and human capital promotion in economic growth [J]. Western forum, 2021, 31 (01): 59-68.
[29] Yong Lou, Liuyu Wang, Fengxia Hao. Analysis of the impact of population aging on scientific and technological innovation in China [J]. Research on science and technology management, 2020, 40 (21): 14-22.
[30] Changqing Li, Yukun Li, Maoliang Li. Equity pledge of controlling shareholders and enterprise innovation investment [J]. Financial research, 2018 (07): 143-157.
[31] Baron M, Kenny D. The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic and Statistical Consideration [J].Journal of Personality and Social Psychology, 1986, 51, (6):1173-1182.