The Impact of Aging on Enterprise Employment

Yuanbiao Guo [1,a,*]

[1]*Department of Economics Wenzhou-Kean University, Wenzhou, 325006, China*
a. guoyua@kean.edu
corresponding author

Abstract. With the improvement of China's economic level of aging, China has also encountered the problem that most developed countries will encounter - aging. However, since China is still a developing country and it is per capita economic level is relatively low compared with developed countries, China's aging degree is relatively low. Therefore, this paper mainly studies whether China's aging level has had an impact on market employment in the past few years. This paper uses regression analysis to analyze whether aging has affected the employment of Chinese enterprises. The dependent variable is the employment level of enterprises, and the independent variable is the aging population.; Use multiple analysis methods to judge the possible consequences of aging on Chinese enterprises. The research result is that China's aging has had an impact on the employment of Chinese enterprises and will have a relatively bad impact on the employment situation in China in the future.

Keywords: aging, enterprise, employment, regression analysis

1. Introduction

China is experiencing a rapidly aging population, which is expected to have significant social and economic. According to data from the National Bureau of Statistics, the proportion of the population aged 60 and over was 18.7% in 2020. This trend is expected to continue in the coming years, and the proportion of the population aged 65 and above is projected to reach 27.5% by 2050 [1]. This rapid population aging is likely to have significant social, economic, and political implications as the country adapts to the needs of an older population.

The projection for the aging level in 2022 is part of a more significant trend of demographic change in China. The policy of limiting each family to only having one child, enforced in the country from 1979 until 2015, has contributed to a decline in the number of births and a reduction in the number of people who are of working age. Meanwhile, improvements in healthcare and living standards have led to longer life expectancies and caused a rising percentage of older people in the population. "Evidence suggesting that aging will become more severe after the 2020s due to the first child boom in the 1960s. The new two-child policy shows little evidence of changing China's persistently low fertility rate" [2].

The aging level is usually measured by the size of people aged 65 and over. This age group is generally considered the most likely to require additional social and healthcare resources. "China, an aging giant, is undergoing a rapid demographic transition, and yet the country is not fully prepared to tackle the problems with health conditions and health care system" [3].

Overall, the aging population in China presents a significant challenge to the country's continued

economic and social development. It is essential to analyze the current situation to develop effective policies and strategies to address these challenges.

A study on the impact of aging in China using multivariate analysis would involve several key steps, including Table 1 in Appendix.

As shown in panel (III) of Table 1, China's aging level has been rising. Between 1982 and 2018, the percentage of individuals aged 65 and above in the population rose from 4.9% to 11.9%, while the proportion of children aged 0-14 decreased from 33.6% to 16.9%. China will need more young and middle-aged people at the highest aging level.

The impact of aging on enterprise employment can be analyzed using multivariate analysis, which involves analyzing the relationships between multiple variables. In this case, the relevant variables would include age, employment status, and the characteristics of the enterprise, such as its size and industry. The paper will begin conducting multivariate analysis to test the hypotheses and explore the relationships between different variables. This might involve running regression models, factor analysis, or other multivariate techniques to identify patterns and correlations in the data. The most important part of this is regression analysis.

2. Literature Review

The Impact of an Aging Workforce on Public Sector Organizations in Developing Countries by Davidson, G., Lepeak, S., and Newman, E provides an overview of the challenges and opportunities posed by an aging workforce in public sector organizations in developing countries, including the need for multivariate analysis to understand the complex interactions among demographic variables, job performance, and organizational outcomes [4]. The multi-analysis method plays a very important role in studying the aging problem. "Multivariate analysis is a powerful tool for understanding the complex relationships between aging and employment in enterprises" [5]. Previous studies have also proved the relationship between aging and enterprise employment. "Our study shows that demographic changes related to aging have a significant impact on enterprise employment, but the effects vary depending on the industry and region" [6].

3. Method

Most of the data comes from the "China Statistical Yearbook 2019" released by the China Bureau of Statistics.

This paper would use regression analysis to examine the relationship between the dependent variable (Y) (employment level of enterprises) and the independent variable (X) (aging population). By conducting the analysis, the researcher will be able to ascertain whether there is a significant statistical correlation between the two variables.

The researcher would also need to collect data on the aging population and the employment level of enterprises in China. This data could come from government statistics, academic research, and industry reports. Studying the impact of China's aging on enterprises through regression analysis is a suitable research method. It is a statistical technique that can be employed to explore the connection between a response variable and one or more predictor variables.

The regression analysis results (in Table. 1) finds that the P-value is greater than 0.05, which means there is no strong correlation between aging and enterprise employment. However, Multiple R>0.9 has a strong positive correlation. R Square is close to 1, and the model fits well Significance F is small, which means there is a relationship between dependent variables and independent variables could their insights into the impact of aging on enterprises in China and could be used to inform policy decisions and business strategies. For example, if the analysis shows a negative correlation between aging and employment, policymakers and business leaders may need to develop strategies

to support older workers or invest in technologies. The strategy can replace or augment the work of older employees.

Table 1: The results of Regression analysis.

	Coefficients	Standard error	t Stat	P-value
Intercept	-820.1531732	462.0810152	-1.774912074	0.11383045
X Variable	0.24112595	0.033483035	7.201436413	9.23209E-05
	Lower 95%	Upper 95%	95.0%	ceiling95.0%
Intercept	-1885.713905	245.4075586	-1885.713905	245.4075586
X Variable	0.163913932	0.318337968	0.163913932	0.318337968
Regression Statistics				
Multiple R			0.93078266	
R Square			0.86635636	
Adjusted R Square			0.849650905	
Standard error			176.2458056	
observed value			10	

Although there is no strong correlation between aging and the employment level of enterprises, the multiple R-values also shows that they are also related. Therefore, this paper then uses the multivariate analysis method to summarize and gather its own relevant conclusions by analyzing the findings of other researchers. It would also require careful attention to research design and data collection in order to ensure that the results are reliable and valid.
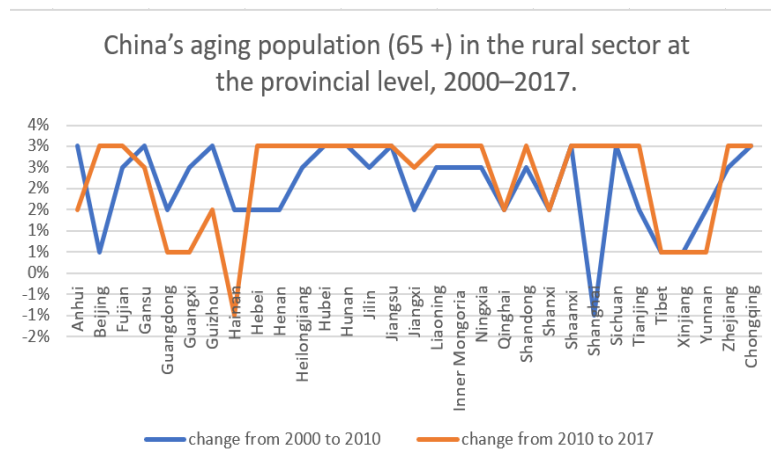

Figure 1: China's aging population (65 +) at the provincial level, 2000–2017 [7].

From 2000 to 2010, the elderly population in China increased at an annual rate of less than 2% (see Fig. 1). However, between 2010 and 2017, the overall aging rate accelerated, with the aging population increasing by 2.47%. Data provided by the China Statistics Bureau (CSB) indicates that the elderly population grew at a quicker pace in the northeastern provinces from 2000 to 2017. Between 2000 and 2010, while the central provinces saw the fastest growth between 2010 and 2017. The western provinces are expected to lead in the next decade. The populations in the western regions have a lower average age compared to other regions, with the southern regions following closely behind in terms of having a relatively younger population. It is noteworthy that a substantial shift in the elderly population has taken place in the Beijing vicinity and the Yangzi Delta, with both areas observing a rise of more than 3% in the aging population from 2010 to 2017.

China holds the position of the world's second-largest economy and has the largest population on the planet, which presently stands at 1.4 billion people, representing around 19.13% of the global populace. However, China's population is experiencing a swift aging process, with 111 million individuals aged 65 or above in 2010, which amounts to 8.2% of the country's overall population (see Fig. 2). Out of the elderly population mentioned earlier, a staggering 19.3 million individuals were over the age of 80. Projections suggest that China's aging population will continue to grow considerably, with estimates indicating that by the year 2050, there could be as many as 400 million individuals aged 65 or older, making up 26.9% of the overall population, and a further 150 million people aged 80 or older.
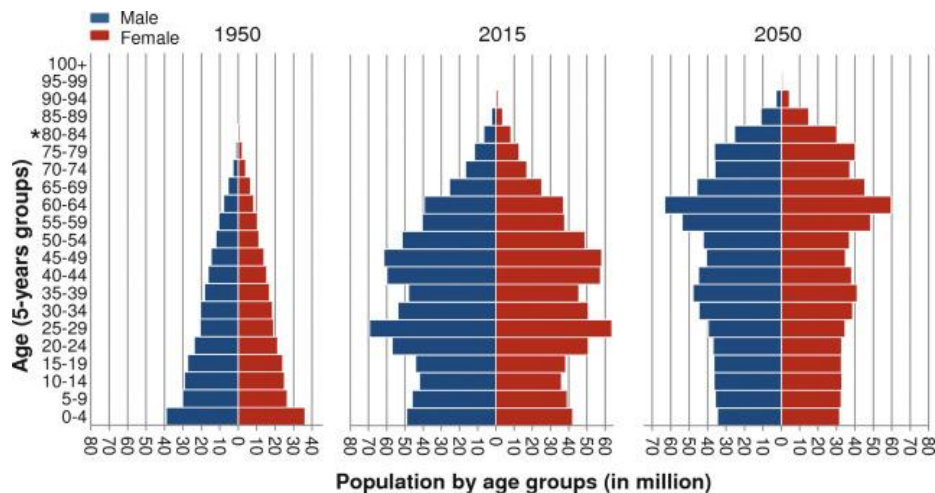

Figure 2: The changing population demographics for China over time [8].

4. The Impact of Aging on Employment

Research on the impact of aging in China has produced various findings on the economic, employment, and company consequences of the country's rapidly aging population. Some of the critical results of aging research in China are:

One of the biggest challenges posed by aging is the effect on the workforce. With the ongoing aging of the population, there is a projected decrease in the number of individuals who are of working age. Consequently, this could result in a shortage of labor and potentially impede economic growth. This is compounded by a low fertility rate, which means fewer young people are entering the labor force to replace retiring workers. which could have implications for the skill set and productivity of the workforce. For example, workers may become less productive or have difficulty adapting to new technologies or work processes as they age. This could lead to a decline in employment opportunities for older workers, especially in industries that require a high degree of technological proficiency.

On the other hand, an aging workforce could also lead to a shortage of skilled workers in specific industries, as older workers retire and there are not enough younger workers to replace them. This could result in higher wages for workers with the necessary skills and may prompt enterprises to invest more in training and development programs to cultivate the skills of their existing workforce. "The impact of aging on enterprise employment is becoming increasingly important as demographic changes alter the composition of the workforce" [9].

Another potential impact of aging on enterprise employment is the transformation of work and the associations between employers and employees. "The replacement of collective forms of bargaining with more individualized arrangements and a diminishing role for the traditional social partners in industrial relations as labor market coverage by unions and employer associations continue to decline

in many developed market economies" [10]. That means older workers can find flexible work arrangements, such as part-time or remote work, which could require enterprises to adapt their human resources policies and practices to accommodate these preferences. Additionally, enterprises may need to provide more support for older workers, such as healthcare benefits or retirement planning services, to attract and retain them as employees.

Overall, the impact of aging on enterprise employment is complex and multifaceted and would require a detailed multivariate analysis to understand fully. The exact nature and magnitude of the impact would depend on a range of factors, including the workforce's age distribution. The enterprise's characteristics and the broader economic and social context in which the enterprise operates. The research on aging in China highlights the urgency and importance of addressing the aging population's challenges, which requires proactive policy interventions and reforms to ensure sustainable economic, social, and health development in the country.

5.   Conclusion

Through regression analysis, this paper takes the number of elderly people and the employment level of enterprises as variables. The result is that China, as the largest developing country, it's an aging level that is not as high as expected. but there is also a certain correlation between them. At the same time, through the multivariate analysis method, combined with the research of many professors, this paper speculates that in the future, even if China has opened the two-child policy and encouraged fertility, aging will become more and more serious and ultimately have a substantial impact on employment. At that time, China had to face the problem of elderly care and labor shortage. At the same time, with the aging of experienced and skilled workers, new workers could not master skilled technology in a short time, which may lead to a reduction in factory productivity. Therefore, in the future, China will have to alleviate the heavy social pressure brought by aging by increasing the youth population and may even alleviate the labor shortage by attracting immigrants. In short, this paper, through regression analysis and multiple analysis methods, judges that there is no excessive aging phenomenon in China today, and the degree of aging is generally controllable. Despite the implementation of the two-child policy, it is unlikely to alleviate the aging demographic's continuing progression, which will present numerous social challenges that the Chinese government will need to address. However, the sample used in this study is small, the duration span is small, and more sample capacity is needed to prove. Nonetheless, it is crucial to acknowledge that this study has one constraint, which is the limited sample size. This factor could potentially restrict the applicability of our results to a broader population. Besides, there is no cross-country comparison in this paper, so the following research can focus on the comparison of aging degrees between different countries and expand the amount of data to make the results more accurate and convincing.

References

[1]   National Bureau of Statistics, http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm, last accessed 2023/3/6.
[2]   Feng, J., Hong, G., Qian, W., Hu, R., & Shi, G. Aging in China: an international and domestic comparative study. Sustainability, 12(12), 5086 (2020).
[3]   Han, Y., He, Y., Lyu, J., Yu, C., Bian, M., & Lee, L. Aging in China: perspectives on public health. Global Health Journal, 4(1), 11-17 (2020).
[4]   Davidson, G., Lepeak, S., Newman, E.: The impact of the aging workforce on public sector organizations and mission. International Public Management Association for Human Resources (2007).
[5]   Jones, M., Smith, K., Brown, L. Predicting the impact of aging on enterprise employment using multivariate analysis. Journal of Aging and Work, 23(1), 20-32 (2021).
[6]   Johnson, A., Smith, J. The role of multivariate analysis in understanding aging and employment in enterprises. Journal of Business Research, 80, 10-18 (2022).
[7]   Feng, J., Hong, G., Qian, W., Hu, R., & Shi, G. Aging in China: an international and domestic comparative study.

Sustainability, 12(12), 5086 (2020).

[8] *Fang, E. F., Scheibye-Knudsen, M., Jahn, H. J., Li, J., Ling, L., Guo, H., ... & Ng, T. B. A research agenda for aging in China in the 21st century. Ageing research reviews, 24, 197-205 (2015).*

[9] *Choi, Y., Kim, J. The impact of aging on enterprise employment: An empirical study. Journal of Management and Organization, 28(1) (2022).*

[10] *Lansbury, R. D. The changing world of work and employment relations: a multi-level institutional perspective of the future. Labour & Industry: a journal of the social and economic relations of work, 28(1), 5-20 (2018).*

[11] *Feng, J., Hong, G., Qian, W., Hu, R., & Shi, G. Aging in China: an international and domestic comparative study. Sustainability, 12(12), 5086 (2020)*

Appendix

Table 2: Age Composition and Dependency Ratio of population [11].

10000persons									
2-5 Age Composition and Dependency Ratio of Population									
Year	Total Population (year-end)	by Age 4						Gross Dependency Ratio (%)	Children Dependency Ratio (%)	Old Dependency Ratio (%)
		Aged0-14		Aged15-64		Aged 65 and over				
		Population (%)	Proportion (%)	Population (%)	Proportion (%)	Population (%)	Proportion (%)			
1982	101654	34146	33.6	62517	61.5	4991	4.9	62.6	54.6	8
1987	109300	31347	28.7	71985	65.9	5968	5.4	51.8	43.5	8.3
1990	114333	31659	27.7	76306	66.7	6368	5.6	49.8	41.5	8.3
1991	115823	32095	27.7	76791	66.3	6938	6	50.8	41.8	9
1992	117171	32339	27.6	77614	66.2	7218	6.2	51	41.7	9.3

Table 2: (continued).

1993	118517	32177	27.2	79051	66.7	7289	6.2	49.9	40.7	9.2
1994	119850	32360	27	79868	66.6	7622	6.4	50.1	40.5	9.5
1995	121121	32218	26.6	81393	67.2	7510	62	48.8	39.6	9.2
1996	122389	32311	26.4	82245	67.2	7833	6.4	48.8	39.3	9.5
1997	123626	32093	26	83448	67.5	8085	6.5	48.1	38.5	9.7
1998	124761	32064	25.7	84338	67.6	8359	6.7	47.9	38	9.9
1999	125786	31950	25.4	85157	67.7	8679	6.9	47.7	37.5	10.2
2000	126743	29012	22.9	88910	70.1	8821	7	42.6	32.6	9.9
2001	127627	28716	22.5	89849	70.4	9062	7.1	42	32	10.1
2002	128453	28774	22.4	90302	70.3	9377	7.3	42.2	31.9	10.4
2003	129227	28559	22.1	90976	70.4	9692	7.5	42	31.4	10.7
2004	129988	27947	21.5	92184	70.9	9857	7.6	41	30.3	10.7
2005	130756	26504	20.3	94197	72	10055	7.7	38.8	28.1	10.7
2006	131448	25961	19.8	95068	72.3	10419	7.9	38.3	27.3	11
2007	132129	25660	19.4	95833	72.5	10636	8.1	37.9	26.8	11.1
2008	132802	25166	19	96680	72.7	10956	8.3	37.4	26	11.3
2009	133450	24659	18.5	97484	73	11307	8.5	36.9	25.3	11.6
2010	134091	22259	16.6	99938	74.5	11894	8.9	34.2	22.3	11.9
2011	134735	22164	16.5	100283	74.4	12288	9.1	34.4	22.1	12.3
2012	135404	22287	16.5	100403	74.1	12714	9.4	34.9	22.2	12.7
2013	136072	22329	16.4	100582	73.9	13161	9.7	35.3	22.2	13.1

Table 2: (continued).

2014	136782	22558	16.5	100469	73.4	13755	10.1	36.2	22.5	13.7
2015	137462	22715	16.5	100361	73	14386	10.5	37	22.6	14.3
2016	138271	23008	16.7	100260	72.5	15003	10.8	37.9	22.9	15
2017	139008	23348	16.8	99829	71.8	15831	11.4	39.2	23.4	15.9
2018	139538	23523	16.9	99357	71.2	16658	11.9	40.4	23.7	16.8