



# An Empirical Study on the Impact of Delayed Retirement on the Youth Unemployment in China

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## Abstract

This paper examines the relationships between delayed retirement and youth unemployment. In light of the life-circle hypothesis, it assumes that the income before retirement is fixed and the consumption level is also constant, perceiving all consumers as rational. All data comes from China Statistical Yearbook, which spans the years 2003 to 2020. The paper mainly uses logarithm processing, runs Pearson relevance and Hausman tests through STATA. It employs the youth unemployment rate as the explained variable and the working-age population as the explanatory variable. The findings show that the labour population of a city has a significantly positive effect on its unemployment rate. One percentage increase in the labour force will result in a 0.54 increase in youth unemployment. It might be ascribed to the stability, saturation of jobs and current economic situations, decreasing the jobs for young people. Therefore, it implies that delayed retirement increases youth unemployment, which is detrimental to social development. At last, the paper gives some policy suggestions to help governments deal with these issues.

**Keywords:** *unemployment rate; delayed retirement; working-age population.*

## 1. INTRODUCTION

As China's population is aging at a rapid pace, it has produced many social and economic problems, such as demographics of aging, disconnections between labour forces, and imbalances in pension payments. China entered the ranks of elderly countries in 2000 when the proportion of the population aged sixty and over in the total population reached 10%. This trend is still accelerating in that some demographers predict that it will meet 21.2% in 2050. In China, males retire at 60, while women retire at 50 or 55, depending on their occupation. However, many other international countries usually have a higher retirement age. Hence, it is ineluctable that China will postpone its retirement age due to the aging population.

The argument that removing elderly workers from the labour market before reaching the statutory retirement age would provide jobs for the youth was widely supported. Nevertheless, the premise of constant labour-which is viewed as "lump of labour fallacy"-is incorrect.

It is not applied to modern society. Gruber and Wise investigated 12 countries to prove that the fixed workforce was unsubstantiated [3]. In fact, a huge proportion of the older labour force was highly associated with low youth unemployment, which suggested that a growth in the elderly labour force did not imply a decline in youth employment. There is a paucity of studies about the causal effects of delaying retirement and youth employment. Furthermore, those findings are rather different. For one thing, some studies indicated that postponing retirement would cause a rise in youth unemployment. Owing to the presumption that the number of jobs was fixed, there would be less place for youth if more elders were at work. Besides, Mohnen contended that fewer retirements would lead to moribund early career consequence-young workers in high-skill jobs were increasing while decreasing in those of low-skill [9]. Michello and Wise suggested that older workers should retire earlier in order to provide more places for younger workers [8][10]. They claimed that most countries' unemployment rate was higher than the natural

unemployment rate, and hence, late retirement would cause a fall in employment. For another thing, many scholars started to hold that the society was not a closed economy where the economic structure could be changed with the increase of supplying jobs. Kalwij et al. posited that young and old workers are poor substitutes, which meant delaying retirement would not have an adverse effect on youth employment [6]. Additionally, some governments have decided to postpone their statutory retirement age since the welfare of pension had become a heavy burden. However, Jousten et al. believed that there is no evidence of a positive relationship between preretirement and youth employment [5]. Conversely, they discovered a negative correlation showing that young and older workers were both susceptible to business cycles. Bertoni and Brunello also asserted that the effects of delaying retirement age on younger workers were undecided [1]. Hu and Yang also posited that the governments were supposed to take the national context into consideration and construct a comprehensible equilibrium that could simulate the outcomes of late retirement [4]. It should depend on the situation that the governments were experiencing.

Following those above, this paper aims to further the understanding of delayed retirement and youth employment. Moreover, this paper is based on developing models using data from 2003 to 2020 in different locations. Consequently, this study intends to establish a relationship between late retirement and youth unemployment in different situations. It is of great significance for a country whether the elderly retirement age will affect youth employment.

## 2. METHODOLOGY

### 2.1. Life-cycle Theory

The life-cycle hypothesis was first developed by economists Franco Modigliani and his student Richard Brumberg in the early 1950s [2]. The narrow definition of the theory was simply representative of a creature's life cycle; the generalized definition argued that there is a periodic law in the natural world. According to this theory, consumers could also be divided into three stages: the youth, the middle aged and the elder.

Two assumptions were set for the theory: (1) the income before retirement was constant without any interest rate, besides no income could be gain after retirement; (2) the consumption level was determined by the whole life incoming, thus consumption was also constant, and no inheritance was considered. The whole life cycle was divided into working stage and retiring stage. The assumption considered consumers were rational and pursuing maximizing their profit. With the accumulation of income before retirement and constant consumption in the whole life cycle, thus the curve of wealth reached the highest point in the retirement time

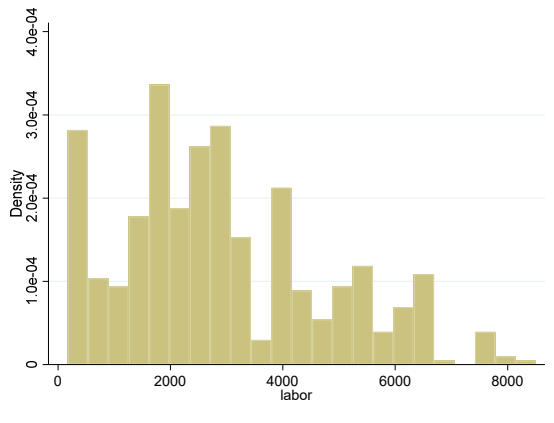
and declined gradually after that. This led to the special 'humpback image' of the theory.

Assuming consumers would gain income and consume simultaneously during the working stage. The retiring stage assumed constant incessant consumption ignoring any annuity income. Consumers would adjust their assumption according to the future income, so that consumptions in each stage could be stable. During the youth stage, consumers are able to require income through working to maintain consumption level. However, the salary level is general low in this stage, so the consumers might loan to satisfy their consuming requirement. During the middle-age stage, both of salary level and consuming level would increase. Consuming requirement could be satisfied even the debt in the previous stage could be partially discharged. Meanwhile, consumers would save up during the stage considering their pension in the future. During the elder stage, consumers quit job, no income could be gain through work anymore, as a result income would considerably diminish. Simultaneous, necessary consuming behaviour led to the incessant declining of savings. A consumer's wealth would descend gradually.

Delayed retirement allows individuals obtain more savings for their elder stage which could help them improve their life and satisfy their consumption needs. And it has positive impact on the working population. The increase in working population will create population dividend. As the result, the jobs will increase and the situation of employment will be improved. Therefore, delayed retirement should decrease the unemployment rate of youth.

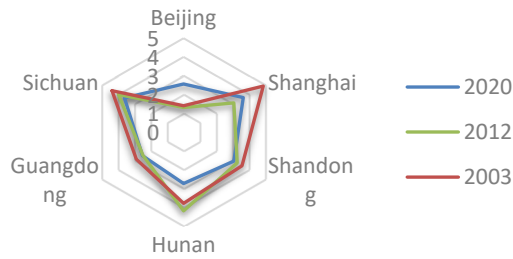
### 2.2. Variables Selection

This paper studies the impact of delayed retirement on the unemployment rate of youth. The explained variable of the empirical model is the youth unemployment rate of each province. According to the research methods of most scholars such as Gruber and Wise and Zhang and Zhao, this paper defines that the age range of the group of youth is from 20 to 24 years old because they are new entrants who may be greatly influenced by delayed unemployment [3][11]. In addition, according to Liu et al., the unemployment mainly occurs among the youth because they have problems to find compatible jobs [7]. Thus, the urban registered unemployment rate of each province can represent the youth unemployment rate of each province. The density histogram of the explained variable is showed as figure 1.



**Figure 1.** The working-age population

The explanatory variable of the empirical model is the working-age population which is directly affected by delayed retirement. The working-age population refers to the population of working age and capable of working. This paper ignores gender differences and adopts the population aged 15-59 as the working-age population. Besides, the variable is converted to logarithmic to indicate the fluctuating process.



**Figure 2.** The youth unemployment rate

The distribution of this variable in some specific provinces(cities) is showed as figure 2

The control variables are working-age population, the proportion of the tertiary industry, GDP growth rate, CPI, employment rate, disposable income per increasing rate, second industry increasing rate and third industry increasing rate. The tertiary industry is more absorptive of working-age population comparing with the primary and secondary industry which enables to relieve employment pressure and lower the unemployment rate simultaneously. According to Petty Clark theory, the industry structure is improved gradually with the enlarging process of economic scale and increasing of income per capita. Descending of primary and secondary industry’s proportion and ascending of job opportunities brought by the tertiary industry. Thus, the tertiary industry variable reflects the employment situation in an area. GDP growth rate is a general accepted standard to measure the economic level of a region.

CPI is the abbreviation of consumer price index which reflects the price changing relative trend and level. It is the variable that correspond to consumption thus it is necessary to add this term in the model. The employment rate, measured by the ratio of employed population to total population, represents the labour capacity of a particular region.

In addition, this paper also includes disposable income per capita, the consuming level per capita, first, second and third industry as other relative control variables. The summary of variables includes all variables discussed above, explanations and symbols (Table 1).

**Table 1.** Variable symbols and explanations

Variable type	Variable name	Variable symbol
Explained	youth unemployment rate	U
Explanatory	working-age population	L
	proportion of the tertiary industry	T
	GDP growth rate	G
Control	consumer price index	CPI
	Employment rate	R
	Disposable income per capita	I
	Consuming level per capita	C
	First industry increasing rate	FI
	Second industry increasing rate	SI
	Third industry increasing rate	TI

The model can be expressed as:

$$U_{i,t} = \alpha + \beta_1 L_{i,t} + \beta_2 T_{i,t} + \beta_3 G_{i,t} + \beta_4 CPI_{i,t} + \beta_5 R_{i,t} + \beta_6 I_{i,t} + \beta_7 C_{i,t} + \beta_8 FI_{i,t} + \beta_9 SI_{i,t} + \beta_{10} TI_{i,t} + \epsilon_{i,t} \tag{1}$$

### 3.RESULTS AND DISCUSSION

#### 3.1. Data Collections

This paper selects the balanced panel data composed of the annual report data of 31 provinces in China from 2003 to 2020 as the data of this paper, with a total of 588 samples. All data is available in China Statistical Yearbook.

**Table 2.** descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
U	3.5	0.7	1.2	6.5
L	2924.8	1833.2	171.2	8503.5
Ln(L)	7.7	.9	5.1	9
T	43.9	9.6	28.6	83.9

G	12.7	7.3	-25.0	29.9
CPI	102.7	1.7	97.7	110.1
R	55.4	7.4	28.4	77.2
I	23045.6	12797.7	6482	76437
C	16135.9	8114.3	4823	48272
FI	1452.6	1228.5	39.6	5556.9
Ln(FI)	6.8	1.2	3.7	8.6
SI	7382.1	7972.2	47.5	44631.3
Ln(SI)	8.3	1.2	3.9	10.7
TI	8243.1	9499.8	98.9	62550.8
Ln(TI)	8.4	1.2	4.6	11

The descriptive statistics illustrates that the variables L has relatively high standard deviations which implies that the differences of L among different provinces over years are large (Table 2). To narrow the large standard deviation, the variable L needs logarithmic processing. In addition, in order to describe the affection by industries' growth to the region in a more appropriate way. This paper also logarithmic the first, second and third industry increasing.

### 3.2. Relevance Analysis

Panel data is used as the fundamental preparation for the following regression analysis. In order to find out the relationship of working-age population and youth unemployment rate, Pearson relevance analysis is ran using STATA.

According to TABLE 3, we find that there is a positive correlation among working-age population, GDP growth rate and youth unemployment rate which suits the expectation mentioned above. The youth unemployment rate is influenced by the working-age population.

In addition, the proportion of the tertiary industry, employment rate, disposable income per capita and consuming level per capita have a significant negative correlation with youth unemployment rate. This means the youth unemployment rate is closely connected with the economic condition and citizen's life quality in this study.

**Table 3.** Matrix of correlations

Variables	U	Ln(L)	T	G	CPI	R	I	C	Ln(FI)	Ln(SI)	Ln(TI)
U	1.000	-	-	-	-	-	-	-	-	-	-
Ln(L)	0.026	1.000	-	-	-	-	-	-	-	-	-
T	-0.485	-0.242	1.000	-	-	-	-	-	-	-	-
G	0.226	-0.024	-0.431	1.000	-	-	-	-	-	-	-
CPI	0.068	-0.025	-0.193	0.459	1.000	-	-	-	-	-	-
R	-0.293	0.204	0.165	-0.109	-0.094	1.000	-	-	-	-	-
I	-0.475	0.065	0.741	-0.564	-0.140	0.299	1.000	-	-	-	-
C	-0.474	0.030	0.759	-0.560	-0.141	0.288	0.987	1.000	-	-	-
Ln(FI)	-0.038	0.806	-0.285	-0.206	-0.024	0.257	0.166	0.118	1.000	-	-
Ln(SI)	-0.202	0.821	0.075	-0.264	-0.068	0.333	0.513	0.496	0.749	1.000	-
Ln(TI)	-0.349	0.704	0.353	-0.376	-0.111	0.370	0.702	0.689	0.651	0.950	1.000

### 3.3 Hausman Test

In this paper, due to the using of panel data, Hausman test was processed. In general, fixed-effect should be chosen if null hypothesis is rejected. On the contrary, random-effect should be accepted if null hypothesis is failed to reject.

Fixed-effect model and random-effect model were estimated separately in STATA. After storing the result and compare with each other. The p-value is 0.003 so we have adequate confidence to reject the null hypothesis. Fixed-effect model is more reliable to use in this paper but not random-effect model.

### 3.4. Regression Results

According to Table 3, the R square of this fixed-effect model is 0.486, which means about 48.6% of the explained variable can be explained by the model. The F-

test is 48.889 whose p-value is 0.000. Thus, the regression model is significant in general and the fitting level is relatively good.

As the coefficient shows in Table 4, working-age population has an extremely obvious influence to the unemployment rate with an acceptable p-value. First, second and third industry's development has a relative obvious effect. The rest of other variables affect little to the explained variable.

In this paper, 31 provinces' data was collected to process the regression which means the data also includes well developed cities like Beijing, Shanghai, Guangzhou and Shenzhen. These cities provided tremendous labor force market with plenty of welfare policies. In addition, the living level of these cities is also way better than others. Even though including these cities might affect the general result, the coefficients of the control variables (especially the Disposable income per capita and

Consuming level per capita) are still helpless to the regression model.

**Table 4.** Regression result

	Coef.	St.Err.	t-value	p-value
Ln(L)	0.54**	0.255	2.12	0.035
T	0.006	0.007	0.94	0.349
G	-0.002	0.003	-0.72	0.473
CPI	0.009	0.010	0.88	0.378
R	-0.006*	0.003	-1.78	0.076
I	0.0000296***	0.000	2.92	0.004
C	0.0000791***	0.000	-4.31	0.000
Ln(FI)	-0.143	0.119	-1.20	0.231
Ln(SI)	-0.268*	0.150	-1.79	0.074
Ln(TI)	0.131	0.201	0.65	0.515
Constant	1.193	2.197	0.54	0.587

### 3.5. Discussion

The labor population of a city has a significantly positive effect on its unemployment rate. One percent increase in the labor force will lead to a 0.54 increase in the youth unemployment rate. Thus, delayed retirement has a positive impact on the unemployment of youth. According to life-cycle theory, people tend to work and save money when they are young. After they retire, people tend to consume their savings that they accumulate when they are young. On the one hand, delayed retirement can help people improve their retirement life. On the other hand, it would increase work opportunities which seems to decrease the youth unemployment rate. However, the empirical result is opposite to this assumption. It may be caused by some reasons.

Firstly, the stability of elder workers may lead to an increase in the youth unemployment rate. Many jobs are occupied by elder workers due to delayed retirement. In addition, there is no new investment to increase the needs for these jobs and elder workers seldom change their jobs. If no one quit their jobs, young people have fewer opportunities to get these jobs that are most suitable for them.

Secondly, the saturation of jobs may result in the growth in the youth unemployment rate. If the saturation of jobs is high which means that these jobs have enough labors, the variety of jobs which young people could choose will decrease. The decrease in jobs choices would lead to the increase in competition. The fierce competition may make many young people cannot find jobs.

Finally, the current economic situation would impact the youth unemployment. If the current economic situation can trigger enterprises to increase the number of jobs, the increase of working-age population could improve the employment of young people which would reduce the youth unemployment rate. If the current

economic situation is already saturated which means there are too many people of working age to accommodate, the continually increasing working-age population will only exacerbate the youth unemployment problem.

Thus, delayed retirement may increase the youth unemployment rate due to the stability of elder workers, the saturation of jobs and the current economic situation which are not considered in this essay.

## 4. CONCLUSIONS

As shown above, the amount of labor force is in direct proportion to unemployment. This paper employed the Hausman test, together with both the fixed-effect and random-effect models, implying that the former is more reliable than the latter one. About 49% of the explained variables appeared to be vindicated by the previous model, which convinced earlier assumptions. It seemed that this paper found that the coefficient was smaller than expected. Late retirement may diminish the negative impacts of the aging population. The higher the extent of aging, the more plainly the delayed retirement impacts on the unemployment rate will be in the long run. Nonetheless, it does not mean that it is doomed to happen but has a presumption given by the economy. Only if the society is moving ahead, providing more positions, it is advantageous to the youth employed. Accordingly, when it comes to policy suggestions, this paper recommends that reforms be pushed gradually, which indicates that governments cannot anticipate reaching the goals in the short term. Conversely, a plethora of delayed retirement policy is required, providing buffers for workers to plan for the future so as to help them go through their hard times. It is vital to alleviate the adverse influences of late retirement.

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