

**Pension Income and Employment Decisions of Middle-Aged and Older
People in China**

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Abstract

On the Chinese labor market, there has always been a group of retired workers that fall into one of two types. One is still working while also being eligible for a pension, while the other is an older person who is not receiving a pension. In this paper, a labor participation model based on logistic regression was used to examine if the amount of money, including pensions and other income and support, that older people obtained may explain whether they participate in the labor market or not. Besides, what effect, if any, will the entry of "laborers with pensions" have on China's whole labor market? Estimates from the 2013 and 2018 Chinese Health and Retirement Longitudinal Study (CHARLS) show that pension coverage encourages older people to leave the labor market early, which causes a dramatic fall in the likelihood of entering the labor market. Also, when an older person with pension enters the labor market, pensions, which are a form of compensation income, disrupt the market's equilibrium wage-setting process and cause a significant fall in earned income.

Key words: pension, labor market, middle-aged and older people

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1. Introduction

Population aging is a phenomenon that affects almost every country in the world, and many high-income countries already have sizable older-age populations. For the population prospects, some middle-income countries and low-income countries are even aging faster than high-income countries. Under the current demographic situation, generally speaking, the development of population aging will lead to a relative decline in the proportion of the working-age population. Insufficient labor supply may lead to the idleness of some production materials and technological equipment, affecting the normal operation of social production activities, and affecting productivity and economic development. I can conclude that population aging changes the age structure of the population. Demographic change is a great challenge for the economy as well as the labor market. And the impact on the labor market is first manifested in the supply of labor.

With the development of the aging population, the improvement of the health status of older people, and the prolongation of the average life expectancy, not only the size of the older population will gradually expand, but also the time that they have the ability to work will be extended accordingly, which will constitute a rich labor force for older people and is increasingly showing its importance in the whole labor market. Since older people are not only growing rapidly in absolute numbers, but have also become substantially healthier (Bloom et al., 2010), “laborers working after retirement” is no longer a special phenomenon from an international perspective, but is becoming common in the aging population.

“Laborers working after retirement” in China are the result of China’s aging development, the law on population and family planning¹, and the transformation of China’s social system, and the reasons behind it may be different from those in developed countries. The motivations for older people in developed countries to continue working mainly include three aspects: The first aspect is necessity. Some older people are constrained by funds and budgets, and face the pressure of insufficient pensions and high living costs. Labor income is an important way for them to achieve their basic living. The second aspect is interest. More older people expect to

¹ Article 18 of the Law on Population and Family Planning provided that the State advocates one child for each couple, except in certain conditions prescribed by laws and regulations.

maintain close contact with their colleagues, customers, and even society through work, and therefore, they can have the opportunity to continue to realize their own life value. The third aspect is opportunity. The population aging in developed countries is becoming more and more serious. Since older people have health status and human capital levels that give them advantages in the labor market, therefore, they can obtain employment opportunities relatively easily.

However, in China, some older people are active because they have the capabilities for entering the labor market and wish to be useful to society and their families. And the other motivation for older people in China to continue working mainly includes direct economic motives. At the time when China had just realized the First Centenary Goal², the pension system has not yet been perfected. Older people after retirement could not receive enough pension income to maintain the previous living standard, therefore, many older people choose to continue to work to maintain the stability of their income sources (Hou et al., 2023). Besides, China maintains relatively young statutory retirement ages, ranging from 45 to 60 years old, which differ based on gender, individual health status, job occupations, and sectors (Henry et al, 2018). I will explain the retirement ages and retirement facts in a detailed way in Chapters 3.1 and 3.2. Therefore, when people reach retirement age, they are able to stay in their jobs and use their human capital. However, if people withdraw from the labor market because they can enjoy pensions or other sources of funds, they will not be able to make full use of human capital to promote economic development.

Therefore, it motivates me to figure out:

Research Question 1: Whether the amount of money including pensions and other income or support the middle-aged and older people³ obtained can explain whether they take part in the labor market or not? Or, in other words, whether the labor supply crowding out effect of pensions⁴ really exists in China or not?

The phenomenon of “laborers working after retirement” has both advantages and disadvantages. Although middle-aged and older people continuing to work after retirement may

² The First Centenary Goal means the realization of moderate prosperity and means that it has put an end to absolute poverty.

³ Here I define that people aged 45-59 are middle-aged people, and those over 60 years old are older people.

⁴ Here I consider “the labor supply crowding out effect of pensions” in the labor market as a situation when pension coverage (social welfare) and other personal income or support can lead to a reduction in labor force participation.

occupy part of the employment opportunities of young people, this is based on the “lump of labor fallacy⁵” which is a misconception or a heuristics and bias from behavioral economics. In fact, Munnell and Wu (2013) show there is no evidence that increasing the employment of older people reduces either the job opportunities or wage rates of younger people. More importantly, most of them have obtained high education levels and accumulated rich experience. And a young worker cannot necessarily do the same job as an older worker who has acquired skills throughout a career⁶. Older employees are mainly engaged in professional, technological, and scientific industries, which increases the labor supply and fills the gap in skilled jobs. Therefore, it is of great significance to study the impacts on the labor market brought by “laborers working after retirement”. In this paper, I am going to focus on examining:

Research Question 2: If the “laborers with pensions” enter the labor market, what will be the impact of them on the whole labor market in China?

I am going to study the research questions by using the logistic regression and labor participation model and employing the individual-level data from the 2013 and 2018 China Health and Retirement Longitudinal Study (CHARLS), which is a questionnaire including self-reported information. And the individual dataset can have a more in-depth analysis of individuals’ personal situations. For research questions, specifically, I propose the following hypotheses:

Hypothesis 1: With pension coverage and increased pension income level, middle-aged and older people tend to quit the labor market.

Hypothesis 2: If the “laborers with pensions” enter the labor market, the earned income level may be relatively low compared with normal workers.

The remainder of the paper is divided into the following chapters. Chapter 2 reviews the related literature. Chapter 3 shows the retirement facts in China. Chapter 4 shows the aim of the models. Chapter 5 shows the data. Chapter 6 presents models and variables. Chapters 7 and 8 present the descriptive statistical analysis and the main empirical results. Chapter 9 gives conclusions.

⁵ A misconception that there is a fixed amount of work that could be done within society. It is wrong because labor markets can adjust to changes in labor supply and demand through changes in wages or immigration.

⁶ International Labor Organization (ILO). Available at: https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_190891/lang--en/index.htm

2. Literature Review

Research into the labor supply crowding out effect of pensions has a long history and many pieces of literature examine whether the amount of money middle-aged and older people obtained can explain whether they take part in the labor market or not. From the end of World War II, the labor force participation rate of middle-aged and older Americans experienced a continuous decline in the 20th century, especially between 1950 and 1989, the labor force participation rates decreased from 87% to 67% for middle-aged and older Americans. Andrew (1998) stated the contemporaneous expansion of the Social Security program has been a key cause for this sharp drop in labor force participation rates. Santos and Ferreira (2004) also employed American data and suggested that the changes in social security between 1950 and 2000 changed retirement behavior, and social security benefits have had a strong negative effect on older people's labor supply. By researching an increase in the Normal Retirement Age (NRA) implemented in 1983 in the U.S., each two-month increase in the NRA translates into a little more than a 1 percentage point reduction in social security benefits, which can generate an increase in labor force participation (Mastrobuoni, 2009). In Spain, Martín (2010) carried out research in treating retirement as an endogenous variable and found that reductions in the pension system's generosity caused delays in the normal retirement age. In Japan, the social security reforms in 1985 encourage older people to continue working and postpone retirement via reduced generosity and an increase in the eligibility age (Oshio et al, 2011). Reform experience in developed countries such as the U.S. and Japan shows that postponing the pension eligibility age or weakening the pension level will significantly increase the labor supply level.

The labor supply crowding out effect of pensions exists not only in developed countries like the U.S. but also in developing countries. In South Africa, pensions are an important source of income for one-third of South African households. There is a sharp drop in the working hours of prime-age individuals in these households when women turn 60 years old or men turn 65, the ages at which they become eligible for pensions (Bertrand et al, 2003). In Brazil, which is also a developing country, Filho (2008) suggested that the enjoyment of pensions increases the probability of rural workers over the age of 55 quitting the labor market by 38%. Gruber and Wise (2005) summarized the effects that changing plan provisions would have on the labor force participation of older workers in 12 countries. They found that an increase in retirement

eligibility ages or ages of receipt of social benefits typically increased labor force participation in these 12 countries with different cultural histories and labor market institutions. For instance, a three-year increment in retirement eligibility age or the age of receipt of social benefits leads to an average of 47% reduction in the proportion of out of the labor force. In Germany and Sweden, the reductions are 77% and 68%, respectively.

While some researchers argue that the social security benefit or pension coverage had little effect on middle-aged and older people's labor supply. Burtless (1986), for example, argued that the labor force participation rate declined after the 1970s in the U.S. for various reasons in addition to the increase in social security payments: sharply higher unemployment levels in the period after 1970 and changing attitudes towards work and retirement. Stock and Wise (1990) argued that whether taking part in the labor market is not decided by social security benefits and pension coverage directly. A person will continue to work if the expected value of retirement in the future is worth more than the value of retiring now (Stock and Wise, 1990). Krueger and Pischke (1992) carried out their research using the Current Population Survey and argued that the labor supply continued to decline for people who received lower social security benefits.

There are many historical studies in the area of the labor supply crowding out effect of pensions in China as well. Cai and Wang (2004) observed the situation of the labor market in the initial stage of state-owned enterprise reform in China and found that those who retire from the state-owned enterprises and enjoy pensions or receive living allowances from laid-off reemployment centers are more inclined to withdraw from the labor market completely. Giles et al (2011) used the 2008-2009 CHARLS survey data to observe the retirement behavior of middle-aged and older people in China. They observed a strong association between pension eligibility and exit from productive employment in China and found that pension is one of the significant influencing factors, and people who enjoy pensions tend to retire earlier. At present, studies (Giles et al., 2011) on the effects of pension income on labor participation have focused on the labor supply model, but less on the labor participation model.

The labor supply crowding out effect of pensions also appears in the rural areas in China. Cheng (2014) used the sample survey data of rural households to observe the labor supply effect of rural pension insurance. It is found that the coverage of pension insurance will reduce the

labor participation rate of rural households significantly. Zhang et al (2014) evaluated the effect of the new rural pension program implemented in 2009⁷ and they also found that the pension insurance policy has reduced the labor supply of the older population in rural areas of China.

If the “laborers with pensions” enter the labor market, what will be the impact of them on the whole labor market? Pensions may cause distortions in the labor market by suppressing the reservation wages of “laborers working after retirement”, which will be further reflected in wage levels and income distribution patterns of the whole society. The difference in wage levels between “laborers working after retirement” who enjoy pensions and normal workers is not only due to human capital, but the pension system is also an important factor. So, to what extent does pension coverage impact wage and income inequality and the labor market? Benedict and Shaw (1995) suggested that if an elderly has a private pension, then it increased annual income inequality by about 2% if he entered the labor market after retirement. In China, Cheng (2014) used CHARLS data from 2011 to 2012 and found that the wage level of “laborers working after retirement” is 30% lower than that of normal workers. But such groups are still willing to work because pensions play an important role in economic compensation. But the reservation wages of “laborers working after retirement” are depressed, affecting income distribution even though they have the same human capital as normal workers.

However, pensions may also have the incentive to raise wages. Pensions provide basic survival guarantees for older people, and they may tend to require a higher wage level before they are willing to stay in their jobs. Bloemen and Stancanelli (2001) found pension income levels tend to increase retention wages and lower employment rates.

The research reviewed above offers an insightful investigation centered on the labor supply crowding out effect of pensions. In this paper, I attempt to research whether pension coverage and other personal income or support can lead to a reduction in labor force participation by employing Chinese individual-level data.

⁷ The new rural pension program implemented in 2009 prescribes the elderly with household registration in rural areas who have reached the age of 60 and do not enjoy the basic pension insurance benefits can receive pensions on a monthly basis from the state.

3. Retirement Facts in China

3.1 The Retirement of Workers

China can be characterized as having two retirement systems: a formal system and an informal system. Under the formal system, in China, long-term urban residents⁸ with formal sector employment can expect to receive a pension upon retirement, but face mandatory retirement at a relatively young age (Giles et al., 2011). Whereas urban employed men have to retire by age 60, women in blue-collar⁹ and white-collar¹⁰ occupations generally have to do the same at age 50 and 55, respectively, with some exceptions (such as university professors), who can continue working until age 60. China has some of the youngest retirement ages in the world, which is becoming a major problem for a country that is steadily aging. While under the informal system, people living in rural areas and those working in the informal sector mainly rely on family support in their later years and have much longer working lives. However, some people in rural areas may participate in a national program called the New Rural Pension Scheme (NRPS), which is a voluntary pension system. Under the NRPS, there are a variety of alternative contribution levels, ranging from 100CNY to 500CNY per year. If people living in rural areas contribute more to the social pension scheme when they are young by themselves, they can receive more pension benefits when they are old. Also, few of them may also purchase endowment insurance through insurance companies when they are young and obtain private pensions when they are old.

However, there exists a special but legal labor relationship in China. Retirement and re-employment (*fanpin*) refers to the employment of an employee who has reached or exceeded the statutory retirement age, retires from the employer, and then continues to work as an employee by signing a contract with the original employer or other employers. That is to say, if the employer and the employee can reach an agreement, the employee can continue to work for a period of time after going through the retirement procedures. And this particularity provides a guarantee for the establishment of the econometrical models later.

Since after going through the retirement procedures, older people can start to enjoy their

⁸ A long-term urban resident in China represent an urban resident with a non-agricultural residential registration (*hukou*) status.

⁹ Women who are in non-state-owned enterprises and not in managerial positions should be considered blue-collar.

¹⁰ Women who work in the government authorities, state-owned enterprises, in non-state-owned enterprises but in managerial positions should be considered white-collar.

pension. According to the results of the 1% population sampling survey in China in 2005, 45.4% of urban residents over age 60 report pension income as their most important source of financial support, but only 4.6% of rural residents note an important role for pension income (Giles et al., 2011). Instead, 38% of respondents from rural areas over the age of 60 say that their primary source of income comes from their own labor. Although the census report was conducted in 2005, it can still reflect the retirement behavior and psychology of middle-aged and older people in China at the emerging stage. There are many factors that affect middle-aged and older people's decision whether to enter the labor market. It can be seen from the survey report that one of the most important factors is whether they have received a pension or support from their child(ren). Many of them decided to drop out of the labor force because they had pensions, when they could have used their human capital to boost the economy. Therefore, in the next chapter, I will start to build a model to observe whether the existence of pension and family support will affect the choice of middle-aged and older people to enter or exit the labor market.

3.2 Laborers Classification

Theoretically speaking, retirees and workers are two independent concepts. In a mature labor market, workers obtain income through employment activities to meet their living needs. After reaching a certain age, they begin to withdraw from the labor market and live on pensions, that is, they turn from laborers to retirees. As the degree of aging gradually deepens in China, the phenomenon of older people continuing to work is gradually being paid attention to. There are a group of workers active in China's labor market. They are either enjoying pensions or have reached retirement age, but they are still working. We call these middle-aged and older people "laborers working after retirement". These groups play an important role in China's labor market with their own human capital.

Table 1 shows the classification of "laborers working after retirement" in order to determine the research objects for my subsequent econometric modeling. All workers in the labor market can be divided into two categories: one is those who have reached retirement age (usually refers to 60 years old and above), and the other is those who have not yet reached retirement age (usually refers to workers aged 18-60 in China). Among the workers who have not reached the retirement age, they can be divided into two groups according to whether they

enjoy pensions: one is normal workers who have not enjoyed pensions and are still at working age, that is, group A in Table 1, and the other group is workers who are still of working age, but has already handled “early retirement” and enjoys a pension, but still continues to engage in employment activities. It is worth mentioning that “early retirement” or “inner retirement” is a special way of retirement in China. If the company needs to cut employees due to poor management, employees who are over 45 years old in the company can apply for “inner retirement” and then they can start to enjoy pensions. Or when employees have been engaged in harmful jobs for a long time, for example, workers working on the production line will smell the harmful gases released by the production of raw materials (such as plastic) for a long time, then when he reaches the age of 45, he can also apply the “inner retirement” and enjoys a pension, that is, group B in Table 1. Group C in the table represents workers in the non-working age population group but without pensions. Group D in the table represents retired workers who enjoy pensions. They have already processed retirement and are enjoying pension benefits, but they are still engaged in employment activities and earning labor income.

Accordingly, I call group A normal workers and groups B, C, and D “laborers working after retirement”, which are the research objects for subsequent modeling.

Table 1: Classification of laborers in the Chinese labor market

all (potential) workers in the labor market	do not exceed 60 years old	A: normal workers without pension
		B: “early retirement” workers with pension
	exceed 60 years old	C: people in the informal retirement system without pension
		D: people in the formal retirement system with pension

Source: Cheng (2014)¹¹.

¹¹ Cheng, J. 程杰 (2014): “Laborers Working after Retirement: A Typical Phenomenon of China in Transition “退而不休”的劳动者：转型中国的一个典型现象,” *Chinese Academy of Social Sciences*, 2(5), 68–103.

4. Aim of Models

The main objective of this paper is to observe the employment decisions and pension income of middle-aged and older people¹² in China. The research models are chosen to examine two key research questions: If the amount of money, including pensions and other income and support, that older people obtained may explain whether they participate in the labor market or not. Besides, what effect, if any, will the entry of “laborers with pensions” have on China’s whole labor market?

Individuals who enjoy pensions should make decisions on labor-leisure choices, that is, choose to quit the labor market or stay in the labor market. First, in order to determine whether or not the availability of pensions will diminish middle-aged and older people's incentive to work, this paper employs a labor market choice model. The labor market decision model reflects the individual labor supply behavior, which can be reflected by the labor participation status and labor supply time, that is, the labor participation model and the labor supply model are constructed, which will be shown in Chapter 6.1.

Secondly, this paper uses the wage determination model to examine if “laborers with pensions” enter the labor market, what impacts will have on China’s whole labor market. Similar to the Mincer equation (Mincer, 1974) in labor economics, this paper also uses a “log-level” regression, which will be shown in Chapter 6.2. The model includes the presence or absence of pensions to explain how pensions affect the earnings of middle-aged and older workers and, consequently, how they affect the whole Chinese labor market.

¹² I will define middle-aged and older people in a detailed way in Chapter 5.

5. Data

The paper needs to investigate whether enjoying pensions or other sources of income and funds can explain whether middle-aged and older people enter the labor market or not. What is needed is the data on middle-aged and older people in China, therefore, the paper employs data from China Health and Retirement Longitudinal Study¹³ (CHARLS) in 2013 and 2018, which is collected by Peking University. This data aims to collect a set of high-quality micro-data representing the families and individuals of middle-aged and older people aged 45 and above in China, so as to analyze the problem of population aging in China. Here I define that the respondents aged 45-59 are middle-aged people, and those over 60 years old are older people. As described in Chapter 3.2, in China, middle-aged and older people over the age of 45 have eligible for retirement. This fact ensures the rationality of the following modeling.

The baseline national wave of CHARLS is being fielded in 2011 and includes about 10000 households and 17500 individuals in 150 counties/districts and 450 villages/resident committees. CHARLS takes 2-3 years as a cycle, therefore, the latest questionnaire and data that have been published so far are the 2018 CHARLS questionnaire and data. I have chosen to use data from 2013 and 2018, which are cross-sectional datasets, so as to gain insights into changes in the labor market and retirement behavior of middle-aged and older people during the five years. The dataset contains 18262 observations in 2013 and 17970 observations in 2018.

There are many missing values and logical errors in the CHARLS data. Therefore, screening the questionnaire questions and data becomes a complex and crucial work. In the screening process, several principles I have adopted are as follows: There are values unrelated to the questions in the data. The answers in the questionnaire are incomplete or missing.

As long as the above situations appear in the data, the corresponding observations will be deleted. After the data cleaning process, the sample size is 10431 for 2013 and 10345 for 2018.

¹³ China Health and Retirement Longitudinal Study (CHARLS): http://charls.pku.edu.cn/en/About/About_CHARLS.htm

6. Models

6.1 Labor Participation Model

Giles et al (2011) used the labor supply model, which is equation (1), to address the determinants of participation in the labor market for middle-aged and older people. However, there are inevitably errors in the measurement of labor time, which will lead to weaker reliability of working time data than labor participation data (Huffman – El-Osta, 1997). Therefore, in the study of labor behavior decision-making, more attention is paid to the study of the labor participation model, while the labor supply model is abandoned (Ahearn et al., 2006). Much of the research on the labor supply effects of social security has focused on changes in labor force participation status (Heckman, 1993). Therefore, I use the labor participation model to observe the impact of pension factors on the labor participation of the population aged 45 and above. Pension factors take into account two aspects: pension coverage in equation (2) which is a binary variable and pension income in equation (3) which is a continuous variable:

$$working_hours_{ti} = \beta_0 + \beta_1 \cdot \log(pension_income_{ti}) + X_{ti} \quad (1)$$

$$labor_force_status_{ti} = \beta_0 + \beta_1 \cdot pension_coverage_{ti} + X_{ti} \quad (2)$$

$$labor_force_status_{ti} = \beta_0 + \beta_1 \cdot \log(pension_income_{ti}) + X_{ti} \quad (3)$$

where $labor_force_status_{ti}$ refers to the labor force status for individual i at year t , X_{ti} represents characteristics for individual i at year t , for instance, age, gender, marital status, and so on.

More specifically, models for the analysis are shown as equation (4) and equation (5):

$$\text{logit}(labor_force_status_{ti}) \quad (4)$$

$$\begin{aligned} &= \beta_0 + \beta_1 \cdot pension_coverage_{ti} + \beta_2 \cdot \log(other_income_{ti}) \\ &+ \beta_3 \cdot gender_{ti} + \beta_4 \cdot education_{ti} + \beta_5 \cdot marital_status_{ti} \\ &+ \beta_6 \cdot health_status_{ti} + \beta_7 \cdot age_{ti} + \beta_8 \cdot living_region_{ti} + \epsilon_{ti} \end{aligned}$$

$$\text{logit}(labor_force_status_{ti}) \quad (5)$$

$$\begin{aligned} &= \beta_0 + \beta_1 \cdot \log(pension_income_{ti}) + \beta_2 \cdot \log(other_income_{ti}) \\ &+ \beta_3 \cdot gender_{ti} + \beta_4 \cdot education_{ti} + \beta_5 \cdot marital_status_{ti} \\ &+ \beta_6 \cdot health_status_{ti} + \beta_7 \cdot age_{ti} + \beta_8 \cdot living_region_{ti} + \epsilon_{ti} \end{aligned}$$

6.2 “Log-Level” Model

The model below is a “log-level” model. The model is used to address the impact on wages if middle-aged and older people are covered by the pension. Therefore, I can address some general impact on the labor market if middle-aged and older people are covered by the pension.

$$\begin{aligned}
 \log(\text{labor_income}_{ti}) & \\
 &= \beta_0 + \beta_1 \cdot \text{pension_coverage}_{ti} + \beta_2 \cdot \text{gender}_{ti} + \beta_3 \cdot \text{education}_{ti} \\
 &+ \beta_4 \cdot \text{marital_status}_{ti} + \beta_5 \cdot \text{health_status}_{ti} + \beta_6 \cdot \text{age}_{ti} \\
 &+ \beta_7 \cdot \text{living_region}_{ti} + \epsilon_{ti}
 \end{aligned} \tag{6}$$

Table 2: Description of variables

<i>labor force status</i>	Equals 1 if the respondent engages in agricultural employed work, agricultural self-employed work, non-agricultural employed work, or non-agricultural self-employed work at least 10 days in the past year. And equals 0 if the respondent never worked, is unemployed, or retired in the past year.
<i>log(labor income)</i>	Logarithmic form of individuals' labor income.
<i>pension coverage</i>	Equals 1 if the respondent receives either a public pension, occupational pension or other forms of pension. And equals 0 if the respondent does not report receiving any forms of pension.
<i>log(pension income)</i>	Logarithmic form of respondents' pension income.
<i>log(other income)</i>	Logarithmic form of respondents' other support and income.
<i>education</i>	Equals 1 if less than lower secondary education, 2 if upper secondary and vocational training, and 3 if tertiary education.
<i>health status</i>	The scale ranging from 1 for Excellent to 5 for Very Poor.
<i>gender</i>	Equals 1 if male and equals 2 if female.
<i>age</i>	The age of the respondent. Including respondents aged above 45.
<i>marital status</i>	Equals 1 if the respondent is married, 2 if partnered, 3 if separated, 4 if divorced, 5 if widowed, and 6 if never married.
<i>living region</i>	Equals 1 if the respondent is located in a rural region. And equals 0 if the respondent is located in an urban region.

7. Results

7.1 Descriptive Statistics

The descriptive statistics of variables are shown in Tables 3 and 4. Some mean values are meaningless. However, I can still draw some concluding remarks about the general data. From the mean values of gender, the number of male respondents is almost the same as the number of female respondents for both 2013 and 2018. From the mean values of the health indicator, on average, the respondents self-evaluated their health status at an average level. The average age of all respondents is around 60 for both 2013 and 2018. In 2013, the average age is slightly below 60. While, in 2018, the average age of all respondents exceeds 60, which indicates the sample average age exceeds both the females' retirement age¹⁴ and males' retirement age¹⁵.

Table 3: Descriptive Statistics (2013)

variable	N	mean	min	max
Labor force status	10431	0.71	0.00	1.00
Pension coverage	10431	0.18	0.00	1.00
Gender ¹⁶	10431	1.50	1.00	2.00
Age	10431	58.42	45.00	80.00
Education	10431	1.09	1.00	3.00
Living region	10431	0.72	0.00	1.00
Health status ¹⁷	10431	3.08	1.00	5.00
Marital Status	10431	1.88	1.00	6.00

Source: China Health and Retirement Longitudinal Study (CHARLS)

Table 4: Descriptive Statistics (2018)

variable	N	mean	min	max
Labor force status	10345	0.69	0.00	1.00
Pension coverage	10345	0.49	0.00	1.00
Gender	10345	1.50	1.00	2.00
Age	10345	61.02	45.00	80.00
Education	10345	1.13	1.00	3.00
Living region	10345	0.63	0.00	1.00
Health status	10345	2.97	1.00	5.00
Marital Status	10345	1.57	1.00	6.00

Source: China Health and Retirement Longitudinal Study (CHARLS)

¹⁴ Women in blue-collar and white-collar occupations generally have to retire at age 50 and 55, respectively.

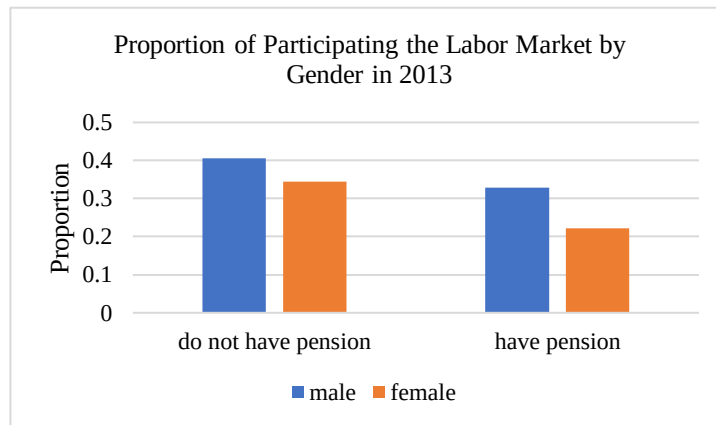
¹⁵ All men have 60 as their retirement age.

¹⁶ Equals 1 if the respondent male and equals 2 if female.

¹⁷ Ranging from 1 for Excellent to 5 for Very Poor.

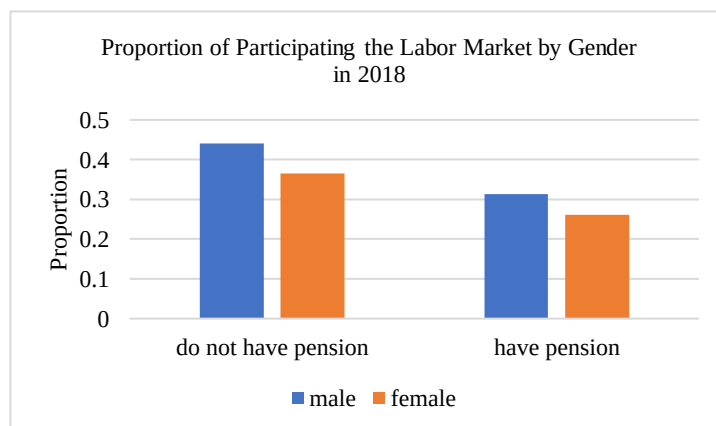
Figures 1 and 2 show the proportion of middle-aged and older people participating in the labor market by gender in 2013 and 2018, respectively. It can be observed that in Figure 1, compared with the subgroup without a pension, in the subgroup with a pension, regardless of male and female, the proportion of participating in the labor market has a significant downward trend. Figure 2 has a similar pattern. The decreasing trend of the proportion of participating in the labor market implies that if middle-aged and older people are covered by a pension, they tend to quit the labor market. At the same time, it can be observed that the proportion of labor participation of middle-aged and older women is always lower than that of men. One possible reason is that middle-aged and older women are always more inclined to be involved in family care provisions. The specific explanation will be elaborated in the following results chapter.

Figure 1: Proportion of participating in the labor market by gender in 2013



Source: China Health and Retirement Longitudinal Study (CHARLS)

Figure 2: Proportion of participating in the labor market by gender in 2018

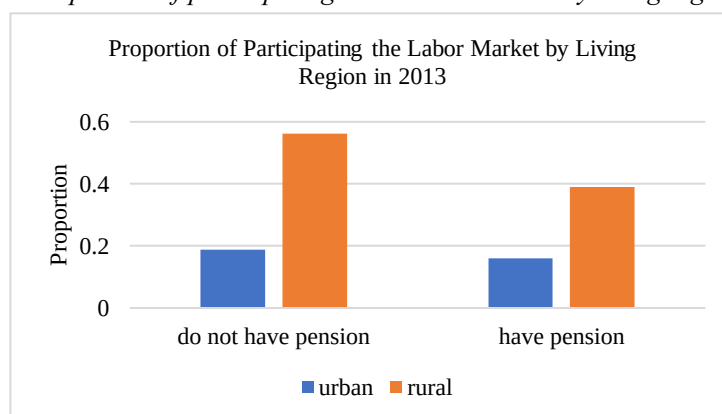


Source: China Health and Retirement Longitudinal Study (CHARLS)

Figures 3 and 4 show the proportion of middle-aged and older people participating in the labor market by living region in 2013 and 2018, respectively. Similar to the previous trend, it

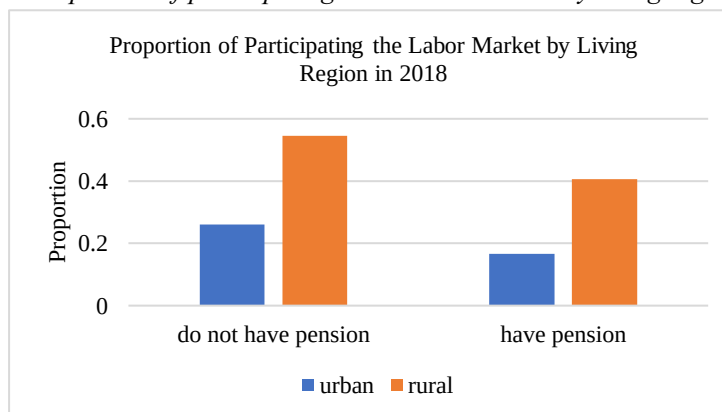
can also be clearly observed that in both 2013 and 2018, compared with subgroups without pensions, in subgroups with pensions, regardless of whether they live in urban areas or rural areas, there is a significant downward trend in the proportion of participating in the labor market. In China, there is a clear difference in the labor force participation of older people in urban and rural areas. Generally speaking, the proportion of middle-aged and older people living in rural areas who still enter the labor market after old age is higher than that of middle-aged and older people living in urban areas. The possible reason is that most people living in rural areas did not pay insurance contributions when they were young since the formal retirement system did not exist for most of them, so most of them cannot enjoy public pension when they are old, so they have to enter the labor market for their livelihood. Even though few people in rural areas can participate in the voluntary pension system, the pension they get from participating in the voluntary pension system is very small. Therefore, they still will enter the labor market.

Figure 3: Proportion of participating in the labor market by living region in 2013



Source: China Health and Retirement Longitudinal Study (CHARLS)

Figure 4: Proportion of participating in the labor market by living region in 2018



Source: China Health and Retirement Longitudinal Study (CHARLS)

7.2 Pension Income and Employment Decisions

In theory, generally, pension income can relax budget constraints, increase current or expected income, and reduce labor participation or savings motivation. Especially for the middle-aged and older population who are about to retire or have already retired, pension income has “the labor supply crowding out effect”¹⁸ and encourages them to withdraw from the labor market earlier. In the Chinese labor market, people who are still of working age can continue to create vitality for the labor market and economic growth, but because China has some of the youngest retirement ages in the world and they can enjoy pensions earlier, they lose their employment motivation. If this kind of labor supply crowding out effect does exist and is relatively prominent, which will cause the limitation and waste of human capital.

Table 5 can generate the results of the research question: Whether the labor supply crowding out effect of pensions exists in China or not by employing equation (4) in Chapter 6.1 and data from 2013 and 2018 CHARLS. The pension factor in Table 5 is a binary variable and coefficients are recorded as odds ratios.

In Table 5, both in 2013 and 2018, the odds ratios of pension coverage are less than 1 and statistically significant at 1% and 5% levels, respectively. Therefore, the result shows that in 2013, when a middle-aged or older person is covered by a pension, then the probability of taking part in the labor market will decrease by 27.3%¹⁹ with other variables remaining constant. In 2018, it has a similar trend to 2013. When a middle-aged or older person is covered by a pension, then the probability of taking part in the labor market will decrease by 9.8%²⁰ with other variables remaining constant. Therefore, I can address the evidence that the coverage of pension can significantly reduce the motivation to enter the labor market for the middle-aged and older population. The logic for the evidence is pension coverage can relieve financial pressures, raise current or anticipated income, and weaken the incentive to work or save. Besides, the decreased probability of taking part in the labor market has a decreasing trend from 27.3% in 2013 to 9.8% in 2018, which means that compared with 2013, even though middle-aged and older population

¹⁸ Here I consider “the labor supply crowding out effect of pensions” in the labor market as a situation when pension coverage (social welfare) and other personal income or support can lead to a reduction in labor force participation.

¹⁹ Calculated from the odds ratio of “pension coverage” in Column (2) Table 5.
probability of taking part in labor market will decrease $1 - 0.727 = 0.273$.

²⁰ Calculated from the odds ratio of “pension coverage” in Column (4) Table 5.
probability of taking part in labor market will decrease $1 - 0.902 = 0.098$.

are covered by a pension, they are more willing to enter the labor market in 2018. And “the labor supply crowding out effect” is becoming weak. The reasonable explanation for the trend is population aging in China and more jobs and positions from service industries are provided to older people.

It can also be seen from Table 5 that in 2013 when the other support and income including rental income, government or public transfer income, other government subsidies, alimony, and child(ren) support of middle-aged and older people increased by 1%, the probability of them entering the labor market decreased by 10.6%²¹. In 2018, when the other support and income of middle-aged and older people increased by 1%, the probability of them entering the labor market decreased by 8.6%²². Therefore, I can conclude that obtaining more amount of other income and support will enable middle-aged and older people to obtain more disposable income and they are more likely to withdraw from the labor market. Comparing 2013 and 2018, when the other support and income of middle-aged and older people increased by 1%, the decreased probability of taking part in the labor market has a decreasing trend from 10.6% in 2013 to 8.6% in 2018, which means that compared with 2013, middle-aged and older people are more willing to enter the labor market in 2018. The tendency can be explained by the fact that China’s population is aging and that older people are getting more occupations.

From Table 5, to answer my research questions, there is significant evidence showing that “the labor supply crowding out effect of pensions” does exist in China, which indicates if a middle-aged or older person has pensions, the probability of entering the labor market will decrease. Also, the amount of money middle-aged and older people obtained could explain whether they enter the labor market, that is to say, with more support and income from the state or children, the probability of entering the labor market will decrease as well.

²¹ Calculated from the odds ratio of “log(other income)” in Column (2) Table 5. $1 - 0.894 = 0.106$.

²² Calculated from the odds ratio of “log(other income)” in Column (4) Table 5. $1 - 0.914 = 0.086$.

Table 5: Odds ratio results of labor participation model: pension coverage

	Year 2013		Year 2018	
	(1)	(2)	(3)	(4)
	Labor force status	Labor force status	Labor force status	Labor force status
Pension coverage	0.412*** (0.022)	0.727*** (0.044)	0.323*** (0.015)	0.902** (0.055)
Log(other income)		0.894*** (0.016)		0.914*** (0.014)
Age		0.929*** (0.003)		0.915*** (0.003)
Gender				
Female		0.470*** (0.024)		0.448*** (0.023)
Education				
Upper secondary		0.916 (0.093)		0.673*** (0.056)
Tertiary		1.298 (0.389)		1.045 (0.204)
Marital status				
Partnered		1.083 (0.111)		1.126 (0.129)
Separated		0.796 (0.270)		0.706 (0.324)
Divorced		0.502*** (0.133)		0.677* (0.156)
Widowed		0.576*** (0.046)		0.613*** (0.047)
Never Married		0.416*** (0.085)		0.465*** (0.138)
Health status				
Good		0.829 (0.109)		1.000 (0.105)
Fair		0.807* (0.097)		0.874 (0.074)
Poor		0.412*** (0.051)		0.459*** (0.042)
Very poor		0.204*** (0.030)		0.249*** (0.029)
Living region				
Rural		1.830*** (0.099)		2.587*** (0.135)
N	10431	10431	10345	10345

Source: China Health and Retirement Longitudinal Study (CHARLS)

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Additionally, the odds ratios of age, gender, and place of residence in 2013 and 2018 are all statistically significant at the 1% level from Table 5, where the odds ratios of age and gender are less than 1, and the odds ratios of the place of residence are greater than 1. As age increases, middle-aged and older people are less likely to enter the labor market. At the same time, the probability of middle-aged and older women entering the labor market is significantly lower than that of men. The reasonable explanation is older women spend more hours in family care provisions than older men including caring for grandchildren and caring for family members (Marhánková and Stípková, 2020), and retirement ages for women²³ remain lower than for men in China – signaling that older women are not willing to participate in the labor market. In addition, middle-aged and older people living in rural areas are twice likely to enter the labor market than those living in urban areas. The reasonable explanation is rural older people, who had lower incomes during their working lives and less accumulated wealth than their urban counterparts, do not typically have pension income, therefore, they have to work more and are more likely to enter the labor market (Giles et al, 2011).

In 2018, middle-aged and older people with “poor” health status were 54%²⁴ less likely to enter the labor force than middle-aged and older people with “excellent” health status. Compared with middle-aged and older people with "excellent" health status, middle-aged and older people with "very poor" health status will be 75%²⁵ less likely to enter the labor market. Therefore, it can be seen from the health status that as the health status gets worse, the probability of middle-aged and older people entering the labor market decreases.

Table 6 below is still based on the labor participation model. However, the main explanatory variable now is the logarithmic form of pension income, which is a continuous variable instead of a binary one. And by using this model (equation (5) in Chapter 6.1) and employing data from 2013 and 2018 CHARLS, I can address whether the total amount of money they obtain can explain they take part in the labor market or not thoroughly. The coefficients in Table 6 are recorded as odds ratios.

²³ Employed men confront retirement at age 60 in China, women in blue-collar occupations are frequently required to retire at age 50, and those in white-collar occupations at age 55.

²⁴ Calculated from the odds ratio of “poor” health status in Column (4) Table 5. $1 - 0.459 = 0.541$.

²⁵ Calculated from the odds ratio of “very poor” health status in Column (4) Table 5. $1 - 0.249 = 0.751$.

Table 6: Odds ratio results of labor participation model: *log(pension income)*

	Year 2013		Year 2018	
	(1)	(2)	(3)	(4)
	Labor force status	Labor force status	Labor force status	Labor force status
Log(pension income)	0.843*** (0.032)	0.770*** (0.038)	0.890*** (0.030)	0.868*** (0.034)
Log(other income)		0.818*** (0.034)		0.916*** (0.021)
Age		0.915*** (0.009)		0.917*** (0.006)
Gender				
Female		0.507*** (0.062)		0.480*** (0.036)
Education				
Upper secondary		0.755 (0.226)		0.717** (0.121)
Tertiary		2.210 (2.086)		1.398 (1.696)
Marital status				
Partnered		1.355 (0.437)		1.137 (0.238)
Separated		0.645 (0.605)		1.007 (0.719)
Divorced		0.555 (0.337)		0.456* (0.223)
Widowed		0.487*** (0.084)		0.477*** (0.047)
Never Married		0.505 (0.264)		0.419** (0.164)
Health status				
Good		1.147 (0.359)		1.161 (0.192)
Fair		1.029 (0.292)		0.911 (0.116)
Poor		0.461*** (0.134)		0.461*** (0.062)
Very poor		0.272*** (0.097)		0.270*** (0.046)
Living region				
Rural		2.067*** (0.281)		1.959*** (0.159)
N	10431	10431	10345	10345

Source: China Health and Retirement Longitudinal Study (CHARLS)

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In Table 6 Columns (2) and (4), the odds ratios of logarithmic form of pension income are less than 1 and statistically significant at 1% level for both 2013 and 2018. The results show that when the pension income increases by 1%, the probability of taking part in the labor market will decrease by 23%²⁶ in 2013 and 13.2%²⁷ in 2018, which shows the labor supply crowding out effect of pensions as well.

As for other support and income, Table 6 also shows that in 2013, when middle-aged and older people's other support and income grew by 1%, the likelihood of them entering the labor market reduced by 18.2%²⁸. The likelihood of middle-aged and older adults entering the labor market declined by 8.4%²⁹ in 2018 when their other sources of support and income grew by 1%. As a result, I may conclude that middle-aged and older people are more likely to leave the labor market if they receive a greater quantity of additional income and support.

When comparing 2013 and 2018, either when middle-aged and older people's other sources of support and income increased by 1% or when middle-aged and older people's pension income increased by 1%, the probability of not participating in the labor market has a decreasing trend, meaning that in 2018 compared to 2013, middle-aged and older people are more willing to enter the labor market, which is similar to the comparison results from Table 8. The pattern can be explained by the fact that China's population is aging and that older people are gaining more jobs.

The results from Table 6 can better capture the answer to the research question. The amount of money that middle-aged and older people have acquired may be a factor in determining whether they enter the labor market, in other words, if they receive more pension income or financial assistance from the government or their children, their likelihood of entering the labor market will be lower.

7.3 Impacts on the Overall Labor Market

Table 7 below is the results from the log-level model. And by using this model (equation (6) in Chapter 6.2) and employing data from 2013 and 2018 CHARLS, I can address the

²⁶ Calculated from the odds ratio of "log(pension income)" in Column (2) Table 6. $1 - 0.77 = 0.23$.

²⁷ Calculated from the odds ratio of "log(pension income)" in Column (4) Table 6. $1 - 0.868 = 0.132$.

²⁸ Calculated from the odds ratio of "log(other income)" in Column (2) Table 6. $1 - 0.818 = 0.182$.

²⁹ Calculated from the odds ratio of "log(other income)" in Column (4) Table 6. $1 - 0.916 = 0.084$.

research question: If the “laborers with pensions” enter the labor market, what will be the impact of them on the whole labor market in China?

Employees who are covered by pension income are considered to receive some amount of transfer payment³⁰, therefore, these employees may tolerate a relatively low reservation wage³¹. Such a situation will have a negative impact on the formation of wage equilibrium with no doubts and tends to lower the average wage in the labor market. Therefore, in this subchapter, I will show the impact of pension coverage on wages. The results in Table 7 show that pension coverage statistically significantly lowers the average earned income. With pension income, if the middle-aged or older person still decides to enter the labor market, then the earned income for him was reduced by 8.9% in 2013. While the extent is relatively large in 2018 that with pension coverage, the earned income was reduced by 13.7%.

Based on the individual effect from Table 7, does the inhibition effect of pension coverage on earned income have a positive, negative, or ambiguous impact on the whole labor market? For the general labor market, employing more middle-aged and older people with pension coverage is better for the labor demand side, because the cost of labor is relatively low from the labor demand side and it helps to alleviate labor pressure. However, it is not good news for the labor supply side (middle-aged and older people with pension coverage), because the reservation wage for these workers is depressed³², the equilibrium is not at a reasonable level, and old workers are at a disadvantage. It will have a negative impact on the development of the overall labor market in China because workers with the same level of human capital do not receive similar wages in the labor market. Also, when “laborers with pensions” participate in the labor market and get lower payments that don’t match their productivity, it is not good for the social system. Because it will make older people who have pensions but enter the labor market more dependent on pensions, and because aging is deepening, it will increase the pressure on social systems. Comparing the inhibition effect of 2018 with 2013, the inhibition effect does not weaken during the five years, which does not allocate labor resources effectively and impedes labor market efficiency improvements. Besides, the inhibition effect in 2018 is

³⁰ The transfer payment here refers to the pension income provided by the government or firms.

³¹ The reservation wage is the wage that makes a person indifferent between working and not working.

³² Axelrad et al (2017) stated that older people usually experienced longer periods of unemployment, and had a greater willingness to reduce salary expectations.

still high, which indicates a problem in the Chinese labor market that earned income always cannot keep up with labor productivity for middle-aged and older people with pension income.

Table 7: Results of log-level model

	Year 2013		Year 2018	
	(1)	(2)	(3)	(4)
	Log(labor income)	Log(labor income)	Log(labor income)	Log(labor income)
Pension coverage	-0.122*** (0.033)	-0.089*** (0.035)	-0.489*** (0.034)	-0.137*** (0.048)
Age		-0.004* (0.002)		-0.029*** (0.004)
Gender				
Female		0.144*** (0.028)		-0.472*** (0.040)
Education				
Upper secondary		0.158*** (0.026)		0.402*** (0.048)
Tertiary		0.542*** (0.042)		0.867*** (0.109)
Marital status				
Partnered		0.040 (0.031)		0.206*** (0.057)
Separated		-0.133 (0.336)		0.461 (0.428)
Divorced		-0.070 (0.107)		0.221 (0.180)
Widowed		-0.104 (0.078)		-0.058 (0.079)
Never Married		-0.107 (0.214)		-0.358 (0.303)
Health status				
Good		-0.086** (0.038)		-0.024 (0.063)
Fair		-0.149*** (0.035)		-0.154*** (0.051)
Poor		-0.209*** (0.049)		-0.453*** (0.070)
Very poor		-0.370*** (0.117)		-0.607*** (0.125)
Living region				
Rural		-0.046* (0.024)		-0.321*** (0.038)
N	10431	10431	10345	10345

Source: China Health and Retirement Longitudinal Study (CHARLS)

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

8. Conclusions

This paper uses the 2013 and 2018 CHARLS data to analyze employment decisions of middle-aged and older people in China through the labor participation model and logistic regression and draws the following conclusions: “The labor supply crowding out effect of pension” does exist in China, that is to say, if a person is covered by the pension, the probability of this person entering the labor market will decrease. To be more specific, if middle-aged and older people receive more pension income or financial assistance from the government or their children, their likelihood of entering the labor market will be lower. When comparing the results from 2013 and 2018, the probability of entering the labor market in 2018 is higher than the probability of entering the labor market in 2013 given the same level of pension. I interpret this increasing possibility of entering the labor market as the aging of Chinese society, which potentially provides more employment opportunities for older people. Also, if laborers with pensions enter the labor market, the earned income is relatively low. As a kind of compensation income, a pension interferes with the wage-forming mechanism, leading to a significant decline in earned income.

In response to the aging population, China is exploring a flexible employment model suitable for older people, so as to encourage older people who could retire but continue to contribute their human capital or stay in the labor market. “China Elderly Talent Website” organized by the Chinese government last August allows companies to publish recruitment information to encourage older people to be employed. China’s McDonald’s has also recruited retirees from society as waiters for three consecutive years. Retirees can implement flexible working hours at McDonald’s according to their circumstances.

Social insurance has always had a trade-off between “protection” and “distortion”. The most obvious distorting effect is the waste of human resources caused by laborers leaving the labor market prematurely, and the decline in labor supply will bring economic losses as well. The World Bank (World Bank, 2013) also put forward suggestions on China’s development prospects in 2030, and building a flexible and secure labor market is particularly critical to ensure that middle-aged and older people do not drop out of the labor market prematurely. Last October, at the 20th National Congress of the Communist Party of China, a meeting held every five years to discuss key political and social issues, a report mentioned that China is considering

the implementation of a progressive retirement age delay plan and it may be officially announced in 2023 and will be formally implemented in 2025.

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