Initial Labor Market Conditions and Individual Employability

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Abstract: *Initial labor market conditions affect how individuals build their human capital and look for jobs and thus can have long-term effects on their income levels, work performance, and career development. Based on data from the Urban Household Survey (UHS) of urban households in China from 1986 to 2009, we perform an empirical test of how initial labor market conditions affect the employability of individuals. Our research shows that people's future incomes suffer if they start out in an adverse job market. Each percentage point of increase in the unemployment rate at an individual's entry into the labor market is associated with a two-percentage-point drop in his or her average annual income. Even after looking at different parts of the job market and sample groups, this conclusion still holds. In the context of global economic instability, our findings may assist government policymakers in addressing adverse labor market conditions.*

Keywords: *Initial labor market conditions, unemployment, labor market frictions, short-term effects, long-term effects*
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1. Introduction

Labor economists have always been interested in the way in which the macroeconomy affects the labor market and individual labor decisions. For example, the link between early childhood development and adult labor market performance (Heckman et al., 2010; Lareau, 2011; Carneiro et al., 2013; Sylvia et al., 2021); the impact of early career experience on later stages of life (Lyu, 2020); and the question of whether or not initial joblessness leaves a psychological scar that hinders future career prospects (Mavromaras et al., 2015) have all been investigated extensively. Research conducted in China has examined the long-term consequences of certain historical events, such as the Down to the Countryside Movement (Chen et al., 2020), as well as the impact of parental employment shocks, such as unemployment, on children (Zhao, 2016). However, the analysis of present economic behaviors and shocks is more conducive to uncovering enduring and persistent effects, rather than transient and immediate effects (Dai et al., 2020).

Existing studies have indicated that economic downturns have a negative effect on individuals who participate in the labor market, with an especially acute impact on young job seekers who are new to the workforce (Forsythe, 2021). The cohort of individuals who enter the workforce during a period of economic recession, known as the "unfortunate generation", may be at risk of enduring prolonged psychological trauma. During typical circumstances, it is common for employees to anticipate an increase in wages during the initial phase of their professional journey and to seek significant economic

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benefits by job-hopping. The advantages of career advancement may prove difficult to attain during periods of economic downturn, however. Utilizing data from household surveys, we estimate unemployment rates at the provincial level in China in order to evaluate the economic climate's impact on workforce entry. Our analysis examines the impact of varying initial conditions on individual employability.

Some scholars posit that individuals who are newly entering the labor market may opt to enhance their general human capital by accepting vocational technical training, which could potentially increase their labor productivity in their future career (Xu, 2013), though a greater number of studies have suggested that experiencing an economic recession or unemployment during one's youth may leave an adverse impact on one's employability. Unemployment in youth may deprive an individual of the opportunity to accumulate specialized human capital on the job. Based on the assumption that the cost of job search increases with age, it is likely that less skilled workers may become trapped in a cycle of low income over time (Oreopoulos et al., 2012; Brunner and Kuhn, 2014; Altonji et al., 2016).

The characteristics of China's gradualist reform during its economic transition have produced notable differences in the economic climate and behaviors over various time spans (Xu, 2011). Reform measures have been implemented over a variety of timeframes, with different goals, target groups, and outcomes. China has been developing its market-based economy and improving market mechanisms, but significant barriers such as market segmentation still persist and prevent the free movement of factors between regions and industries. Policy shocks that happen at certain critical times are therefore more likely to have lasting effects.

This article aims to assess the importance of labor market conditions upon workforce entry, with a particular emphasis on job opportunities and market matching efficiency. The primary focus of this study is to examine the long-term implications of initial market characteristics on an individual's future employability. The importance of this study is two-fold. First, it elucidates the long-term effects of policies for economic transition. China's economic policies have the ability to alter the supply and demand of labor, as well as to impact the external employment environment and opportunities. Second, the study facilitates future analysis of China's market-oriented reforms. In an ideal market without obstacles to adjusting the allocation of resources, people can adapt to external shocks by finding new jobs; their ability to find work depends solely on current market conditions and their individual qualities, and is not affected by the nature of their previous job.

This study examines the mid- and long-term impacts of initial labor market conditions. We employ data from the Urban Household Survey (UHS) spanning from 1986 to 2009 and the *China Labor Statistical Yearbook* covering the period from 1996 to 2016 and reach the following conclusions. (i) A rise in the unemployment rate during the initial year of workforce entry by one percentage point results in a reduction of an individual's income - whether it be annual or wage income - by a range of 0.8 to 2.7 percentage points. The duration of the negative impact may persist for about five years and dissipate a decade after workforce entry. (ii) Our baseline fixed effect model regression outcomes remain consistent across various educational levels. (iii) There is no noteworthy distinction in the impact of initial labor market conditions between male and female subgroups. (iv) The efficiency of labor market matching and variations in economic structure do not serve as the primary explanatory factor for individual employability. Further research is necessary to ascertain the mechanism by which initial labor market conditions affect individual employability.

2. Literature Review

Most studies on labor market conditions are concerned with developed countries[1], while developing countries receive less attention[2]. Many studies show that the initial state of the job market upon entry has

[1] These include Japan (Kondo, 2007; Genda et al, 2010), South Korea (Choi et al, 2020), Germany (Umkehrer, 2019), the United Kingdom (Taylor, 2013), Austria (Brunner and Kuhn, 2014), Spain (Fernández-Kran and Rodriguez-Planas, 2018), Belgium (Cockx and Ghirelli, 2016), and Norway (Raaum and Røed, 2006; Liu et al., 2016; Haaland, 2018).

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a lasting impact on income and career choices. According to a study conducted on male college students in Canada and the United States (Oreopoulos et al., 2012; Kahn, 2010), these effects may persist for one or two decades, and according to Oyer's (2006) research, the initial labor market conditions for PhD economists significantly influence their lifelong academic output. Individuals who hold higher positions initially have a greater chance of publishing papers in the top five economics journals thanks to a more favorable academic environment, better reputation, and more supportive colleagues. Oyer (2008) finds that MBAs who graduate during an economic downturn earn significantly less, ranging from 1.5 million to 5 million US dollars less, over the course of their career compared to those who enter the workforce during an economic upswing.

According to Yagan (2019), although the unemployment rate recovered after the Great Depression, there were still losses of jobs and to individual incomes. In other words, a bad job market has a lasting effect. In Germany, most young people who don't attend college participate in apprenticeships and have to look for a job once completing their apprenticeships regardless of the state of the labor market. Apprentices are more inclined to enter the labor market compared to college students who tend to postpone graduation. Umkehrer (2019) concludes that initial labor market conditions have varying effects based on his study of Germany. In particular, physical and service jobs are prone to long-term effects, whereas technical jobs are susceptible to medium-term effects. Thus, many economists agree that a bad job market has an adverse impact on a person's ability to find work in developed countries. This conclusion serves as a point of reference for research for developing nations. Our paper addresses the lack of attention given to developing countries by focusing on the initial labor market conditions in China.

The effects of initial labor market conditions differ in magnitude and continuity across labor markets with varying levels of flexibility, as well as among individuals with different levels of education (Cockx and Ghirelli, 2016). In countries with rigid wage determination, an unfavorable economic climate dampens individuals' career outlooks throughout their lives. In countries with flexible wage determination, these effects mainly affect individuals in the early stages of their careers (Kawaguchi and Murao, 2014). According to Genda et al. (2010), in labor markets that are more flexible, such as those in the United States and Canada, low-skilled workers are hit harder by recessions but recover more quickly, while highly skilled workers are impacted less severely but take longer to bounce back (Oreopoulos et al., 2012). Typically, when the unemployment rate rises by 4% to 5%, those who are starting out in their careers can expect their incomes to drop by 10% to 15%. This effect is especially noticeable for those with a low level of skills (Wachter, 2020). China's labor market flexibility has undergone changes over the years due to market-oriented reforms. Research on initial labor market conditions, therefore, will supplement research literature in this field. If the effects of initial labor market conditions are relatively short lived, the implication is that China's labor market flexibility has increased.

Initial labor market conditions influence individual employability through interactions between the accumulation of skills (Ben-Porath, 1967) and job search (Burdett, 1978; Manning, 2003). An individual chooses a profession and invests in relevant skills before looking for a job in his field, which means that individuals accumulate their skills for specific professions (Gibbons and Waldman, 2006). In a bad job market, however, it is very likely for individuals to accumulate specialized skills for less rewarding professions because they tend to start their first job at smaller companies that pay even less. To make things worse, they cannot expect a substantial raise even if they change a job, not to mention stay in the same job (Wachter, 2020).

People with general skills can look for fulfilling jobs and experience wage growth as a result (McLaughlin and Bils, 2001). Job switching has a significant impact on how people develop their careers (Topel and Ward, 1992), and labor market entry in bad times will lessen job-hopping's advantage. Low-skilled workers often

[2] The reform of state-owned enterprises (SOEs) since the late 1990s resulted in significant job cuts in urban areas. Some studies have also found that the incomes of re-employed laid off workers were low (Li and Knight, 2002; Du and Cheng, 2006).

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give up searching for work as the cost of doing so rises with age. They are also more likely to take longer to recover from the effects of a bad job market and experience permanent shocks (Oreopoulos et al., 2012). Our empirical study is informed by others' prior work on the initial state of the labor market. It takes more research to find out if the results of previous research are applicable to the Chinese context.

The research literature also highlights the significance of the initial labor market conditions. Long-term unemployment caused by unfavorable initial job conditions hinders economic recovery and labor market improvement (Yagan, 2019; Wachter, 2020). During tough times, college graduates may not reap the same benefits from their education as they would during more favorable circumstances (Oreopoulos et al., 2012). Experiencing negative effects in the first year of labor market entry can lead to a 10% decrease in an individual's incomes over the course of a decade, which is nearly equivalent to 99% of their average annual income. This decrease is a big blow for most people. According to Schwandt and Wachter (2019), individuals with a college education will experience a 40% decrease in their average annual income over a period of 10 years due to the negative effects in the first year. Several studies also suggest that initial job market conditions have an impact on noneconomic outcomes of individuals such as their decisions to get married, have children, or get divorced, with or without children. Those factors add to the cost of job hunting, making the economic impact of initial labor market conditions even worse (Wachter, 2020). Analyzing the changing impact of initial labor market conditions on China's macroeconomic environment is thus an important area of research.

3. Data, Variables, and the Estimation Model

This study uses data from the China Urban Household Survey (UHS) conducted by the National Bureau of Statistics (NBS) between 1986 and 2009. The survey provides annual information on employment and income at the individual level based on the daily records of income and spending of the households surveyed. This paper uses household survey samples from 18 different provincial jurisdictions: Beijing, Shanxi, Liaoning, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Shandong, Henan, Hubei, Guangdong, Chongqing, Sichuan, Yunnan, Shaanxi, and Gansu. Those provincial jurisdictions have varying degrees of economic development and are spread out across China.

The survey's data only capture the employment and income status of those who were surveyed during the year of the survey. What're missing are the experiences of being employed or unemployed. Even though the urban household survey requires sample households to keep track of their finances for several years, and samples are rotated annually by a certain ratio, the lack of consistent household codes across years means that these households can only be considered as pooled cross-sectional data. As such, we cannot determine the lasting impacts of an individual's past unemployment experience and have to limit ourselves to discussing the long-term employability effects of variations in the job environment. This paper measures the initial labor market conditions by looking at the unemployment rate of the urban labor force at the time of job market entry, which is our key explanatory variable.

3.1 Unemployment Status

Unemployment status refers to the unemployment rate in the provincial jurisdiction where a person started working in the first year. Rather than using the official urban unemployment rate, we compute the unemployment rate by referring to the UHS data following the method of Feng et al. (2017)[3]. Figure

[3] There are 15 categories of the "employment status" variable based on the UHS data of 1992-2007: (1) Employees at enterprises of state ownership; (2) employees at enterprises of collective ownership; (3) employees at enterprises of other types of ownership; (4) the urban self-employed; (5) employees of the urban self-employed; (6) re-employed retirees; (7) other employees; (8) retirees; (9) incapacitated workers; (10) domestic workers; (11) youngsters waiting for jobs; (12) graduates waiting for job assignments; (13) college students; (14) graduates waiting for enrolment for a higher degree; and (15) other non-employed persons. In this paper, we regard (1) through (7) as employed persons and (11) and (12) as unemployed persons. Columns (8), (9), (10), (13), (14) and (15) are economically nonactive populations. There is a change in the classification sequence for the 2007-2009 data, but it is roughly consistent with the 1992-2007 information.

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1 presents the registered urban unemployment rate and the UHS unemployment rate for a number of years. The registered urban unemployment rate remained fairly consistent over time, but the UHS unemployment rate actually rose. Prior to the 1990s, both the UHS unemployment rate and the registered urban unemployment rate remained low. While the reform of SOEs since the mid- to late-1990s did not have a major impact on the registered urban unemployment rate, the UHS unemployment rate began to rise sharply, and the gap between the two became more apparent. The unemployment rate in the UHS fell in 2003 but rebounded a bit in 2008. The variations in the differences between the two different measures indicate that the UHS unemployment rate is more responsive to changes in the economic climate than the registered urban unemployment rate[4].

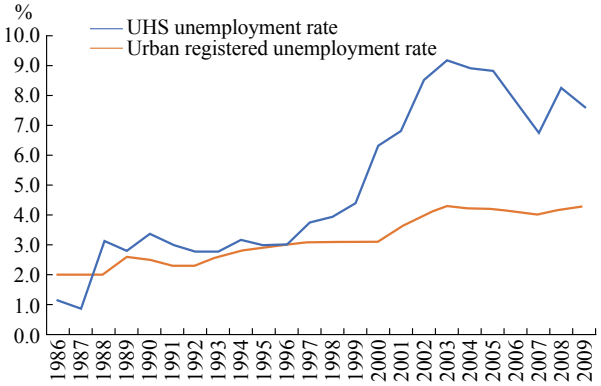

Figure 1: Urban Registered Unemployment Rate and UHS Unemployment Rate

Note: The UHS unemployment rate was drafted by authors based on the UHS data (1986-2009).
Source: NBS and UHS data (1986-2009), same as below.

The UHS unemployment rates of four provinces, namely Sichuan, Gansu, Shandong, and Jiangsu, are presented in Figure 2. As shown in Figure 2, the time series data for UHS unemployment rates display distinct variations within a given province across different years. Moreover, discernible disparities in UHS unemployment rates are evident among these provinces within the same year, and this phenomenon is also present in other provinces. The UHS unemployment rate displays both temporal and cross-sectional variations, which offer an opportunity to examine the long-term effects of initial workforce employment conditions.

Figure 3 shows that when the labor force is categorized into distinct groups based on length of work experience, individuals with less than five years of experience exhibit the highest unemployment rate, surpassing that of other cohorts by a wide margin[5]. Furthermore, the disparities in unemployment rates are smaller among groups with a work experience of more than five years, and fluctuations in these unemployment rates is considerably lower across years compared to those with less than five years of

[4] Their differences can be attributed to several reasons. Li and Deng (2004) discuss differences in the results of urban unemployment rate based on various estimation methods. Feng et al. (2017) believe that aggregation mistakes and the potential problem of data manipulation may exist in registered unemployment. Given the modest unemployment insurance replacement rate and inefficient job referrals by public employment service institutions, a registered unemployment record may dissuade a potential employer from recruiting the job applicant. These factors may demotivate the unemployed from registering for unemployment. Since the estimated result of the unemployment rate based on the household survey data may largely avoid such problems, the statistics bureau also began to publish the surveyed unemployment rate, which has drawn increasing attention in the analysis the economy in addition to the original registered unemployment rate.

[5] This trait aligns with the NBS's published survey on unemployment rates by age group. In the past few years, the unemployment rate in urban areas has been significantly higher for individuals aged 16 to 24 compared to those aged 25 to 59. Data for May and June 2022 indicate that the unemployment rate in urban areas was 18.2% and 18.4%, respectively.

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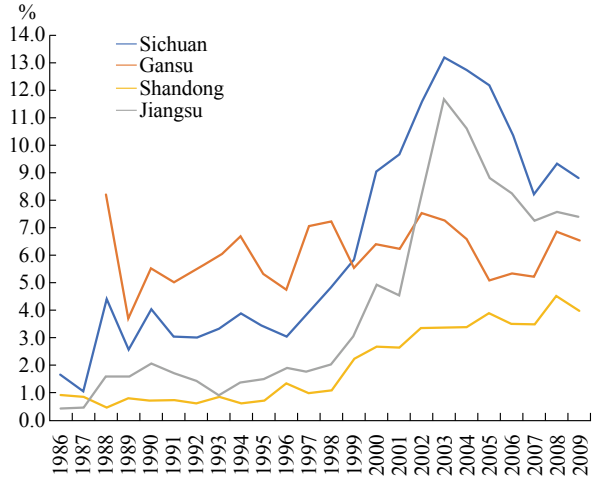

Figure 2: UHS Unemployment Rates in Sichuan, Gansu, Shandong, and Jiangsu

Note: The sample age for calculating unemployment rates is limited to 16 to 60 years for male and 16 to 55 years for female respondents.

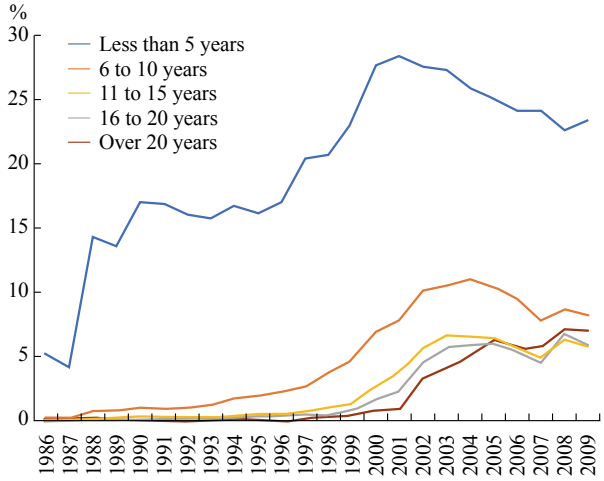

Figure 3: UHS Unemployment Rates of Cohorts with Different Work Experience

work experience despite possessing similar time-sequence attributes. This phenomenon means that job opportunities in China's labor market exhibit a pattern of "adjustment of the increment": Any rise or fall in job openings has a more palpable effect on the employment status of new entrants to the workforce.

3.2 Income Changes of Cohorts Entering the Labor Market during Different Periods of Time

Figure 4 presents an analysis of the income level changes among cohorts entering the labor market at various points in time as a function of their accumulated work experience. There is little difference in the income levels of new entrants to the labor market in their first year (when they have no work experience), but the gap widens in the first two years and then stabilizes thereafter. There is no convergence in the wage levels of cohorts who enter the labor market during different periods of time.

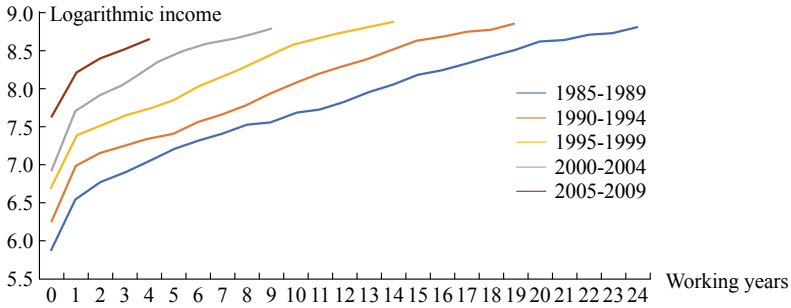

Figure 4: Income Variation for Labor Market Entrants during Different Periods of Time

3.3 Descriptive Statistics of Individual Characteristics

Table 1 displays the descriptive characteristics of the samples utilized in this study. Since this study focuses on the labor market performance of individuals at a microscopic level, the sample population is limited to working-age individuals. Specifically, male individuals between the ages of 16 and 60 and

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female individuals between the ages of 16 and 55 are included in the samples. Moreover, gender and educational attainment are also factors that differentiate individual traits.

This paper utilizes the annual urban consumer price index (CPI) in 1988 as the baseline for adjusting the income variable across various years. The male samples exhibit a higher annual income in comparison to the female samples. Individuals who have attained a college degree or higher exhibit a substantially higher income level compared to those who have completed high school education or below.

Upon labor market entry, the average unemployment rate within a province is about 3%. The data suggest that the unemployment rate among male individuals who are entering the labor market for the first time is comparatively lower than that of their female counterparts. Regarding educational attainment, individuals with college education and above tend to experience a higher initial unemployment rate compared to those with lower levels of education. One potential explanation is that those who are more educated may have commenced their participation in the workforce at a later stage in life relative to those with lower levels of education. Furthermore, the increase in college enrollment has resulted in a greater percentage of individuals with post-secondary education in the workforce at a higher age. The data depicted in Figure 1 indicates a general trend of rising urban unemployment rates.

Table 1: Descriptive Variable Statistics

Variable	Full sample	Male	Female	College and above	High school and below
Logarithm of annual income	8.193 (0.988)	8.351 (0.966)	8.046 (0.985)	8.637 (0.844)	7.917 (0.970)
Logarithm of wage income	8.138 (1.002)	8.280 (0.996)	8.006 (0.988)	8.606 (0.842)	7.822 (0.977)
Logarithm of operating income	8.232 (1.085)	8.425 (1.092)	8.018 (1.037)	8.527 (1.280)	8.188 (1.046)
Provincial unemployment rate in the initial year (%)	3.339 (2.817)	3.267 (2.771)	3.405 (2.856)	3.451 (2.884)	3.270 (2.772)
Male	0.480 (0.500)			0.523 (0.499)	0.453 (0.498)
Age	32.20 (7.446)	32.17 (7.265)	32.23 (7.608)	32.23 (5.765)	32.18 (8.315)
Work experience	10.02 (6.077)	10.28 (6.084)	9.785 (6.060)	10.51 (5.788)	9.722 (6.229)
College and above	0.381 (0.486)	0.416 (0.493)	0.350 (0.477)		
Sample size	277,248	133,052	144,196	105,756	171,492

Note: Annual income, wage income, and operating income have been adjusted by the CPI index with the base period of 1988. Sample age for calculating the unemployment rate is limited for the working-age population, 16 to 60 years for male and 16 to 55 years for female. Numbers presented in this table are the mean values of variables, and numbers in parentheses are the standard deviations.

The male samples constitute 48% of the overall sample size. Among individuals with college education and above, the proportion of male samples is 52.3%, which is seven percentage points greater than the proportion of those with high school education and below, which stands at 45.3%. With regards to the temporal scope examined in this paper, it is observed that male participants exhibit a higher degree of educational attainment in comparison to their female counterparts. The average age of the labor force in this study is 32 years, with no discernible differences between genders or levels of education.

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On average, the sample individuals possess a work experience of around 10 years. Specifically, male samples have 0.5 years more work experience than female samples, and those with a college degree or higher have 0.8 years more work experience than those with a high school degree or less. The proportion of individuals with a college education or higher in the overall workforce is 38%. Moreover, the percentage of males with such educational attainment is 6.6 percentage points greater than that of females.

Table 2 presents changes in the average values of the variables over the years. The dataset for 1986 and 1987 solely comprises the monthly standard wage, which is incompatible with the annual income of the samples in the following years. As such, we exclude these data from our regression analysis. From the mid to late-1990s, the Chinese government overhauled state-owned enterprises (SOEs) and subsequently enhanced social protection, which means that actual compensation was higher than wage income. This discrepancy stems from contributions to pension insurance and housing provident funds, both of which entail mandatory savings. Drawing from Li and Luo's (2007) methodology, we compute Wage Income II, which encompasses these two items of social security contributions. The adjustment is made as follows: Wage income (including personal and corporate deductions) + 2.5 × Individual contribution to the pension fund (individual coverage of 8% and corporate contribution of 20%) + Personal contribution to the housing provident fund (Shared between individuals and employers at the ratio of 1:1). Since employee contributions to the social security system did not begin until after 2002, the adjusted wage income in the samples span from that year to 2009.

Table 2: Annual Mean Values of Key Variables

	UHS unemployment rate (%)	Annual income (yuan)	Wage income (yuan)	Operating income (yuan)	Wage income II (yuan)
1986	1.13				
1987	0.87				
1988	3.13	971	776.5	62.38	
1989	2.79	1,007	859.7	17.62	
1990	3.36	1,153	1,012	10.24	
1991	3.00	1,325	1,163	18.01	
1992	2.79	1,456	1,403	11.86	
1993	2.79	1,634	1,588	11.93	
1994	3.18	1,870	1,814	13.38	
1995	2.98	2,031	1,974	12.91	
1996	3.01	2,126	2,068	11.66	
1997	3.75	2,328	2,258	13.68	
1998	3.93	2,551	2,467	16.93	
1999	4.40	2,884	2,781	21.72	
2000	6.32	3,175	2,958	126.3	
2001	6.81	3,520	3,263	152.5	
2002	8.53	3,890	3,487	295.8	3,779
2003	9.19	4,303	3,807	367.8	4,186
2004	8.93	5,059	4,505	401.5	4,997
2005	8.82	5,671	4,950	541.1	5,557
2006	7.83	6,384	5,571	602.8	6,308
2007	6.73	7,106	6,148	739.8	6,978
2008	8.27	7,897	6,826	851.6	7,786
2009	7.62	8,945	7,783	892.2	9,162

Note: Annual income is adjusted for the CPI index with the base period of 1988; Wage Income II includes social security contributions in addition to wage income, and social security contributions include individual and corporate contributions.
Source: Calculated based on USH data in relevant years.

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3.4 Estimation Model

This study focuses on the impact of initial labor market conditions on individual employability, as indicated by various metrics such as total annual income and annual wage income. However, the impact of initial labor market conditions on individual income is subject to variation based on changes in work experience. To account for this, we incorporate work experience and a multiplicative interaction term between work experience and unemployment rate in the initial year into the baseline model as specified below.

$$y_{ipt}=\beta_0+\beta_1 UR_{pt_{i0}}+\beta_2 Exp_{it}+\beta_3 UR_{pt_{i0}}*Exp_{it}+\Phi_t+\theta_p+\gamma_{t_{i0}}+\chi_i+UR_{pt}+n_{pt_{i0}}+u_{ipt} \quad (1)$$

In Equation (1), explained variable y_{ipt} represents the logarithmic values of individual annual income, wage income, and operating income in various provinces and years. Subscript i is the individual index, p is the province, and t is the year of survey. The calculation of annual income comprises various categories of income, such as wage income, other forms of income received by employees from their employer, income earned by employed individuals, income earned by employed or re-employed retirees, income earned by other workers, other forms of labor income, operating income, property income, and transfer income.

In this study, the core explanatory variable is the unemployment rate $UR_{pt_{i0}}$ in the province where an individual enters the labor force. The subscript t_{i0} indicates the year when individual i enters the workforce. Exp_{it} is the individual i's work experience in year t; Φ_t is the fixed effect of year; θ_p is the fixed effect of province; $\gamma_{t_{i0}}$ is the fixed effect of year of workforce entry; χ_i is individual-level control variables, including age, age squared, gender, and level of education. The provincial unemployment rate UR_{pt} for the current year is also included as a control variable to account for the macroeconomic environment.

To control for the labor supply-side effect, we include in the regression equation the number of college graduates $n_{pt_{i0}}$ at the provincial level in the initial year as a control variable (Brunner & Kuhn, 2014). Given the potential correlation between individuals in the same province and year, standard errors are clustered at the provincial and yearly levels. This paper is concerned with the coefficients β_1, β_2 and β_3. Among them, β_1 is the total income elasticity of the unemployment rate in the initial year when work experience is zero, and β_3 indicates how labor market conditions change with increasing work experience.

We also perform a regression analysis based on the work experience of samples, dividing full samples into five sub-samples according to their work experience: Zero to five years, six to ten years, 11 to 15 years, 16 to 20 years, and above 20 years. The subsample regression model is as follows:

$$y_{ipt}=\beta_0+\beta_1 UR_{pt_{i0}}+\Phi_t+\theta_p+\gamma_{t_{i0}}+\chi_i+UR_{pt}+n_{pt_{i0}}+u_{ipt} \quad (2)$$

In order to mitigate the endogeneity problem related to self-selection that may arise from the timing of labor market entry, we also utilize the unemployment rate for individuals who are 16 years of age as our core explanatory variable. This is based on the nine-year compulsory education system in China for children beginning at the age of seven. The initial model for the instrumental variable (IV) approach can be expressed as follows:

$$UR_{pt_{i0}}=\alpha_0+\alpha_1 UR_{pt_i16}+\Phi_t+\theta_p+\gamma_{t_{i0}}+\chi_i+UR_{pt}+n_{pt_{i0}}+\varepsilon_{pt_{i0}} \quad (3)$$

The issue of individual self-selection is addressed through the substitution of the primary explanatory variable. Specifically, in lieu of the unemployment rate in the base year, alternative indicators are utilized as substitutes, including the unemployment rate for persons aged 18, the mean unemployment rate for individuals aged 17 to 20, and the unemployment rate for those aged 16 (Arellano-Bover, 2020). We collect the numbers of secondary school and tertiary education students, overall population aged between 15 and 19, and overall population aged between 20 and 24, as

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documented in the *China Statistical Yearbook*, the *China Population Statistical Yearbook*, and provincial statistical yearbooks. The results are used to compute high school and college enrolment rates, which are introduced into the regression equation as control variables to address the issue of delayed labor market entry resulting from prolonged education.

In reference to Brunner and Kuhn's (2014) work, we conduct a regression analysis utilizing the unemployment rate at the prefectural city level as the core explanatory variable as a substitute of provincial unemployment rate in the robustness test section. The robustness test section includes a treatment that is conducted with regard to individual migration. The UHS data spanning from 2002 to 2009 is expected to reveal the first year of an individual's residency in the town. Using such data, we distinguish samples that did not migrate elsewhere, and perform a robustness test using such sub-samples to partially solve the problem of individual migration.

In the robustness test section, we introduce $\theta_p \cdot t$ into the model to control for the temporal trend related to province. This extended regression model is as follows:

$$y_{ipt}=\beta_0+\beta_1 UR_{pt_{i0}}+\beta_2 Exp_t+\beta_3 UR_{pt_{i0}}*Exp_t+\Phi_t+\theta_p+\theta_p \cdot t+\gamma_{t_{i0}}+\chi_i+UR_{pt}+n_{pt_{i0}}+u_{ipt} \quad (4)$$

The variables in Equations (2), (3), and (4) are defined the same as in Equation (1).

4. Empirical Results

4.1 Baseline Regression Results

Utilizing UHS data spanning from 1986 to 2009, we compute the unemployment rates of various provinces during relevant years and correlate them with the years of labor market entry for individuals. Subsequently, an Ordinary Least Squares (OLS) model is utilized to gauge the impact of initial labor market conditions on the employability of individuals. The logarithmic value of individual incomes in the surveyed year serves as the explained variable, and the unemployment rate at the time of an individual's entry into the workforce is considered the primary explanatory variable. The regression analysis also includes province, year of workforce entry, and year of survey data collection as fixed effects.

Our calculation of annual incomes encompasses individual contributions to pension insurance and housing provident fund, while excluding various social insurance contributions made by employers. As such, the personal wage income as the explained variable incorporates corporate contributions to pension insurance and housing provident fund, which are estimated based on UHS data after 2002 (logarithmic value of the adjusted Wage Income II).

In order to account for the long-term effects of initial labor market conditions, the full sample is stratified into distinct subgroups for the purposes of conducting a regression analysis. This process is expounded upon in columns (2) through (6) of Table 3. The findings presented in column (1) of Section (A) in Table 3 indicate that, when controlling for work experience, a one percentage point increase in the unemployment rate is associated with a two-percentage-point decrease in gross annual income. From a sample-specific perspective, it can be observed that the adverse effects of the initial labor market conditions on an individual's salary income during the first five years are smaller than the mean value. Specifically, a rise in the rate of unemployment by one percentage point will result in a corresponding decrease in annual income by only one percentage point. Individuals who possess work experience above 20 years still experience a negative impact on their annual incomes due to initial labor market conditions. Unfavorable labor market conditions at the outset can have a negative effect on an individual's employability, ultimately leading to a reduction in their income level over time.

Table 3 presents the impact of the unemployment rate during the initial year of labor market entry on the wage income, operating income, and wage income adjusted to account for social security contributions, as indicated in Sections (B), (C), and (D). Broadly speaking, a bad job market greatly

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reduces the wage incomes of individuals, but does not have a significant impact on their operating income. Unfavorable labor market conditions affect the overall income level primarily by reducing the employability - and thus wage income - of individuals.

The findings presented in Table 3 indicate that initial labor market conditions significantly reduce the wage income of individuals with work experience of no more than five years. Based on column (6) of Table 3, we see that the negative income effect may still be significant even for those with over 20 years of work experience, and the primary cause can be attributed to the distribution of samples across various years.

Individuals with more than 20 years of work experience began their career between the years 1986 and 1989, and their income information was recorded during the period of 2006 to 2009. When this cohort entered the workforce, China's labor market was not yet fully developed and governmental measures to address unemployment were insufficient. Therefore, the economic climate had a more significant influence on an individual's employability.

Individuals with over 20 years of work experience still suffered considerable shocks in their wage income and transfer income, however, resulting in a more substantial impact on their overall income, which can be split into wage income, operating income, property income, and transfer income. We expect this phenomenon is expected to manifest repeatedly in the regression analysis conducted on various subsamples stratified by work experience.

Table 3: Effects of Initial Labor Market Conditions on Individual Income

Section A	Explained variable: Logarithmic value of annual income					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Unemployment rate in the initial year	-0.020*** (0.005)	-0.010** (0.004)	-0.009 (0.006)	0.006 (0.005)	-0.003 (0.007)	-0.027*** (0.010)
Work experience (years)	0.035*** (0.003)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
Sample size	276,216	80,779	65,977	67,064	52,027	10,369
R^2	0.469	0.480	0.416	0.338	0.285	0.232
Section B	Explained variable: Logarithmic value of wage income					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Unemployment rate in the initial year	-0.018*** (0.005)	-0.008* (0.005)	-0.009 (0.006)	0.008 (0.006)	-0.007 (0.008)	-0.020* (0.011)
Work experience (years)	0.046*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
Sample size	256,012	76,906	61,362	61,825	46,731	9,188
R^2	0.490	0.498	0.426	0.354	0.304	0.256
Section C	Explained variable: Logarithmic value of operating income					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years

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Table 8 Continued

Unemployment rate in the initial year	-0.015 (0.016)	-0.012 (0.015)	-0.004 (0.015)	0.010 (0.019)	0.041 (0.034)	-0.075 (0.079)
Work experience (years)	0.017 (0.019)					
Unemployment rate in the initial year × Work experience (years)	0.002 (0.002)					
Sample size	21,331	4,523	5,145	5,597	5,074	992
R^2	0.224	0.253	0.212	0.191	0.172	0.212
Section D	Explained variable: Logarithmic value of adjusted Wage Income II					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5	6-10	11-15	16-20	20 years and above
Unemployment rate in the initial year	-0.017*** (0.005)	-0.006 (0.004)	-0.012** (0.006)	0.015** (0.007)	-0.002 (0.008)	-0.002 (0.011)
Work experience (years)	0.047*** (0.003)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
Sample size	188,349	37,424	39,844	53,501	48,025	9,555
R^2	0.316	0.330	0.318	0.297	0.276	0.212

Note: Regression analysis conducted in column (1) incorporates both work experience and the interaction between the unemployment rate in the initial year and work experience. All regressions have controlled for the fixed effects of cohort, province, and year, in addition to the variable of individual characteristics. ***, **, and * indicate statistical significance levels at the 1%, 5%, and 10%, respectively. In addition, the numbers presented in parentheses correspond to robust standard errors that have been clustered at the level of province and year. Same as below.

4.2 Heterogeneity Analysis

4.2.1 Differences in the level of education

We also categorized the cohorts into four distinct groups to analyze the impact of initial market conditions on individuals with varying levels of education. These groups include individuals with college educations or higher, those with junior college or technical secondary school educations, those with high school educations, and those with junior middle school educations or below. The regression results are presented in Table 4. Column (1) displays the regression results for the entire sample, and column (2) presents the results for those with college educations or higher as the baseline group. Column (2) also includes the interaction term between the unemployment rate in the initial year and the other levels of education variables.

The sample-specific regression results for those with a college degree or higher, a junior college or technical secondary school diploma, a high school diploma, or a junior middle school diploma or less are shown in columns (3), (4), (5), and (6), respectively. The sample-specific results have coefficients that are comparable to the full sample baseline regression results, showing that the effects of the initial labor market conditions were generally similar for people with various levels of education. The results from the two kinds of heterogeneity analysis are also largely consistent when comparing the interaction regression results in column (2) and the sample-specific regression results in the following four columns. Notably, for individuals with junior middle school or lower educational attainment, the influence coefficient of initial labor market circumstances is lower than in the baseline regression.

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Table 4: Effects of Initial Labor Market Conditions on Individual Annual Income (by the level of education)

	(1)	(2)	(3)	(4)	(5)	(6)
	Full samples	Full samples	College and above	Junior college and technical secondary school diploma	High school	Junior middle school and below
	Explained variable: Logarithmic value of annual income					
Unemployment rate in the initial year	-0.021*** (0.005)	-0.018*** (0.006)	-0.022*** (0.005)	-0.019** (0.008)	-0.022*** (0.006)	-0.017*** (0.006)
Junior college and technical secondary school diploma		-0.178*** (0.023)				
High school		-0.375*** (0.031)				
Junior middle school and below		-0.468*** (0.048)				
Junior college and technical secondary school × Unemployment rate in the initial year		-0.007* (0.004)				
High school × Unemployment rate in the initial year		-0.003 (0.006)				
Junior middle school and below × Unemployment rate in the initial year		0.002 (0.007)				
Work experience (years)	0.035*** (0.003)	0.037*** (0.003)	0.026*** (0.004)	0.040*** (0.004)	0.039*** (0.004)	0.014*** (0.004)
Unemployment rate in the initial year × Work experience (year)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.002** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Sample size	276,021	276,021	42,257	75,442	96,911	61,411
R^2	0.468	0.474	0.515	0.463	0.380	0.363

Note: In column (2), the baseline group for regression is individuals with a college degree or higher. All regressions incorporate work experience and the interaction term between the unemployment rate in the initial year and work experience. Also, the variable of education length is used to control for the level of individual education. All regressions have controlled for the fixed effects of cohort, province, and year, as well as individual characteristics.

4.2.2 Gender differences

The current body of literature does not adequately account for gender differences. Previous research has focused solely on the male workforce due to the complex nature of female labor supply, as noted by Oreopoulos et al. (2012) and Brunner and Kuhn (2014). In addition, studies conducted by Schwandt and Wachter (2019) and Yagan (2019) have revealed that there is no discernible heterogeneity in the career impact between male and female workforce.

This section therefore aims to examine the potential gender-based disparities that may arise between male and female employees. Specifically, it explores the gender-specific differences in the impact of labor market conditions on individual employability. Regression results are shown in Table 5. Column (2) of Table 5 presents a baseline regression with an interaction term between unemployment rate in the initial year and the variable of male workers, and columns (3) and (4) present sample-specific regressions for male and female groups. Based on the estimated coefficients, adverse labor market conditions at the outset have comparable effects on the incomes of male and female workers. Specifically, a rise in the initial rate of unemployment by one percentage point corresponds to an average annual income reduction of two percentage points.

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Table 5: Effects of Initial Labor Market Conditions on Individual Annual Income (gender-specific)

	(1)	(2)	(3)	(4)
	Full samples	Full samples	Male	Female
	Explained variable: Logarithmic value of annual income			
Unemployment rate in the initial year	-0.020*** (0.005)	-0.017*** (0.005)	-0.019*** (0.005)	-0.020*** (0.007)
Male	0.240*** (0.026)	0.262*** (0.035)		
Male workers × Unemployment rate in the initial year		-0.006 (0.004)		
Work experience (years)	0.035*** (0.003)	0.035*** (0.003)	0.036*** (0.003)	0.032*** (0.004)
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.003*** (0.001)
Sample size	276,021	276,021	132,833	143,188
R^2	0.469	0.469	0.509	0.421

Note: All regressions have controlled for the fixed effects of cohort, province and year, as well as the variable of individual characteristics. All regressions have incorporated work experience and the interaction term between unemployment rate in the initial year and work experience.

4.3 Robustness Tests

4.3.1 Use of unemployment rate at the level of prefectural cities as the explanatory variable

Referencing Brunner and Kuhn (2014), we now consider conducting a regression analysis with the unemployment rate at the level of prefectural cities to substitute for the unemployment rate at the provincial level as the core explanatory variable[6]. Similar to the baseline regression results, Table 6 presents the regression results with the unemployment rate at the level of prefectural cities as the explanatory variable. For individuals with no prior work experience, a one-percentage-point increase in the unemployment rate in the first year of workforce entry is associated with a two-percentage-point decrease in their annual income. During the first five years after entering the workforce, each percentage point increase in the unemployment rate corresponds to a one percentage point decrease in an individual's annual income. When the duration of employment exceeds 20 years, the annual income of individuals continues to be affected by the unemployment rate in the first year: Annual income decreases by 2.7 percentage points for every percentage point increase in the unemployment rate.

Table 6: Effects of Initial Labor Market Conditions on Individual Annual Income (unemployment rate in prefectural cities)

	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years
	Explained variable: Logarithmic value of annual income					
Unemployment rate in the initial year	-0.020*** (0.005)	-0.010** (0.004)	-0.009 (0.006)	0.006 (0.005)	-0.003 (0.007)	-0.027*** (0.010)
Work experience (years)	0.035*** (0.003)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
Sample size	276,021	80,758	65,946	67,010	51,966	10,341
R^2	0.469	0.480	0.416	0.338	0.285	0.231

Note: Regression in column (1) includes work experience and the interaction term between unemployment rate in the initial year and work experience.

[6] We use the location of the individual in the surveyed year as a substitute for the location of the individual's entry into the labor market in the initial year. As a result, our primary regression results adopt the provincial unemployment rate to compensate (partially) for measurement error in the locations of individuals.

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4.3.2 Limiting samples to non-migratory individuals

Migration of samples is the source of the endogeneity problem in research on the effects of initial labor market conditions. Individuals' decision to migrate in order to escape a bad job market may cause a bias in the estimated coefficient[7]. Since 2002, urban household survey questionnaires have included inquiries such as "When did you move to this city/town?" We identify non-migratory samples based on the responses to this query. If the "year of employment commencement" is greater than the "year of settlement in the city/town", the individual is deemed not to have migrated upon employment commencement. Comparing the regression coefficients of non-migratory samples to those of full samples reveals that the regression coefficients of non-migratory samples are comparable to those of full sample results (Table 7). Each percentage point increase in the unemployment rate is associated with a decrease in annual income ranging from 0.7 to 2.7 percentage points.

Table 7: Effects of Initial Labor Market Conditions on Individual Annual Incomes (non-migratory samples)

Section A	Full samples (2002-2009)					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years
	Explained variable: Logarithmic value of annual income					
Unemployment rate in the initial year	-0.017*** (0.005)	-0.007* (0.004)	-0.014* (0.008)	0.010** (0.005)	-0.003 (0.007)	-0.027*** (0.010)
Work experience (years)	0.036*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.000)					
Sample size	203,584	40,192	43,532	57,553	51,966	10,341
R^2	0.311	0.297	0.305	0.301	0.285	0.231
Section B	Non-migratory samples (2002-2009)					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years
	Explained variable: Logarithmic value of annual income					
Unemployment rate in the initial year	-0.013** (0.006)	-0.008* (0.004)	-0.012 (0.008)	0.010* (0.005)	-0.002 (0.007)	-0.014 (0.012)
Work experience (years)	0.039*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.001*** (0.001)					
Sample size	156,038	37,840	34,364	40,920	36,003	6,911
R^2	0.299	0.294	0.292	0.286	0.277	0.212

Note: Regression in column (1) includes work experience and the interaction term between unemployment rate in the initial year and work experience, same as the rest.

[7] We have also demonstrated with other test methods that migration has a modest impact on our conclusions. First, migrant population accounts for a small share in the demographic structure based on the classification of individuals into the four categories of household registration (*hukou*), which indicates that labor migration is not the primary question under the research framework of this paper. Second, we consider employing provincial panel data to directly evaluate the effects of unemployment rate on migration rate. After gathering each province's population inflow from the *China Demographic Statistics Yearbook*, we perform a regression analysis of unemployment rates, which have no statistically significant impact on population inflow. Third, provincial population inflow calculated with UHS data is incorporated as a control variable into the main regression equation to directly control for the impact of migration. Due to space constraints, the above test results are not included in this report.

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4.3.3 Control for province-related temporal trend

By introducing the interaction term between province and temporal trend into the regression equation, we also control for the province-related temporal trend. In column (1) of Table 8, the results of the baseline regression equation are displayed. A one-percentage-point increase in the unemployment rate is associated with a 2.3-percentage-point decrease in individual annual income, which is consistent with the results of the baseline regression. After controlling for the province-related temporal trend, however, the negative impact of initial labor market conditions decreases sharply and becomes statistically insignificant for subsamples with no more than five years of work experience. This is likely due to the province-related temporal trend, such as the level of economic development in a province, which has neutralized the effect of initial labor market conditions.

Table 8: Impact of Initial Labor Market Conditions on Individual Annual Income (controlling for province-related temporal trend)

	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20
	Explained variable: Logarithmic value of annual income					
Unemployment rate in the initial year	-0.023*** (0.005)	-0.003 (0.003)	-0.005 (0.005)	0.008 (0.005)	0.003 (0.007)	-0.025*** (0.005)
Work experience (years)	0.034*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.003*** (0.001)					
Sample size	276,021	80,758	65,946	67,010	51,966	10,341
R^2	0.472	0.485	0.420	0.341	0.287	0.233

4.3.4 Replacement of explanatory variable

In order to address the endogeneity problem that arises from the self-selection bias of individuals in choosing the year to commence their first job, we substitute the unemployment rate in the initial year with the annual mean unemployment rates of individuals aged 18, between 17 and 20, and 16[8] as the explanatory variable in the regression equation (Arellano-Bover, 2020).

According to the estimated results in Section A of Table 9, the initial labor market conditions (as measured by the annual unemployment rate for 18-year-olds) affect individual employability by about 1.6%, which is comparable to the baseline regression result. According to the estimated results in Section B of Table 9, the estimated coefficient with the annual mean unemployment rate as the explanatory variable for individuals aged 17 to 20 is slightly greater than the baseline regression result, indicating that delaying graduation may mitigate the negative effect of initial labor market conditions. The estimated results in Table 9 Section C are comparable to those in Section A. Each percentage point increase in the unemployment rate for individuals aged 16 will result in a 1.5-percentage-point decrease in their annual income.

[8] The selection of the unemployment rate for 16-year-olds is predicated on the assumption that children begin attending school at age seven and receive a nine-year compulsory education. The age of 16 marks the conclusion of compulsory education. According to China's laws, individuals aged 16 and older may legally seek employment.

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Table 9: Impact of Initial Labor Market Conditions in the Annual Income of Individuals (replaced explanatory variable)

	Explained variable: Logarithmic value of annual income					
Section A	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Annual mean unemployment rate for individuals aged 18	-0.005 (0.004)	-0.016*** (0.005)	-0.002 (0.006)	-0.002 (0.003)	-0.003 (0.006)	-0.028* (0.016)
Work experience (years)	0.050*** (0.004)					
Unemployment rate for individuals aged 18 × Work experience (years)	0.000 (0.000)					
Sample size	208,357	67,752	53,837	51,600	30,897	4,271
R^2	0.468	0.492	0.406	0.319	0.248	0.177
	Explained variable: Logarithmic value of annual income					
Section B	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Annual mean unemployment rate for individuals aged 17 to 20	-0.004 (0.006)	-0.024*** (0.006)	-0.002 (0.009)	0.010 (0.009)	-0.014 (0.016)	-0.057 (0.055)
Work experience (years)	0.049*** (0.005)					
Unemployment rate for individuals aged 17 to 20 × Work experience (years)	0.001 (0.001)					
Sample size	186,920	64,342	50,775	45,893	23,478	2,432
R^2	0.465	0.490	0.402	0.307	0.235	0.167
	Explained variable: Logarithmic value of annual income					
Section C	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Annual mean unemployment rate for individuals aged 16	-0.003 (0.004)	-0.015*** (0.005)	0.003 (0.006)	-0.007 (0.005)	-0.009 (0.012)	-0.041 (0.052)
Work experience (years)	0.055*** (0.005)					
Unemployment rate for individuals aged 16 × Work experience (years)	0.000 (0.001)					
Sample size	166,502	60,973	47,355	40,037	17,124	1,013
R^2	0.461	0.483	0.395	0.300	0.222	0.170

Note: Regression in column (1) includes work experience and the interaction term between unemployment rate and work experience.

4.3.5 Use of unemployment rate for 16-year-olds as the proxy variable of unemployment rate in the initial year

Given the endogeneity problem in the individual decision on when to enter the labor market, we conduct a two-stage semiparametric least squares (2SLS) analysis using the 16-year-old unemployment rate as the instrumental variable for the initial unemployment rate. The cessation of compulsory education at age 16 is exogenous. In addition, first-stage regression results indicate a significant correlation between the unemployment rate for 16-year-olds and the overall unemployment rate in the initial year. As a result, we select the 16-year-old unemployment rate as the instrumental variable for the unemployment rate in the initial year. In the regression results for full samples, the first-stage F value is greater than 10, indicating that the problem of a weak instrumental variable is nonexistent. In addition, unemployment

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rate in the initial year has a significantly negative effect on annual incomes. Full sample regression results are comparable to baseline regression results: A one-percentage-point increase in the unemployment rate will result in a two-percentage-point decline in annual income. For individuals with no more than five years of work experience, there is a sharp increase in the estimated coefficient of unemployment rate in the initial year.

Table 10: Impact of Initial Labor Market Conditions on Individual Annual Income (with unemployment rate for 16-year-olds as the instrumental variable)

	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Second-stage regression results						
Unemployment rate in the initial year	-0.020* (0.012)	-0.146*** (0.022)	0.038 (0.037)	0.135* (0.072)	0.133 (0.096)	-0.457 (0.446)
Work experience (years)	0.042*** (0.006)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
First-stage instrumental variable regression						
Unemployment rate for 16-year-olds	0.127*** (0.002)	0.100*** (0.004)	0.085*** (0.005)	-0.049*** (0.004)	-0.068*** (0.007)	0.062 (0.060)
F value (first-stage)	4143	641.7	325.7	165.6	98.59	1.059
Sample size	166502	60,973	47,355	40,037	17,124	1,013
R^2	0.462	0.450	0.391	0.288	0.206	0.052

4.3.6 Control for change in educational enrolment rate in various years and stages

When labor market conditions are unfavorable, another possibility is that individuals will opt to further their education. Using the *China Statistics Yearbook* and *China Population Statistics Yearbook*, we gather data on the total number of high school students, college students, 15- to 19-year-olds, and 20- to 24-year-olds in each province in order to examine the impact of extended education. Then, we calculate high school and college enrollment rates and introduce a control variable in the form of a baseline regression equation. The high school enrollment rate is calculated by dividing the number of high school students by the total population of 20- to 24-year-olds. As evidenced by regression results in Table 11, the impact of initial labor market conditions for full samples is comparable to the results of the baseline regression: a one-percentage-point economic disruption will reduce individual annual income by 2.1 percentage points. Nonetheless, the statistical significance of subsample results is relatively poor, as is their economic importance.

Table 11: Impact of Initial Labor Market Conditions on Individual Annual Income (with inclusion of high school and college enrolment rates in the initial year)

	Explained variable: Logarithmic value of annual income					
	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Over 20 years
Unemployment rate in the initial year	-0.021*** (0.006)	-0.004 (0.005)	-0.006 (0.006)	0.006 (0.007)	-0.007 (0.006)	0.003 (0.011)
Work experience (years)	0.038*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.002*** (0.001)					
Sample size	205,953	60,224	49,927	51,387	37,452	6,963
R^2	0.473	0.488	0.412	0.337	0.278	0.242

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4.4 Impact of Initial Labor Market Conditions on Individual Unemployment

In regards to an individual's employability, we also consider the extensive margin and not just the intensive margin. In other words, a bad job market has an impact on individual employment. Following the methodology of Feng et al. (2017), we construct a variable indicating a person's status of unemployment and use it as the explanatory variable to examine how adverse labor market conditions will impact unemployment. The "employment status" variable in UHS data may reveal the employee status of individuals[9]; therefore, we construct a dummy variable of whether a person is an employee and use it as the explained variable in a regression of the unemployment rate in the initial year.

As shown in the regression results in Table 12, initial labor market conditions have no significant effect on whether an individual is unemployed, but a significantly negative effect on whether an individual is an employee in the full sample. Nevertheless, the economic significance is limited. Consequently, the impact of initial labor market conditions in terms of individual economic losses, including annual income, wage income, and property income, as discussed in this paper, should be the primary focus of attention. We can only analyze the impact of initial labor market conditions on an individual's employability during the survey years due to the lack of information regarding a person's entire career.

Table 12: Impact of Initial Labor Market Conditions on Individual Unemployment

	Explained variable: Whether an individual was unemployed (Yes=1)					
Section A	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years
Unemployment rate in the initial year	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.003 (0.005)
Work experience (years)	0.001 (0.001)					
Unemployment rate in the initial year × Work experience (years)	0.000 (0.000)					
Sample size	278,106	81,345	66,595	67,768	52,166	10,232
R^2	0.032	0.035	0.033	0.035	0.035	0.035
	Explained variable: Whether an individual was an employee (Yes=1)					
Section B	(1)	(2)	(3)	(4)	(5)	(6)
Work experience (years)	Full samples	0-5 years	6-10 years	11-15 years	16-20 years	Above 20 years
Unemployment rate in the initial year	-0.008* (0.005)	-0.005 (0.005)	-0.004 (0.003)	0.001 (0.003)	-0.005 (0.005)	-0.000 (0.007)
Work experience (years)	0.013*** (0.004)					
Unemployment rate in the initial year × Work experience (years)	0.001** (0.000)					
Sample size	262,850	69,497	65,671	66,578	51,092	10,012
R^2	0.241	0.317	0.267	0.202	0.183	0.189

5. Labor Market Matching Efficiency and Structural Transition

5.1 Matching Efficiency

The employability impact of initial labor market conditions may be contingent on the efficiency

[9] In UHS data, individuals are designated as "employees" if they (1) are employed by an entity of public ownership; (2) are employed by an entity of collective ownership; or (3) are employed by an entity of other types of ownership. Non-employees include other workers and unemployed persons. Here, the regression does not include non-participants in the labor market.

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of market matching. If labor market matching is inefficient, initial labor market conditions may have a greater impact. The reason for this is that workers can become trapped in an unfavorable employment environment from the start, making career advancement more difficult. The majority of discussions on the efficiency of labor market matching are intuitive rather than quantitative and based on empirical evidence. We therefore develop a matching efficiency metric based on the number of vacancies (V), registered job applicants (U), and successful referrals (M) from the *China Labor Statistics Yearbook* for the relevant years. If the job-seeking process is frictionless, the number of successfully matched job-seekers should be min (U, V), and the M/min (U, V) ratio can thus be calculated to reflect the difference between the number of successfully matched jobseekers and the maximum number of job matches in a frictionless market. The frictional factor utilized in this paper is the inverse indicator of the above ratio, 1-M/min (U, V). The higher the value, the larger the losses caused by the market friction factor; if this ratio is zero, market matching is frictionless.

Table 13 presents the pertinent regression results. Columns (1) and (2) are the regression results for samples with a high level of education, and columns (3) and (4) are the regression results for samples with a lower level of education. The introduction of the labor market friction factor reduced the negative impact of initial market conditions on less-educated samples, but the impact on highly educated samples is negligible. When the friction factor is zero, the absolute value of the negative impact of initial labor market conditions on an individual's annual income ranges from 0.8% to 2.8%, and the direction of the interaction term's coefficient varies across samples with different levels of education. Consequently, there is heterogeneity in the negative impact of initially unfavorable labor market conditions on samples with varying levels of education. An increase in the friction factor reduces the impact of initial labor market conditions on highly educated individuals but exacerbates the impact on individuals with less education. The reason for this is that switching employers is a common method for individuals to leave a bad job (Oreopoulos et al., 2012). Greater labor market friction makes it more difficult for individuals with mediocre and replaceable skills and less education to switch employment.

Table 13: Impact of Matching Efficiency on Initial Labor Market Conditions

	(1)	(2)	(3)	(4)
Level of education	College and above (including junior college)		High school and below (including technical secondary schools)	
	Explained variable: Absolute value of annual income			
Unemployment rate in the initial year	-0.021*** (0.003)	-0.028*** (0.005)	-0.014*** (0.003)	-0.008* (0.004)
Frictional factor	0.047 (0.044)	-0.043 (0.063)	0.143*** (0.041)	0.242*** (0.062)
Unemployment rate in the initial year × Frictional factor		0.018** (0.009)		-0.018** (0.009)
Sample size	40,985	40,985	50,948	50,948
R^2	0.343	0.343	0.265	0.265

5.2 Structural Transition

To reflect the impact of structural economic changes on the labor market, we create the following index based on the change in the industrial structure of employment in consecutive years: $\sqrt{\sum_{j=1}^{J}\left(\frac{e_{j,t}}{E_t}-\frac{e_{j,t-1}}{E_{t-1}}\right)^2}$, where E_t and E_{t-1} represent total employment in year t and $t-1$, and $e_{j,t}$ and $e_{j,t-1}$ represent the number of employment in sector j in years t and $t-1$. The transformation in industrial

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structure in China occurred between 1996 and 2016, and our index reflects the industrial shift with respect to the structure of employment. Table 14 shows the results when using change in the employment structure as one of the initial labor market conditions to control for the effect of structural transition when estimating the initial unemployment rate. The regression results after accounting for the structure of the factors are shown in Table 14. As shown in columns (1) and (3), there is little change in the regression coefficient after the structural factor is taken into account on the impact of initial labor market conditions. We can also see that the structural variable has a positive impact on the logarithmic value of individual annual income for both highly educated and less educated samples, but its statistical significance is weak.

As indicated by the estimated results in column (2), employment structure change increases the incomes of more-educated workers, who benefit more from structural change due to their higher human capital and skills. Nonetheless, even after controlling for structural transition, the unemployment rate in the initial year has an effect on the labor market. According to the estimated result of the interaction term between unemployment rate in the initial year and structural transition, the negative impact of initial labor market conditions may be compounded by structural transition. Interestingly, structural change in the labor market has no significant effect on those with less education.

Table 14: Influence of Structural Change on the Average Effect of Initial Labor Market Conditions

	(1)	(2)	(3)	(4)
Level of education	College and above (including junior college)		High school and below (including technical secondary school)	
	Explained variable: Logarithmic value of annual income			
Unemployment rate in the initial year	-0.020*** (0.003)	-0.014*** (0.004)	-0.015*** (0.003)	-0.014*** (0.004)
Structural factor	0.572 (0.354)	2.592*** (0.649)	0.176 (0.354)	0.459 (0.623)
Unemployment rate in the initial year × Structural factor		-0.401*** (0.108)		-0.057 (0.103)
Sample size	40,985	40,985	50,948	50,948
R^2	0.343	0.343	0.265	0.265

6. Conclusions and Policy Suggestions

Initial labor market conditions have a significant impact on an individual's employability. Our conclusion regarding the employability impact of initial labor market conditions based on the Urban Household Survey (UHS) data from 1986 to 2009 is generally consistent with the findings of the existing research literature, though more comprehensive in scope. After controlling for the fixed effects of province and survey year, initial market conditions still had a negative impact on the annual income of individuals. A one-percentage-point increase in unemployment rate in the initial year resulted in a 0.8 to 2.7 percentage points decline in individual income (annual income or wage income), and such a negative impact may last for five years before dissipating between the fifth and tenth year after the start of employment.

Our heterogeneity analysis distinguished individuals by their level of education and gender. Here, the sample was divided into various categories based on education level: College graduates and above, junior college and technical secondary school, high school, and junior middle school and below. Our regression results indicate that there is no significant difference in the impact of initial labor market conditions on individual employability across samples with different levels of education, and that

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the influence coefficient of a bad job market remained stable. A one-percentage-point increase in the unemployment rate in the initial year reduces individual annual income by about two percentage points. Moreover, according to the results of our gender heterogeneity analysis, there is no significant difference between male and female subsamples with respect to the impact of initial labor market conditions.

Next, to solve the self-selection problem, our robustness test controlled for province-related temporal trends, individual decisions to migrate, and changes in school enrollment rates at various stages and across different years. This test also replaced various explanatory variables and adopted the annual unemployment rate for 16-year-olds as the instrumental variable for unemployment rate in the initial year. The results of the robustness test were consistent with the results of the baseline regression.

We also discussed the effect of the unemployment rate in the initial year on an individual's employability, and regression results indicated that the initial unemployment rate had no significant effect on an individual's future unemployment status. In an analysis of the full sample, the unemployment rate in the initial year has had a negative impact on whether an individual is an employee, but its economic significance was limited. In other words, the unemployment rate in the initial year has a negative effect primarily on individual income levels.

After incorporating the variables of matching efficiency and structural transition, the impact of initial labor market conditions remained significant and varied among those with different levels of education. The effects of the frictional factor on initial labor market conditions were heterogeneous. An increase in the frictional factor mitigates the impact of initial adverse conditions for individuals with a higher level of education but exacerbates the impact for those with a lower level of education. The impact of adverse labor market conditions is also worsened by structural change for individuals with varying levels of education but not statistically significantly for those with less education. In the context of labor market disruptions, matching efficiency and structural change are therefore not the primary determinants of an individual's employability. It will take more research to unravel the mechanism by which initial labor market conditions affect individual employability.

In summary, our findings indicate that adverse initial labor market conditions significantly reduce the income level of individuals during the first five years of their career. We thus think it is likely that an "unfortunate generation" will bear the brunt of this negative effect in the context of an economic recession induced by COVID-19. In April and May of 2022, the urban surveyed unemployment rates for 16- to 24-year-olds were 18.2% and 18.4%, respectively[10]. Our message is that new labor market entrants face a dire employment situation and that policymakers should prioritize mitigating the long-term effects of the current economic climate on their employability. In addition, the government should increase labor market competitiveness and flexibility in order to reduce barriers for workers to change jobs. Based on our results, we expect these measures to mitigate the "lock-up" effect that may result from unfavorable initial conditions.

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