

The Impact of COVID-19 Pandemic on Chinese Labor Market: A Case Study of Unemployment Rate

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Abstract: This study aims to examine the impact of the COVID-19 pandemic on the Chinese labor market, with a focus on unemployment rates. This research provides a relatively comprehensive analysis of how different factors influence employment, such as different age groups, industries, and the duration of first-level emergency response. The study uses the data from the National Bureau of Statistics of China, covering the period from 2018 to 2022, and includes a regression model to assess the correlation between the duration of first-level emergency response measures and unemployment rates. The findings reveal that while emergency measures were essential for controlling the virus, their impact on unemployment was minimal. This study offers crucial insights for policymakers to make more former decisions when facing an epidemic to minimize negative effects on the unemployment rate.

Keywords: COVID-19 pandemic, Chinese labor market, Unemployment rate, Epidemic policy

1. Introduction

Since its outbreak at the end of 2019, COVID-19 quickly became a global public health crisis, profoundly affecting the global economy and society. China, as one of the initial epicenters, implemented a series of strict epidemic prevention measures, including but not limited to nationwide lockdowns, restrictions on movement, and mass testing. While these measures effectively controlled the spread of the virus, they also had a significant impact on the labor market, particularly in terms of employment rates.

There are sufficient existing studies analyzing the impact of COVID-19 on the labor market from different perspectives. Most of the studies focus on the impact caused by only the epidemic itself on the labor market. There is a lack of specific analysis about the impact directly caused by the prevention policies—for example, lockdown. Especially there is a lack of comparison on the impact of these two factors. This comparative study is crucial for future policy-making in response to similar public health events. The lack of a separate analysis of policy effects on the labor market makes it difficult for us to accurately assess the specific impact of different epidemic prevention acts on the labor market.

This study aims to fill this gap by systematically comparing and analyzing the data and studies about the comparison between the direct influence caused by prevention policies and the spread of

the virus on the Chinese labor market, especially employment rates. Through investigating detailed data analysis of different regions and time periods, this study will evaluate which prevention policy has the least negative impact on the unemployment rate while controlling the epidemic.

The results of this study will provide important decision support for policymakers, assisting them in formulating policies that can effectively control the epidemic and also minimize the impact on the labor market when facing similar public health crises in the future. In addition, this study will also assist policy makers in evaluating the effectiveness of implemented pandemic prevention policies and providing a basis for adjusting and optimizing current and future policy measures as well.

By distinguishing and analyzing the impact of epidemic prevention policies and the virus itself on the labor market, this study will provide new theoretical and empirical evidence for the fields of labor economics and public health policies. The results of this study will enrich our understanding of the economic impact of public health crises and provide a new approach to evaluating policy effectiveness.

The structure of this paper is as follows: First, we present a comprehensive Literature Review, summarizing the existing research on the impact of the pandemic on labor markets. Next, the Methodology section describes the data sources and analytical methods used in this study. Following that, the Data Analysis section offers an in-depth look at the findings from the Chinese labor market. Finally, the Conclusion summarizes the key insights and policy implications and offers suggestions for further research.

2. Literature review

Chen mentions that the pandemic led to a decline in labor participation rates, and although unemployment rates in Japan and South Korea initially rose, they showed a downward trend later on [1]. Alon et al. concluded that more women than men are directly affected by layoffs during the COVID-19 pandemic [2]. Dai observed that unemployment rates rose in countries such as the USA, Canada, and Australia, though measures to raise unemployment standards in the EU and the USA paradoxically reduced unemployment rates [3]. Ahmad et al. analyzed that lockdown measures and health concerns caused workers to exit the market, leading to higher unemployment rates, and predicted that countries like France and Spain would see future increases in unemployment rates, needing at least five years to overcome the economic impacts of the pandemic [4]. Carmen et al. analyzed that different areas were affected differently by the epidemic [5]. Chairassamee et al. analyzed the COVID-19 pandemic had greatly affected the labor market in India and increased the unemployment rate significantly, especially in the service industry [6]. Birinci et al. emphasized that tackling unemployment requires strengthening social security and employment services, supporting the digital economy and the digitalization of the labor market while also promoting educational equity and skill training to bridge the digital divide and ensure that everyone benefits from the outcomes of the digital economy [7]. Javed suggested that the lockdown situation would give rise to vulnerable employment, and layoffs in every province of Pakistan were expected [8].

However, concluded from Akhtar et al., literature analyzing the impact of pandemic policies on labor markets often overlooks the distinction between the direct effects of the virus and the effects of policies [9]. This is particularly the case in China, a country with a unique political system and a large population, where the impact of the pandemic and its containment measures on the labor market is especially complex. Connected with the words by Sabrina et al. current literature often lacks in-depth analysis of the pandemic's impact under China's national conditions and seldom investigates the independent effects of pandemic policies [10].

The operation mechanisms of China's labor market significantly differ from those of other countries. For example, the Chinese government's rapid and extensive lockdown measures and travel restrictions during the pandemic had immediate and profound effects on the labor market. Therefore,

analyzing the independent effects of these policies is crucial for understanding their specific impact on the labor market.

3. Methodology

3.1. Data sources and variables

Based on the data availability, the data used in this study is sourced from the National Bureau of Statistics of China and relevant public health institutions, covering the period from 2018 to 2022. The statistics, including yearly and monthly records in 31 major provinces and cities, are aggregated for analysis and comparison. The upper one is used for statistical analysis, and the former is connected with the independent and dependent values, which are used in the regression model.

Independent variable: Duration of Level 1 Emergency Response in *31 major provinces and cities, which refers to the number of days the government implemented Level 1 emergency measures during the pandemic. This variable reflects the severity and duration of the emergency response.

Dependent variable: Unemployment Rate during the time in the same 31 major areas, which represents the overall and the average unemployment rate in the Chinese labor market during the study period.

3.2. Regression model

Linear regression analysis is conducted using statistical software in an Excel table. Based on the regression analysis results, to evaluate the correlation between the duration of level 1 emergency response and unemployment rate. (Both independent and dependent variables is data in 31 major provinces and cities¹—collected the average value). The significance of the regression coefficients was evaluated. The data and the results are assessed by using P-value and R square to estimate the correlation between the independent variable duration of Level 1 Emergency Response in 31 major areas and the Unemployment Rate during the time in the same 31 major areas.

To analyze the correlation between the duration of Level 1 emergency response and the unemployment rate, a linear regression model is employed in this study. The basic form of the linear regression model is:

$$unemployment = \beta_0 + \beta_1 \times duration + \epsilon \quad (1)$$

Where *unemployment* is unemployment rate, β_0 is the intercept of the regression model, β_1 is the coefficient representing the effect of the emergency response duration on the unemployment rate, and ϵ is the error term.

¹ * 31 cities refers to: Beijing, Tianjing, Hebei, Shanxi, Neimenggu, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Xizang, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang.

4. Data analysis

4.1. Statistical analysis on the effect of Covid-19 on unemployment

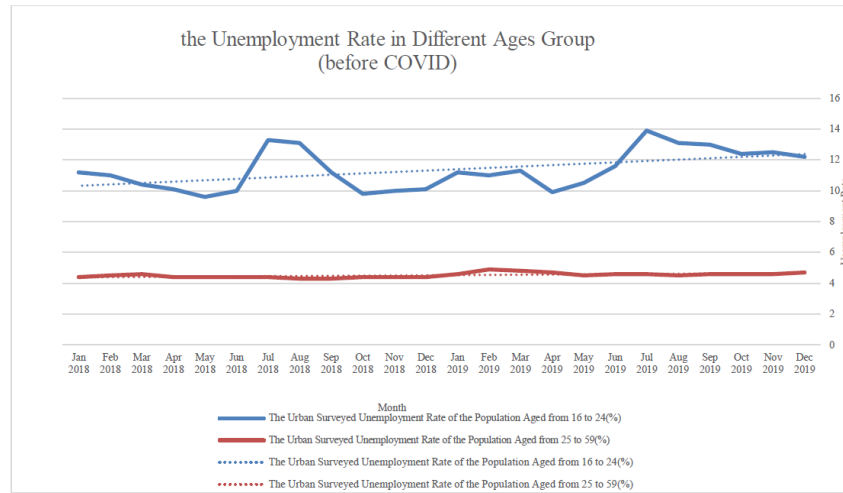


Figure 1: The unemployment rate in different age groups before the COVID-19 pandemic

Firstly, the COVID-19 pandemic has a pronounced impact on unemployment rates across different age groups in China. The unemployment rate for the population aged 16 to 24, representing younger workers, substantially increased following the onset of the pandemic in early 2020.

Before the pandemic, from February 2018 to December 2019, the unemployment rate for this age group fluctuated but generally remained under 13%. This period is relatively stable, and any fluctuations in the unemployment rate may be attributed to seasonal employment changes, as depicted in Figure 1.

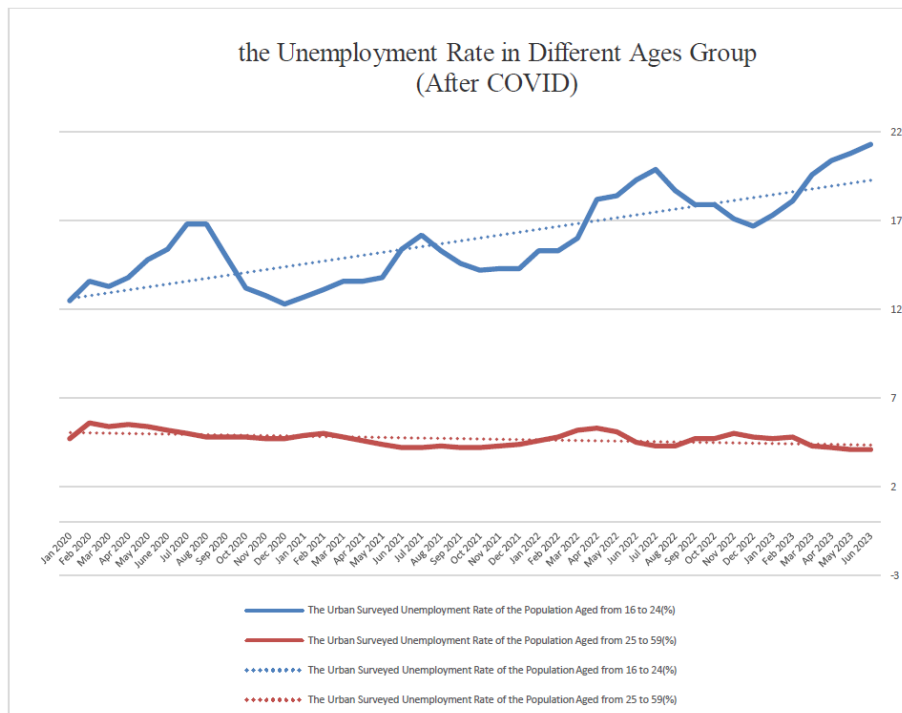


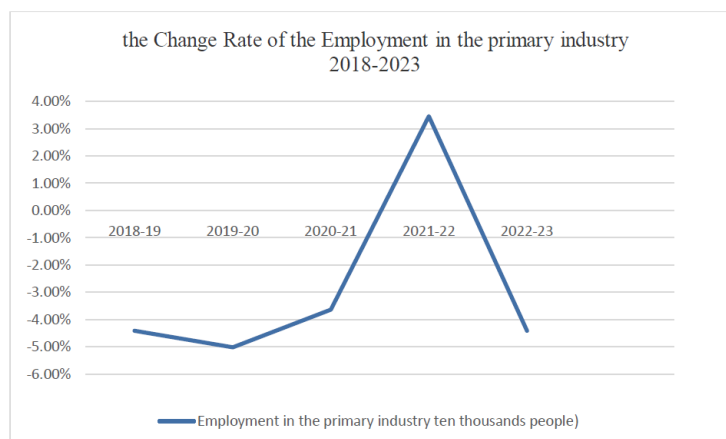
Figure 2: The unemployment rate in different age groups after the COVID-19 pandemic

The arrival of COVID-19 in early 2020 causes a sharp increase in unemployment for young workers, as shown in Figure 2. This group's unemployment rate increased to around 17% by mid-2020 as businesses shut down and firing workers became widespread. The situation continues to deteriorate, with the unemployment rate peaking at over 22% by June 2023. This prolonged increase suggests a lagging recovery for younger workers, possibly due to their overrepresentation in industries that were slower to bounce back or have fundamentally changed due to the pandemic.

In contrast, the unemployment rate for the population aged 25 to 59, which represents more established workers, remains relatively stable throughout the period. The unemployment rate for this age group hovered around 4-5% before the pandemic, indicating a robust employment situation for more experienced and skilled workers who likely held more secure jobs. Although there was a slight uptick in unemployment to around 6% during the initial months of the pandemic, the rate stabilized and remains consistent, reflecting the greater resilience of this demographic. This group is likely employed in industries that are either essential or have the capacity to adapt to pandemic conditions (e.g., remote work in sectors like finance, education, and IT).

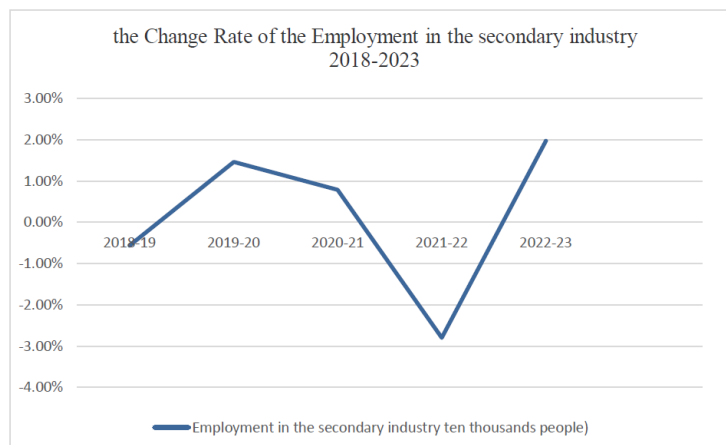
The sharp contrast between these age groups underscores the vulnerability of younger workers during economic downturns, especially in a crisis as severe as the COVID-19 pandemic.

Secondly, we investigate the changes on employment across different sectors. The employment landscape across primary, secondary, and tertiary industries also reflects significant shifts during the pandemic, as shown in Figures 3,4 and 5.



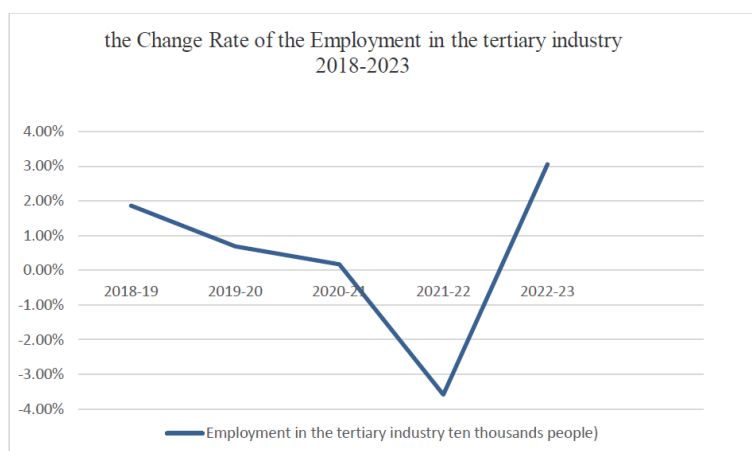
Source: China National Bureau of Statistics

Figure 3: The Change Rate of Employment in the Primary Industry from 2018 to 2023



Source: China National Bureau of Statistics

Figure 4: The Change Rate of Employment in the Secondary Industry from 2018 to 2023



Source: China National Bureau of Statistics

Figure 5: The Change Rate of Employment in the Secondary Industry from 2018 to 2023

Employment in the primary industry, which includes agriculture, forestry, and fishing, is on a downward trend even before the pandemic, with a significant decline of nearly 5% from 2018 to 2019. This decline can be attributed to ongoing urbanization, the shift of labor towards more industrialized and service-based sectors, and structural changes within the agricultural sector. The pandemic exacerbates these trends, as disruptions in supply chains and labor mobility further reduce employment opportunities in this sector. However, by 2021-2022, there is a temporary recovery, with employment increasing by approximately 3%. This rebound could be due to increased demand for food security and agricultural production during the crisis. Despite this brief recovery, employment declines again in 2022-2023, reflecting the ongoing structural challenges within the primary industry, including automation and rural depopulation.

Employment in the secondary industry, encompassing manufacturing, mining, and construction, exhibited fluctuations between 2018 and 2020. Initially, there is a slight increase in employment (about 1%) from 2018 to 2019, likely driven by industrial growth. However, the pandemic causes a downturn, with employment decreasing during the 2020-2021 period due to factory shutdowns and reduced construction activity. By 2021-2022, the sector experienced a recovery as industries adapted to new norms, including the adoption of health protocols and the acceleration of digitalization in manufacturing processes. Employment sees a notable increase of around 2% during this period, signaling a partial recovery driven by increased industrial activity and infrastructure projects initiated as part of economic stimulus measures.

The tertiary industry, which includes services such as retail and healthcare, initially experienced steady growth, with employment increasing by approximately 2% from 2018 to 2019. This growth reflects the ongoing shift of the Chinese economy towards a more service-oriented structure. However, the pandemic has a severe impact on this sector, particularly in non-essential services that are directly affected by lockdowns and social distancing measures. Employment in the tertiary industry falls by nearly 3% during the 2020-2021 period, with significant job losses in tourism, entertainment, and hospitality. Despite the initial shock, the sector demonstrates resilience, with employment rebounding by about 3% from 2021 to 2022. This recovery is driven by the gradual reopening of the economy, increased consumer spending, and the rapid growth of e-commerce and digital services, which help mitigate the losses in traditional service sectors.

Thirdly, there is an impact of emergency response duration on unemployment. To assess whether the duration of the first level emergency response implemented during the pandemic influences unemployment rates across Chinese provinces, a regression analysis is conducted. The results, presented in Figure 6 and Table 1, indicate that there is no significant correlation between the duration of these emergency measures and the unemployment rates in both 2020 and 2021.

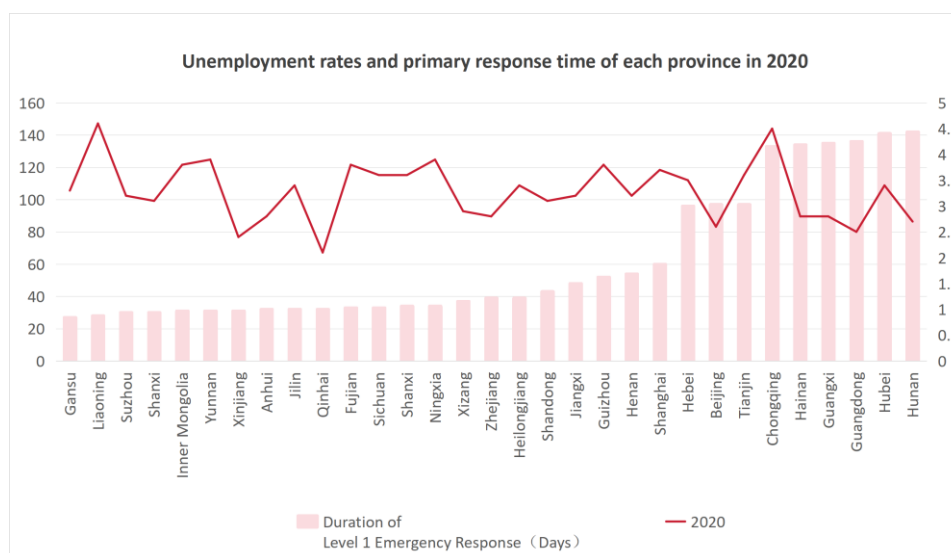


Figure 6: Unemployment rates and the duration of the primary response time of each province

Table 1: Regression result

	Unemployment Rate (%)		
	2020	2021	2020-21
Emergency Response(Days)	-0.002 (0.003)	-0.003 (0.003)	-0.003 (0.003)
R-square	0.025	0.038	0.036
Observations	31	31	31

4.2. Regression analysis

Table 1 is the estimated relationship between the duration of level 1 emergency response and the unemployment rate. Column (1) shows a negligible and statistically insignificant impact on unemployment rates. Column (2) reinforces the finding that the duration of emergency response days had a minimal effect on unemployment rates during this period based on the data in 2021.

This table suggests that while the emergency response measures are critical for controlling the health crisis, they do not have a statistically significant relationship with employment levels.

In summary, the analysis highlights the disparate impacts of the COVID-19 pandemic across different age groups and economic sectors in China. Younger workers face significant challenges, reflected in rising unemployment rates, while the primary, secondary, and tertiary industries each experience unique trajectories in employment trends. The duration of emergency response measures, while necessary for public health, have limited influence on unemployment, suggesting the need for more targeted economic interventions to address the labor market disruptions caused by the pandemic.

5. Conclusion

Since China is a large developing country and has adopted more stringent prevention and control measures than other countries during the epidemic, it is a good example to study the impact of the degree of government prevention measures on its labor market unemployment rate.

At the national level, we study the impact of government prevention and control measures on different industries and workers of different ages. In terms of age, the unemployment rate of workers aged 16 to 24 was significantly affected by the COVID-19 prevention and control measures, the data showed. In terms of industry, the employment rate of the primary industry showed an upward trend during the prevention and control period and was less affected, while the employment rate of the secondary and tertiary industries declined sharply and was severely impacted. The finding suggests that the impact of COVID-19 on workers varies across industries and age groups.

At the provincial level, we examine the relationship between the prevention and control policies implemented by the government and the unemployment rate. The duration of the first-level emergency response is used as a proxy variable to explain the government's prevention and control efforts and measures. We perform regression analysis and calculate the regression coefficient of the independent and dependent variables with the R-square in the regression model. The results show that the prevention and control measures implemented by the government have a negative relationship with the unemployment rate, but the impact on the unemployment rate is minimal. The data also prove that the goodness of fit of the regression model is poor, and the prevention and control policies have no significant impact on the unemployment rate in the labor market.

In terms of suggestions, through the empirical research in this paper, it is found that the Chinese government's prevention and control measures have very little impact on the unemployment rate in the labor market. Therefore, if similar situations occur in the future, the government's prevention and control measures can continue to be implemented. Furthermore, the study finds that the COVID-19 prevention and control measures have an asymmetric impact on China's labor market. From the perspective of employment rate, the negative impact on workers aged 16 to 25 and the secondary and tertiary industries is greater. Therefore, the government needs to take corresponding measures immediately to provide different employment support for different portraits of workers while implementing the measures.

Nevertheless, this paper's analysis does have some limitations. For instance, the sample used for regression analysis reflects the circumstances of workers affected during the most severe period of the 2020 and 2021 epidemics. While it has demonstrated the impact of the epidemic, a review of China's COVID-19 situation in 2022 suggests that there may be new developments compared to those in 2020 and 2021. Furthermore, despite categorizing research by industry, age group, and province, our existing data resulted in overlooking certain self-employed workers. It is also worth investigating whether their situation differs from that of migrant workers. Considering China's unique national conditions (where approximately one-third of workers choose to work outside their home region), further exploration and research are needed to determine if the epidemic will lead to changes in subsequent labor migration patterns.

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