



Impact of the COVID-19 Pandemic on Rural Income: A Study Based on CHARLS Data

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Abstract. The purpose of this article is to discuss whether a series of measures during the epidemic have an impact on the income level of rural people, and if so, how much impact is there. This study could make up for the impact of hygiene on income that hasn't been discussed in previous papers. This paper uses the existing CHARLS data of 2020 for analysis on Stata, so it is authoritative. The method for analyzing the data is to use regression to parse a correlation study. The conclusion is that two hygiene habits are strongly related to the income of the rural population, namely, avoiding gathering and wearing masks during the epidemic, in which the association of wearing masks is stronger ($p < 0.001$), both of which are less than 0.005. But overall, the changes in health habits related to income were subtle, meaning that they did not significantly affect income.

Keywords: Rural incomes, Covid-19, health, China

1 Introduction

The COVID-19 outbreak can be considered to be the biggest globally event the world has faced since the Second World War. This is due to its profound impact on society and people in all aspects of their lives especially on personal income. The shutdown of factories and the isolation of people's have almost halted production activities, which will have a great impact on people's income. Among them, the impact on rural

individual' wage is more significant than that of urban residents. The reason behind this phenomenon is that most of the rural economy is based on farming, at the same time, this occupation has strong seasonality, large mobility of migrant workers, poor protection conditions, and is highly vulnerable. Therefore, many agricultural products enterprises have suffered an existential crisis. Another important reason why China's rural economy needs to be studied is 'the dualistic structure system of urban and rural areas.' This phenomenon is a serious obstacle to China's economic and social development, which is mainly manifested in the household registration barrier between urban and rural areas. The final result of this phenomenon is the increasing difference between urban and rural areas, including economy, technology, talent requirements and so on.

The data base that this paper is going to use is a relatively complete and systematic social survey known to China, and almost no one has used this data to study problems related to the relationship between Covid 19 and individual income. It is due to the time when Charls was first established in 2008, it was for the convenience of understanding and conducting research on the extent of aging population in China. However, in the new data for 2020, after the outbreak of the epidemic, a new impact variable was added. It looked at the impact of the pandemic on personal income. The national survey was carried out in 2011, covering more than 10,000 households in 150 counties and 450 villages randomly selected across the country. Since then, the national tracking survey has continued in 2013, 2015, 2018, 2020, and 2021-23. In this article, the 2020 database will be used most, and the 2018 database will be compared as a control group. CHALRS 'questionnaire is designed with reference to international experience and includes basic personal information, family structure and financial support, health status, physical measurements, access to medical services and health insurance, work, retirement and pensions, income, consumption, assets, and community information [7].

The plan of this paper is that in the following contents of the article, The first part of the introduction includes literature review. In the following part, the details of the data and the background of some data analysis are first introduced. Then, regression is used to conduct a study on how much rural people's income has been affected by the health problems caused by the epidemic. The third part is the conclusion, which makes a summary of my conclusion and some limitations of this paper.

2 Literature Review

When conducting literature review, it was found that there are many articles on the relationship between covid-19 and agricultural economy. The first of it is about the impact of the pandemic on rural America, including population, unemployment, overall life satisfaction, mental health, and economic prospects, has been significantly negative. And these effects occurred generally indiscriminately across age, race, education and gender[1].

The second article focuses on the impact of the epidemic on India's rural economy. employment, personal income, poverty, health and economic impact were then measured. Among them, agriculture is a special category, because India is a country composed of villages, so agriculture is a very important source of income. Through the comparison of different years, it can be found that before 2019, basically all industries related to agriculture had an upward trend, but in 2020, there is a decline. The data used in this article are mainly about health infrastructure and COVID-19 in India. The article mentions that health indicators such as the number of hospital beds, doctors and nurses in India are low relative to other countries that have been more affected by the outbreak [5].

This article focuses on the impact of COVID-19 on smallholder farmers and vulnerable rural populations in Vietnam. Based on reference information, the article points out that the epidemic has caused many negative impacts on farmers and vulnerable populations in rural areas of Vietnam. The epidemic has led to a drop in demand for agricultural products, volatility in agricultural prices and disruption of agricultural sales channels. This has led to economic hardship and reduced income for smallholder farmers. The impact of the epidemic on small farmers and vulnerable rural populations in Vietnam is therefore profound. The sample included 1,300 rural households. Qualitative and quantitative data were used to assess the impact of the COVID-19 pandemic on smallholder farmers and vulnerable rural populations. The results of the survey show that, at the same time, the income of rural households has decreased, and household expenditure has been affected [6].

The first three papers did not focus on the impact of the epidemic on China, but the next three papers will focus on the changes of China's rural economy in the context of the epidemic. The first part shows the extent and special effects of the COVID-19 epidemic on rural residents' income. It is revealed that the reasons for the greater impact on rural residents' income are the weak rural public health service

system, the imperfect public service system for migrant workers, the low anti-risk ability of small and micro enterprises and individual industrial and commercial households, and the low quality of agricultural business entities and agricultural service entities[2].

The second paper focuses more on the impact of the epidemic on rural agricultural development. The study shows that the logistics disruption caused by epidemic prevention and control and the survival crisis of poultry breeding enterprises will lead to the short-term drop in meat prices and the intensification of the tight supply and demand of meat in 2020. Unmarketable fruits and vegetables, delayed grain sales, and depressed consumption of some agricultural products will make a considerable part of farmers face a decline in earnings in 2020[4].

The third paper, which is also the most similar to my research content, discusses the economic and mental health of rural communities in Sichuan Province has been affected during the epidemic. The study found that the epidemic significantly affected the mental health of local people, resulting in socio-economic vulnerability[3]. Of note, local households are concerned about income loss (40-43%), whether in terms of socioeconomic status, income level or industry participation[8].

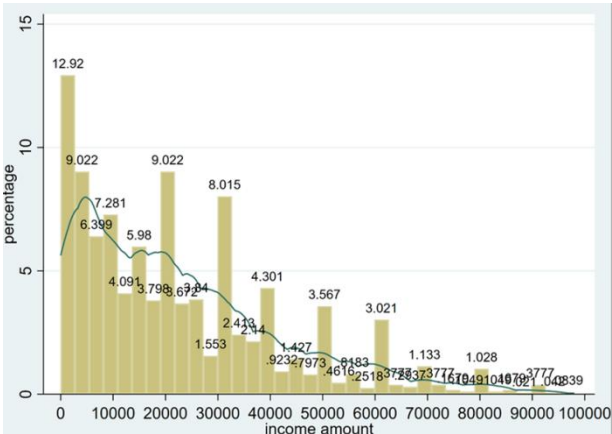
Most of the previous literature on pandemics and personal income has focused on specific factors that affect income, such as unemployment due to individual isolation. Others focus on how much different industries have been affected by the pandemic or break it down into different types of income and expenditure. Most of these papers use charts to list and summarize the percentage, but only a few discuss the specific impact of different health habits caused by epidemic on rural people's income. Based on the China Health and Retirement Longitudinal Study and the survey objects in this data are of all families from rural China, this paper will explore which specific measures of the epidemic have affected rural people's income and how much different measures have correlated with income, which other literature has not paid attention to. At the same time, this paper will use regression as the main statistical data method to more clearly reflect the correlation analysis between dependent variables and independent variables. This data research method is rarely used in other papers, so this paper is different from other papers in the research object and research method. Meanwhile, no other paper has analyzed whether changes in hygiene habits are a factor in income.

3 Data Analysis

3.1 Sample Description

First of all, CHARLS data is very authoritative in China, and the access response rate and data quality of CHARLS are also in the forefront of similar projects in the world, and the data has been widely used and recognized in the academic community. At the same time, as a database focusing on the health of middle-aged and elderly people and tracking the elderly, it is beneficial to use it as the basic data of health habits during the epidemic. Because hygiene is one of their main concerns.

Table 1. The percentage of income amount of the participants.

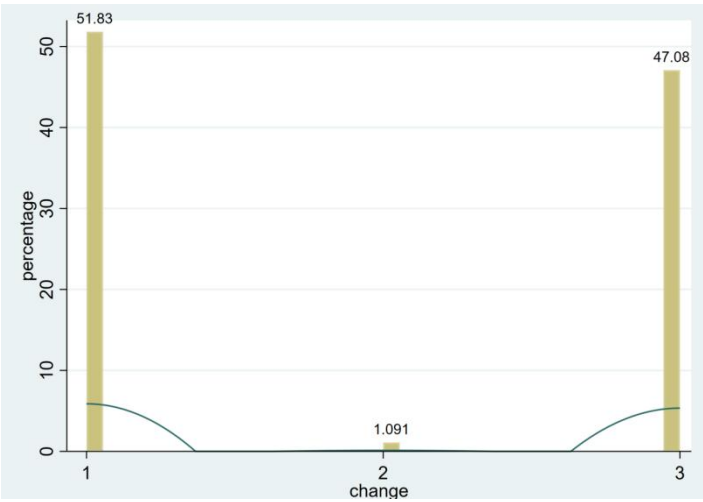


Most participants earn less than 100,000 yuan a year, and 21 percent earn less than 5,000 yuan. Therefore, compared with the average annual income of 32,000 in China, part of participants' income is higher than their annual income. Therefore, it can be seen that most rural people in CHARLS data do not have low incomes as we think, on the contrary, a large part of them have considerable incomes. This is partly because the article did not study the impact of agricultural production during the pandemic, because these villages are relatively wealthy and not all depend on agriculture for their livelihoods. The detail of the sample is presented in table 1.

Before this paper get into talking which factor of Covid affecting the income of people. There is a graph (Table 2) illustrating what people's idea of impact of Covid on wage. The x-axis is labelled as change in income, 1 refer to decrease in income, 2 refer to increase in income, 3 refer to no change in income, this graph is not based on

actual data, its just what participants think of the changes in their income amount. The percentage of People who think their income goes down is 51.8% compared to the percentage of people who think their income increases (1.09%), there is a big difference. However, still 47.8% of people hold the idea that their income is not changing. Therefore, before a real statistical study, it can conclude that more than half of people think their income has dropped because of the pandemic.

Table 2. percentage of different people's view on impact of Covid on Wage.



3.2 Regression Result

At the first place, the purpose of this paper is to understand the impact of COVID-19 on rural people's income. Therefore the dependent variable is about the amount of income, and the independent variable is the changes in hygiene practices caused by the epidemic, including washing hands, using disinfectant, avoiding shaking hands, masking, avoiding traveling and avoiding gathering. And social distancing. The reason I choose these independent variables is that they all changed because of the pandemic. First, wearing masks, washing hands, and using disinfectant are all measures to prevent infection when socializing during the outbreak. The other variables are due to government measures, as people are forced to stay at home. It will lead to avoid shaking hands, socializing and traveling. All of these behaviors are caused by the epidemic, so they are all related to what this paper wants to discuss is whether the changes in health habits caused by these epidemics have an impact on

income The variables that I control for are, first, the differences between different communities, different sources of income, different levels of income amount and unemployment.

Regression is chosen as the main data analysis method in this paper mainly because it is the most commonly used algorithm with simple form, easy to use and clear results. And what this article wants to discuss is how close the relationship between the two factors are. The linear regression model provides the linear relationship between the independent variable and the dependent variable, and the coefficient of the model can also be used to explain the degree of influence of the variable on the dependent variable.

Table 3. Regression about the income amount.

	Dependent variable: income amount (p value)
wash hands	0.497
Use disinfectant	0.096
Avoid handshaking	0.980
Avoid travelling	0.376
Avoid gathering	0.003**
Social distancing	0.276
Masking during the pandemic	0.000**
Pensions receive	0.000**
Unemployment compensation receive	0.466
Pension vouchers receive	0.174
Pension subsidy for the oldest receive	0.007**

Worker's industrial accident compensation receive	0.821
Elderly family planning subsidy receive	0.249
Medical aid receives	0.295
Other government subsidy	0.514
Other income source	0.931
Number of observations	19384

*<.05, **<.01

Table 3 shows the total income of the explained variable, and the health protection methods caused by the outbreak of the explained variable, as measured by regression. First of all, the data summarized in the table is about the P-values of the two variables, that is, the data used to indicate whether the correlation between the two factors is strong. The smaller the data, the stronger the correlation between the two. The influencing factors that can be used to explain the change of income amount have been marked with ** in the table ($p<0.01$). Those two variables are avoiding gathering and wearing masks during an outbreak.

According to the P-value point of view, the first thing that has a significant correlation with income level is to avoid gathering. The strong correlation between the two is due to the fact that Chinese people are forced to stay at home due to some government policies of the epidemic, so if the work cannot be completed online, then it is equivalent to a disguised unemployment for these people. No wages will be paid during this time, and government pensions will not be available in time for all of these temporarily unemployed people. Even after the end of the epidemic, some industries, such as the catering industry and agriculture, will close down due to the loss of business in the epidemic, in this case, it really leads to some people's unemployment.

Another factor that has a strong correlation is whether people wear masks during the pandemic, which can be explained by the fact that people who wear masks should have a more thorough understanding of the epidemic, so they can timely understand the benefits of wearing masks and the health problems caused by not wearing masks.

Then those who are able to understand the social situation as quickly as possible are also those with higher social status and higher education. In the case of rural studies, this group of people will be relatively small.

In Table 3, the variables following the variable of wearing masks during the epidemic period are all the control variables in this paper, that is, different channels of income acquisition. In general, the personal hygiene protection brought about by the epidemic in this paper has little impact on personal income, because according to the data of adj-R square (0.03), these influencing factors can only explain 3% of the change of rural people's income.

From the data analysis in the previous four paragraphs, it can be concluded that hygiene habits have a strong correlation with rural population income, but the overall effect is small. This conclusion should be the same as people's basic cognition, but the strong correlation showed by wearing a mask and avoiding social interaction is a bit unexpected. Since the previous articles were all about the impact of economic problems caused by the epidemic or agricultural problems on income, this article is to supplement the effect of health habits on income.

4 Discussion

This paper will help guide the formulation of public policy. First, lockdown is the main reason why people cannot socialize during the pandemic, which leads to a drop in income. And judging from the current economic situation in China, it has not returned to the state before the epidemic. lockdown has a small impact on income, but lockdown has a huge impact. This means that policies should be designed to avoid opportunities that discourage people from participating in social activities.

The research content of the article is also missing, mainly due to the limitation of data analysis, which cannot expand the comparison of different years, and the observed independent variables are also few. Since this paper was completed in a relatively short period of time, some things may be rushed, especially the part about data. Because this is the first time for the author to use the statistical software Stata to write the paper, he is not familiar with many things and there are some states of writing while learning. There are also shortcomings in the analysis of some data, because I have not systematically learned the use of statistics in paper writing, and I have only learned a little of statistics. Another part of the reason is that CHARLS is a large data set, and some of the statistical variables have insufficient data or the names

are not clearly written, which also has a certain impact on the research. As for further research, such as adding robustness analysis, it is impossible to continue further research due to time problems and lack of experience. I hope I can further my study in the follow-up study.

5 Conclusion

Due to the epidemic, China has experienced a certain impact on the economy. While other articles have focused on the study on the agricultural production chain, people's health and income, this paper focuses on the impact of health protection issues brought by the epidemic on rural people's income. Among the hygiene habits brought about by the epidemic, wearing masks and avoiding gathering have the greatest impact on people's income. However, generally speaking, hygiene habits do not have a great impact on income, and more of the impact comes from a series of chain reactions brought about by government measures in the follow-up development of the epidemic. For example, it causes some unemployment and health problems associated with unemployment.

For those who want to study this type of article further, the suggestion is to include more variables, or to use different methods. For example, the comparison of data before and during the epidemic should be increased, and panel data regression should be added to reduce the wrong results caused by errors in statistical process.

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