

Research Article

Statistical Analysis of the Influence of Sino-U.S. Minimum Wages on Employment

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From 2004 to 2015, the minimum wage's employment effect varied according to the minimum wage level, FDI, per capita gross domestic product, and labor production in 31 Chinese provinces. Regardless of the amount of investment, the minimum wage raise lowered hiring as FDI intake increased. In this research paper, we aim to study different scenarios that can help raise the minimum wage without harming employment. We will evaluate the influence of employment's minimum wage change in China (world's largest emerging market) and the U.S. (the largest developed country) using co-integration regression analysis. The minimum wage system is a basic wage and social security system that the governments have used to interfere directly in labor market wages. The data enumerated and collected is from 2003 to 2016, which is published annually by both governments. Our emphasis is on the overall employment impact, accommodation, and foodservice industry impact. According to the findings, the minimum wage increase has a minor impact on overall employment in China. However, it has a beneficial impact on employment in the U.S. In China and the U.S., minimum wage raise has a significant beneficial influence on employment in the retail and foodservice industries. The impact on the U.S., however, is higher than on China.

1. Introduction

The systems of minimum wage and social security have been utilized by governments to directly intervene in the wages of the labor market. The disparity rises among workers with low income in various places and sectors. The consequences of low income in the U.S. and China are the topic of this research. The primary reason for this is that China is the largest emerging market of the world, while the U.S. is the largest established country. In terms of GDP, both countries are in the top two positions. The results of the research in these two countries will serve as useful benchmarks for other countries [1–4].

Numerous studies on the impacts of low income have also been undertaken by the research community across the world. Such studies show low income's effect on the employment of industrial laborers and laborers of other sectors, and they have been published in the past decades in different countries. The following details explain the publications in four areas.

- (i) Minimum wage standard has shown different effects on employment in different countries and regions. Harrison and Scorse found that low income harms employment in Indonesia. Sabia and Joseph discovered that low income climbed between 1989 and 2012 and that recessions cut rather than expanded low-skilled employment. During state economic booms, estimated employment elasticities for low income varied from 0 to 0.2 but reached as high as 0.3 during business cycle troughs [5–9]. Sofia Bauducco and Alexandre Janiak demonstrated low income using a medium-scale DSGE model. They used the U.S. data to evaluate how low income affected the aggregate variables.
- (ii) Minimum wage has varying effects on the employment of various workers. Brown, Burkhauser, Bazen, Tony Fang, Morley Gunderson, Roberto Pedace, and Stephanie Rohn discovered that raising low income has a considerable influence on teens' employment. According to Abowd et al., less

income has a detrimental impact on low-income households' household income. Other research has found that raising low income has no detrimental consequences. Using the DID (digital image data) model, Saul discovered the minimal indication of detrimental employment consequences for youths or less-educated adults [10–13].

- (iii) In various industrial sectors, low income had a distinct impact on employment [14–16]. For each nation, Bell utilized panel data. In Colombia, low income had a significant influence on unemployment, however, in Mexico, low income had little effect on employment in the industrial sector. Scale effects and/or capital-labor substitution may provide employment spillovers to employees who do not have legally enforceable low income. Their results showed that the increase in low income has a significant impact on employment, with the employment elasticity coefficients of -0.2 and $0.15\sim 0.16$, respectively. Even and Macpherson used quarterly employment data, wages, and government census data to analyze the impact of low income and found that with an increase in low income, the weekly wage of tipped workers declined and the employment opportunities of tipped workers in the restaurant industry were reduced [17–23].
- (iv) Researchers used a variety of methods when studying the employment effect of low income, such as time series regression analysis (Charles Brown), policy simulation method (Belman, Dale et al.), panel data analysis (Neumark and Wascher), natural experiment method, and dual difference method (Card and Krueger). In recent years, the difference method and panel data method became more popular. Burkhauser thought that it avoided the two extremes that were amplified and reduced by compromising the time effect. Addison et al. looked at the influence of low income on earnings and employment in a few different segments of the retail trade industry and found minimal indication of job losses [24–26].

The influence of low income on American youth employment, various gender employees, and employment in different states is centered in the U.S. However, comparing the influence of low income on employment in different nations and industries seldom yields useful results. They provide research space for this study [27–30]. This paper selects relevant government departments' annual statistical data during 2003–2016 and uses co-integration regression analysis to analyze the employment effect for the increase of low income of China and the U.S. on their overall employment, accommodation, and foodservice industries. As they have a relatively high level of low income profit and are most sensitive to low income, accommodation catering industries were chosen as the major industry research

objects in this paper. They have low skill, a large number of labor forces, and a relatively low level of wages. As a result, there is a greater research value and practical significance [31–34].

The research paper is organized as follows: the next section explains the research methods used for this study. It will be followed by empirical specification and results. Finally, the discussion and concluding remarks are explained at the end of this research paper.

2. Research Methods

In this section, the data sources, variable selection, and research methodology are explained. It will help identify the most accurate research method for the analysis of this research. The explanation is as follows:

2.1. Data Sources. The Chinese data adopted in this paper comes from their official statistics, including The National Bureau of Statistics of the People's Republic of China, The Ministry of Human Resources and Social Security, The National Federation of Trade Unions, and other departments, such as “the statistical yearbook of China (2004–2016),” “the labor statistical yearbook of China (2004–2016),” “the statistics bulletin of the national economy and social development of China (2003–2016),” and the relative annual statistical yearbooks from different provinces, autonomous areas, and municipalities that are directly under the control of the central government. The U.S. data are mainly from the statistical data and the investigation reports released on the website of the Bureau of Labor Statistics by the Department of Labor [35–38].

Data studied in this paper include the low income and average wages, employment, GDP (gross national product), the value added by industry, and relevant data like the consumer price index. These figures come from authoritative sources, ensuring their accuracy and dependability.

2.2. Variable Selection. Employment is influenced by a variety of factors, including the rate of economic development, pay levels, labor supply and demand, and changes in the worldwide economic environment. This piece of research focuses on the impact of raising the low income on employment. In the process of econometric analysis, the variables that have a major impact are employment volume, less income, average wage, and gross national product or the value-added by the industry. It should be noted that in the analysis of the low-income employment effect in the industry, the value-added by industry is used to replace the gross national product variable because of the lack of industry gross national product statistics. Low income, average wage, gross national product, and the value added by industry have been converted into monthly low income, monthly average salary, monthly per capita GDP, and monthly per capita value-added [39–43].

National less income is not defined in China, and most low income is separated into multiple tiers. As a result, the national low income is computed by multiplying the arithmetic mean of the low income in each province and municipality directly under the central government with the number of provinces and cities studied in this research. As the hourly minimum pay standard in the U.S. is normally an hourly low-income standard, econometric analysis converts the hourly low-income standard to a monthly low income (calculated using 40 hours per week, 52 weeks in a year, or 12 months in a year).

To ensure the comparability of the cross-yearly data, considering 2003 as the base, the low income, average wage, gross national product, the value-added by industry, and so on are converted into the actual value by eliminating the consumer price index. Annual time series, such as minimum and average wages, gross national product, and value-added by industry, are transformed into the natural logarithm to reduce possible heteroscedasticity between variables.

2.3. Research Methodology. The co-integration regression analysis test is used in this paper to examine the employment effect of low income in China and the U.S. The co-integration regression analysis method is chosen because time series, such as employment, less income, average wage, gross national product (GDP), and the value-added by industry, are not stationary sequences. Some linear combinations may present stability so that the factors have a long-term and stable connection. Moreover, the “Spurious Regression” phenomenon occurs when a nonstationary sequence is analyzed using a statistical method of stationary time series, which is likely to draw the wrong conclusion. The co-integration regression analysis method makes up for the deficiency of the stability hypothesis of the classical regression model. In the process of using the co-integration regression analysis method, it is possible to have different variance and autocorrelation of the sequence. It must be validated by the unit root and data co-integration.

3. Empirical Specifications

In this section, the modeling and testing of co-integration relationship is explained. It will help analyze the empirical specifications of the collected data. The explanation is as follows:

3.1. Model. The rise in the less income norm is expected to have an ambiguous impact on employment. The employment effect varies from countries to industries. We propose the following empirical regression model:

$$\ln(E_i) = C_0 + C_1 \ln(MW_i) + C_2 \ln(AW_i) + C_3 \ln(AP_i) + \varepsilon_i \quad (1)$$

Employment (E) is the explained variable, whereas the monthly low income (M) is the explanatory variable (MW). The monthly average wage (AW) and the actual value of a month per capita GDP or the value added by industry (AP)

are used as control variables I to represent different cross-sectional data, and ε_i is the random error term.

E : employment reflecting employment level. The early western economists utilized changes in the unemployment rate as a technique to test the low income standard, which has gradually developed with employment since using employment to quantify the employment effect of the low income standard is more accurate for a specific location or sector.

MW : the actual value of the monthly low income. As aforementioned, there is no national low income available. The low income in most areas is divided into different grades. Therefore, in the study of this paper, the low income in China is calculated by the sum of the arithmetic mean of the low income in each province and municipality divided by the number of provinces and cities. The American federal low income standard form is usually an hourly low income standard. In the heart of the econometric analysis, the standard of hourly low income is converted into monthly low income (calculated using 40 hours a week, 52 weeks in a year, or 12 months in a year).

AW : the monthly average wage’s true worth. The average pay shows the degree to which workers in a certain place and time earn on average. The nominal monthly wage is derived by dividing the national average wage or the average wage in the industry by 12 to get the actual monthly wage, and the notional monthly wage is then transformed into the actual value using the price index.

AP : the monthly per capita GDP or the real value added by industry on a monthly basis. It is calculated by dividing the national annual GDP or industry employment per capita annual value by total employment, then multiplying with 12. The price index has been included in the calculations. The rate of growth of the GDP industry reflects the economic growth rate of a country or region, and the growth rate of the value added by industry reflects the development of an industry.

3.2. Test of Co-Integration Relationship. This paper adopts Eviews8.0 to test the economic data in terms of unit root and co-integration relationship.

3.2.1. Economic Data Co-Integration Test of China. The unit root stationarity test of ADF is shown in Table 1.

In this table, 1 represents the first-order difference, 2 represents the test type, c , t , n , respectively, represent the constant term, the linear trend, and the lag order, and *, **, ***, respectively, represent the critical value at 1%, 5%, and 10%.

The series of time, such as $\ln(E_{cz})$, $\ln(MW_{cz})$, $\ln(AW_{cz})$, and $\ln(AP_{cz})$, is a nonstationary first-order integer column. However, there may be a linear combination of long-term stability, that is to say, the variables have a co-

TABLE 1: Unit root stationarity test of *ADF*.

Variable	Inspection form	ADF Statistic	Critical value	AIC	SC	DW	Conclusion
$\ln(E_{cz})$	(C,t,1)	12.0732	-1.6029	-10.5755	-10.5351	0.52	Not smooth
$\ln(MW_{cz})$	(C,t,0)	-3.0022	-3.7597	-3.2831	-3.1415	2.01	Not smooth
$\ln(AW_{cz})$	(C,0,0)	-0.7802	-3.7597	-5.3025	-5.1609	2.07	Not smooth
$\ln(AP_{cz})$	(C,t,0)	0.3837	-3.7597	-3.7701	-3.6285	1.21	Not smooth
$\Delta \ln(E_{cz})$	(c,t,1)	-3.9217	-3.4200***	-12.2468	-12.1383	2.07	Smooth
$\Delta \ln(MW_{cz})$	(C,0,0)	-5.1752	-4.0044*	-2.9186	-2.8273	2.02	Smooth
$\Delta \ln(AW_{cz})$	(C,t,0)	-3.7002	-3.3423***	-5.2016	-5.0647	2.01	Smooth
$\Delta \ln(AP_{cz})$	(C,T,2)	-3.8379	-3.4608***	-4.7720	-4.6510	2.10	Smooth

integration connection. Using the Johansen co-integration test, the test results show that there are two co-integration equations within 5% of the significant level (see Table 2).

3.2.2. *The US Economic Data Co-Integration Test.* The unit root stability ADF test is shown in Table 3.

It can be seen from Table 3 that the sequence of non-stationary time, such as $\ln(E_{az})$, $\ln(MW_{az})$, $\ln(AW_{az})$, and $\ln(AP_{az})$, after a first-order difference becomes a significant stationary sequence.

Time series, such as $\ln(E_{cz})$, $\ln(MW_{cz})$, $\ln(AW_{cz})$, and $\ln(AP_{cz})$, is a nonstationary first-order integer column. However, it is possible that there is a linear combination of long-term stability, that is to say, there is a relation between variables. The results of the Johansen co-integration test show that there is just one co-integration equation within 5% of the significant threshold (see Table 4).

3.2.3. *Accommodation and Foodservice Industry Economic Data Co-Integration Test of China.* Unit root stability ADF test is shown in Table 5.

Notes: 1. Δ and Δ^2 , respectively, represent the first-order difference and second-order difference. 2. In the test type, c , t , n , respectively, represent the constant term, the linear trend, and the lag order. 3. *, **, ***, respectively, represent the critical value at 1%, 5%, and 10%.

It can be seen from Table 5 that for nonstationary time series, such as $\ln(E_{caf})$, $\ln(MW_{caf})$, and $\ln(AP_{caf})$, after the first-order difference becomes a significant stationary sequence, the natural logarithm of the control variable, the second-order difference fraction gradually becomes a stationary sequence, and other series of different orders are being eliminated here to modify the original model. Time series, such as $\ln(E_{caf})$, $\ln(MW_{caf})$, and $\ln(AP_{caf})$, is a nonstationary first-order integer column. There is, nevertheless, the prospect of a linear combination of long-term stability. A co-integration relationship exists between the variables. It was decided to employ the Johansen co-

integration test. The test results indicate that there are 2 co-integration equations (see Table 6).

3.2.4. *Accommodation and Foodservice Industry Economic Data Co-Integration Test of the U.S.* Unit root stability ADF test is shown in Table 7.

Using the Johansen co-integration test, it shows that there is 1 co-integration equation (see Table 8) within 5% of the significant level.

The co-integration test of the main economic variables in China and the U.S. reveals that there is at least one co-integration equation at the significant level. As a result, it can be used to determine whether variables have a long-term equilibrium connection.

4. Empirical Results

In this section, the regression results of low-income employment effect and the explanation of regression results of low-income employment effect have been discussed. It will explain about the empirical results of this study.

4.1. *Regression Results of Minimum Wage Employment Effect.* Using data during the years 2003–2016, the co-integration regression analysis method was used to analyze the overall employment effect of low income increase in China and the U.S. Using economic research, determine its impact on employment, housing, and the foodservice industry. The regression results are shown in Table 9.

4.2. *The Explanation of Regression Results of Minimum Wage Employment Effect*

4.2.1. *The Econometric Analysis of Overall Employment Impact of China due to the Increase of Minimum Wage.* The results of the co-integration regression analysis of the overall employment effect of Chinese low-income increases are as follows:

$$\ln(E_{cz}) = 0.0740 \ln(MW_{cz}) + 0.2226 \ln(AW_{cz}) + 0.0723 \ln(AP_{cz}) + 7.6553. \quad (2)$$

t value — (5.5638) (8.9012) (2.9755) (2.3247).

p value — (0.0001) (0.0012) (0.0116) (0.0023).

According to the regression results, the low income (MW_{cz}) has a value of 5.5638, and the associated probability

TABLE 2: Co-integration test results.

Hypothesized No. of CE(s) Prob.**	Eigenvalue	Trace statistic	0.05 critical	Value
None*	0.983727	91.78192	47.85613	0.0000
At most 1*	0.786425	34.12623	29.79707	0.0149
At most 2	0.590887	12.51351	15.49471	0.1339
At most 3	5.82E-05	0.000814	3.841466	0.9784

Notes: * indicates that the null hypothesis is rejected at 5%.

TABLE 3: Unit root stability ADF test.

Variable	Inspection form	ADF Statistic	Critical value	AIC	SC	DW	Conclusion
In (E_{az})	(C,0,1)	-1.6269	-2.7138	-5.3413	-5.2201	1.66	Not smooth
In (MW_{az})	(C,t,0)	-0.9760	-2.8525	-3.8290	-2.7221	0.93	Not smooth
In (AW_{az})	(C,0,0)	-0.5769	-3.1199	-5.7110	-5.6241	1.68	Not smooth
In (AP_{az})	(C,t,0)	-1.2192	-3.8290	-4.8393	-4.7089	0.84	Not smooth
Δ In (E_{az})	(0,0,0)	-1.6193	-1.6029***	-5.3491	-5.3087	1.61	Smooth
Δ In (MW_{az})	(C,t,2)	-6.2370	-5.2954**	-4.1885	-4.0372	2.36	Smooth
Δ In (AW_{az})	(C,0,0)	-2.9243	-2.7138***	-5.5890	-5.5082	1.91	Smooth
Δ In (AP_{az})	(0,0,2)	-2.1000	-1.9740**	-5.2901	-5.2497	1.78	Smooth

Notes: 1. Δ represents first-order difference. 2. In the test type, c, t, n, respectively, represent the constant term, the linear trend, and the lag order. 3. *, **, ***, respectively, represent the critical value at 1%, 5%, and 10%.

TABLE 4: Co-integration test results.

Hypothesized No. of CE(s) Prob.**	Eigenvalue	Trace statistic	0.05 Critical	Value
None*	0.856623	53.80054	47.85613	0.0125
At most 1	0.728286	28.55090	29.79707	0.0691
At most 2	0.482020	11.61181	15.49471	0.1765
At most 3	0.209744	3.060171	3.841466	0.0802

Notes: * shows that the null hypothesis is rejected at 5%.

TABLE 5: Unit root stability ADF test.

Variable	Inspection form	ADF statistic	Critical value	AIC	SC	DW	Conclusion
In (E_{caf})	(C,0,0)	-0.4469	-3.1449	-2.4733	-2.3925	1.32	Not smooth
In (MW_{caf})	(C,t,0)	-2.9499	-3.8753	-3.1712	-3.0450	1.79	Not smooth
In (AW_{caf})	(C,t,0)	-1.5490	-3.8753	-5.2298	-5.1086	1.29	Not smooth
In (AP_{caf})	(C,t,0)	-1.7890	-3.8753	-2.2333	-2.1121	1.57	Not smooth
Δ In (E_{caf})	(0,0,0)	-1.7403	-1.6021***	-2.4866	-2.4504	2.17	Smooth
Δ In (MW_{caf})	(C,t,0)	-4.5701	-3.9334**	-2.7013	-2.5928	1.96	Smooth
Δ In (AW_{caf})	(C,t,0)	-2.0553	-3.9333	-4.9431	-4.8346	1.79	Not smooth
Δ^2 In (AW_{caf})	(C,0,0)	-3.2870	-3.2127**	-4.5864	-4.5259	2.11	Smooth
Δ In (AP_{caf})	(0,0,0)	-1.8756	-1.6021***	-2.4301	-2.0068	2.27	Smooth

TABLE 6: Co-integration test results.

Hypothesized No. of CE(s) Prob.**	Eigenvalue	Trace statistic	0.05 Critical	Value
None*	0.998807	92.16956	29.79707	0.0000
At most 1*	0.742673	18.12945	15.49471	0.0196
At most 2	0.252277	3.197953	3.841466	0.0737

Notes: shows that the null hypothesis is rejected at 5%.

p value is 0.0001, which is less than 0.05, indicating a significant statistical effect. The employment elasticity coefficient of low income is 0.0740, which means that if low-income increases by 1%, the employment elasticity coefficient will increase by 0.0740. Employment will increase by about 0.07%. As a result, low-income increase has little impact on overall employment in China. The t value of per

capita GDP (AP_{cz}) is 2.9755, the variable coefficient is 0.0723, and the associated probability p value is 0.0116. The statistical results are significant. It indicates that the growth does not have an obvious impact on China's overall employment level. It is in line with the fact that the unemployment rate in China's labor sector has not changed much in recent years.

TABLE 7: Unit root stability ADF test.

Variable	Inspection form	ADF Statistic	Critical value	AIC	SC	DW	Conclusion
In (E_{aaf})	(c,t,0)	-1.5124	-3.8290	-5.1427	-5.0123	1.34	Not smooth
In (MW_{aaf})	(C,t,0)	-0.9760	-2.8525	-3.8290	-2.7221	0.93	Not smooth
In (AW_{aaf})	(C,t,0)	-1.5767	-3.8289	-5.2700	-5.1397	1.41	Not smooth
In (AP_{aaf})	(C,0,0)	-0.2569	-3.1199	-4.3164	-4.2296	1.27	Not smooth
Δ In (E_{aaf})	(0,0,2)	-1.6613	-1.6029***	-4.9018	-4.8615	1.83	Smooth
Δ In (MW_{aaf})	(C,t,2)	-6.2370	-5.2954**	-4.1885	-4.0372	2.36	Smooth
Δ In (AW_{aaf})	(0,0,2)	-2.2456	-1.9740**	-5.1542	-5.1138	1.71	Smooth
Δ In (AP_{aaf})	(c,t,0)	-3.4573	-3.3883***	-4.6054	-4.4841	2.12	Smooth

Note: 1. Δ represents first-order difference. 2. In the test type, c, t, n, respectively, represent the constant term, the linear trend, and the lag order. 3. *, **, ***, respectively, represent the critical value at 1%, 5%, and 10%.

TABLE 8: Co-integration test results.

Hypothesized No. of CE(s) Prob.**	Eigenvalue	Trace statistic	0.05 Critical	Value
None*	0.765230	41.36965	40.17493	0.0377
At most 1	0.683875	22.53073	24.27596	0.0817
At most 2	0.305413	7.559678	12.32090	0.2729
At most 3	0.195131	2.821990	4.129906	0.1100

TABLE 9: Co-integration regression results.

Variable	MW	AW	AP	R^2	Adj R^2	DW
E_{CZ}	0.0740 (0.0001)	0.2226 (0.0000)	0.0723(0.0116)	0.99	0.99	1.76
E_{az}	0.1094 (0.0942)	-0.3472 (0.2340)	0.9968 (0.0000)	0.92	0.89	1.87
E_{caf}	0.7241 (0.0000)		-0.5066(0.0005)	0.97	0.97	1.75
E_{aaf}	1.0468 (0.0077)	-2.1097 (0.0854)	1.99938 (0.0051)	0.72	0.64	1.30

Notes: the data in the brackets in the above-mentioned table is the associated probability.

4.2.2. The Econometric Analysis of Overall Employment Impact on the U.S. due to the Increase of Minimum Wage.

The results of the co-integration regression analysis of the overall employment effect of American low-income increases are as follows:

$$\ln(E_{az}) = 0.1094 \ln(MW_{az}) - 0.3472 \ln(AW_{az}) + 0.9968 \ln(AP_{az}) + 5.7828. \quad (3)$$

t value — (1.8488) (-1.2666) (8.6920) (4.0082).

p value — (0.0942) (0.2340) (0.0035) (0.0025).

From the regression results, the variable coefficient of the less income (MW_{az}) was 0.1094, with the associated probability p value of 0.0942, and the statistical results were significantly below 10%. It shows that the higher low income has a certain effect on the overall employment level of the U.S.

4.2.3. The Econometric Analysis of Accommodation and Foodservice Industry Employment Impact of China due to the Increase of Minimum Wage. The results of the co-integration regression analysis of accommodation and foodservice industry employment effect of Chinese low-income increases are as follows:

$$\ln(E_{caf}) = 0.7241 \ln(MW_{caf}) - 0.5066 \ln(AP_{caf}) + 4.6558. \quad (4)$$

t value — (15.5163) (-5.0373) (7.9680).

p value — (0.0052) (0.0005) (0.0024).

Accommodation catering co-integration regression results from China show that low income (MW_{caf}) and per capita value added by the industry (AP_{caf}) of variable coefficients are 0.7241 and -0.5066, respectively. The concomitant probability p value is less than 0.5, and the results are significant. Low-income increases have a positive effect on Chinese accommodation and foodservice industry employment, according to regression results. It is consistent with our previous research, which found that low-income increases promoted employment in the hospitality industry, implying that low-income increases promoted employment in the catering industry to some extent.

4.2.4. The Econometric Analysis of Accommodation Catering Industry Employment Impact of the U.S. due to the Increase of Minimum Wage. The results of the co-integration

regression analysis of accommodation catering industry employment effect of American low-income increases are as follows:

$$\ln(E_{aaf}) = 1.0468 \ln(MW_{aaf}) - 2.1097 \ln(AW_{aaf}) + 1.9938 \ln(AP_{aaf}) - 2.8596. \quad (5)$$

t value — (3.3260) (−1.9086) (3.5653) (−0.8282).

p value — (0.0077) (0.0854) (0.0051) (0.4269).

Regression results show that low income (MW_{caf}) and per capita value added by industry (AP_{caf}) of variable coefficient were 1.0468 and 1.9938, respectively. The concomitant probability p -value is less than 0.05, and the statistical results were significantly below 5%. The average wage (AW_{aaf}) has a variable coefficient of −2.1097, and its statistical results are significantly below 10%. The rise in the low income has helped boost employment in the hotel and catering business in the United States.

5. Discussion

In this section, we will explain the comparison of low-income employment effect and cause the analysis of the employment effect of different low incomes. It will help discuss the comparison of wages and analyze its employment effect.

5.1. The Comparison of Minimum Wage Employment Effect. Through the above econometric analysis, we found that low-income increases for China and the U.S. have a promoting effect on their whole employment levels and accommodation catering industry employment, however, the degree of influence is different. The specific performance is as follows:

5.1.1. The Overall Employment Effect of Minimum Wage. In China and the U.S., the increase in the low income has boosted total employment. In China, however, the positive impact of the low income is less clear. As a result, a rise in the low income in China will have a minor influence on overall employment. The increase in employment in the U.S. is more noticeable than in China.

5.1.2. Minimum Wage Employment Effect of the Low-Wage Industry. Low-income increases have a substantial influence on employment in the lodging and foodservice industries in China and the United States, however, the effects are different. The impact of low income on employment in the U.S. hotel and foodservice industry is far greater than in China.

The comparison of low-income increase employment effect is shown in Table 10.

5.2. Cause Analysis of Employment Effect of Different Minimum Wage. Many variables impact the low-income

employment effect, including low income and increasing range, labor supply and demand, supply and demand elasticity, and the degree of compliance and enforcement. They will have an impact on the employment effect of low income to some extent (Fu). As a result, the causes for the disparity in low-income employment effect may be investigated.

5.2.1. Minimum Wage and Adjustment Range Difference

(1). Chinese Low Income and Adjustment Range. According to statistics, during the period of 2001–2016, with 2009 affected by the world financial crisis not being adjusted, all the other years have a different proportion of adjustment of the low income, and the adjustment is more than 90% in 2010 and 2015. While the Chinese low income adjustment frequency has been accelerating, the pace of adjustment has been increasing. The low income and adjustment conditions of China from 2001 to 2016 are shown in Table 11.

Data sources: national bureau of statistics statistical yearbook (2001–2017). The national low income in China is calculated by dividing the average total of provinces and cities over the years by the number of provinces and cities.

Firstly, from the low income growth rate, the Chinese low income is growing faster. From 289 yuan/month in 2001 to 1455 yuan/month in 2016, the average annual growth rate was 11.6%, and the low income increase in most years was more than 10%. In 2004 and 2010, the low income rose by more than 20%. On the whole, however, the annual growth rate of low income is lower than the average annual GDP and average wage growth. During the period from 2001 to 2016, the average annual growth rate of low income was 11.6%, while the average per capita GDP and average wage growth rate were 13.3% and 13.1% respectively (see Table 11). Second, in terms of the less income and per capita GDP ratio. Between 2001 and 2016, China's less income was roughly between 29 and 40 percent of GDP, with an annual average of 33.8 percent. In 2009, the ratio reached a minimum of 29%. From 2010, the low income as a percentage of GDP per person has picked up gradually in terms of per capita GDP growth, which is related to the rapid growth of China's low income. Once again, from the ratio of low income to the average wage, China's low income is generally low. Table 11 shows the changes in the ratio of low income to the average wage in China between 2001 and 2016. The ratio is between 23% and 35%, and the annual mean is 27.7%. The low income growth rate, per capita GDP growth rate, and average

TABLE 10: The comparison of low-income increase employment effect.

Country	Overall employment effect	Employment effect of accommodation catering industry
China	0.0740 (0.0001)	0.7241 (0.0000)
America	0.1094 (0.0942)	1.0468 (0.0077)

Notes: the data in the brackets in the above table is the associated probability.

TABLE 11: The low income and adjustment conditions of China from 2001 to 2016.

Year	Low income (yuan/month)	Low income growth rate (%)	GDP growth rate per capita (%)	Average wage growth rate (%)	Ratio of less income to GDP per capita (%)	Ratio of low income to average wage (%)
2001	289	—	—	—	40.0	31.9
2002	314	8.6	9.0	14.3	40.0	30.3
2003	328	4.5	12.2	13.0	37.0	28.0
2004	400	21.9	17.0	14.1	39.0	30.0
2005	424	6.0	15.0	14.6	36.0	28.0
2006	504	18.9	16.4	14.4	36.0	29.0
2007	559	10.9	22.5	18.7	33.0	27.1
2008	622	11.3	17.6	17.2	31.0	25.8
2009	622	0.0	8.6	12.0	29.0	23.1
2010	771	23.9	17.7	13.5	30.0	25.3
2011	900	16.7	17.8	14.3	30.0	25.8
2012	1019	13.2	9.8	12.1	31.0	26.1
2013	1166	14.4	9.5	10.1	32.0	27.2
2014	1252	7.40	7.6	9.5	32.0	26.7
2015	1425	13.8	11.5	10.3	33.0	30.4
2016	1455	2.10	7.15	8.93	32.4	28.1
Mean value	—	11.6	13.3	13.1	33.8	27.7

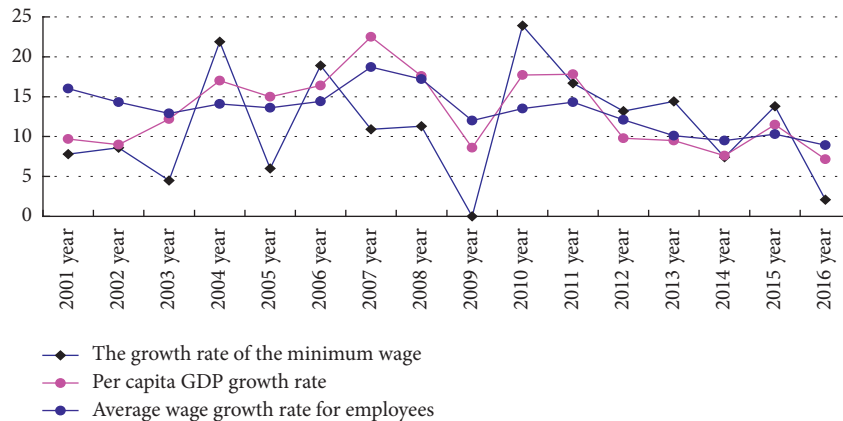


FIGURE 1: The low income growth rate, per capita GDP growth rate and average wage growth rate of China from 2002 to 2016 (in percentage).

wage growth rate of China from 2002 to 2016 (in percentage) are shown in Figure 1.

(2). *The U.S. Minimum Wage and Its Adjustment Range.* The low income adjustment frequency is not specified under U.S. law. In practice, America's low income adjustment is not regular or frequent. From 2001 to 2016, the U.S. low income has been adjusted only four times (see Table 12). Between 1997 and 2007, the U.S. did not adjust the low income for 10 years. In July 2009, the low income in the U.S. was adjusted to \$7.25 (50.75RMB per hour) and has not been adjusted for eight years. As one can observe, the low income in the U.S.

has been gradually adjusted and slowly raised, while the number of adjustments has been relatively low relative to China's.

5.3. *Data Source: U.S. Bureau of Labor Statistics.* Firstly, low-income growth rate is relatively slow in the U.S. According to the Labor Statistics Bureau, low income in the U.S. rose from \$5.20 in 1999 to \$7.25 in 2016, with an annual growth of just 2.8%, which is significantly lower than China's 11.6%. According to the bank of England's average monthly exchange rate, the real value of America's low income is low and undulating (see Table 3). On the whole, America's low

TABLE 12: Low income and adjustment conditions in the U.S. from 2000 to 2016.

Year	Low income (dollar/month)	Low income growth rate (%)	GDP growth rate per capita (%)	Average wage growth rate (%)	Ratio of low income to GDP per capita (%)	Ratio of low income to the average wage (%)
2001	5.15	—	—	—	28.7	31.5
2002	5.15	0	2.40	4.59	28.1	30.1
2003	5.15	0	3.81	1.81	27.0	29.6
2004	5.15	0	5.35	2.24	25.6	28.9
2005	5.15	0	5.39	2.30	24.2	28.3
2006	5.15	0	4.59	3.46	23.1	27.3
2007	5.85	13.6	3.38	3.82	25.3	29.9
2008	6.55	12.0	0.70	3.89	28.1	32.2
2009	7.25	10.6	-2.98	2.85	32.1	34.7
2010	7.25	0	2.84	2.15	31.2	34.0
2011	7.25	0	2.83	1.83	30.3	33.3
2012	7.25	0	3.21	1.24	29.3	32.9
2013	7.25	0	2.50	1.45	28.6	32.5
2014	7.25	0	3.28	1.70	27.6	31.9
2015	7.25	0	2.81	2.29	26.9	31.2
2016	7.25	0	2.30	2.71	26.3	30.4
Mean value	—	2.40	2.80	2.60	27.7	31.2

income growth is slower than the GDP growth of 2.8% and average wage growth of 2.6% (see chart 12). Secondly, from the point of low income and the per capita GDP index, the proportion that low income occupies the GDP per capita in the U.S. from 2001 to 2016 is hovering between 23 percent and 35 percent, with the lowest period in 2006, with a peak value of 32.1% in 2011 and an annual average of 27.7% in 2011, which is lower than the annual average of 33.8% in China. It is related to the relatively slow pace of U.S. economic growth. Once again, the ratio between low income and the average wage ratio is between 27 and 35 percent, with an average of 31.2 percent, compared with 27.7 percent in China (see Table 12). The nominal low income and the actual low income measured by price in 2012 from 1935 to 2012 in the U.S. are shown in Figure 2.

Data Sources: the BLS, <https://www.dol.gov/whd/minwage/chart.htm>. The chart data are obtained after collating.

From the above analysis, it can be seen that China and the U.S. differ in their low income and their adjustment range. The low income in China is lower than that in the U.S. The low income in the U.S. is adjusted less frequently and is with a smaller range than that in China.

According to the low-income unemployment effect model and the buyer monopoly model proposed by (Stigler), When the government's low-income standard is equal to or less than the equilibrium wage of complete competition, there is no detrimental influence on the labor market. When the low income is higher than the competitive equilibrium wage, employment is gradually decreasing. The ideal state is reached when the minimum pay equals the competitive equilibrium wage.

As a result, the low-income standard is acceptable when the salary level paid by the corporation falls between that of the competitive equilibrium wage. When the low income is low, increasing it correctly will not hinder work opportunities. According to econometric study, raising low income

will neither reduce general employment nor industry employment in China or the U.S. After a frequent and rapid rise in China's low income, its low-income overall employment elasticity tends to zero, which indicates that China's low-income growth in the future should be conservative, and the increased range should be slowed down. Otherwise, it runs the danger of lowering employment. Secondly, China should set a minimum pay guideline for each industry based on various characteristics of labor productivity and labor cost, which will assist to improve the low income's rationale and effectiveness. America's low income adjustment is slow, and its overall employment positive effect is relatively obvious. According to the theory of less income, there is room for America's low income to improve. Raising low income properly is good for low-skilled workers' income as it can increase employment opportunities and can improve the quality of employment.

5.3.1. The Difference between China and America in Supply and Demand in Labor Market and Elasticity of Supply and Demand. The low-income employment effect is determined not just by the low-income level but also by labor market supply and demand, supply and demand elasticity, and the characteristics of workers' groupings. According to the theory of labor market supply and demand, when wages rise, labor demand decreases more than labor supply because labor demand elasticity is greater than labor supply elasticity. Therefore, the wage rate goes up, the labor demand goes down, the supply of labor increases, and the supply exceeds the demand. Under the established cost conditions, when low-income increases and the labor supply increases, the enterprises reduce the employment demand of the labor force, leading to the reduction of the employment level. The reduction in the employment rate brought by low income also depends on the elasticity of demand and the elasticity of supply. In the case that other conditions do not change, the

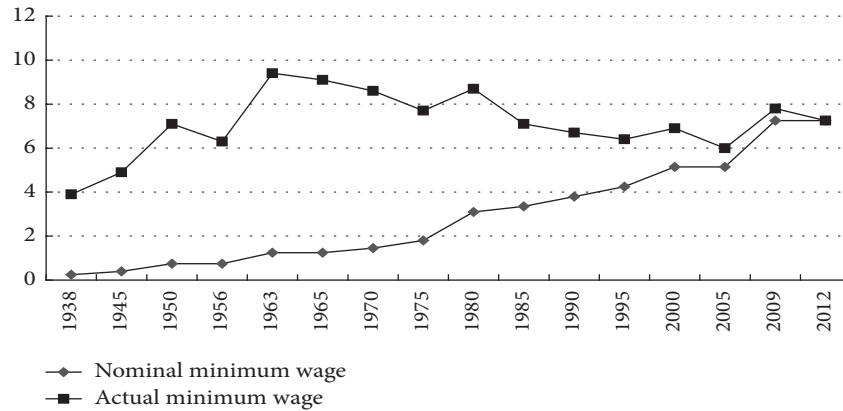


FIGURE 2: The nominal low income and the actual low income measured by price in 2012 from 1935 to 2012 in the U.S.

greater the elasticity of labor supply and elasticity of demand, the more obvious the negative effect of low income on employment. In China, the labor force is abundant, especially the low-end labor force. The labor supply is greater than demand, the overall labor productivity is low, and labor supply elasticity and demand elasticity are bigger. The work force in the United States is relatively short-term, capital is generally abundant, low income is relatively high, and labor supply and demand elasticity are minimal. The negative effect of low-income increases on employment is less obvious. One of the reasons why America's low income employment is better than China's is because of this.

5.3.2. The Difference between China and the U.S. in Compliance and Enforcement of Minimum Wage. The compliance degree of low income relates to the fact that it may be quantified using the compliance rate, which is defined as the ratio of real low income implementation to compliance. The level of the low income, the complexity of the system, and the perfection of the enforcement mechanism are all factors that influence compliance. The simpler the low-income system, the lesser the low income, and the easier the implementation, the higher the compliance rate. Ding Shouhai showed in his research that low income and its external regulatory environment determine the low-income employment effect. The greater the regulatory environment, the greater the impact of low-income system on employment.

In China, the minimum pay is determined by the low income requirement and the new labor contract legislation. In China, low-income law is restricted to departmental and local rules, and it has not been elevated to a national legal level. There has been no special low-income law enacted up to this point. China's tripartite consultation mechanism is inadequate, and the effectiveness of low income, mandatory, and binding force is weak, and the penalties for violating low income is light. Phenomena, such as impotence and refraining from punishing law-breakers, are more common. In addition, Chinese workers have low awareness of low income and weak protection of human rights, which makes low-income compliance rate relatively low and enforcement-weak. It overestimates the positive effect of low income on employment to some extent.

In 1938, the U.S. enacted the national low income act called the Fair Labor Standards Act. It has a special low-income commission, which is composed of many representatives for the formulation, adjustment, auditing, and revision of the low income and is overall responsible for the violation of sanctions, making the decisions more scientific and effective. The U.S. Department of Labor's wages man-hour is responsible for the management and execution of the "Fair Labor Standards Act." The penalties for the violations of labor laws and low income laws are severe, anywhere from being fined to being criminally charged and even sentenced to imprisonment. As a result, the low income in the U.S. is more effective, with higher compliance rates and stronger enforcement than in China. Generally speaking, the higher the compliance level of low income, the stronger the enforcement and the more obvious the negative effect of low income on employment.

In short, China and the U.S. differ in low income and adjustment, labor market supply and demand, and the degree of compliance and enforcement, which is the primary reason for the wage disparities between the two nations. The low-income employment effect, on the other hand, is the outcome of a combination of all of these factors.

6. Conclusion

In this article, we evaluated the influence of changes in low income on employment in China and the U.S. using co-integration regression analysis. The minimum wage was a basic pay and social security system utilized by governments to intervene directly in labor market wages. For this purpose, the econometric analysis and comparative research on the employment effect of low income and the employment effect on the lodging and foodservice sector in China and the United States were conducted using the co-integration analysis technique. The findings reveal that in China, the positive employment effect of low income is not clear and that increasing low income has no substantial effect on employment, however, in America, the positive employment effect of low income is very obvious. Raising low income will promote employment in the accommodation and foodservice industry in China and the U.S. As a result, an adequate

rise in low income in China and the United States will have no effect on their employment. These findings vary from those of other research, which claim that raising low income will reduce employment in the hospitality and foodservice industries in the U.S. (Even and Macpherson). By comparing the low-income employment effect in China and the U.S. and analyzing its reasons, this paper proposes that it is necessary to set up a low-income standard in China and raise low income in the U.S. appropriately. It also serves as a source of information and assistance for the mutual coordination of low income and employment in China and the United States. This sort of research should aid policymakers in such nations in making appropriate decisions.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that he has no conflicts of interest.

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