

An Examination of the RMB Real Effective Exchange Rate and Employment: Firm-level Evidence from China

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ABSTRACT This paper empirically examines the impact of changes in the RMB real effective exchange rate on the employment of heterogeneous workers within enterprises based on matched data from the China Industrial Enterprise Database and Customs Database from 2000 to 2007, aiming to provide micro-level evidence for labor-intensive export industries such as textiles and garments to address employment stability under exchange rate shocks. Against the background of increasingly digitalized manufacturing and intelligent industrial systems supported by advanced information transmission and electromagnetic communication infrastructures, understanding employment responses to external economic fluctuations has become increasingly important. The results show that RMB appreciation aggravates unemployment and leads to a more pronounced decline in unskilled employment than in skilled employment. Moreover, unemployment effects are particularly significant in textile, clothing, and leather enterprises that are highly dependent on international trade. These findings provide empirical evidence for maintaining employment stability and industrial resilience in export-oriented manufacturing while offering useful policy implications for sustainable operation and intelligent upgrading of modern industrial systems.

INDEX TERMS RMB real effective exchange rate, employment, textile industry, intelligent manufacturing, electromagnetic communication infrastructure

I. INTRODUCTION

EMPLOYMENT stable is not only the cornerstone of individual survival and development, but also the “ballast stone” and “stabilizer” of the country’s economic and social operation. Driven by the steady global economic recovery and sustained expansion of external demand, China’s economic growth has maintained a rapid upward trend since 2000, with continuously strengthening growth momentum. In 2000, China’s Manufacturing Purchasing Managers’ Index (PMI) remained robust above the threshold line throughout the year, while manufacturing investment and export orders grew rapidly. The industrial competitiveness continued to rise within the global value chain, injecting strong vitality into the national economy. As a typical labor-intensive and export-oriented industry, the textile, garment, and leather industry occupies an important position in China’s manufacturing sector, and its employment stability is of critical significance to people’s livelihood and social development. Since China implemented managed floating exchange rate system (exchange rate abbreviated as ER), RMB ER has appreciated, which makes manufacturing

industry face the dilemma of shrinking external markets. Since the implementation of ER reform policy in 2005, the RMB appreciation has accumulated more than 30%.

Employment adjustment is an important channel for companies to deal with ER shocks. Based on S-S theorem in neoclassical trade framework, it is pointed out that international trade promotes the increase of real returns of domestic relatively abundant elements, while the actual returns of relatively scarce elements decrease. In developed countries, skilled labor is an element of abundance, and the demand for skilled labor in the world market increases and the demand for unskilled labor decreases, resulting in an increase in skilled employment rather than a decrease in skilled employment in developed countries. For developing countries, unskilled labor is an abundant factor, and the demand for unskilled labor in the world market is relatively increasing, so unskilled employment increases while skilled employment decreases. At present, skilled labor accounts for 26% of total employment, high-skilled labor accounts for 28% of total skilled labor, and unskilled labor accounts for 74% of total employment in China. ER fluctuations

affect the size of companies and investment decisions by affecting products prices, and then affect domestic employment. Starting with RMB ER change, we attempted to study the impact of this external shock on the employment in China's manufacturing enterprises. Given that exchange rate fluctuations are particularly sensitive to highly export-dependent industries such as textiles, garments, and leather, the findings of this paper provide important practical guidance for understanding and ensuring employment stability in the textile sector and even the entire light manufacturing industry.

The existing literature confirms ER changes have different impact on the employment in different companies, but there is a relative lack of research on the impact of ER changes on internal wage structure and wage gap. The impact of RMB ER changes on the wage levels and wage gaps of heterogeneous workers in micro-enterprises is of great significance to the adjustment of the central bank's ER policy. In this paper, we attempted to solve the following problems: (1) How does RMB ER affect the employment of skilled labor and unskilled labor? Will RMB appreciation lead to the replacement of unskilled labor force? (2) Does the impact of RMB ER on workers employment vary in different kind of companies? (3) What are the dynamic characteristics of the impact on workers' career?

RMB ER affects the companies' profit by affecting the relative prices of import and export products, and it also affects the demands for labors. according to matching samples of Chinese industrial enterprise and customs databases, we make an empirical test on the impact of RMB ER changes on skilled labor and unskilled labor employment in micro-enterprises. We have drawn the following conclusions: (1) RMB appreciation has aggravated domestic unemployment, which is manifested in the simultaneous decline in the employment level of all skill-level workers. The unskilled workers' unemployment level is more prominent. RMB appreciation increases employment through import channels, and reduces employment through export channels, and export channels dominate. (2) RMB appreciation has increased all workers' employment in state-owned and collective enterprises. However, the increase in the employment of skilled workers is even greater. Private enterprises and foreign funded enterprises employ less labor, but the decrease in unskilled labor is even greater. (3) The unemployment impact caused by RMB appreciation is particularly significant for industries such as textiles, garments, and leather, highlighting the need for special attention to the employment vulnerability of such labor-intensive export industries when formulating exchange rate and industrial policies.

II. LITERATURE REVIEW

ER is an important tool for policy adjustment under condition of open economy. Since we implement ER reform policy in 2005, RMB ER fluctuation has more significant impact on commodity prices and trade behaviors. The ER

fluctuation range and frequency of will affect the domestic employment by price indirectly transmission and enterprise behavior. At present, scholars have done sufficient research on the relationship between RMB ER fluctuation and employment from the theoretical and empirical aspects, including the influencing factors of ER-employment effect, the mechanism of ER changes affecting employment and country comparison.

A. THE EFFECT OF ER ON EMPLOYMENT

The existing scholars' research is mainly focused on three levels: enterprise, industry and industry. On the whole, ER changes affect employment level by allocating jobs in enterprises, such as the destruction of existing jobs and the creation of jobs related to the trend of ER changes. Based on a country's opening policy, the impact on employment is more profound, and the more frequent ER changes, the less conducive to the stability of employment. For enterprises, devaluation can make foreign currencies of the same denomination exchange for more local currencies and buy more domestic goods, so devaluation increases the demand for goods in foreign markets, thus promoting employment, while currency appreciation reduces the level of employment in the opposite way [1,2]. For the industry, the depreciation of the RMB ER helps to increase employment in labour-intensive industries, while appreciation contributes to employment in technology-and capital-intensive industries. In the long run, appreciation will lead to a decrease in manufacturing employment, a decline in real wages in international trade sectors and an increase in real wages in non-international trade sectors [3].

From the industrial level, the RMB appreciation led to decline of employment rate in China's industry. It is related to the intertemporal substitution elasticity of consumption. Only when the elasticity level is small, RMB devaluation will promote employment. RMB appreciation has improved labor efficiency, and also increased the capital intensity and reduced labor demand [4]. The depreciation of the RMB will boost employment in most of China's labour-intensive manufacturing industries, while RMB appreciation will also increase employment in capital-intensive and technology-intensive companies.

B. THE IMPACT OF ER ON DIFFERENT COUNTRIES' EMPLOYMENT

The adjustment speed of industries in French and German to long-term steady state is slow, which is not significantly affected by ER fluctuations, while the industrial adjustment process of the US, Britain, Canada, Japan and Italy is faster, and their domestic employment is more affected by ER fluctuations [5]. However, it is believed that the impact of ER fluctuations on enterprise employment is not mainly achieved through trade, enterprise production is faced with sunk costs, its investment and labor allocation need to be planned in advance, ER fluctuations change the investment and labor demand of enterprises, and enterprises

need to pay huge costs to change their decisions. The RMB appreciation leads to the reduction of employment, while RMB depreciation can increase employment in a certain period of time. The appreciation of the dollar reduced US employment by 4.5 % and 7.5 %, and average wages by 2% [6]. In countries with slow industrial adjustment, such as Germany and France, domestic employment is not sensitive to ER changes, while in countries with faster industrial adjustment, such as the United States. At the same time, employment in developing countries is also sensitive to ER changes [7-9]. So competitive ER policies matter not only for raising long-term growth potential, but also for reducing longstanding gender disparities in labor force participation [10].

C. THE INFLUENCE MECHANISM OF ER ON EMPLOYMENT

The influence mechanism of ER on employment is mainly concentrated in the theoretical research level, including two perspectives of factors and price. For example, it is believed that ER changes mainly affect labor demand by three ways: import penetration, export pull and input substitution [11]. Real ER appreciation promotes employment growth through the reallocation of resources. It is summed up three channels through which the real ER affects employment: macro import and export channels, economic growth channels and labor intensity channels [12]. The ER mainly affects employment by three ways: technology, export demand and efficiency. If a country pursues ER stability, its unemployment rate is relatively low [13].

The adjustment of labor force structure in response to ER shocks is affected by many external factors. It is believed that enterprises will adjust workers' wages to cope with the impact of ER fluctuations, and take into account the impact of corporate monopoly and import factors when calculating the employment elasticity of ER [14]. Based on new trade theory, in labor market, the higher the adjustment cost of skilled labor and unskilled labor, the lower the employment elasticity of ER [15]. Under the market conditions of low productivity, high trade dependence and easy labor adjustment, the greater the employment adjustment when enterprises are faced with ER fluctuations, ER changes promote the distribution of jobs in the industry to some extent [16].

III. MODEL SETTING, VARIABLE SELECTION AND DATA DESCRIPTION

A. MODEL SETTING

This article constructs the following measurement model to examine the impact of ER changes on employment in companies. Compared with the nominal exchange rate, the actual effective exchange rate eliminates price factors and can better reflect the competitiveness of a country's currency in international trade [17]. So, we use the real effective ER (REER) as the main explanatory variable for regression.

$$\begin{aligned}\Delta \ln y_{it} = & \alpha_0 + \alpha_1 \Delta \ln R_t^X + \alpha_2 X S_{i,t} + \alpha_3 \Delta \ln R_t^X X S_{i,t} \\ & + \alpha_4 \Delta \ln R_t^I + \alpha_5 I S_{i,j,t} + \alpha_6 \Delta \ln R_t^I I S_{i,j,t} \\ & + \beta X_{it} + \theta_j + \theta_t + u_{ijt}.\end{aligned}\quad (1)$$

The regression uses the first-order difference form of all variables. i , j and t represent the company, the trading partner and the time respectively. $\Delta \ln y_{it}$ represents enterprise employment, and indicates the change of $\ln y_{it}$. R_t^X indicates the REER for exports, which takes into account of the impact of ER fluctuations on domestic employment due to different exporting countries. R_t^I represents REER of imports, which takes into account of the impact of ER fluctuations on domestic employment due to differences in the source countries of intermediate inputs. $X S_{i,t}$ is the share of the enterprise's export in income, and its value range is $[0, 1]$, which indicates the influence of the enterprise on the change of employment in terms of income. $I S_{i,j,t}$ represents the ratio of imported intermediate goods in all input expenditure, indicating the impact of enterprises on employment changes in terms of costs. θ_j refers to the fixed effect of the industry, indicating the industry trend of employment. θ_t refers to the time trend item, indicating the common impact of major events on enterprises, such as price, demand, interest rate and fiscal policy. u_{ijt} refers to exogenous random interference. X_{it} refers to the control variable, which mainly includes three variables, among which the foreign expdpd (GDP growth), is used to represent the external demand change of the enterprise. Corporate income inco and profit profit, are used to express the output and profitability of the enterprise. The cross item $\Delta \ln R_t^X X S_{i,t-1}$ indicates the REER affects the employment structure of enterprises through export channels. The cross item $\Delta \ln R_t^I I S_{i,j,t-1}$ indicates that the REER affects the employment structure of enterprises through intermediate goods imports. On this basis, the elasticity of export REER and import REER are as follows:

$$\varepsilon_{RX} = \alpha_1 X S_{it} + \alpha_3 \quad (2)$$

$$\varepsilon_{RI} = \alpha_4 I S_{it} + \alpha_6 \quad (3)$$

ε_{RX} refers to the elasticity of export REER, indicating that for 1% change in the REER, the degree of change in enterprise employment caused by export channels. ε_{RI} refers to the elasticity of the import REER, indicating that for 1% change in the REER, the degree of change in enterprise employment caused by import channels.

Through the data statistics, the average value of $X S_{it}$ is 0.07 and the average value of $I S_{it}$ is 0.03. The export REER elasticity and import REER elasticity can be calculated according to formula (2) and (3). The change of the REER is caused by the change of the geographical location of trade, the ER of the main trading countries and the relative

ER of their own countries. The fluctuation range of ER is different in different periods of the sample. The right side of the formula (1) takes into account not only the change of enterprise income (the ratio of export to total income), but also the change of enterprise cost (the ration of intermediate goods import to total import cost).

B. INDEX MEASURE

In this paper, the arithmetic weighted algorithm was used to calculate the REER of RMB. According to the calculation method of Baggs [18], the calculation method of the REER of country k in t period is as follows:

$$rer0_{kt} = (E_{k/CNY_t}) \times (p_{ct}/p_{kt}) \quad (4)$$

Among them, E_{k/CNY_t} refers to the nominal ER of RMB and currency k in t period (indirect pricing method). p_{ct} is the Chinese consumer price index (1999=100), p_{kt} refers to the consumer price index of country k (1999-100). The REER of each country is then converted to the REER based on 1999:

$$rer_{kt} = (rer0_{kt}/rer_{k99}) \times 100 \quad (5)$$

Finally, the REER of enterprise i in t period is expressed as:

$$Reer_{it} = \sum_{k=1}^n \left(S_{ik} / \sum_{k=1}^n S_{ik} \right) \times rer_{kt} \quad (6)$$

$S_{ik} / \sum_{k=1}^n S_{ik}$ indicates the proportion of the trade volume between enterprise i and country k in the t period and the total trade volume in the current period.

REER of imports:

$$imReer_{it} = \sum_{k=1}^n \left(I_{ik} / \sum_{k=1}^n I_{ik} \right) \times rer_{kt} \quad (7)$$

$I_{ik} / \sum_{k=1}^n I_{ik}$ indicates the ratio of the intermediate goods imported by enterprise i from country k in the t period to the total imports in the current period.

$$exReer_{it} = \sum_{k=1}^n \left(X_{ik} / \sum_{k=1}^n X_{ik} \right) \times rer_{kt} \quad (8)$$

$X_{ik} / \sum_{k=1}^n X_{ik}$ indicates the ratio of enterprise i exports to country k during t period to the total exports of the current period.

C. DATA SOURCE

We uses the matching samples of Chinese industrial enterprise database and customs database from 2000 to 2007 to carry out empirical test. We match of enterprises in the two databases through three steps [18]. Firstly, we match the two databases with the enterprise name. Secondly, we delete the matched samples from the original sample, and match the remaining samples according to the postal code and the last

seven digits of the phone number of the enterprise. Finally, the samples that have been successfully matched are deleted from the original sample, and the remaining samples are matched according to the postal code and the enterprise contact person. After that, we processed the samples which are successfully matched in the following ways: (1) we exclude samples with zero or negative average wages and sales; (2) We remove the samples that the enterprise code cannot correspond one to one, and delete the samples whose commodity price, trade volume or trade volume is zero or negative. (3) We exclude the samples in which the total assets are less than the net fixed assets, the total assets are less than the current assets, and the accumulated depreciation is less than the current depreciation, because the bookkeeping of these enterprises does not comply with the accounting standards. (4) We exclude enterprises whose number of employees is less than 8. If the number of employees is less than 8, the enterprise lacks an effective accounting system. (5) We exclude the samples whose amount of intermediate inputs, the annual average balance of net fixed assets, paid-in capital, fixed assets and industrial added value is zero or negative. (6) We remove duplicate samples.

D. BASIC STATISTICS OF VARIABLES

We have compiled statistics on the number and proportion of samples of enterprises in different years and the results are listed in Table 1. Since 2004 was the annual economic census, its sample size was the largest with 90,715 companies, and the sample size in 2000 is the smallest with 19,613 companies, and the overall sample size is 416,971 samples.

We count these samples according to the type of enterprise ownership, and the results are listed in Table 2. The top three types are wholly foreign-owned companies, Sino-foreign joint ventures and state-owned companies, and the proportions of enterprises are 36.75%, 27.27% and 6.65% respectively. We consider wholly foreign-owned enterprises, Sino-foreign joint ventures and Sino-foreign cooperative enterprises as foreign-funded enterprises, so the proportion of foreign-funded companies reaches to 68.57%. It can be seen that the number of foreign-funded companies in the sample far exceeds the number of state-owned enterprises and private companies.

IV. ESTIMATED RESULT

A. THE INFLUENCE OF RMB REER ON AVERAGE EMPLOYMENT

Columns 1 and 2 of Table 3 are the basic estimation results of the impact of REER fluctuations on all enterprise employment. Regional fixed effects and industry fixed effects are added one after another in the following four columns, and robust standard errors are adopted. Taking the first column of the regression results as an example, for every 1% appreciation of the REER of exports, the overall employment level decreases by an average of 0.2%. The reason is that the external demand shrinking has caused the total income to fall. The impact of export share on the

TABLE 1. Sample Number and Sample Ratio in Different Years

Year	Sample numbers	Proportion	Proportion accumulation
2000	19613	4.7	4.7
2001	26506	6.36	11.06
2002	33000	7.91	18.97
2003	42232	10.13	29.1
2004	90715	21.76	50.86
2005	74221	17.8	68.66
2006	68956	16.54	85.2
2007	61728	14.8	100
Total	416971	100	

TABLE 2. Statistics of Sample Ownership Types

Enterprise type	Quantity	Proportion	Cumulative proportion
Others	378	0.27	0.28
State-owned enterprises	9410	6.65	6.93
Collective enterprises	8891	6.28	13.1
Private enterprise	25711	18.17	31.38
Wholly foreign-owned enterprises	52010	36.75	68.13
Sino-foreign joint ventures	38591	27.27	95.4
Sino-foreign cooperative enterprises	6505	4.6	100
Total	141518	100.00	

workers employment is obvious, and for every 1% increase in exports share, the employment of enterprise workers will increase by 0.065% accordingly. In contrast, every 1% increase in the import REER will correspondingly increase the employment of enterprise workers by 0.008%. It can be seen that the increase in intermediate goods imports caused by the appreciation of the REER of RMB has enhanced the production capacity of enterprises, which increase the employment of enterprise workers. In the table, labor is the corporate worker employment.

First of all, the ER appreciation increases the purchasing power of RMB to intermediate goods, and the increase in the number of imported intermediate goods means the increase of domestic production scale and product types, and the overall demand for labor force. At the same time, the decline in the price of intermediate goods will also lead

to an increase in the substitution of capital for labor, so there is a driving force for a reduction in the demand for labor. On the other hand, China is a big exporter, and exports play an important role in economy and employment. The number of imported intermediate goods is relatively small, the proportion of imports in the total input of enterprises is small, and the impact on labor employment is relatively weak. This is similar to the regression results of Italian manufacturing enterprises [14], American manufacturing enterprises [1], and Swiss manufacturing enterprises [19]. But compared with developed countries, ER appreciation has less impact on the employment of Chinese enterprises. The reason may be that the marketization level in China is relatively low, and the proportion of state-owned enterprises is large, and the transmission effect of ER fluctuations on the labor market of micro enterprises is not complete. This

TABLE 3. The Impact of RMB REER on Corporate Employment

Variables	(1) dlnlabor	(2) dlnlabor	(3) dlnlabor	(4) dlnlabor	(5) dlnlabor	(6) dlnlabor
$\Delta \ln R_t^X X S_{i,t}$	-0.161*** (-2.80)	-0.154*** (-2.68)	-0.206*** (-4.21)	-0.162*** (-2.81)	-0.205*** (-4.18)	-0.193*** (4.32)
$\Delta \ln R_t^I I S_{i,j,t}$	0.000 (0.21)	0.000 (0.22)	0.000 (0.43)	0.000 (0.18)	0.000 (0.39)	0.000 (0.58)
$\Delta \ln R_t^X$			-0.009** (-2.02)	-0.010** (-2.11)	-0.008* (-1.81)	-0.009* (-1.80)
$\Delta \ln R_t^I$			0.008*** (14.48)	0.009*** (14.67)	0.009*** (14.65)	0.009*** (15.14)
$X S_{i,t}$	0.065*** (7.53)	0.061*** (7.10)	0.067*** (8.18)	0.066*** (7.61)	0.071*** (8.65)	0.058*** (6.09)
$I S_{i,t}$	0.000 (0.95)	0.000 (0.99)	0.000 (1.19)	0.000 (0.93)	0.000 (1.12)	0.000 (0.87)
exgdp	0.100* (1.74)	0.111* (1.93)	0.105* (1.82)	0.116** (2.01)	0.110* (1.90)	0.098* (1.79)
lninco	0.035*** (48.33)	0.036*** (49.05)	0.036*** (49.28)	0.036*** (47.25)	0.036*** (47.46)	0.036*** (51.65)
lnprofit	0.020*** (11.13)	0.020*** (10.87)	0.020*** (10.92)	0.019*** (10.71)	0.020*** (10.76)	0.021*** (10.05)
_cons	-0.346*** (-42.84)	-0.366*** (-34.62)	-0.368*** (-34.86)	-0.586*** (-7.82)	-0.585*** (-7.79)	-0.060*** (-11.24)
ϵ_R^X	-0.020***	-0.021***	—	-0.019***	-0.014***	-0.023***
ϵ_R^I	0.008***	0.009***	—	0.009***	—	0.009***
Regional Effect	NO	YES	YES	YES	YES	YES
Industry Effect	NO	NO	NO	YES	YES	YES
N	160268	160268	160268	160268	160268	160268
R^2	0.017	0.019	0.018	0.021	0.020	0.018

makes the average employment level of Chinese enterprises less flexible to import effective ER and export effective ER. Another possible reason is that the data at the enterprise level of a single manufacturing industry hides the possible interaction between industries, so the final calculated coefficient of elasticity is smaller.

The regression coefficients of other control variables are in line with expectations. The proportion of enterprise exports reflects the scale of external market demand and has a significant positive correlation with labor employment. For every 1% increase in overall GDP in importing countries, the average employment level of enterprises increases by 0.1%. The level of income and profit reflects the production and profitability of enterprises, in which for every 1% increase in income, the average employment of workers increases by 0.035%, while for every 1% increase in profits, the average employment level of workers increases by 0.020%. Therefore, the higher the level of production and profitability of enterprises, the expansion of their technology, capital and

scale needs to match the level of labor force, so there is a positive correlation between external demand and their own productivity and the average employment of enterprises.

In order to increase the robustness of the results, the article re regresses using the RMB/USD exchange rate R as the explanatory variable. As we see in table4, column (1), for every 1% appreciation of the RMB, employment decreases by 0.062%. Therefore, the regression results are robust. We reclassified skilled labor and unskilled labor, treating workers with wages higher than the industry average as skilled labor and workers with wages lower than the industry average as unskilled labor. As we see in table3, column (6), for every 1% appreciation of the RMB, employment decreases by 0.023%, and the results remained robust. Before 2005, China implemented a fixed exchange rate system pegged to the US dollar, and after 2005, a managed floating exchange rate system was implemented. The real effective exchange rate of the RMB is not entirely driven by the market, and the intervention of the central bank

may respond to the national economic situation (including employment goals). Therefore, there may be a reverse causal relationship between the real effective exchange rate and employment. To address the endogeneity issue in the model, we chose the US inflation rate as the instrumental variable for regression analysis. On the one hand, US inflation will affect the Federal Reserve's monetary policy (interest rates), which in turn affects the RMB exchange rate through interest rate parity and capital flows. On the other hand, US inflation is mainly determined by domestic factors such as fiscal stimulus, supply chains, and labor markets, and is not directly affected by China's employment targets, which meets the intuitive requirement of exogeneity. As we see in Table 4 column (2), for every 1% increase in US inflation rate, labor employment decreases by 0.031%, and the regression results remain robust.

B. HETEROGENEITY TEST OF RMB REER INFLUENCE ON EMPLOYMENT

1) The influence of RMB REER on the level of skilled and unskilled employment and the employment level of men and women

We article classifies labor into skilled and unskilled based on workers' educational levels, with those having a college degree or above considered skilled labor, and those with less than a college education considered unskilled labor. Table 1 only showed the impact of ER fluctuations on overall enterprise employment, but do not reflect the heterogeneity of enterprise workers' employment. First of all, for the heterogeneity of enterprises, the above regression cannot distinguish which enterprises have increased employment and which enterprises have decreased employment. Secondly, for the heterogeneity of the labor force, the overall regression cannot distinguish between skilled labor and non-skilled labor employment changes. Based on which, we first test the impact of ER fluctuations on the employment of skilled and unskilled workers and the employment levels of different genders, as showed in Table 5. In this table, labor_s is the skilled worker employment, and labor_u is the unskilled worker employment. We consider high school diploma or above as skilled labor and other workers are unskilled worker. Labor_m is the skilled man worker employment. labor_f is the skilled woman worker employment.

Through the regression of skilled and unskilled employment, we can find that the appreciation of export REER reduces the employment of skilled labor and unskilled labor at the same time. When the ER appreciates by 1%, the elasticity coefficient of its impact on employment of skilled labor and unskilled labors is -0.03% and -0.06% respectively. The appreciation of domestic ER results in more unemployment of unskilled labor and an increase in the proportion of relative demand for skilled labor. From a gender perspective, the impact of ER appreciation on male and female employment is also asymmetrical. For every 1% appreciation of the ER, male employment will drop by 0.08%, while female employment will drop by

0.04%. This is related to China's export structure. Textile, clothing, leather and other enterprises account for more than 30% of the export industry, and the demand for female labor force is relatively high. At the same time, in terms of China's population structure, the number and proportion of female population is low, the mobility is poor and the structure is relatively stable, while the male workers number is larger and more mobile. Therefore, under the influence of ER appreciation, the employment of male workers changes relatively greatly.

2) The impact of RMB REER on the employment of single export and two-way trading enterprises

According to the previous analysis, ER fluctuations affect the employment level and employment structure by affecting enterprises' import behavior and export behavior respectively. Based on this, we separately examine the impact of ERs on the employment of workers in one-way export companies and two-way trading companies, and the results are listed in Table 6. For export enterprises, for every 1% appreciation of the RMB effective ER, the employment level of enterprise labor force decreases by 0.04%, but the average effect is not significant. The skilled labor force decreased by 0.026%, while the unskilled labor force decreased by 0.033%. The employment of both male and female workers in export enterprises has declined, but the decline of male workers is greater (0.053%), while that of female workers is relatively low (0.028%), which is consistent with the previous regression results.

Compared with simple export enterprises, the employment response of two-way trading enterprises to ER appreciation is slightly different. The ER appreciation has significantly reduced the employment level of two-way trading enterprises. For every 1% appreciation of the ER, the employment of skilled labor has decreased by 0.050%, but this process is not significant. While the employment of unskilled labor force decreased by 0.087%. We can see that ER fluctuations have a greater impact on the employment of unskilled labor force in two-way trading enterprises. The reason is that the ER appreciation has seriously hindered the enterprises export, and the reduction of output and the original labor-intensive industrial structure have accelerated the unemployment of unskilled labor force. From the perspective of import costs, ER appreciation reduces the import costs of enterprises. On the basis of the original productivity structure, the increase in the number of imported intermediate goods increases the employment of unskilled labor and reduces the employment of skilled labor. To some extent, this offsets the impact of ER appreciation on exports. The change in the level of enterprise employment depends on the relative strength of the two. It can be seen that the import behavior of two-way trading companies has eased the impact of RMB appreciation on the labor market to a certain extent.

The appreciation of the REER reduces the level of employment through exports. Compared with female employ-

TABLE 4. Robustness test and endogeneity test

Variables	(1) dlnlabor	(2) dlnlabor
R	-0.062*** (4.56)	
Inf		-0.031*** (3.55)
$XS_{i,t}$	0.005*** (6.35)	0.060*** (6.01)
$IS_{i,t}$	0.001 (1.02)	0.002 (1.22)
exgdp _g	0.112** (2.12)	0.092*** (4.23)
lninco	0.042*** (45.30)	0.032*** (30.53)
lnprofit	0.031*** (9.88)	0.028*** (10.22)
_cons	-0.409*** (-31.26)	-0.511*** (-20.76)
Regional Effect	YES	YES
Industry Effect	YES	YES
N	160268	160268
R^2	0.131	0.125

ment (0.059), the decline of male employment level is more obvious (0.101). It can be seen from the regression results (Tab.7) that the increase in imports of intermediate goods by two-way trading companies has expanded the demand for male labor to a certain extent, alleviating the pressure of male unemployment, while the trend of female employment has not alleviated. That is, for every 1% appreciation of the RMB, the company increases the employment of men by 0.5% through imports. In terms of gender, men decline rapidly, grow fast, and are sensitive to shocks, while women decline slowly, grow slowly, and respond relatively slowly to ER shocks.

3) The influence of RMB REER on the employment of enterprises with different ownership

According to the ownership nature of enterprises, we divided samples into state-owned enterprises/collective enterprises, private enterprises and foreign-funded enterprises, and the results are listed in Table 8. Among them, foreign-funded enterprises include wholly foreign-owned enterprises, Sino-foreign equity joint ventures and Chinese-foreign contractual joint ventures. Among them, state-owned collective enterprises accounted for about 12.82%, private enterprises accounted for 16.63%, and the foreign-funded enterprises accounted for 70.80% of the total sample.

What the three types of enterprises have in common is that the impact of ER appreciation on enterprise employment through the export income effect is higher than that caused by the import cost effect. The difference is that state-owned enterprises increase the number of skilled and unskilled labor force through the export way, but unskilled labor employment increase more. For every 1% appreciation of the ER, skilled employment increases by 0.148%, while unskilled employment increases by 0.065%. However, private enterprises and foreign-funded enterprises have increased the employment of unskilled workers and

reduced the employment of skilled workers through export channels.

Compared with State-owned/collective enterprises, the marketization degree of private enterprises is relatively high, and In the case of RMB appreciation and exports blocked, state-owned enterprises can have priority to receive government subsidies and subsidies. At the same time, the scale of state-owned enterprises is relatively large, and they bear the important task of settling some jobs in cities and towns, so they enjoy more preferential policies. Preferential and subsidy policies have reduced the costs of state-owned collective enterprises and made them more capable of production, thus increasing the demand for labor, but the increase in skilled labor is still greater than that of unskilled labor. At the same time, the decline in import costs has led to a more significant decline in the demand for unskilled labor in state-owned enterprises, because capital is more likely to replace unskilled labor.

For private enterprises and foreign-funded enterprises, the appreciation of the renminbi reduces the employment of skilled workers and increases the employment of unskilled workers. Taking private enterprises as an example, for every 1% appreciation of the RMB, skilled labor employment will decrease by 0.028%, while unskilled labor employment will increase by 0.085%. The possible reason is, on the one hand, the private enterprises size is small, and it has reduced the production scale and the employment of skilled and unskilled labor under the impact of ER fluctuations. On the other hand, the original production structure has poor returns under the existing market conditions, and some manufacturers may begin to adopt a price war and turn to produce cheaper goods in order to survive, resulting in an increase in the employment of unskilled labor force. In addition, the employment of unskilled labor force decreases significantly through the import cost effect (the influence coefficient is -0.012% and -0.019% respectively).

TABLE 5. The Impact of RMB REER Fluctuations on Different Skills/Gender Employment Levels

Variables	(1) dlnlabor_s	(2) dlnlabor_u	(3) dlnlabor_m	(4) dlnlabor_f
$\Delta \ln R_t^X X S_{i,t}$	0.034 (0.177)	-0.697*** (-3.303)	-0.437** (-2.535)	-0.634*** (-2.951)
$\Delta \ln R_t^I I S_{ij,t}$	-0.019 (-0.439)	-0.001 (-0.018)	-0.060 (-1.564)	0.031 (0.654)
$\Delta \ln R_t^X$	-0.034** (-2.471)	-0.010 (-0.692)	-0.044*** (-3.619)	0.002 (0.142)
$\Delta \ln R_t^I$	0.000 (0.239)	0.001 (0.720)	0.001 (0.880)	-0.001 (-0.452)
$X S_{i,t}$	0.148*** (5.891)	-0.174*** (-6.284)	-0.021 (-0.931)	-0.057** (-2.009)
$I S_{i,t}$	0.568*** (16.145)	1.340*** (34.598)	0.530*** (16.757)	1.534*** (38.879)
exgdp	-0.149 (-0.906)	-0.360** (-1.992)	-0.203 (-1.374)	-0.330* (-1.793)
lninco	0.645*** (293.912)	0.568*** (235.244)	0.635*** (321.564)	0.570*** (231.906)
lnprofit	-0.156*** (-17.993)	-0.159*** (-16.647)	-0.173*** (-22.143)	-0.146*** (-14.956)
_cons	-0.966*** (-5.247)	0.648*** (3.196)	0.035 (0.213)	-0.563*** (-2.725)
ϵ_R^X	-0.031**	-0.059***	-0.075**	-0.042***
ϵ_R^I	-0.0002	0.001	-0.001	0.0001
Regional Effect	YES	YES	YES	YES
Industry Effect	YES	YES	YES	YES
N	98780	98780	98780	98780
R^2	0.522	0.417	0.564	0.461

4) The influence of RMB REER on China's textile enterprises employment

Textile, clothing and leather products occupy the main position in China's export. In 2006, for example, the country's imports and exports of textiles and clothing reached 162.06 billion US dollars, with an increase of 22.6 percent over the same period last year, accounting for 9.2 percent of the country's total trade in goods. In view of the important

position of textile, clothing and leather in China's import and export trade and national economy, we test the samples of textile industry separately. There are 21732 samples of textile industry, and the two industry codes are 17, 18 and 19 respectively. The regression results are showed in Tab. 8. From the results, we can see that the impact of ER on the employment level of textile, clothing and leather industry is more significant. When the RMB appreciates, the decline

TABLE 6. The Impact of RMB REER on the Employment in Single Export Enterprises

Variables	(1) dlnlabor	(2) dlnlabor_s	(3) dlnlabor_u	(4) dlnlabor_m	(5) dlnlabor_f
$\Delta \ln R_t^X X S_{i,t}$	-0.356 (-1.230)	0.198 (0.560)	-0.580* (-1.653)	-0.398 (-1.258)	-0.328 (-0.865)
$X S_{i,t}$	-0.449*** (-4.678)	-1.467*** (-12.480)	0.004 (0.034)	-0.912*** (-8.696)	0.111 (0.882)
$\Delta \ln R_t^X$	-0.017 (-1.061)	-0.040** (-1.986)	0.008 (0.388)	-0.026 (-1.430)	-0.005 (-0.237)
exgdp _g	-0.091 (-0.369)	0.075 (0.249)	-0.272 (-0.916)	0.041 (0.154)	-0.315 (-0.982)
profit	-0.144*** (-13.382)	-0.149*** (-11.287)	-0.137*** (-10.526)	-0.164*** (-13.966)	-0.135*** (-9.597)
inco	0.579*** (149.286)	0.570*** (120.168)	0.581*** (123.682)	0.612*** (144.454)	0.545*** (107.244)
ϵ_R^X	-0.042	-0.026**	-0.033*	-0.053	-0.028
_cons	1.104*** (3.467)	0.333 (0.854)	0.512 (1.325)	0.577* (1.658)	-0.409 (-0.981)
N	30245	30245	30245	30245	30245
R^2	0.496	0.429	0.399	0.509	0.390

in order sales in exporting countries has a direct impact on the survival of these enterprises which are labor-intensive. From the perspective of export elasticity in which ER appreciation affects the level of employment, for every 1% RMB appreciation, enterprise employment, skilled labor force and unskilled labor force drop by 0.127%, 0.063% and 0.160%, respectively (Table 9). The number of unemployed unskilled workers is much higher than that of skilled workers. From the perspective of ER import elasticity, the appreciation of ER reduces employment by reducing import costs. The reason is that the proportion of imports in China is relatively low. There are few importing countries, the impact scope and intensity of ER fluctuations are small, and the reduction of import costs makes enterprises use more capital instead of labor, resulting in a significant decline in the number of unskilled labor force. As a result, the impact of ER on the employment structure of textile, clothing and leather industry is mainly realized through external demand.

5) The influence of RMB REER on the employment of general trade and processing trade

According to the different ways of trade, enterprises are divided into general trade and processing trade enterprises. In the whole sample, about 2/3 of the enterprises are engaged in general trade and 1/3 are engaged in processing trade. As can be seen from Table 10, for every 1% appreciation of the REER, employment decreased by

0.042% due to the decline in export earnings, and increased by 0.007% due to lower import costs. Among them, the number of skilled workers fell by 0.016%, and the number of unskilled workers decreased by 0.045%. The decline in the employment of unskilled workers is much higher than that of skilled workers, and the relative demand for skilled labor in the market is still strong. Similarly, due to ER fluctuations, employment has been increased through cost reduction effects, but this effect still occupies an auxiliary position and cannot reverse the trend of employment decline caused by export setbacks.

Facing ER changes, the employment trends of processing trade enterprises and general trade enterprises are consistent. As can be seen from Table 8, for every 1% appreciation of the REER, employment decreased by 0.078% due to the decline in export earnings, and increased by 0.006% due to lower import costs. Among them, the number of skilled employments decreased by 0.045%, and the number of unskilled employment decreased by 0.093%. The impact of ER fluctuations on the employment of unskilled labor force is more significant.

Similarly, the RMB appreciation increases the labor demand by reducing import costs, thus increasing the employment level of the labor force of enterprises. By comparison, it is found that the impact on the employment of processing trade enterprises is greater than that of general trade enterprises. This is because the processing trade is

TABLE 7. The Influence of RMB REER on the Employment of two-way trading Enterprises

Variables	(1) dlnlabor	(2) dlnlabor_s	(3) dlnlabor_u	(4) dlnlabor_m	(5) dlnlabor_f
$\Delta \ln R_t^X X S_{i,t}$	-0.741*** (-3.824)	-0.354 (-1.554)	-1.002*** (-3.833)	-0.709*** (-3.447)	-1.016*** (-3.889)
$\Delta \ln R_t^I I S_{ij,t}$	0.019 (0.537)	0.017 (0.400)	-0.008 (-0.157)	-0.063* (-1.664)	0.064 (1.336)
$X S_{i,t}$	1.218*** (38.512)	0.679*** (18.278)	1.463*** (34.306)	0.658*** (19.607)	1.602*** (37.596)
$I S_{i,t}$	-0.071*** (-3.335)	0.057** (2.248)	-0.224*** (-7.761)	-0.067*** (-2.947)	-0.132*** (-4.576)
$\Delta \ln R_t^X$	-0.021 (-1.354)	-0.025 (-1.326)	-0.017 (-0.768)	-0.052*** (-3.084)	0.013 (0.581)
$\Delta \ln R_t^I$	-0.003 (-1.479)	-0.016*** (-6.380)	0.011*** (3.873)	0.007*** (2.962)	-0.012*** (-4.244)
exgdp _g	-0.376** (-2.276)	-0.342* (-1.759)	-0.494** (-2.217)	-0.382** (-2.176)	-0.440** (-1.975)
lnprofit	-0.162*** (-16.576)	-0.156*** (-13.602)	-0.172*** (-13.025)	-0.175*** (-16.906)	-0.148*** (-11.243)
lninco	0.615*** (283.284)	0.651*** (255.412)	0.569*** (194.360)	0.641*** (278.501)	0.571*** (195.209)
ϵ_R^X	-0.073***	-0.050	-0.087***	-0.101***	-0.059***
ϵ_R^I	-0.003	-0.015***	0.011***	0.005***	-0.010***
_cons	0.499*** (2.831)	-1.161*** (-5.603)	0.681*** (2.863)	-0.108 (-0.578)	-0.455* (-1.914)
N	68535	68535	68535	68535	68535
R^2	0.587	0.544	0.427	0.586	0.477

directly connected with foreign markets, and when facing with the RMB appreciation, it is easy for foreign manufacturers to transfer their production and processing business to other countries where labor costs are cheaper. These foreign enterprises will always pay attention to the impact of RMB ER on their production costs and adjust the mode of production in time to cope with the impact of cost changes. Therefore, processing trade enterprises respond more directly and quickly to ER fluctuations, and when the ER appreciates, these enterprises suffer more serious unemployment and shrinking profits due to the reduction of external demand.

V. CONCLUSIONS AND POLICY RECOMMENDATIONS

We use the matching data of China's industrial enterprise database and customs database from 2000 to 2007 to measure the actual effective ER of RMB at the level of

manufacturing enterprises to investigate the impact of the actual effective ER of RMB on the employment of heterogeneous workers within the enterprise. Given the core position of labor-intensive and export-oriented industries such as textiles, garments, and leather in China's employment and export trade, the findings of this paper hold significant guidance value for maintaining the stability and competitiveness of these key areas, especially providing critical reference for policy making in the textile industry.

Firstly, RMB appreciation has aggravated the level of domestic unemployment, which is manifested in the simultaneous decline in the employment level of skilled and unskilled workers. The unskilled workers' unemployment is more prominent. RMB appreciation increases employment by imports and reduces employment by exports.

Secondly, RMB appreciation has increased the employment of skilled and unskilled workers in state-owned and

TABLE 8. The Impact of RMB REER on the Employment in Enterprises of Different Ownership

Variables	state-owned/collective		private		foreign-funded	
	skilled	unskilled	skilled	unskilled	skilled	unskilled
$\Delta \ln R_t^X X S_{i,t}$	2.020** (2.274)	0.749*** (3.428)	0.982 (1.580)	0.824*** (6.698)	-0.241 (-1.159)	1.020*** (20.394)
$\Delta \ln R_t^I I S_{i,j,t}$	-0.012 (-0.133)	-0.0004 (-0.018)	-0.437 (-1.250)	-0.269*** (-3.889)	-0.002 (-0.037)	-0.162*** (-13.881)
$X S_{i,t}$	-0.643*** (-3.791)	0.059 (1.419)	-0.415*** (-2.951)	0.138*** (4.967)	0.780*** (21.140)	-0.041*** (-4.577)
$I S_{i,t}$	0.138 (0.870)	-0.022 (-0.564)	0.791*** (4.806)	-0.178*** (-5.466)	0.114*** (4.473)	-0.058*** (-9.471)
$\Delta \ln R_t^X$	0.006 (0.190)	0.012 (1.523)	-0.097*** (-3.329)	0.027*** (4.679)	-0.020 (-1.127)	0.030*** (6.994)
$\Delta \ln R_t^I$	-0.002 (-0.532)	-0.005*** (-5.619)	0.002 (0.544)	-0.004*** (-6.070)	0.003 (1.447)	-0.014*** (-27.284)
exgdpg	-1.121*** (-2.599)	0.467*** (4.406)	1.662*** (3.712)	-1.400*** (-15.815)	-0.204 (-1.074)	0.538*** (11.772)
lnprofit	-0.067*** (-6.878)	0.002 (0.644)	-0.405*** (-5.065)	-0.066*** (-4.166)	-0.408*** (-20.083)	-0.022*** (-4.586)
lninco	0.655*** (113.629)	0.017*** (12.188)	0.622*** (98.789)	0.014*** (10.839)	0.627*** (243.065)	0.016*** (25.570)
ϵ_R^X	0.148**	0.065***	-0.028***	0.085***	-0.037	0.102***
ϵ_R^I	-0.002	-0.005***	-0.011	-0.012***	0.003	-0.019***
_cons	-0.595*** (-2.724)	8.086*** (150.537)	-1.665*** (-4.418)	8.256*** (110.714)	-3.689*** (-7.681)	8.281*** (71.714)
N	12573	12573	16008	16008	69460	69460
R^2	0.615	0.904	0.438	0.902	0.511	0.859

collective enterprises. However, the effect in the employment of skilled workers is even greater. Private enterprises and foreign-funded enterprises employ less labor, but the decrease in unskilled labor is even greater. RMB appreciation has a more significant impact on textile, clothing and leather companies, and unemployment of unskilled workers in companies has become more serious. Compared with general trade enterprises, the unemployment of unskilled workers in processing trade enterprises is more serious. Thirdly, the unemployment impact caused by RMB appreciation is particularly significant for industries such as textiles, garments, and leather, highlighting the need for special attention to the employment vulnerability of such labor-intensive export industries when formulating exchange rate and industrial policies. This finding highlights the vulnerability of the textile industry in coping with exchange rate risks and ensuring labor employment, clearly defining the significant contribution of this research to the field of textile studies.

Based on the above study, the following policy recommendations are put forward for reference. Firstly, the adjustment of the ER policy should fully consider the domestic

employment situation, the affordability of export enterprises and the overall economic growth trend, and appropriately slow down the marketization and appreciation of the RMB ER.

Secondly, the appreciation of the renminbi has reduced the price of foreign capital elements. Enterprises should take this opportunity to speed up the upgrading of imported equipment. It is indeed necessary to import major technical equipment and products, or intermediate products, raw materials and other input elements that are conducive to economic recovery and development of the industry. Tariffs and import value-added tax should be reduced or exempted.

Thirdly, considering that labor-intensive industries such as textiles, clothing, toys, and furniture absorb a large number of labors, the government can further appropriately increase the export tax rebate for products in these industries. Special consideration should be given to stabilizing exports and employment for critical livelihood industries like textiles and garments, making it a priority in tax policy. For industries such as steel and automobiles, the government should speed up the construction of export bases, implement a flexible

TABLE 9. The Impact of RMB REER on Textile Enterprises Employment

Variables	Total Employment	Skilled Employment	Unskilled Employment
$\Delta \ln R_t^X X S_{i,t}$	-0.343 (-1.272)	0.398 (1.126)	-0.597* (-1.755)
$\Delta \ln R_t^I I S_{ij,t}$	-0.333*** (-3.003)	-0.584*** (-4.009)	-0.202 (-1.439)
$X S_{i,t}$	1.502*** (24.480)	0.788*** (9.792)	1.692*** (21.845)
$I S_{i,t}$	0.263*** (6.362)	0.267*** (4.936)	0.287*** (5.515)
$\Delta \ln R_t^X$	-0.103*** (-3.540)	-0.091** (-2.369)	-0.118*** (-3.198)
$\Delta \ln R_t^I$	0.002 (0.612)	0.003 (0.797)	0.002 (0.440)
exgdp _g	-0.096 (-0.371)	0.025 (0.075)	-0.205 (-0.629)
lnprofit	-0.128*** (-10.608)	-0.116*** (-7.288)	-0.136*** (-8.902)
lninco	0.646*** (144.969)	0.651*** (111.443)	0.634*** (112.813)
ϵ_R^X	-0.127***	-0.063**	-0.160***
ϵ_R^I	-0.008***	-0.015***	-0.004
_cons	-1.344*** (-21.088)	-2.304*** (-27.555)	-1.852*** (-23.026)
N	21732	21732	21732
R^2	0.520	0.415	0.397

export tax policy, stabilize the international market share, and encourage indirect exports of products.

At the same time, the government may encourage market diversification strategies, expand exports to emerging markets, encourage companies to set up logistics centers and distribution centers in their main sales markets, focus on opening up markets in neighboring countries and regions, and develop overseas employment.

Overall, this study provides micro-level empirical evidence and policy references for key industries like textiles on how to achieve structural optimization, technological upgrading, and stable employment amidst exchange rate fluctuations, which is of great practical significance for promoting the integration of theoretical research and industrial practice in the field of textile studies.

TABLE 10. The Impact of RMB ER Fluctuation on the Employment of Workers in General Trading Enterprises and Processing Trade Enterprises

Variables	General Trading Enterprises			Processing Trade Enterprises		
	lnlabor	lnlabor_s	lnlabor_u	lnlabor	lnlabor_s	lnlabor_u
$\Delta \ln R_t^X X S_{i,t}$	-0.185 (-0.820)	0.439 (1.626)	-0.501* (-1.749)	-0.832*** (-3.486)	-0.722** (-2.551)	-0.940*** (-2.873)
$\Delta \ln R_t^I I S_{ij,t}$	0.247*** (3.343)	-0.007 (-0.082)	0.409*** (4.342)	-0.023 (-0.562)	-0.029 (-0.590)	-0.019 (-0.338)
$X S_{i,t}$	0.900*** (17.654)	-0.011 (-0.183)	1.386*** (21.351)	1.148*** (30.952)	0.799*** (18.172)	1.274*** (25.061)
$I S_{i,t}$	-0.666*** (-11.135)	-0.112 (-1.553)	-1.254*** (-16.453)	-0.044* (-1.849)	0.027 (0.954)	-0.130*** (-4.010)
$\Delta \ln R_t^X$	-0.029** (-2.234)	-0.047*** (-3.034)	-0.010 (-0.631)	-0.020 (-0.746)	0.006 (0.178)	-0.027 (-0.742)
$\Delta \ln R_t^I$	-0.001 (-0.434)	-0.001 (-0.464)	0.0004 (0.223)	0.007* (1.719)	0.010** (2.078)	0.005 (0.876)
exgdp	-0.246 (-1.400)	-0.093 (-0.441)	-0.391* (-1.749)	-0.219 (-1.001)	-0.242 (-0.935)	-0.374 (-1.250)
lnprofit	-0.162*** (-18.243)	-0.164*** (-15.400)	-0.164*** (-14.516)	-0.132*** (-10.536)	-0.129*** (-8.675)	-0.134*** (-7.833)
lninco	0.623*** (265.814)	0.646*** (229.831)	0.599*** (200.975)	0.584*** (191.963)	0.631*** (174.992)	0.520*** (124.678)
ϵ_R^X	-0.042**	-0.016***	-0.045*	-0.078***	-0.045**	-0.093***
ϵ_R^I	0.007***	-0.001	0.013***	0.006*	0.009**	0.004
_cons	0.375** (2.319)	-0.944*** (-4.866)	0.161 (0.784)	1.092** (2.134)	-1.245** (-2.052)	1.637** (2.333)
N	65866	65866	65866	32914	32914	32914
R^2	0.560	0.511	0.433	0.574	0.530	0.398

AUTHOR CONTRIBUTIONS

Lina Yang is the sole author of this study. She was responsible for the study conception, design, data collection, analysis, manuscript drafting, and all subsequent revisions. She takes full responsibility for the integrity and accuracy of all aspects of this work.

CONFLICTS OF INTEREST

The author declares no conflicts of interest.

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