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Does the Minimum Wage Standard Weaken Income Polarization?

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Abstract: Based on panel data from the China Household Tracking Survey spanning 2010 to 2022, this study investigates the impact and mechanism of minimum wage standards on income polarization at the county level. The findings indicate that increases in the minimum wage significantly exacerbate income polarization. This effect is realized through industrial structure upgrading and moderated by productivity and labor supply, with a more pronounced impact in low-income regions. Accordingly, policy recommendations are proposed to optimize income distribution, provide targeted assistance to farmers, and promote coordinated regional development.

Keywords: Minimum Wage Standard, Income Polarization, Industrial Structure Upgrading

1. Introduction

Since the implementation of the minimum wage system following the Reform and Opening-up, it has played a significant and undeniable role in solidly advancing common prosperity. However, income polarization has remained a severe issue in the 21st century. The intensification of income disparities not only suppresses economic growth and entrenches the difficulties faced by low-income groups but also triggers a series of socio-economic problems, such as structural changes in society [1] and hindering the upward mobility of medium-skilled workers [2].

Research on minimum wage policies shows significant differences between domestic and international studies. Abroad, a systematic theoretical framework has been established, primarily focusing on wage effects and employment controversies, with attention to labor market equilibrium [3], technological heterogeneity [4], and firm cost adjustments [5]. In contrast, domestic research is more policy-oriented, concentrating on local issues such as migrant employment and crime [6], employment of people with disabilities [7], and entrepreneurship in the digital economy [8]. Studies on income polarization mainly emphasize its concepts, characteristics, and measurement methods. The ER index, based on the "identity-alienation" framework, measures multi-level polarization by assessing within-group homogeneity and between-group heterogeneity [9]; the W-shaped index divides income groups by the median [10], quantifying the degree of polarization.

Some scholars argue that raising the minimum wage standard exacerbates income polarization. An increase in the minimum wage produces a significant spillover effect on employees earning wages above the minimum wage [11], thereby raising their wage levels and expanding income polarization. Moreover, the minimum wage can reduce employment levels among low-income

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workers through employment effects, further intensifying income polarization. Conversely, other scholars contend that increasing the minimum wage weakens income polarization. The wage increase creates a truncation effect, elevating the wages of those previously earning below the minimum wage [9], thereby expanding the middle-income group and mitigating income polarization.

Currently, international research mainly focuses on measurement methods and cross-country trends, while domestic studies primarily analyze macro-level trends, with less attention given to decomposition and the impact of minimum wage policies. This paper utilizes county-level data from the China Family Panel Studies (CFPS) spanning 2010 to 2022 and employs the W-shaped polarization index to examine the impact of minimum wage standards on income polarization from a micro-level perspective. The study aims to provide empirical evidence to help alleviate income polarization.

2. Theoretical hypotheses

This paper puts forward the following theoretical hypotheses:

Table 1. Theoretical hypotheses and corresponding mechanisms

Hypothesis	Core Mechanism
Hypothesis 1: The increase in the minimum wage standard exacerbates income polarization.	The minimum wage increase raises wages of low-income earners through a truncation effect, but spillover effects may also elevate wages of high-income earners; firms reduce employment of low-skilled labor due to higher costs, leading to increased unemployment.
Hypothesis 2: Total factor productivity (TFP) strengthens the positive impact of the minimum wage on income polarization.	Skill-biased technological progress. TFP improvements accelerate technological upgrading, causing firms to prefer hiring high-skilled labor [12], further squeezing employment and income opportunities for low-skilled workers.
Hypothesis 3: Labor factor abundance amplifies the effect of the minimum wage on income polarization.	When labor supply is abundant, firms are more likely to adjust their employment structure in response to cost pressures, thereby widening income disparities.
Hypothesis 4: Industrial structure upgrading mediates the widening effect of the minimum wage on income polarization.	The minimum wage promotes industrial upgrading, increasing high-skilled jobs while pushing out low-skilled labor, thus widening the income gap.

Based on the theory of structural employment effects, an increase in the minimum wage standard drives industrial transformation by raising labor costs [13]. The rising cost of low-skilled labor leads to the contraction of low value-added industries, reducing the share of primary industries. Meanwhile, wage growth enhances consumption capacity, stimulating demand for high value-added services and promoting the expansion of secondary and tertiary industries [14]. This industrial upgrading reshapes the income distribution pattern: the expansion of high-skilled service sectors creates high-income jobs, while low-skilled workers are forced into informal employment or unemployment, thereby exacerbating income polarization [15].

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3. Research design

3.1. Data sources and processing

The income data used in this study are derived from the China Family Panel Studies (CFPS) conducted between 2010 and 2022, while minimum wage data are obtained from official documents issued by the Ministry of Human Resources and Social Security. Data processing includes the exclusion of non-Chinese nationals, samples with missing county-level codes, and samples with missing values in key variables. Additionally, continuous variables are winsorized at the 1% level to mitigate the influence of outliers.

3.2. Variable selection and construction

3.2.1. Variable description

The dependent variable in this study is the income polarization index of residents at the county level, primarily calculated based on the "total work income" reported in the adult questionnaire. The income polarization is measured using the W-shaped polarization index proposed by Förster and Wolfson. The minimum wage standard is measured by the natural logarithm of the monthly minimum wage. Control variables are selected with reference to the approach of Zhou Guangsuo et al [16]., focusing mainly on county-level socioeconomic and demographic characteristics.

3.2.2. Model specification

This study constructs the following two-way fixed effects model:

$$fw_{i,t} = \alpha_0 + \alpha_1 lnwage_{standardi,t} + \alpha_2 C_{i,t} + \delta_i + \theta_t + \varepsilon_{i,t} \quad (1)$$

In the model, the dependent variable fw represents the annual Förster & Wolfson index for each county; the independent variable lnwage_standard denotes the natural logarithm of the minimum wage standard for each county and year; C represents the set of control variables; i indicates the region; t denotes the year. δ represents regional fixed effects, θ denotes year fixed effects, and ε is the random error term.

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Table 2. Variable definitions

Variable Name	Variable Symbol
Dependent Variable	
Folster&Wolfson（1992）Index	fw
Independent Variable	
Natural logarithm of minimum wage standard	lnwage_standard
Control Variables	
Per capita GDP	lnmgdp
Average age	mean_age
Average years of education	mean_edu
Proportion of male population	man_proportion
Household size	familysize
Urbanization rate	urbanizationrate

4. Empirical analysis

4.1. Descriptive statistics

The mean value of the income polarization index is 0.466, with a standard deviation of 0.188. The mean value of the logarithm of the minimum wage is 7.194, with a standard deviation of 0.344. The values of all variables fall within reasonable ranges.

4.2. Baseline regression results

To test Hypothesis 1, Table 3 reports the regression results of the baseline model (4.2): Column (1) includes neither fixed effects nor control variables; Column (2) includes control variables; Column (3) includes both fixed effects and control variables. The results show that an increase in the minimum wage standard significantly raises the level of income polarization, thereby confirming Hypothesis 1.

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Table 3. The impact of minimum wage standards on income polarization: baseline regression results

	(1)	(2)	(3)
	fw	fw	fw
lnwage_standard	-0.361***	0.082	1.361***
	(-5.0832)	(0.8991)	(2.7356)
lnmgdp		-0.272***	-0.229*
		(-4.4187)	(-1.6938)
mean_age		0.023***	0.030**
		(4.2818)	(2.3899)
mean_edu		-0.045**	0.260***
		(-2.4077)	(4.3570)
man_proportion		-0.044	-0.217
		(-0.0728)	(-0.3009)
familysize		0.021	-0.042
		(0.4026)	(-0.2933)
urbanization_rate		-0.001	0.001
		(-0.4266)	(0.5559)
Constant	3.064***	2.042***	-7.933**
	(5.8952)	(2.9942)	(-2.2451)
year fe	No	No	Yes
city fe	No	No	Yes
N	937	926	926
r2_a	0.031	0.161	0.343
F	25.839	12.621	.

4.3. Regression results of the two-way fixed effects model

As shown in Table 4, after controlling for year and regional fixed effects as well as per capita GDP, the increase in the minimum wage standard still significantly exacerbates income polarization, and the estimated coefficient remains robust.

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Table 4. The impact of minimum wage standards on income polarization: fixed effects model regression results

	（1）	（2）
Variable Name	Two-Way Fixed Effects	
lnwage_standard	1.265*** （2.55）	1.139*** （2.38）
lnmgdp	YES	NO
mean_age	YES	YES
mean_edu	YES	YES
man_proportion	YES	YES
Sample Size	937	937
R2	0.345	0.340
Number of Counties and Districts	162	162

4.4. Robustness tests

After replacing the polarization index, controlling for provincial fixed effects, and excluding data from 2020, the minimum wage standard continues to significantly promote income polarization, demonstrating the robustness of the conclusions.

4.5. Endogeneity treatment

This study addresses endogeneity by using the average minimum wage standard of other counties and districts within the same city [6] [17] as an instrumental variable. The two-stage least squares (2SLS) results in Table 5 show that the coefficients in both the first and second stage regressions are significantly positive. Additionally, tests reject both the under-identification and weak instrument hypotheses, indicating that the minimum wage standard exacerbates income polarization.

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Table 5. Endogeneity test

	(1)	(2)
	First Stage	Second Stage
Variable	lnwage_standard	fw
mlowincome	0.0006***	3.2532**
	(39.19)	(2.50)
Controls	Yes	Yes
Constant	5.9317***	
	(36.20)	
Kleibergen-PaaprkLMstatistic	40.831*** （0.000）	
Cragg-DonaldWaldFstatistic	108.074 （16.380）	
N	936	933
R-squared	0.123	0.334

5. Further analysis

5.1. Mechanism analysis of the minimum wage standard's effect on income polarization

5.1.1. Moderating effect analysis

5.1.1.1. Total factor productivity

To test Hypothesis 2, this study constructs an interaction term between the minimum wage standard and total factor productivity (TFP) (denoted as TJ_c). The results in Table 6 indicate that total factor productivity significantly strengthens the amplifying effect of the minimum wage on income polarization. Since the employment creation effect of the minimum wage is weaker than its employment erosion effect [18], improvements in total factor productivity reinforce skill-biased technological progress, intensifying the crowding out of low-skilled workers. This positively moderates the minimum wage's effect on income polarization, thus supporting Hypothesis 2.

5.1.1.2. Labor factor abundance

To test Hypothesis 3, this study constructs an interaction term between the minimum wage standard and labor factor abundance (denoted as TJ2_c). The results in Table 6 demonstrate that labor factor abundance has a positive moderating effect: when labor supply is abundant, firms face greater cost pressures and are more inclined to reduce low-skilled employment, thereby exacerbating income polarization. This supports Hypothesis 3.

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Table 6. Mechanism tests on the effect of minimum wage standards on income polarization

	(1)	(2)	(1)	(2)
Variable	Model 1	Model 2	Model 1	Model 2
lnwage_standard	0.4280***	0.4118***	0.4655***	0.3042***
	(0.1017)	(0.1021)	(0.1032)	(0.1116)
TFP	3.5922***	3.8112***		
	(0.8468)	(0.8556)		
labour_rate			0.0246***	0.0392***
			(0.0054)	(0.0067)
TJ_c		1.0820*		
		(0.6383)		
TJ2_c				0.0388***
				(0.0106)
Controls	Yes	Yes	Yes	Yes
Constant	0.0174	-0.1600	0.7229	0.8306
	(1.1842)	(1.1873)	(1.0708)	(1.0627)
N	936	936	936	936
adj.R^2	0.0520	0.0543	0.0551	0.0700

5.1.2. Mediation effect analysis

Based on Hypothesis 4, this study conducts an empirical analysis using a mediation effect model, constructing the following models.

$$Med_{i,t} = \beta_0 + \beta_1 lnwage_{standard_{i,t}} + \sum \varphi C_{i,t} + \sum year + \sum city + \varepsilon_{i,t} \quad (2)$$

$$fw_{i,t} = \gamma_0 + \gamma_1 lnwage_{standard_{i,t}} + \gamma_2 Med_{i,t} + \sum \mu C_{i,t} + \sum year + \sum city + \varepsilon_{i,t} \quad (3)$$

Where Medi,t is the mediating variable.

This study uses the industrial structure advancement index (IND) as the mediating variable [19]. This index is calculated by weighting the value added of the three economic sectors, with higher values indicating a more advanced industrial structure. The results in Table 7 show that industrial structure upgrading plays a significant mediating role. The increase in the minimum wage promotes industrial upgrading, while the accompanying skill-biased technological progress crowds out low-skilled labor [15], thereby exacerbating income polarization. Hypothesis 4 is thus supported.

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Table 7. Mediation effect of industrial structure upgrading on the impact of minimum wage on income polarization

	(1)	(2)
	fw	IND
lnwage_standard	1.265***	1.670***
	(0.474)	(0.267)
Controls	Yes	Yes
Constant	-9.541**	-1.689
	(3.770)	(1.936)
N	933	933

5.2. Heterogeneity analysis

The impact of the minimum wage standard on income polarization varies across regions with different income levels. In counties with lower per capita income, the minimum wage standard has a significantly positive effect on income polarization, whereas in counties with higher per capita income, the effect is not significant. This is because enterprises in low-income counties have weaker risk resilience and are more likely to reduce wages or positions for low-skilled workers when the minimum wage rises, directly impacting the income of low-income groups and exacerbating polarization effects.

6. Research conclusions and policy recommendations

6.1. Research conclusions

This study finds that: (1) increases in the minimum wage standard significantly exacerbate income polarization, a conclusion supported by robustness and endogeneity tests; (2) the underlying mechanisms operate primarily through total factor productivity, labor factor abundance, and the level of industrial structure; and (3) this effect exhibits income heterogeneity, being particularly pronounced in low-income regions.

6.2. Policy recommendations

This paper proposes the following policy recommendations: First, implement differentiated minimum wage adjustment strategies—moderate the pace of adjustment in labor-intensive regions, while reasonably adjusting in capital- and technology-intensive regions in line with productivity growth. Second, provide targeted support policies for groups such as farmers, aiming to reduce burdens and increase incomes to narrow income disparities. Third, strengthen coordinated regional development by leveraging opportunities from industrial relocation to optimize the industrial structure in underdeveloped areas and enhance regional linkage and development.

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