

The Impact of Minimum Wage Policy on Service Sector Employment: Evidence from Multi-period DID

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Abstract:

This paper investigates the impact of minimum wage policy on employment in China's service sector using a multi-period difference-in-differences (DID) framework. Drawing on a balanced panel of 285 prefecture-level cities from 2015 to 2022, The authors estimate the average effect of minimum wage adjustments on the share of service employment. the baseline results indicate that minimum wage hikes significantly reduce the service sector employment rate by approximately 3.2 percentage points. Further heterogeneity analysis reveals that life-related services experience a greater negative impact than production-related services, reflecting differences in labor intensity and wage sensitivity. Robustness checks, including pre-trend and placebo tests, confirm the validity of the identification strategy. These findings support the hypothesis that wage rigidity may lead to labor demand contraction, particularly in low-skill intensive sectors. Policy implications include the adoption of differentiated wage floors by sector and enhanced monitoring of informal employment responses. This study contributes to the growing body of empirical literature on minimum wage policy in developing economies.

Keywords: minimum wage; service sector; employment; multi-period DID

1. Introduction

Minimum wage policy is among the most debated labor market regulations globally. As a form of government intervention to establish wage floors, its primary aim is to protect low-income workers and mitigate income inequality. However, its actual impact on employment remains controversial. Classical economic

theories predict negative employment effects due to increased labor costs, while empirical studies provide mixed results [1].

A seminal work by Card and Krueger (1994), using a difference-in-differences (DID) design in the U.S. fast-food sector, found no evidence of employment loss. Since then, an expanding body of research has attempted to reconcile the theory-evidence gap,

often emphasizing the importance of empirical context and methodology. Neumark and Wascher (2008), in a comprehensive review, concluded that negative effects on employment remain prevalent, especially for low-skilled groups. Yet, early studies were often criticized for failing to control for regional trends or sector-specific shocks.

In China, the minimum wage system has been gradually strengthened since the early 2000s, with increasing frequency and scope of adjustments. While numerous studies focus on the manufacturing sector, the service sector—characterized by high labor intensity and low capital substitution—has received comparatively less attention, despite accounting for over 50% of urban employment [1, 2].

This study fills this research gap by estimating the employment effects of minimum wage increases in China's service sector using a multi-period difference-in-differences (DID) approach. Unlike traditional pre-post or binary-period DID models, the framework captures dynamic treatment effects and accommodates staggered policy implementation across cities. The authors further distinguish between life-related and production-related services to explore heterogeneous impacts across subsectors, considering differences in labor substitutability, wage rigidity, and exposure to automation [3, 4].

This paper contributes to the literature in three ways. First, it provides updated empirical evidence on minimum wage effects in China's urban service sector, addressing an underexplored yet policy-relevant domain [5, 6]. Second, the use of a multi-period DID design improves identification by controlling for both time-invariant and time-varying confounders. Third, the analysis of service industry heterogeneity enhances understanding of the distributional impacts of wage policy and offers insights for targeted labor regulation [7, 8].

2. Methodology

2.1 Design

To identify the causal impact of minimum wage adjustments on service sector employment, the authors employ a multi-period DID model. This approach allows for the exploitation of policy variations in timing and magnitude across cities, while controlling for city and time fixed effects. Following Du and Wang (2020), the authors treat the implementation of a minimum wage hike as the treatment and use untreated cities as the control group [9].

2.2 Data Source

The analysis is based on a balanced panel dataset comprising 285 prefecture-level cities in China from 2015 to 2022. Key variables include minimum wage standards,

service sector employment rates, and macroeconomic indicators. Employment and GDP growth data were compiled from city-level statistical yearbooks and bulletins.

2.3 Variables

Dependent variable: employment, measured as the share of service sector employment in total urban employment per city-year.

Treatment indicator: treated, a dummy variable equal to 1 if the city introduced a minimum wage increase during the study period.

Policy period: post, equal to 1 in the years following the policy implementation (2018–2022), and 0 otherwise.

Interaction term: treated $\times$ post, which identifies the DID estimator for policy impact.

Control variable: gdp_growth, the annual GDP growth rate of each city.

Subgroup variable: industry, coded as 1 for life-related services and 2 for production-related services [10].

2.4 Model Specification

The authors estimate the following baseline specification:

$$\text{employment}_{it} = \alpha + \beta(\text{treated}_i \times \text{post}_t) + \gamma \times \text{gdp_growth}_{it} + \mu_i + \lambda_t + \epsilon_{it} \quad (1)$$

Where:

employment_{it} is the service sector employment rate in city i at year t ;

$-\text{treated}_i \times \text{post}_t$ is the DID interaction term;

μ_i and λ_t denote city and year fixed effects;

ϵ_{it} is the idiosyncratic error term.

The coefficient β captures the average treatment effect of minimum wage increases on service sector employment.

2.5 Identification Strategy

The DID method relies on the parallel trends assumption: absent the policy intervention, treatment and control groups would have exhibited similar employment trends. The authors test this assumption via a pre-trend analysis, which shows no significant differences in employment trajectories before 2018. To strengthen identification [11, 12]. The authors also conduct placebo tests using pseudo-treatment years and find no significant employment effects in those periods. These tests reinforce the robustness of the causal interpretation and are consistent with recent applications in Chinese labor policy evaluation.

To assess heterogeneity, The authors re-estimate the model by service subsector [13]. This enables to distinguish policy impacts between industries with varying sensitivity to labor cost shocks.

3. Rresult

3.1 Baseline DID Estimates

Table 1 presents the results of the baseline difference-in-differences (DID) regression. The coefficient for the interaction term treated $\times$ post is -0.032 and is statistically significant at the 1% level ($p = 0.003$), indicating that the implementation of a minimum wage increase is

associated with an average 3.2 percentage point decline in the service sector employment rate. The GDP growth rate is also positively and significantly associated with service employment, with a coefficient of 0.215 ($p = 0.029$). These findings suggest that while overall economic growth supports employment, raising the minimum wage tends to reduce the share of service jobs, possibly due to increased labor costs in low-wage industries.

Table 1. Baseline Regression Results

Variable	Coefficient	Std. Error	p-value
treated $\times$ post	-0.032	0.011	0.003 ***
GDP_growth	-0.215	0.098	0.029 **
City Fixed Effects	YES		
Year Fixed Effects	YES		
Observations	Not Reported		
R-squared	Not Reported		
Note: Robust standard errors clustered at the city level.			
*** p < 0.01, ** p < 0.05.			

3.2 Heterogeneity Analysis by Service Type

To explore whether the policy effect varies across different types of service industries, The authors estimate the DID model separately for life-related and production-related services. life-related services are significantly more negatively affected by minimum wage increases compared to production-related services.

For life-related services—such as hospitality, retail, and domestic care—the DID coefficient is -0.041 and statistically significant at the 1% level, indicating a stronger reduction in employment. In contrast, the impact on production-related services—such as logistics, software, and commercial services—is smaller, with a DID coefficient of -0.018 , significant at the 10% level. The elasticity of employment in life-related services is approximately 2.3 times that of production-related services, highlighting the vulnerability of low-skill, labor-intensive subsectors.

3.3 Robustness Checks

To validate the causal interpretation, The authors conduct a series of robustness checks. First, a pre-trend test confirms that the treatment and control groups followed parallel employment trends prior to the policy implementation, as all pre-treatment coefficients are statistically insignificant ($p > 0.1$). Second, placebo tests using pseudo-treatment years show no significant effects, suggesting that the observed employment reductions are not driven by spurious correlations or coincidental timing.

Additionally, visual inspection of employment trends in treated versus control cities further supports the DID assumption. The two groups track closely before the policy change in 2018, and diverge notably thereafter, consistent with the regression estimates.

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4. Conclusion and Policy Implications

This study examines the causal impact of minimum wage adjustments on service sector employment in China using a multi-period difference-in-differences approach. Based on a panel dataset of 285 prefecture-level cities from 2015 to 2022, the analysis yields three key findings:

First, minimum wage increases are associated with a statistically significant reduction in the service sector employment rate. The baseline DID estimates show a decline of approximately 3.2 percentage points, suggesting that the cost shock induced by wage floors may reduce firms' labor demand, especially in low-wage service industries. Second, the employment effect exhibits substantial heterogeneity across service subsectors. Life-related services—such as retail, hospitality, and personal care—face more pronounced negative impacts than production-related services, reflecting differences in labor intensity, capital substitutability, and exposure to automation. Employment elasticity in life-related services is estimated to be more

than twice that of production-related services.

Third, robustness checks—including pre-trend tests and placebo regressions—confirm the validity of the identification strategy. The parallel trends assumption is satisfied, and no significant effects are found in pseudo-policy years, reinforcing confidence in the causal interpretation of the results.

The findings are consistent with classical labor market theory, which posits that when wage floors are binding, they may induce distortions in labor allocation. In particular, wage rigidity may lead firms to reduce hiring, substitute capital for labor, or shift resources to higher-margin sectors. The pronounced impact on life-related services supports the view that these sectors, being labor-intensive and low-wage, are more sensitive to mandated wage increases.

Given the observed differential impacts, a uniform minimum wage policy may be suboptimal. Instead, policymakers should consider adopting differentiated wage standards across industries or regions. For instance, wage floors could be calibrated based on sector-specific productivity or cost structures, minimizing adverse employment effects while ensuring income protection.

Additionally, targeted support—such as subsidies, tax relief, or training programs—could be offered to vulnerable service sectors to cushion the adjustment burden. Improving labor market monitoring, especially in informal employment, would also help assess unintended side effects and enhance policy precision.

This study has several limitations. First, while the DID framework controls for observable and time-invariant unobservables, omitted variable bias may persist due to unmeasured shocks. Second, the analysis focuses on employment levels and does not address potential changes in working hours, job quality, or labor force participation. Third, data constraints prevent examination of informal employment, which may be especially relevant in response to wage regulation.

Future research could explore firm-level dynamics, investigate wage spillover effects, or incorporate longer-term

impacts of wage policies using panel data with richer labor market indicators.

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