



# Minimum wage introduction and employment: Evidence from South Korea



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## HIGHLIGHTS

- We examine the effect of the introduction of minimum wage on employment in Korea.
- We apply a difference-in-differences framework to the plant-level panel data.
- The introduction of minimum wage increased the average remuneration for employees.
- The minimum wage introduction had no discernible effect on plant-level employment.

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## ABSTRACT

This paper examines the effect of the introduction of the national minimum wage on plant-level employment in South Korea. We show that the minimum wage introduction increased the average remuneration for employees, but has no discernible effect on plant-level employment.

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## 1. Introduction

The impact of the minimum wage on employment is an empirically controversial question. In particular, the existing literature fails to agree concerning whether the minimum wage reduces employment (Card and Krueger, 1997; Neumark and Wascher, 2007; Schmitt, 2013). The goal of this paper is to provide new evidence regarding the effect of minimum wage on employment. We attempt to contribute to the literature by examining the effect of the introduction of minimum wage in contrast to the impact of the incremental increases in the minimum wage. In particular, relatively

few studies on the minimum wage have investigated the effect of the introduction of minimum wage, with most research regarding minimum wage focusing on the effect of incremental increases in the minimum wage. Moreover, most literature about the effect of the introduction of a minimum wage has been focused on the experience of the United Kingdom, where the national minimum wage was first enacted in 1999 (Draca et al., 2011; Metcalf, 2008; Stewart, 2004). We extend the understanding of the effect of the introduction of a minimum wage by documenting the experience of Korea, where a minimum wage was first enforced in 1988.

Using the fact that the introduction of the minimum wage had a larger effect on low-wage plants than on high-wage plants, we apply a difference-in-differences framework to the plant-level panel data to reveal the causal effect of the newly introduced minimum wage. Our empirical result shows the introduction of minimum wage increased the wage at the plants that had been paying below the minimum wage level prior to the enforcement

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of minimum wage. However, we find that the minimum wage introduction did not have any discernible adverse effect on plant-level employment.

The remainder of the paper is organized as follows: Section 2 addresses the detailed institutional background regarding the introduction of minimum wage in Korea, and describes the plant-level panel data used in this study. Section 3 explains the empirical strategy adopted for the analysis, followed by a discussion of the results in Section 4. Section 5 includes a summary and concluding remarks.

## 2. Background and data

In Korea, no law regulated the minimum wage until 1986, although the Labor Standard Act was passed in 1953 to protect workers' basic rights at work. To improve the working conditions of low-paid workers, the Minimum Wage Act was passed by legislators, and enacted December 31, 1986. The law stipulated that the Minimum Wage Council would determine the first minimum wage rate by December 15, 1987, and the rate would be applied from the beginning of the following year—January 1, 1988. In the initial stage, the minimum wage was applied only in manufacturing plants with 10 or more employees. It was eventually expanded to all plants in 1999.

After numerous debates, in December 24, 1987, the Minimum Wage Council determined the initial minimum wage. In particular, in 1988, the initial minimum wage applied was 462.50 Korean won (KRW) per hour and 111,000 KRW per month for the low-paying manufacturing industries, and 487.50 KRW per hour and 117,000 KRW per month for the rest of the manufacturing sector.<sup>2</sup>

Exploiting this initial minimum wage level, we use the Mining and Manufacturing Survey from 1983 and 1990, to analyze the impact of the minimum wage introduction. The data were collected by Statistics Korea, and include detailed information about all mining and manufacturing plants with five or more workers, such as the standard industry classification; the number of employees; the amount of tangible assets, including capital; and the amount of energy input and non-energy input. Because the minimum wage was initially applied only in the manufacturing sector, we limit the sample to manufacturing plants. We also exclude plants with fewer than 10 employees because they were regarded as qualitatively different from other plants, so were initially exempt from the minimum wage enforcement. Moreover, as endogenous exits and entries of plants due to the implementation of the minimum wage could bias the estimates, we construct a balanced panel and focus on the plants observed in every wave of the surveys during the periods analyzed in this study. Finally, to increase the comparability across plants in the sample, we exclude plants that paid above, in 1987, 250,000 KRW—approximately twice of the initial minimum monthly wage.<sup>3</sup> Table 1 shows summary statistics of the key variables in the dataset used for our main analysis.

<sup>2</sup> The low-paying manufacturing industries, noted as “Group 1”, include 12 industries based on three-digit standard industry classifications, such as Food Manufacturing, Manufacture of Textiles, Manufacture of Paper and Paper Products, and Manufacture of Pottery China and Earthenware. After the initial implementation of the minimum wage in 1988, the minimum wage has been increased every year during our periods of analysis. In particular, in 1989, the hourly minimum wage was 600 KRW and was increased to 690 KRW in 1990. Moreover, the council has not set the minimum wage separately for industries since 1988.

<sup>3</sup> We provide the results based on the plants without a wage upper bound in Panel A of Table A.1 in the Appendix. The result is qualitatively and quantitatively similar to the main result.

**Table 1**  
Summary statistics.

Variables	Mean (1)	SD (2)
Number of employees	42.50	49.43
Total labor cost (mil. KRW)	134.27	190.11
Labor cost per worker (mil. KRW)	2.96	1.52
Total annual wage (mil. KRW)	117.73	158.53
Annual wage per worker (mil. KRW)	2.65	1.26
Average monthly wage (mil. KRW)	0.23	0.11
Energy input used (mil. KRW)	35.54	119.99
Non-energy input used (mil. KRW)	599.65	1591.51
N(obs)	29 495	

N(obs) is the number of observations and SD indicates the standard deviation.

The sample includes 3687 plants surveyed from 1983 to 1990. Labor cost of plants includes wages, insurance contributions, severance pay, and cost of employee benefits. Average monthly wage is the annual wage per worker divided by 12. Energy input includes the cost of fuel and electricity. Non-energy input indicates the cost of production other than labor, capital and energy input, such as material costs and cost of water. All monetary values are in current price.

## 3. Empirical strategy

To reveal the causal effect of the introduction of the minimum wage, we use the fact that low-wage plants, paying below the minimum wage, were likely to be substantially affected by the minimum wage enforcement. This empirical setting allows us to apply a difference-in-differences framework.<sup>4</sup> In particular, we partition the manufacturing plants into a treatment group and a control group based on the average monthly wage in 1987, prior to the enforcement of the initial minimum wage rate in 1988.<sup>5</sup> Thus, the treatment group consists of plants in which the average monthly wage in 1987 was less than the initial minimum monthly wage (referred to as “low-wage plants”), and the control group consists of plants in which the average monthly wage in 1987 was higher than the initial minimum wage. Comparing the outcomes for the low-wage plants with those for the high-wage plants, we can capture the effect of the minimum wage introduction. Thus, the effect of the minimum wage introduction could be summarized by the estimates from the following equation (1):

$$Y_{ijt} = \beta \text{After}_t \cdot \text{Treat}_i + \mathbf{X}'_{ijt} \Phi + \delta_i + \gamma_j + \tau_t + \xi_{jt} + \epsilon_{ijt} \quad (1)$$

where  $Y_{ijt}$  is an outcome variable such as the average wage per worker and the number of workers employed at each plant  $i$  in industry  $j$  in year  $t$ .  $\text{After}_t$  is a dummy variable for the periods after the initial minimum wage was applied.  $\text{Treat}_i$  is a dummy variable indicating whether the initial implementation of the policy affected the plant. In other words,  $\text{Treat}_i$  takes a value equal to one if plant  $i$ 's average monthly remuneration for its employees in 1987 was less than the minimum wage applied in 1988. Thus, the coefficient of the interaction between  $\text{After}_t$  and  $\text{Treat}_i$ ,  $\beta$ , will summarize the effect of the introduction of the minimum wage. The control variables include time-varying plant-specific variables such as the log of energy and non-energy inputs,  $\mathbf{X}$ ; plant-, industry-, and time-fixed effects,  $\delta_i$ ,  $\gamma_j$  and  $\tau_t$  respectively; and industry  $\times$  year fixed effects,  $\xi_{jt}$ , to control unobserved shocks to specific industries in a given year.

Furthermore, we alternatively use a continuous measure of the treatment intensity based on the difference between the pre-policy wage and the minimum wage applied in 1988. Because the

<sup>4</sup> Our empirical strategy is similar to the previous literature that examined the effect of a minimum wage at the plant-level (Draca et al., 2011; Haegg and Lin, 2015; Riley and Bondibene, 2013).

<sup>5</sup> A more appropriate measure would be the proportion of employees whose monthly wage was below the minimum wage rate prior to implementation of the policy (Dube et al., 2007). Unfortunately, we cannot use that measure because the data do not have information about the wages of individual workers.

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