

# The 2005 Amendment to Minimum Wage Act of South Korea: Impact to Income Gap Among Young Adults

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*This is an abridged and revised version of the junior independent work at Princeton University.  
It is also uploaded to: <https://github.com/jtschoi/Projects>.*

## **Abstract**

The 2005 Amendment to the Minimum Wage Act of South Korea was a policy directed at not only improving the efficiency of minimum wages but also expanding the coverage of them. The Korean government sought to achieve the latter objective by including metrics of wage inequality when determining the minimum wage rate. In light of the said characteristic, this study conducts an empirical analysis of whether the said 2005 Amendment had any impact on decreasing the income gap among young adults. It uses the difference-in-differences methodology in conjunction with the Korean Labor Income and Panel Study (KLIPS) dataset. The study finds only minimal evidence of the 2005 Amendment reducing the wage gap among young adults and suspects that this is due to the said amendment indirectly affecting income.

# 1 Introduction

Empirical studies have shown mixed results when it comes to judging the minimum wage’s contribution to reducing income inequality. An earlier influential study by David Lee (1999) has attributed the fall in the minimum wage to the rise of wage inequality in the U.S. during the 1980s. More recent studies, however, pinpoint the possibility that the importance of minimum wage may have been overstated in the previous studies (Dickens and Manning 2004; Autor, Manning, and Smith 2016). Despite this, the consensus in preexisting studies is that if minimum wages do affect a large number of workers, it can help reduce income inequality even if it may not be the primary factor in doing so.

A possible policy question to follow these studies is whether any changes to minimum wage regulations can affect rising income inequality in both advanced and developing countries. The 2005 Amendment to the Minimum Wage Act in South Korea, spearheaded by the progressive Roh Moo-hyun administration, could be an interesting example to study when addressing the question mentioned above. A policy directed at improving the efficiency of the minimum wage, it sought to expand the coverage of minimum wages; further, it included metrics of wage inequality as determinants of the minimum wage rate, which is annually updated by the Minimum Wage Committee of South Korea.

In this paper, I use data from Korean Labor Income and Panel Study (KLIPS) surveys constructed by the Korean Labor Institute (KLI) to test whether the 2005 Amendment to Minimum Wage Act contributed in decreasing the wage gap, especially among the young adults. In specific, I focus on whether the 2005 Amendment had an impact on reducing the college premium in wages (wage gap due to a college education) and the difference between wages of regular and irregular workers (wage gap due to work regularity). The reason to consider college and work regularity premiums to be metrics of wage income inequality has to do with the specific nature of the South Korean labor market and will be further explored in the literature review. However, even without considering specifics in South Korea, there is good evidence that income inequality and returns to education correlated (Juhn, Murphy, and Pierce 1993).

The methodology used in this study is composed of two steps: (i) identifying the combined impact of the 2005 Amendment and other post-2005 policies, and then (ii) isolating the impact of the 2005 Amendment itself. I use this method because the 2005 Amendment is not a standalone policy that can directly improve the wage income gaps, but a policy that permeates through the medium of minimum wage regulation. This observation is the reason why the 2005 Amendment can be considered as “improving the efficiency” of minimum wage despite that it sought to achieve other specific goals (such as the improved scope of applicability).

This study finds that while the 2005 Amendment had some success in improving the minimum wage’s efficiency in decreasing the wage income gaps of the younger workers, it was not able to reduce the wage income gaps directly due to its limited impact on the minimum wage system. The analyses also show that the minimum wage system of South Korea itself may be contributing to the increase in wage income gaps, especially for the one that is due to work regularity.

## 2 Overview of the South Korean Situation

### 2.1 The 2005 Amendment to the Minimum Wage Act

Act No. 7563, otherwise known as the Fifth or 2005 Amendment to the Minimum Wage Act of Korea, was passed on May 31, 2005, and taken into effect on September 1, 2005 (National Law Information Center n.d.). This Amendment sought to achieve goals such as accounting for income distribution and labor productivity when deciding upon the magnitude of the minimum wage, expanding the scope of those affected by Minimum Wage Act, and greater pecuniary punishment for employers not abiding by the regulations on minimum wages (Minimum Wage Council n.d.). Table 2.1 of the Appendix lists the exact details.

The most distinctive feature of this Amendment is that it proposes to address income inequality, by accounting for income distribution and labor productivity in future decisions on the magnitude of the minimum wage. Despite this, the 2005 Amendment falls short in the aspect that it does not reveal how income distribution and labor productivity are incorporated into the Minimum Wage Commission's decision-making. Upon further research, I discovered that the Commission has specific sub-commissions devoted to studies of issues such as current income and cost of living conditions and the potential impact of minimum wages. However, the specifics of how such analyses are conducted are undisclosed (Minimum Wage Commission n.d.).<sup>1</sup> This ambiguity contrasts with other changes included in the Amendment, such as enlarging the scope of application, which, for instance, mentions explicitly that the Minimum Wage Act will be extended to affect workers during on-the-job or entry training periods.

The opaqueness mentioned above in how the 2005 Amendment seeks to address income inequality is part of the motivation for this analysis. While it is notable that President Roh Moo-Hyun (in office from February 2003 to February 2008) sought to introduce various policies targeted at mitigating income inequality (Yun 2009, p.270), the actual impact of the Amendment needs to be tested. This research, through its use of empirical analysis, evaluates whether the 2005 Amendment has been influential in reducing income inequality, especially among young adults.

### 2.2 Comparison with the U.S. and U.K. Minimum Wage Systems

The minimum wage system in Korea is administered by the Minimum Wage Commission, a governmental organization under the supervision of the Ministry of Employment and Labor (MOEL). On March 31 of every year, the Minister of Employment and Labor calls for a review of the current hourly minimum wage rate, which the Minimum Wage Council conducts. Based on this review process, the Council proposes a target minimum wage rate, which may be rejected by MOEL. Listed reasons for rejection include a case in which the offered target rate is challenging for implementation or another in which labor unions or several corporations file complaints. The target rate is finalized on August 5 of every year and is put into actual practice on January 1 of the following year.

The process mentioned above, as well as the minimum wage system in general, differs from the U.S. system mainly in two ways. Firstly, while the Korean system is administered solely by the central

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<sup>1</sup>To avoid confusion, I note that the Minimum Wage Commission of South Korea was formerly known as the Minimum Wage Council in English.

government, the U.S. minimum wage system has two tracks: federal (central government) and state minimum wage rates. Due to this characteristic, there is no cross-region variance in minimum wage rates in Korea. However, it is the second difference that increases the variability of the minimum wage rate in South Korea: that minimum wage rate is updated every year, as mandated by the law. This annual change is not something observed in the U.S. scenario, as there are multiple years in which both the federal and state governments have not set new minimum wage rates.

These two characteristics of the minimum wage system in South Korea (i.e., that it is administered by the central government and is changed every year) makes it more akin to the system in the U.K., as the latter also undergoes semi-annual updates and is controlled by the central-governmental organization. However, unlike the U.K. system, where the minimum wage standard may vary for different age groups (GOV.UK n.d.), the South Korean system utilizes a single rate across all sectors of the economy. This age-invariant characteristic is what the South Korean system shares with the U.S. system. Therefore, one may conclude that the minimum wage system in South Korea is somewhat a mixture of the U.S. and U.K. systems.

### 3 Literature Review

#### 3.1 Minimum Wage's Impact on Inequality

The debate on whether the minimum wage system has a positive or negative impact on inequality seems to be unresolved. Proponents argue that minimum wage is a vital deterrence measure against greater inequality, and some even extend this idea by stating that the current levels of federal or national minimum wage rates are low. For instance, Lee (1999) makes a firm argument by using the U.S. data of the 1980s; the author states that declines in the real value of federal minimum wage rate contributed towards the growth of inequality (p.1016). Dickens and Manning (2004), using the U.K. data, argue that the level of the national minimum wage is too low in the U.K. that wage inequality is seemingly unaffected by (p.615). On the other hand, while the opponents of minimum wage do not argue that the minimum wage system contributes to the growth of income inequality, some researchers indeed assert that evidence is thin when it comes to minimum wage's effectiveness on decreasing inequality. Autor, Manning, and Smith (2016) – using data from developed countries – critique the Lee (1999) to argue that the effectiveness of minimum wage may have been exaggerated when focusing on a more extended period (p.91).

Studies specific to Korea also give off mixed signals concerning minimum wages' impact on inequality. Jeong (2006), for instance, argues that while the poor are indeed more likely to be affected by the minimum wage, the system also seems to reward the non-poor households. The author also pinpoints that the minimum wage system may be ineffectual for those who are poor and unemployed at the same time (Jeong 2006, p.2). Kim (2013) provides a qualified analysis in describing the effectiveness of the minimum wage system. The author elaborates that while there exists evidence that the minimum wage system was effective in lowering the poverty rate of South Korea, it must be supported by other measures (such as social security) for decreasing inequality in general (Kim 2003).

### 3.2 Wage Gap Due to a College Education

Studies of wage income gaps due to a college education, or “college wage premium,” have been targeted at understanding how college wage premium arises and what methods can be taken to measure this premium accurately. Papers such as Grogger and Eide (1995) and Fang (2006) exhibit such trends, in which the authors attempt to disentangle the actual value of returns to college from other confounding factors such as ability bias and signaling effect. Other studies focus on the supply-demand framework to understand the rise and fall of the college premium. For instance, work by Walker and Zhu (2008) that focuses on higher education in the U.K. attempts to measure the returns to college education where the supply of college-educated workers increased significantly. Past literature by Murphy and Welch (1989) also uses the supply-demand framework to argue that college premium has increased due to an increase in demand for such workers (p.17).

While college premium or wage income gaps by college education seem to be deemed a naturally occurring phenomenon in literature outside of Korea, much of Korean literature tends to focus on the wage income gap by college education as overblown and a task to be solved. Seong (1988) uses the supply-demand framework to understand the decrease in wage income gaps by college education in the 1980s. However, the said author also pinpoints that rapid industrialization in Korea has brought a distortionary impact on the screening process of the labor market, in that only those with higher education are selected despite other similar worker characteristics (Sung 1988, p.137). Choi, Lee, and Jeong (2004) extend this line of thought and presents evidence on increasing wage income gaps in the 1990s to early 2000s (p.42). Park (2014) uses the supply-demand-institutions framework to argue that wage income gaps in Korea are seemingly persistent despite that elasticity between more-educated and less-educated in Korea is higher than those of other countries, indicating the possibility for discrimination at work (p.479).

### 3.3 Wage Gap by Work Regularity

As work regularity is very much a situation specific to Korea, literature that focuses on irregular and regular workers in a context outside of Korea is very scant. However, in the sense that wage gap between the two types of workers – when controlling for other variables – is attributable to some form of discrimination, the discussion of wage gap by work regularity becomes akin to that of wage by gender or by race. While this study does not focus significantly on gender and race inequality in pay, I briefly note that previous studies on such subjects have used statistical methods (notably, Oaxaca-Blinder decomposition) to show that such disparities may be attributable to discrimination (Cotton 1988; Margo 1995; Shin 2011).

A book by Kim et al. (2009) gives a useful review of how one’s status as an irregular or regular work is decided. The authors use a logit model to find that married male workers with more extensive work experience, as well as those with higher educational levels, are less likely to be classified as irregular workers (Kim et al. 2009, 206). However, according to this study, even when other variables are controlled for, merely the classification as an irregular worker delivers less income for the workers than being classified as a regular worker (Kim et al. 2009, 231). This observation suggests that some level of discrimination is at work.

### 3.4 In Relation to the Existing Literature

The literature mentioned above provides information for understanding how the wage income gap arises and how minimum wage regulations can affect inequality in general. This study seeks to serve the role of connecting the two subjects by presenting evidence on how the minimum wage system and the related regulations can or cannot help in reducing wage income gaps. I emphasize wage income gaps by college education and work regularity. I also seek to extend the literature by focusing on wage gaps by the division of groups (i.e., by the college education and work regularity) rather than considering the entire wage income distribution as a whole. In doing so, I will rely on regression analyses based on the difference-in-differences technique.

At the same time, this study is a departure from only focusing on how magnitude changes in the minimum wage affect inequality, in that it provides a comprehensive analysis of how *qualitative* change in the Minimum Wage Act itself can affect the effectiveness of minimum wage regulation on reducing wage income gaps. This statement, however, is not to say that I will forgo the quantitative aspect of the minimum wage, as qualitative policy changes affect the labor market results through quantitative measures (i.e., the rate of minimum wage).

## 4 Data

### 4.1 Korea Labor and Income Panel Study

Korea Labor and Income Panel Study (KLIPS) is a longitudinal survey administered by the Korea Labor Institute (KLI), a governmental research organization affiliated with the Office for Government Policy Coordination. KLIPS surveys approximately 5,000 households (around 12,500 individuals) annually, and it is targeted at providing household- or individual-level data on economic activity, employment status, labor market outcomes, and more. The surveyed individuals are of ages 15 and above, and the available data covers the years 1998 to 2015 (18 annual waves in total). Furthermore, as opposed to other surveys conducted by the Korean government on labor and employment, KLIPS has characteristics that are both of a repeated cross-sectional survey and a longitudinal (panel) one.

The major research design-related reason for choosing KLIPS over other surveys, such as the Current Population Survey of South Korea, was because it provides individual-level microdata that is useful for constructing econometric analyses. Other surveys only present general summary statistics to the greater public, making them unsuitable for this particular study as I want to observe how individual labor market outcomes have been affected due to the policy change. Therefore, the KLIPS dataset, providing in-depth individual-level statistics, has a comparative advantage befitting the purpose of this study.

From here on, I will denote the aggregated KLIPS dataset covering the years 1998 to 2015 as the “main dataset” of the study.

## 4.2 Target Group of the Study

The target of the study will be observations from the main dataset that meet the following set of criteria during the year of the survey. Firstly, they are employed and report positive wage incomes; secondly, they are not daily workers, family workers, or self-employed; thirdly, they have completed their stated levels of final education; and finally, have a high school, junior college, or college education as the highest level of education. The fourth and final criterion is only applied when making the analysis of wage income gaps by a college education; when studying the wage income gaps due to work regularity, I will use observations regardless of the final level of education.

The above set of criteria is essential in answering the central research question of this study: whether the 2005 Amendment was effectual in decreasing the wage gaps. The first criterion is required as one should be able to observe labor market outcomes to make analyses on the size of wage income gaps. This study does not attempt to extrapolate the potential earnings function (which can be approximated using the main dataset) to make judgments on the unemployed using individual characteristics. Rather, it relies on actual wage incomes, which are visible only from those who are employed and report positive wage incomes.

The second and third criteria are necessary to ensure consistent measures of wage gaps. This study aims to compare the wages of two groups, given the study controls for other variables that may confound the analysis. In doing so, I want to observe workers whose contracts are acceptable in length (i.e., are not daily workers) and who receive wage income from employers (i.e., are not self-employed or family workers). In essence, I want to focus on individuals whose employment status and wage income reported at the time of the survey will be consistent throughout the year, and are in typical employee-employer relationships. For example, family workers may get paid only a small amount of wage due to working for their parents or relatives; self-employed workers can determine their wages for themselves. As these types of workers may pose trouble for this analysis, I exclude these observations from the target group of study.

In addition to the above three criteria, I will introduce a fourth criterion when analyzing wage income gaps due to a college education: the target group is restricted to those who indicate high school, junior college, or college as their final level of education. The reason why I wanted to implement this criterion was to be able to observe income gaps due to a college education with less variability. Considering those with less than a middle school education or with a post-college education may make the income gap due to a college education larger than it seems, especially when using a difference-in-differences methodology; therefore, the study excludes such observations. However, I emphasize that all levels of education are considered when analyzing wage income gaps due to work regularity, as focus shifts from not having a college education to one's status as an irregular worker.

The observations satisfying the above three criteria (and the fourth when necessary) will be denoted as the "target group" throughout this study. I further divide the target group into "young target" and "older target" by defining "young" as those between 15 to 35 years of age, and "older" as those above 35 years of age. Despite having identified the older target, I reiterate that this study primarily focuses on young adults (i.e., the young target).

### 4.3 Variables and Summary Statistics

The dependent variable of this study is the natural log of real monthly wage income.<sup>2</sup> This variable was calculated using the reported value of monthly wage income from the main dataset and inflation rate data from the OECD Data website. I tried to stay away from using the log of *hourly* monthly wage income as the main dataset generally lacks information on whether or not, and by what rate, workers receive payment for their overtime work. Approximately 99.9% (70,729 out of 70,764 observations) of the target group report their non-overtime working hours, but approximately 72.9% (51,605 out of 70,764 observations) do not report information about their overtime work. Therefore, to avoid further confusion, I adhere to using the log of monthly rates.

Figure 1 of the Appendix depicts the trend of the annual average log of real wages for the target group, along with those of young and older targets. The most prominent features of this figure are the sudden decreases in 1999 and post-2008, which can be attributed to the Asian financial crisis and the Great Recession, respectively. Also, it is notable that the average real wage income of young workers has caught up with that of the older workers. The potential reason for this phenomenon will be explained in the following paragraph, but will not be delved into deeply as it is not the main focus of the study.

As this study utilizes difference-in-differences methodology, the categorical variables to divide the main dataset will be important regressors to examine. One of these variables is the binary variable that equals 1 if an observation is from 2006 and onward to signify the implementation of the 2005 Amendment. The other variable serves as the border between the groups that this study proposes to measure the wage difference. For the wage gap due to a college education, I will use a binary variable denoted *NCE* (for “non-college-educated”) that equals to 0 if an observation has a college education and 1 if an observation has a high school or junior college education. For the wage gap due to work irregularity, I will use a binary variable denoted *IRR* (for “irregularity”) that equals to 1 if an observation is an irregular worker.

It is observable, from Figures 2 and 3 of the Appendix, that the younger generation of workers has consistently had a higher average rate of college education and a lower average rate of being irregular workers. This can serve as a potential reason for why the averages of real wage for young and older workers have converged in recent years, as seen from Figure 1 of the Appendix; despite having more work experience, older workers may be disadvantaged as their younger counterparts are more educated and less likely to suffer from discrimination due to work irregularity.

In addition to the regressors mentioned above, I will also introduce regressors to be used as controls for worker characteristics. Notably, these variables include the final level of education (when focusing on wage gap due to work irregularity), irregular work (when focusing on wage gap due to a college education), sex, age, experience, and experience squared. The addition of these controls – especially education, experience, and experience squared – have been inspired by the Mincer standard earnings function, first introduced in Mincer (1974). The standard earnings function uses the years of education and the years of total labor market experience as measures of education and experience. However, the main dataset does not provide sufficient information on these measurements. Instead, it provides information about an individual’s final level of education; therefore, I will use a binary variable for each level of final education reported in the main dataset (except one, of course, to account for collinearity). Concerning experience, the main dataset does not report the total years of work experience but allows a

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<sup>2</sup>In particular, I use 10,000 South Korean won in 2015 as the denomination for real monthly wages.



researcher to deduce the number of years a worker has spent on the current job. This value is precisely the measurement of work experience that I will utilize in this study. Of course, this may only make sense if one assumes that a hypothetical employer does not take a worker’s experience at other past jobs into consideration when deciding the wage of this individual. Nonetheless, I note that this is the most accurate measure of experience I was able to obtain from the main dataset.

The levels of minimum wages will also be considered in the regression. While the study focuses on the 2005 Amendment, the Amendment is not a standalone component that directly affects labor market outcomes. Rather, as a part of the minimum wage system, it influences labor market outcomes by reverberating through the medium of the minimum wage. Therefore, the actual magnitudes of the minimum wage are important for further analysis of the impact of the 2005 Amendment. As the main dataset does not directly report the levels of the minimum wage in Korea, I rely on the Minimum Wage Commission (n.d.) to retrieve these values. After acquiring this information, I have calculated the levels in real terms (denominated in Korean won in 2015) and subsequently logged them to acquire the log of real minimum wages. The trend of this variable can be seen from Figure 4 of the Appendix.

Finally, this study also introduces two types of fixed effects: year fixed effects and job classification fixed effects. Year fixed effects are added to account for any specific shocks that may have occurred for a given year. Job classification fixed effects are added to account for the impact of different jobs on wage income. By “job classification,” I refer to the 5-way classification used in Autor and Price (2013), in which all jobs and occupations are divided into five categories: routine manual, non-routine manual, routine cognitive, non-routine interpersonal, and non-routine analytic (where the last two comprise non-routine cognitive together). To reproduce the said 5-way classification for this particular study, I first examined the reported occupations and types of work and then categorized them befittingly according to their description. Finally, I created dummy variables using this categorization.

Table 1 of the Appendix presents summary statistics on the variables mentioned above for the target group.

## 5 Methodology

### 5.1 On Difference-in-Differences and Parallel Trends Assumption

Before moving onto discussing the actual model, I must explain what the treatment, as well as the treatment and control groups, will be for this particular study. The focus of this study is on the impact of the 2005 Amendment, so the Amendment itself will be the “treatment” of the difference-in-differences (abbreviated to D-in-D from subsequently) methodology. There is also the need for drawing the line between the control and treatment groups, in which the treatment group is the one to be affected by the 2005 Amendment. It is clear that the treatment group will be either the non-college-educated workers or the irregular workers, depending on the specific wage income gap investigated by regression analyses (i.e., wage income gap due to a college education or due to work regularity). The corresponding control groups will be the college-educated and regular workers, respectively.

Further, there is a need to address the parallel trends assumption, which is crucial for a D-in-D analysis. Before treatment, both the treatment and control groups have similar – or “parallel” – trends

in the dependent variable. In this study, the dependent variable will be the observed amounts of logged real wages. Parallel trends assumption is essential as a D-in-D analysis relies on the idea that the treatment group would have trended similarly to the control group in the post-treatment period given the absence of treatment. Without this assumption, a D-in-D analysis will not only be measuring the effect of treatment, but also the impact coming from different trends. As recommended in Angrist and Pischke (2014), I will rely on visual inspection of confirming the parallelism of the pre-treatment trends. Figures 5 and 6 of the Appendix, with their focus on the young target, show that pre-2005 trends are in accordance with parallel trends assumption, as they are upward-sloping with similar angles for each control-treatment pair.

## 5.2 Assumption on the Impact Scope of the Minimum Wage System

In the previous paragraphs, by defining treatment and control groups, I have implied that it is only the treatment group that will be affected by the 2005 Amendment and the minimum wage system in extension. However, I do acknowledge the fact that there may be individuals in the control group who are affected by minimum wage regulation. Therefore, I will relax this assumption on the impact scope of the minimum wage system to stating that it is *more likely* to affect the treatment group than the control group. The following observations can make the relaxation of the initial assumption (i.e., that the 2005 Amendment will only affect the treatment group). Firstly, the yearly distributions of logged wage income for the control and treatment groups look similar to one another, as observable from Figures 7 and 8 of the Appendix.<sup>3</sup> Secondly, every year, the average wage income for the control group is higher than that of the treatment group. As the lower-income workers are the intended target of the minimum wage system, combining these two observations lead to the idea that the minimum wages affect the treatment group more than the control.

I follow Oh (2015) to ensure further that the minimum wage affects the treatment group more than its control counterpart. The said paper uses the benchmark of 125% of an annual minimum wage rate and below as being in the impact scope of the minimum wage system and of potential changes to it. The author subdivides 125%-and-below group into three: those receiving less than the minimum wage (0 to 95%), those receiving around the minimum wage level (95 to 105%), and those who may potentially be affected by increases in the minimum wage rate (105 to 125%). I have calculated that, in all of the subdivisions, the treatment group has a higher share than the control group. Table 2 of the Appendix shows the said results. Based on this investigation, I will safely conclude that there is evidence to pursue the assumption that the minimum wage system and the 2005 Amendment are more likely to affect the treatment group than the control group.

## 5.3 Regression Models

I use a two-part approach to assess the impact of the 2005 Amendment. The first part of this approach is to use a D-in-D regression and test the statistical significance of the difference between the pre- and post-2005 wage income gaps. Technically, in this setting, the treatment is not limited only to the activation of the 2005 Amendment but any successive policy changes, including those in the magnitudes of the real

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<sup>3</sup>I use kernel density estimations on the existing data of logged real wage income to produce the distributions.

minimum wage. Therefore, the D-in-D estimator seeks to serve as a measure of combined effectiveness of the minimum wage system, rather than the isolated effectiveness of the 2005 Amendment.

$$\ln w_{it} = \beta_0 + \beta_1 TG_{it} + \delta_{DD}(TG_{it} \times POST_t) + X_{it}\gamma + \mathbb{J}_{it} + \rho_t + \epsilon_{it} \quad (1)$$

Table A: Summary of Variables from Equations 1 and 2

Variable	Description
$w_{it}$	Real wage income (in 10,000 Korean won in 2005)
$TG_{it}$	Binary variable; = 1 if treatment group
$POST_t$	Binary variable; = 1 if $t \geq 2006$
$\mathbb{J}_{it}$	5-way job classification fixed effects
$X_{it}$	$1 \times n$ matrix of control variables
$\rho_t$	Year fixed effects
$MW_t$	Level of real minimum wage (in Korean won in 2005)
$\epsilon_{it}$	Error term

NOTE: Subscripts  $i$  and  $t$  refer to observation  $i$  in a given year  $t$ .

The above equation (1) shows the regression that will be conducted for the first part. Table A accompanies this equation to explain what each variable means.  $\beta_0$ ,  $\beta_1$ ,  $\delta_{DD}$ , and  $\gamma$  indicate the associated coefficients.<sup>4</sup> The most important coefficient is  $\delta_{DD}$ , the D-in-D estimator for this regression. This coefficient will tell how much the wage gap has changed from the pre-2005 period to the post-2005 period. A statistically significant, positive value for  $\delta_{DD}$  will be ideal, as it would not only show that the wage gap has decreased but also provide evidence that there was a combined impact of the post-2005 policies – including the 2005 Amendment – on decreasing the wage income gaps.

The second part of the approach is the following attempt. I seek to differentiate between the isolated impact of the 2005 Amendment and that from the rest of the minimum wage system. I will be examining whether there is evidence that the 2005 Amendment was successful in decreasing the wage income gap between the treatment and control groups. For this part, a modified D-in-D estimator, which is a three-way interaction term of the treatment group variable ( $TG_{it}$ ), log of real minimum wages ( $\ln MW_t$ ), and post-2005 dummy variable ( $POST_t$ ), will be used.

$$\begin{aligned} \ln w_{it} = & \beta_0 + \beta_1 TG_{it} + \delta_{MW}(TG_{it} \times \ln MW_t) \\ & + \delta_{AM}(TG_{it} \times \ln MW_t \times POST_t) + X_{it}\gamma + \mathbb{J}_{it} + \rho_t + \epsilon_{it} \end{aligned} \quad (2)$$

The above equation (2) shows the regression that will be conducted for the second part. The variables are explained in Table A once again.  $\beta_0$ ,  $\beta_1$ ,  $\delta_{MW}$ ,  $\delta_{AM}$ , and  $\gamma$  are the associated coefficients.<sup>5</sup> Notice that  $\ln MW_t$  interacts only with the treatment group; this is a consequence of the relaxation mentioned above of the assumption that the minimum wage system affects the treatment group more as opposed to the control group. The coefficient  $\delta_{MW}$  will, therefore, signify whether the minimum wage system was effective in decreasing the wage income gap in the years before the 2005 Amendment was introduced.

<sup>4</sup>To be specific,  $\gamma$  is referring to an  $n \times 1$  vector of coefficients for the control variables.

<sup>5</sup>Once again,  $\gamma$  is referring to an  $n \times 1$  vector of coefficients for the control variables.

On the other hand,  $\delta_{AM}$  will show whether the Amendment, after its enactment, has made the minimum wage system *more* effective in decreasing the wage income gap. One can interpret this coefficient as the isolated impact of the 2005 Amendment to the minimum wage system and the wage income gap.

Finally, I note two further considerations. Firstly, in addition to the regression equations (1) and (2), I will also conduct separate regression analyses by adding the term  $\beta_2(YC_t \times TG_{it})$ , where  $YC_t$  is the year count from 1998 (i.e.  $YC_t = (\text{current year}) - 1998$ ) and  $\beta_2$  is the associated coefficient for this interaction term. This addition is a precautionary measure to account for the potential treatment-group-specific linear trend problem, in case that the parallel trends assumption fails to hold. Secondly, I will use year-clustered standard errors in this set of analyses to account for the possibility that in a given year, error terms may be correlated with one another. The use of year-clustered standard errors will also be a statistically robust measure for considering potential heteroskedasticity.

## 6 Results

### 6.1 Wage Gap due to a College Education

Table 3 in the Appendix reports the results of conducting regression analysis using equation (1) concerning the wage gap due to a college education. I emphasize once again that the D-in-D estimator in this regression – shown as the coefficient on  $POST \times NCE$  in Table 3 – is the estimate of the combined impact of post-2005 policies on the wage gap due to a college education. This observation means that it will include the effects of the 2005 Amendment and any post-2005 changes in the (logged value of) real minimum wage, but will not isolate that of the 2005 Amendment.

Commonly seen from Table 3’s results is that when adding treatment-group-specific linear trends, the statistical significance of the D-in-D estimator falls. The addition of such a linear trend even reverses the sign on the D-in-D estimator for the older target group. As previously mentioned, linear trends can be added to play the role of relaxing the parallel trends assumption. At the same time, however, the use of linear trends can confound the analysis if there are no critical or specific reasons to relax the parallel trends assumption. Therefore, I will understand the D-in-D estimator value on the regressions with linear trends as the “lower bound” of the combined impact of post-2005 policies.

Given this understanding of linear trends, comparing the young target to older target reveal the following. It is observable that the post-2005 policies combined were able to reduce the wage gap due to college education among the young by 1.61 5.48% with some statistical significance. However, the same policies’ combined impact was not significant in decreasing the same wage gap among older workers, as there is no statistical significance even without the consideration of treatment-group-specific linear trends. This idea that the combined impact of post-2005 policies was unsubstantial for the older generations is made even more evident by observing Figure 9 in the Appendix. For comparisons, note that Figure 10 depicts the young target, where one can find that there is a substantial gap between the counterfactual NCE trend (created using the regression results) and the real NCE trend. However, the analogous gap for the trends in Figure 9 is not very prominent.

Table 4 in the Appendix reports the results of conducting regression analysis using equation (2) with respect to wage gap due to a college education. The isolated impact of the 2005 Amendment on the wage

gap is shown through the coefficient on  $\ln MW \times POST \times NCE$  in the table. Firstly, it is observable that the coefficients on  $\ln MW \times NCE$  – which signifies the impact of the magnitude of minimum wage on the wage income gap before and in 2005 – are either negative with statistical significance (for the young target) or not statistically significant (for the overall target and the older target). This observation shows that the minimum wage system in the pre-2005-Amendment period was not only ineffective in reducing the wage gap due to a college degree but also contributing to increasing the wage gap for the younger workers.

For regressions without linear trends, I refer to the coefficients on  $\ln MW \times POST \times NCE$ . They are positive with statistical significance (for the overall target and the young target) or not statistically significant (for the older target). For the younger workers, adding this coefficient to the coefficient on  $\ln MW \times NCE$  yields a positive value of approximately 0.058; therefore, there is statistically significant evidence that the 2005 Amendment was effective in reducing the wage gap due to a college education *in an isolated manner*. Yet the sign is negative for the same sum of coefficients for the regression result when considered with linear trends (for the young target). This observation tells us that while the 2005 Amendment has made the minimum wage system more effective, the minimum wage system itself still has a long way to go in its effort to reduce the wage income gap.

## 6.2 Wage Gap due to Work Regularity

In contrast to the results shown in Table 3, the regression results in Table 5 of the Appendix explain that even the combined impact of the post-2005 policies was not very significant in reducing the wage income gap between regular and irregular workers. For the young target, the post-2005 policies seem to have been effective in reducing the wage gap due to work regularity, as shown by the coefficients on  $POST \times irreg$ . But the same coefficients for the older target and the overall target are negative, with many of them being statistically significant.

The observation that policies seem to have been ineffective in reducing the wage gap due to work regularity appears to continue in Table 6, where it measures the isolated impact of the 2005 Amendment. Not only are none of the coefficients on  $\ln MW \times POST \times irreg$  statistically significant but also those on  $\ln MW \times irreg$  are statistically significant and with a negative sign. This discovery suggests that the minimum wage system was not at all helpful in decreasing the gap between regular and irregular workers and that the 2005 Amendment was ineffectual in improving the minimum wage system either in terms of the wage gap due to work regularity.

## 7 Conclusion

In summary, the study finds that the 2005 Amendment may have been effective in reducing the wage income gap due to a college education for younger workers. More importantly, however, the said amendment was not very effective in reducing the wage gap due to both a college education or work regularity in general. Another striking observation is that there seems to be statistically significant evidence on the minimum wage system itself increasing the wage income gaps. Using this observation, one can argue that if the Korea government truly seeks to solve the problem of income disparity, it may need to introduce

further amendments or changes in the minimum wage system that is currently operating. One suggestion is to announce the changes in minimum wage rates ahead of time and less often, instead of updating them every year. This claim is not to say that increases in minimum wage rates are ineffective. Instead, it is to argue that perhaps the businesses need more time for adjustments in response to the changes in the rates.

I wish to conclude the paper by focusing on some of the limitations of this paper. Firstly, while the methodology that I used was perhaps effective in understanding the impact of the 2005 Amendment as a “treatment,” it had its shortcomings on providing explanations to the internal dynamics of how the effect of a treatment propagates. For instance, the regression analyses conducted in this paper bypass the firms or the business sector in general. They do not account for how firms react to the changes in the minimum wage rates or the introduction of policies such as the 2005 Amendment. Secondly, this paper fell short on isolating the impact on the treatment and control groups. It rather relied on the assumption that the treatment group was more likely to be affected. While I showed evidence that this assumption was valid, there may have been “spillover effects” in which the impact on the treatment group also permeates to the control group. Future studies may want to refer to other literature such as Autor, Manning, and Smith (2016), especially when attempting to understand the entire wage distribution as opposed to differentiating the control and treatment groups as done in this study. Finally, there is the issue of external validity. While this study elaborates much on the current status of wage income gaps and the minimum wage system in Korea, it still is focused on evaluating a single (while vital) policy – the 2005 Amendment. Also, whether similar analyses focused on *other countries* will yield similar results is quite unclear. Despite these shortcomings, I sincerely hope that this study enlightens some of the defects in the current minimum wage system and motivates further improvements to it.

# A Appendix

## A.1 Tables

Table 1: Summary Statistics, 1998–2015

	Target		Young Target		Older Target	
	Mean	SD	Mean	SD	Mean	SD
<i>Panel A. Level of education</i>						
No education	0.7%	-	0.0%	-	1.1%	-
Elementary school	6.3%	-	0.2%	-	10.3%	-
Middle school	9.0%	-	1.8%	-	13.8%	-
High school	36.1%	-	32.7%	-	38.3%	-
Junior college	17.1%	-	27.5%	-	10.2%	-
College	26.1%	-	34.2%	-	20.7%	-
Master's degree	3.9%	-	3.4%	-	4.3%	-
Doctorate degree	0.8%	-	0.3%	-	1.2%	-
<i>Panel B. Age-related</i>						
Young	39.9%	-	-	-	-	-
Age	40.12	11.50	29.23	4.03	47.36	8.84
<i>Panel C. Job classification</i>						
Routine manual	37.2%	-	24.7%	-	45.3%	-
Nonroutine manual	1.7%	-	2.0%	-	1.5%	-
Routine cognitive	34.0%	-	38.9%	-	30.7%	-
Nonroutine analytic	25.4%	-	34.0%	-	20.0%	-
Nonroutine interpersonal	1.8%	-	0.4%	-	2.6%	-
<i>Panel D. Other characteristics</i>						
Irregular	23.3%	-	16.6%	-	27.8%	-
Female	40.0%	-	43.5%	-	37.7%	-
Experience (in years)	6.10	6.91	3.35	3.25	7.92	8.01
Monthly real wage	222.31	153.19	199.36	108.37	237.56	175.13
<i>N</i>	70,764		29,332		42,432	

NOTE: Information on irregular worker is unavailable for 2000, so the calculation on this excludes the year 2000. Also, monthly real wage is denominated in 10,000 Korean won in 2015.

Table 2: Percentage of Workers Under the Influence of Minimum Wage

Classification	Control / Target	Categories of minimum wage's influence			
		<95%	95-105%	105-125%	<125%
College education	C: CE	1.25%	0.63%	1.78%	3.67%
	T: NCE	4.75%	2.27%	6.36%	13.39%
Work regularity	C: Regular	2.75%	1.40%	3.88%	8.03%
	T: Irregular	17.09%	6.18%	13.44%	36.70%

Table 3: Assessing the Combined Impact of Post-2005 Policies; Wage Gap by College Education

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Non-college-educated	-.2072*** (.0088)	-.2251*** (.0165)	-.2217*** (.0108)	-.2440*** (.0245)	-.1656*** (.0111)	-.1960*** (.0140)
$POST \times NCE$	.0336** (.0131)	.0012 (.0243)	.0548*** (.0159)	.0161 (.0314)	.0199 (.0136)	-.0362 (.0231)
$YC \times NCE$		.0037 (.0022)		.0046 (.0034)		.0061*** (.0016)
Irreg. employment	-.1880*** (.0073)	-.1884*** (.0072)	-.1590*** (.0106)	-.1593*** (.0106)	-.1909*** (.0082)	-.1915*** (.0080)
Experience	.0456*** (.0018)	.0456*** (.0018)	.0544*** (.0025)	.0544*** (.0025)	.0298*** (.0013)	.0298*** (.0013)
Exp. squared	-.0006*** (5.84e-05)	-.0006*** (5.84e-05)	-.0015*** (.0002)	-.0015*** (.0002)	.0001*** (3.53e-05)	.0001*** (3.53e-05)
Female	-.3856*** (.0037)	-.3856*** (.0037)	-.2779*** (.0047)	-.2778*** (.0047)	-.4699*** (.0060)	-.4699*** (.0060)
Age	-.0022*** (.0007)	-.0022*** (.0007)	.0136*** (.0008)	.0135*** (.0008)	-.0120*** (.0003)	-.0121*** (.0003)
Temporary work	-.2097*** (.0078)	-.2096*** (.0078)	-.1894*** (.0095)	-.1891*** (.0095)	-.2154*** (.0100)	-.2154*** (.0100)
Constant	5.2967*** (.0258)	5.3078*** (.0306)	4.7584*** (.0227)	4.7719*** (.0272)	5.8463*** (.0121)	5.8660*** (.0148)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Job dummies	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend	No	Yes	No	Yes	No	Yes
$N$	52,294	52,294	24,472	24,472	27,822	27,822
$R^2$	.5228	.5229	.4582	.4583	.5648	.5650

NOTE: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Clustered standard errors in parentheses (clustered by year).



Table 4: Isolating the Potential Impact of the 2005 Amendment; Wage Gap by College Education

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Non-college-educated	-.195*** (.0124)	-.204*** (.0084)	-.204*** (.0159)	-.218*** (.0118)	-.174*** (.0164)	-.182*** (.0102)
$\ln MW \times NCE$	-.075 (.0434)	-.340*** (.0734)	-.104** (.0406)	-.438*** (.0860)	.004 (.0680)	-.348*** (.0929)
$\ln MW \times POST \times NCE$	.108*** (.0325)	.088** (.0359)	.162*** (.0277)	.135*** (.0289)	.038 (.0541)	.014 (.0583)
$YC \times NCE$		.0152*** (.0040)		.0196*** (.0053)		.0197*** (.0058)
Irreg. employment	-.188*** (.0072)	-.188*** (.0072)	-.159*** (.0105)	-.159*** (.0106)	-.191*** (.0081)	-.192*** (.0080)
Experience	.0456*** (.0018)	.0456*** (.0018)	.0544*** (.0025)	.0545*** (.0025)	.0298*** (.0013)	.0298*** (.0013)
Exp. squared	-.0006*** (5.85e-05)	-.0006*** (5.85e-05)	-.0015*** (.0002)	-.0015*** (.0002)	.0001*** (3.54e-05)	.0001*** (3.54e-05)
Female	-.386*** (.0037)	-.386*** (.0037)	-.278*** (.0047)	-.278*** (.0047)	-.470*** (.0061)	-.470*** (.0061)
Age	-.0022*** (.0007)	-.0022*** (.0007)	.0135*** (.0008)	.0136*** (.0008)	-.0121*** (.0003)	-.0121*** (.0003)
Temporary work	-.210*** (.0078)	-.210*** (.0078)	-.189*** (.0094)	-.189*** (.0095)	-.215*** (.0100)	-.216*** (.0100)
Constant	5.288*** (.0297)	5.284*** (.0263)	4.745*** (.0257)	4.742*** (.0233)	5.853*** (.0184)	5.846*** (.0143)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Job dummies	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend	No	Yes	No	Yes	No	Yes
N	52,294	52,294	24,472	24,472	27,822	27,822
R <sup>2</sup>	.523	.523	.459	.459	.565	.565

NOTE: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Clustered standard errors in parentheses (clustered by year).

Table 5: Assessing the Combined Impact of Post-2005 Policies; Wage Gap by Work Irregularity

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Irreg. employment	-.141*** (.0127)	-.108*** (.0137)	-.179*** (.0139)	-.183*** (.0186)	-.140*** (.0173)	-.124*** (.0157)
$POST \times irreg$	-.070*** (.0157)	-.008 (.0186)	.045*** (.0121)	.038 (.0265)	-.075*** (.0187)	-.046* (.0245)
$YC \times irreg$		-.007 (.0018)		.001 (.0024)		-.003 (.0021)
<i>Level of education</i>						
- Elementary school	.227*** (.0294)	.230*** (.0292)	.237 (.213)	.236 (.213)	.167*** (.0293)	.168*** (.0289)
- Middle school	.339*** (.0360)	.341*** (.0357)	.282 (.216)	.236 (.215)	.167*** (.0353)	.168*** (.0348)
- High school	.459*** (.0366)	.462*** (.0362)	.375* (.212)	.375* (.212)	.326*** (.0320)	.328*** (.0315)
- Junior college	.513*** (.0367)	.516*** (.0364)	.449** (.211)	.448** (.210)	.384*** (.0286)	.385*** (.0282)
- College	.666*** (.0333)	.669*** (.0330)	.599** (.208)	.599** (.207)	.503*** (.0295)	.505*** (.0292)
- Master's degree	.773*** (.0333)	.776*** (.0331)	.731*** (.214)	.730*** (.214)	.574*** (.0278)	.575*** (.0276)
- Doctorate degree	.987*** (.0395)	.989*** (.0392)	.890*** (.200)	.889*** (.199)	.788*** (.0386)	.790*** (.0383)
Experience	.042*** (.0015)	.042*** (.0015)	.051*** (.0024)	.051*** (.0024)	.027*** (.0012)	.027*** (.0012)
Exp. squared	-.0006*** (4.85e-05)	-.0006*** (4.84e-05)	-.0014*** (.0002)	-.0014*** (.0002)	-.0001*** (3.24e-05)	-.0001*** (3.26e-05)

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Clustered standard errors in parentheses (clustered by year). Omitted level of education is "no education".

Table 5: Assessing the Combined Impact of Post-2005 Policies; Wage Gap by Work Irregularity

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Female	-.3856*** (.0029)	-.3855*** (.0029)	-.279*** (.0052)	-.279*** (.0052)	-.449*** (.0048)	-.449*** (.0048)
Age	-.0034*** (.0007)	-.0034*** (.0007)	.0142*** (.0007)	.0142*** (.0007)	-.0138*** (.0004)	-.0138*** (.0004)
Temporary work	-.2003*** (.0100)	-.1997*** (.0100)	-.201*** (.0092)	-.201*** (.0092)	-.189*** (.0155)	-.189*** (.0155)
Constant	4.6874*** (.0192)	4.6791*** (.0183)	4.144*** (.212)	4.145*** (.211)	5.416*** (.0275)	5.411*** (.0265)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Job dummies	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend	No	Yes	No	Yes	No	Yes
N	66,653	66,653	26,177	26,177	40,476	40,476
R <sup>2</sup>	.5659	.5661	.470	.470	.625	.625

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Clustered standard errors in parentheses (clustered by year).

Table 6: Assessing the Combined Impact of Post-2005 Policies; Wage Gap by Work Irregularity

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Irreg. employment	-.103*** (.0195)	-.103*** (.0196)	-.175*** (.0209)	-.178*** (.0229)	-.110*** (.0188)	-.011*** (.0188)
$\ln MW \times irreg$	-.164*** (.0157)	-.159* (.0186)	-.005 (.0121)	-.063 (.0265)	-.152*** (.0187)	-.315*** (.0245)
$\ln MW \times POST \times irreg$	.0125 (.0303)	.0129 (.0310)	.0621 (.0368)	.0571 (.0427)	.0090 (.0437)	-.0032 (.0433)
$YC \times irreg$		-.0002 (.0043)		.0034 (.0076)		.0092* (.0040)
<i>Level of education</i>						
- Elementary school	.230*** (.0292)	.230*** (.0291)	.235 (.214)	.234 (.215)	.169*** (.0288)	.169*** (.0287)
- Middle school	.341*** (.0357)	.341*** (.0357)	.280 (.217)	.279 (.218)	.231*** (.0348)	.231*** (.0347)
- High school	.462*** (.0362)	.462*** (.0362)	.374* (.213)	.373 (.214)	.329*** (.0314)	.328*** (.0314)
- Junior college	.516*** (.0363)	.516*** (.0363)	.447* (.212)	.446* (.212)	.329*** (.0314)	.328*** (.0314)
- College	.669*** (.0330)	.669*** (.0330)	.598** (.209)	.597** (.209)	.505*** (.0290)	.505*** (.0290)
- Master's degree	.776*** (.0330)	.776*** (.0330)	.729*** (.215)	.728*** (.216)	.576*** (.0275)	.575*** (.0275)
- Doctorate degree	.989*** (.0391)	.989*** (.0391)	.889*** (.201)	.888*** (.201)	.791*** (.0382)	.790*** (.0382)
Experience	.042*** (.0015)	.042*** (.0015)	.052*** (.0024)	.052*** (.0023)	.027*** (.0012)	.027*** (.0012)
Exp. squared	-.0006*** (4.85e-05)	-.0006*** (4.84e-05)	-.0014*** (.0002)	-.0014*** (.0002)	-.0001*** (3.25e-05)	-.0001*** (3.25e-05)

NOTE: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Clustered standard errors in parentheses (clustered by year). Omitted level of education is "no education."

Table 6: Assessing the Combined Impact of Post-2005 Policies; Wage Gap by Work Irregularity

Variables	Dependent variable = log of real monthly wage income					
	Target (1)	Target (2)	Young target (3)	Young target (4)	Older target (5)	Older target (6)
Female	-.385*** (.0029)	-.385*** (.0029)	-.279*** (.0052)	-.279*** (.0052)	-.449*** (.0048)	-.449*** (.0048)
Age	-.0034*** (.0007)	-.0034*** (.0007)	.0142*** (.0007)	.0142*** (.0007)	-.0137*** (.0004)	-.0138*** (.0004)
Temporary work	-.200*** (.0099)	-.200*** (.0099)	-.201*** (.0093)	-.202*** (.0093)	-.189*** (.0152)	-.190*** (.0152)
Constant	4.677*** (.0185)	4.677*** (.0185)	4.145*** (.212)	4.146*** (.212)	5.407*** (.0262)	5.407*** (.0266)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Job dummies	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend	No	Yes	No	Yes	No	Yes
<i>N</i>	66,653	66,653	26,177	26,177	40,476	40,476
<i>R</i> <sup>2</sup>	.566	.566	.469	.469	.625	.625

NOTE: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Clustered standard errors in parentheses (clustered by year).

## A.2 Figures

Figure 1: Annual Averages Log of Real Wage

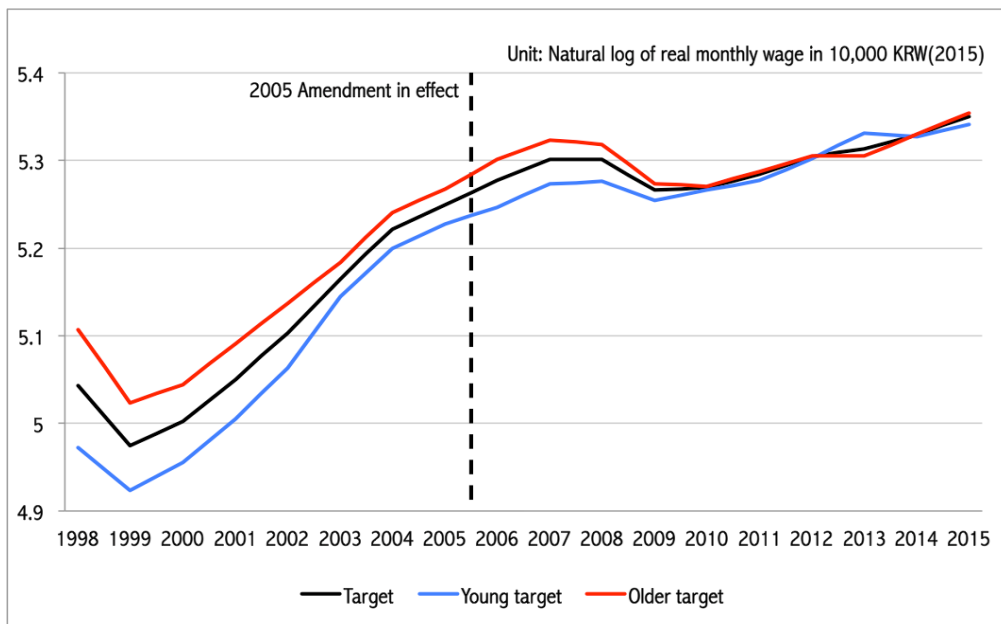


Figure 2: Percent of Workers with College Education

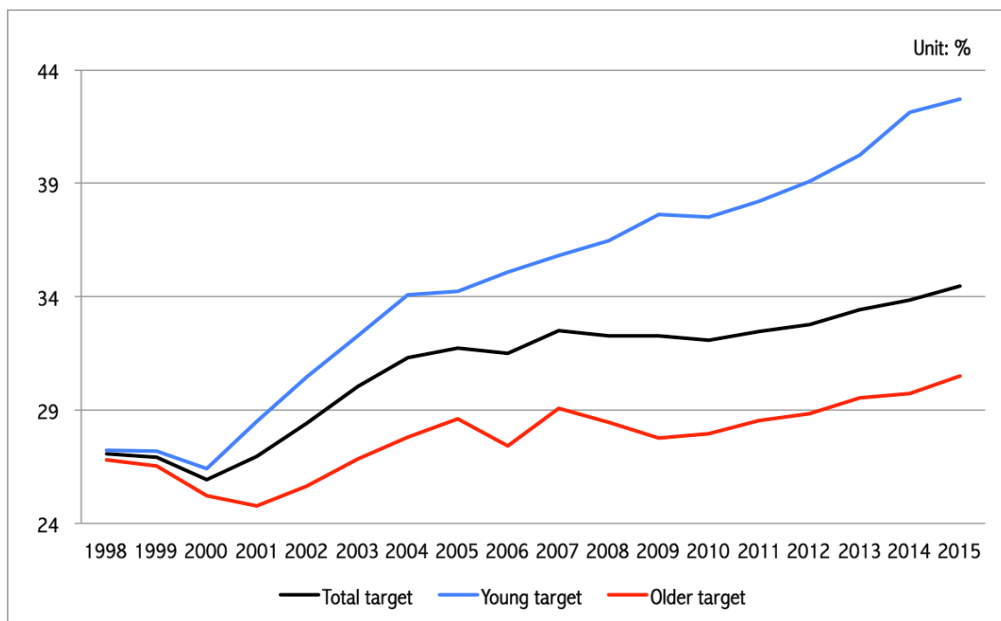
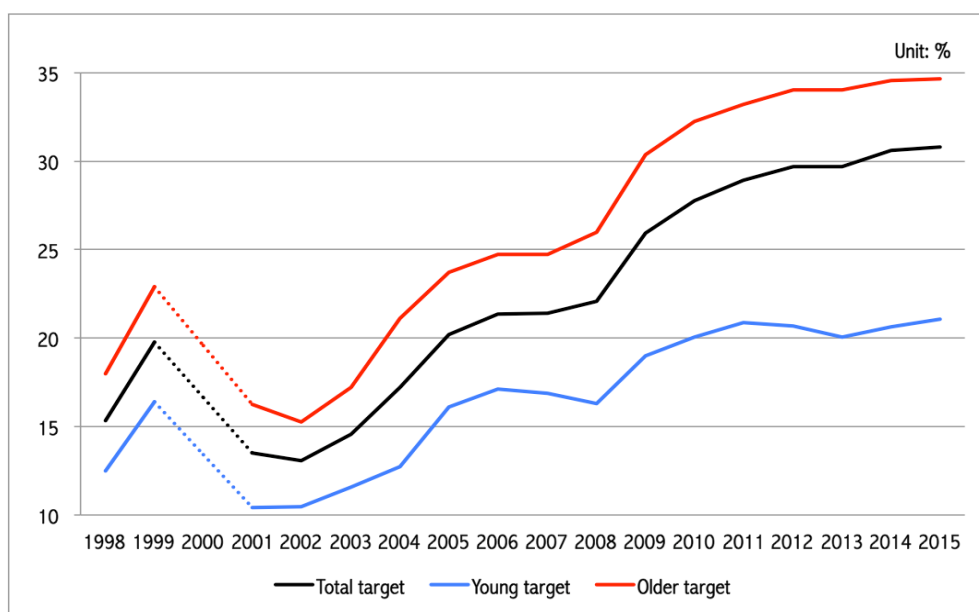


Figure 3: Percent of Those Who are Irregular Workers



NOTE: Dotted lines represent the lack of information on work regularity in 2000

Figure 4: Trend in Real Hourly Minimum Wage Rate of South Korea

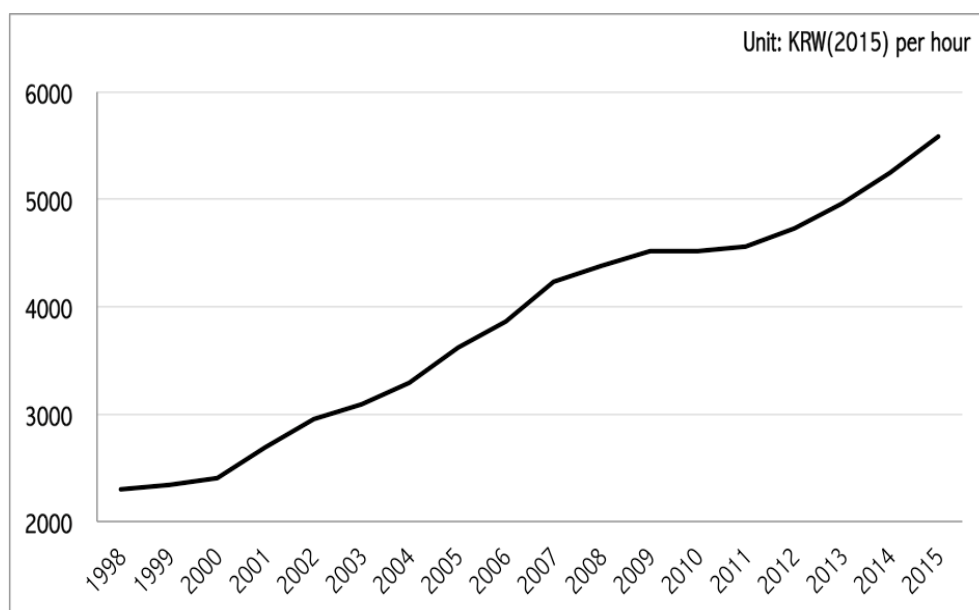
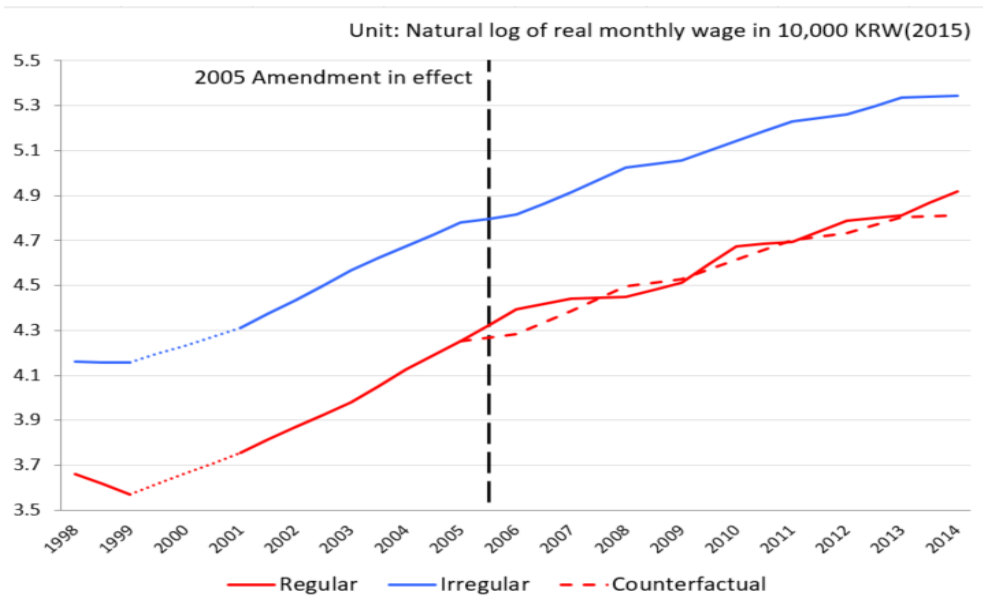


Figure 5: College-Educated Versus Non-College-Educated; Young Target



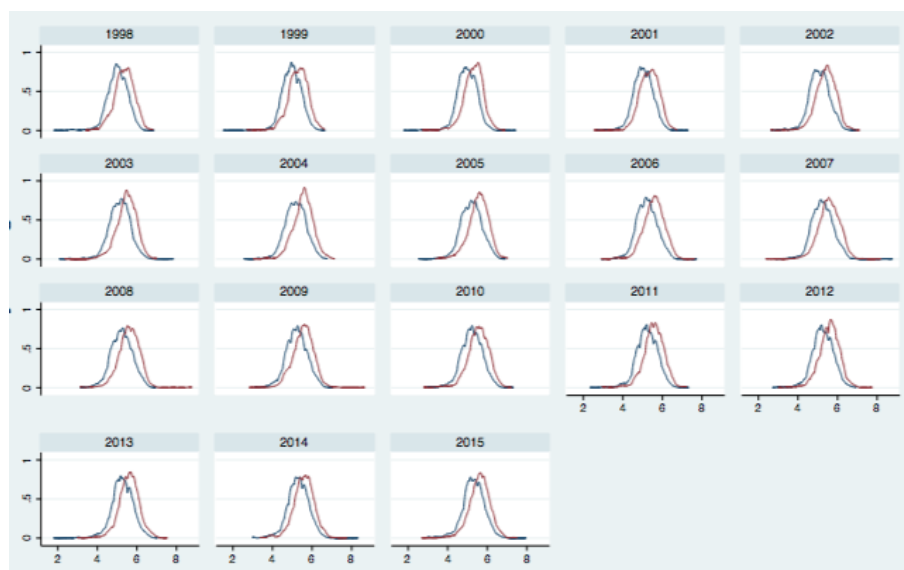
Figure 6: Regular Versus Irregular Workers; Young Target



NOTE: Dotted lines between 1999 and 2001 represent the lack of information on work regularity in 2000

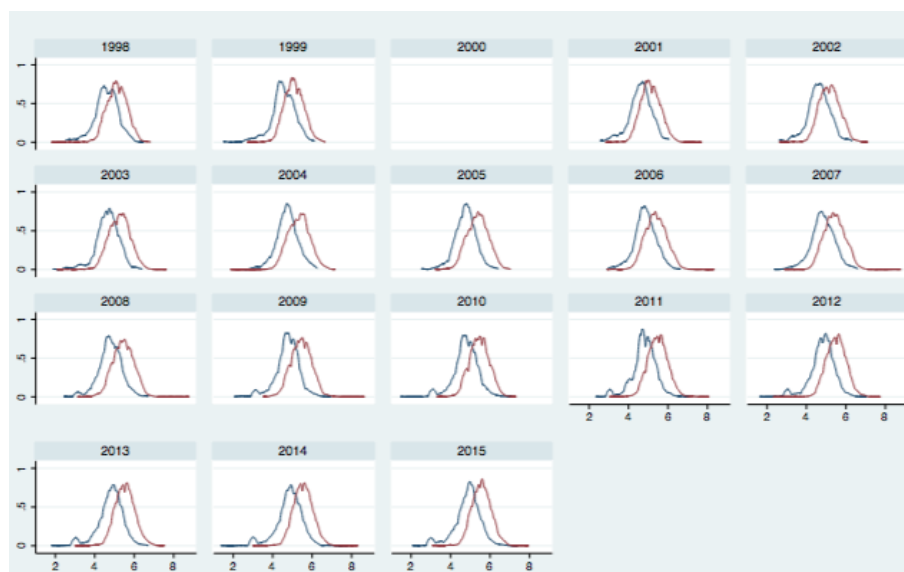


Figure 7: Annual Distributions of Logged Real Wage Income; CE Versus NCE



NOTE: Red lines indicate the college-educated (CE), and blue line indicate the non-college-educated (NCE).

Figure 8: Annual Distributions of Logged Real Wage Income; Irregular Versus Regular



NOTE: Red lines indicate the regular workers, and blue line indicate the irregular workers; 2000 is omitted due to the lack of information on work regularity in 2000.

Figure 9: Wage Gap Due to a College Education for the Older Target; Combined Impact

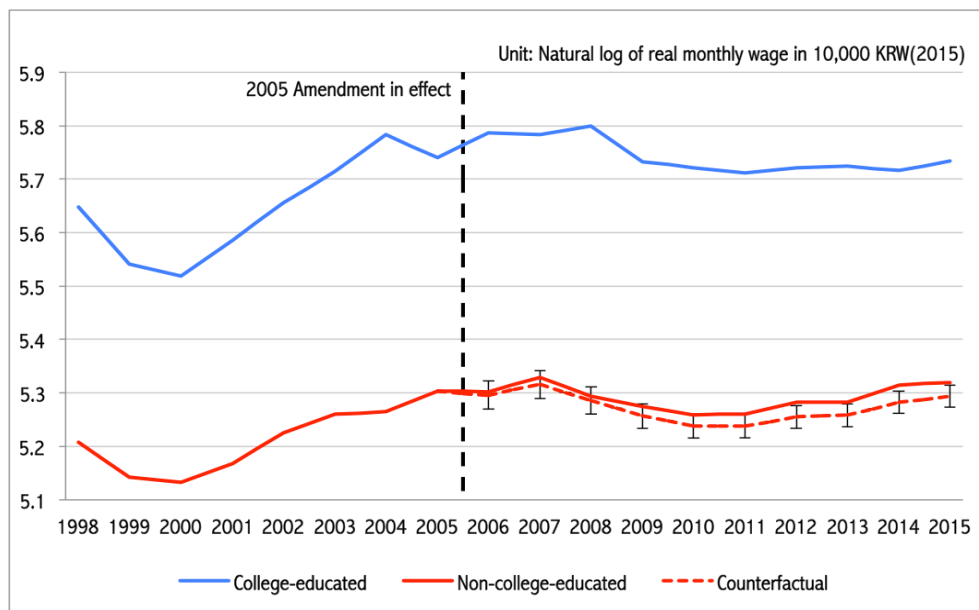
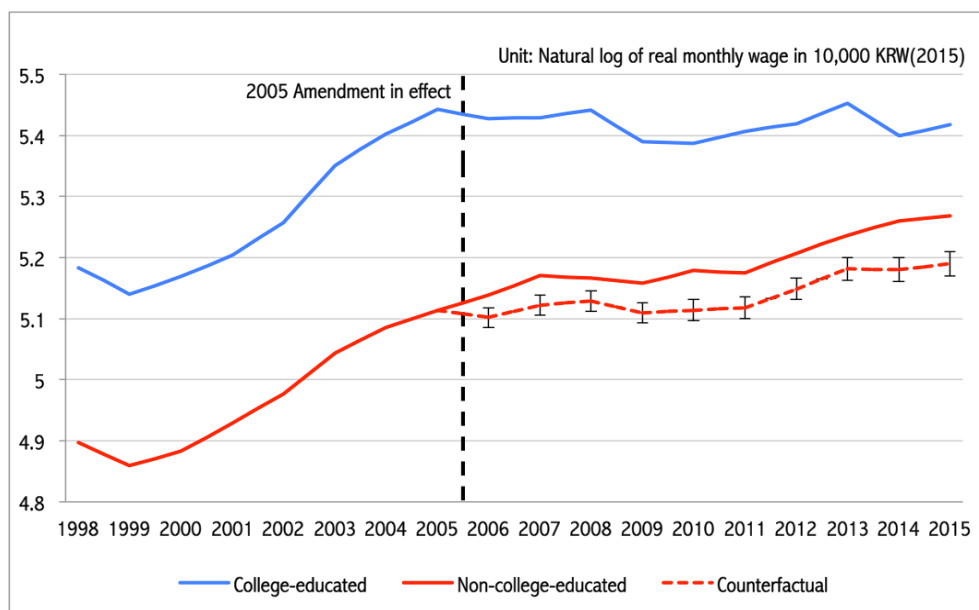


Figure 10: Wage Gap Due to a College Education for the Young Target; Combined Impact



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