

“Do anti-discrimination laws alleviate labor market duality? Quasi-experimental evidence from Korea”

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Abstract

Labor market segmentation is a growing phenomenon in many countries across different continents. In 2007, the Korean government undertook a labor reform prohibiting undue discriminatory treatment against fixed-term, part-time, and dispatched workers in an attempt to address income inequality arising from labor market duality. By exploiting a gradual introduction of the anti-discrimination law by firm size, I identify the treatment effects of the anti-discrimination law on gaps in wage and non-wage benefits between regular and non-regular workers, taking a difference-in-differences approach, a quasi-experimental design. My findings suggest that the imposition of the anti-discrimination law has significantly narrowed gaps in labor conditions between regular and non-regular workers. Labor conditions of targeted non-regular workers did not improve at the expense of those of non-targeted non-regular workers. Nevertheless, non-targeted non-regular workers being treated in a less favorable way raises another concern about the possibility of overusing non-targeted non-regular workers.

JEL classification: J31; J42; J71; J78

Keywords: Discrimination; Wage gap; Non-regular worker; Difference in differences; Korea.

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1. Introduction

Labor market segmentation is a growing phenomenon in many countries across different continents, its causes having been accounted for in a wide array of theories (see, for example, Doeringer and Piore, 1971; McNabb and Ryan, 1990; Reich et al., 1973). An extreme form of segmentation, labor market duality, albeit rarely observed in reality, is characterized by sizeable gaps in wage and non-wage benefits between workers in the primary and secondary sectors. As the large differentials in labor conditions produce various detrimental effects, the least of which are income inequality and relative poverty, scholars and policy makers have raised concern about the persistence of labor market duality in the economy.

The Republic of Korea (hereafter, Korea) is one of the countries with a highly dualized labor market. “Non-regular workers¹” who consist of fixed-term, part-time, and atypical workers, are subject to adverse labor conditions such as low wages, little employment protection, and weak coverage by the social safety net, while regular workers enjoy high wages, high levels of employment protection, and broad coverage by the social safety net. According to the Economically Active Population Survey (EAPS) conducted by the Korean National Statistics Office (KOSTAT), 34% of total wage workers were non-regular workers in 2013, and the share of temporary workers², who accounted for almost a half of non-regular workers in Korea, was the third highest among the OECD countries in that year (OECD, 2013)³.

Gaps in labor conditions between regular and non-regular workers in Korea are substantial and continuously widening. The EAPS reports that the average monthly wage of non-regular workers was only 55.8% of that of regular workers in 2014, while the corresponding figure in 2002 was 67.1%. Obviously, their lower wages are explained in part by productivity differences⁴. However, as Kim (2010) points out, the fact that most non-regular workers

¹ There is no commonly accepted definition for various non-traditional employment patterns including short-term and temporary work. Non-regular worker is a term that has been widely used in Korea since the 1980s. The Korea Tripartite Commission of Labor, Management, and Government agreed to the classification of non-regular workers according to employment type, and the labor reform of 2007 relied on this classification. Thus, the classification of non-regular workers is used in this paper, although it does not apply internationally.

² To allow better international comparisons, the OECD maintains a database on temporary workers that are defined as wage workers whose job has a pre-determined termination date. For Korea, temporary workers include workers with a fixed-term contract, temporary agency workers, and on-call workers (excluding double counting).

³ Poland ranked highest, followed by Spain and Korea.

⁴ Previous studies such as Lee (2009) and Nam (2007) argue that the wage gap between regular and non-regular workers is less than 10% after controlling for individual and firm specific characteristics.

perform almost the same tasks as regular workers and work the same hours makes the wage differentials problematic. Moreover, non-regular workers' disadvantages in access to social insurance systems and corporate-provided fringe benefits further widen the gaps between regular and non-regular workers, fuelling income inequality and relative poverty.

In 2007, the Korean government, after five years of discussion with the social partners, undertook a labor reform in an attempt to curb the excessive use of non-regular employment and to improve the labor conditions of non-regular workers⁵. The reform introduced two main changes: first, the maximum duration of employment for fixed-term workers was restricted to two years; second, undue discriminatory treatment against fixed-term, part-time, and dispatched workers was prohibited. While several studies have focused on the effect of the two-year maximum duration, mostly on employment⁶, few studies have been conducted on the second part of the reform, the so-called "anti-discrimination law," even though differences in labor conditions between regular and non-regular workers are the main cause of broadening inequality and are the reason why non-regular workers are unsatisfied with their conditions of employment.

Therefore, the primary objective of this paper is to evaluate the effectiveness of the reform, paying special attention to the anti-discrimination law. I provide evidence on how labor market duality can be alleviated through such legislation. More specifically, this paper estimates the effects of the anti-discrimination law on hourly wage, three major social insurance schemes (pension, health insurance, and employment insurance), four major fringe benefits (severance pay, bonus, overtime pay, and paid vacation), and training opportunities for both regular and non-regular workers, to investigate whether and how the anti-discrimination law contributes to reducing the gaps in labor conditions between the two types of workers. The gradual introduction of the anti-discrimination law by firm size makes the evidence from Korea interesting and informative. By exploiting the gradual introduction of the anti-discrimination law, a difference-in-difference (DD) estimator, applied to the 2007-2010 waves of the Economically Active Population Survey (EAPS), measures the unbiased treatment effects.

The main findings of this study can be summed up as follows: First, gaps in labor conditions between regular and non-regular workers have been significantly narrowed by the imposition

⁵ The Non-regular Workers Protection Law, which consists of (i) *Act on the Protection, etc. of Fixed-term and Part-time Employees*, (ii) *Act on the Protection, etc. of Dispatched Workers*, and (iii) *Labor Relations Commission Act*, was enacted in July 2007.

⁶ Those researches do not produce concluding results on the effect of the regulation of two-year maximum duration on employment. See, for example, Lee (2009), Nam and Park (2010), and Yoo and Kang (2009).

of the anti-discrimination law, but this was not achieved through the improvement of all labor conditions for non-regular workers. Second, labor conditions of targeted non-regular workers were not improved at the expense of those of non-targeted non-regular workers. Nevertheless, the less favorable treatment of non-targeted non-regular workers raises another concern about creating a new gap between targeted and non-targeted non-regular workers and about a possibility of overusing non-targeted non-regular workers. Policy recommendations based on my analysis should be of interest, not only to Korean authorities, but also to the wide set of countries with dualized or segmented labor markets.

The article proceeds as follows: Section 2 provides an overview of gaps in labor conditions in Korea driven by labor market duality and a description of the labor reform of 2007. Section 3 describes the dataset and the empirical methodology employed in the analysis. In section 4, the main results and discussion are presented. Finally, section 5 concludes with policy implications.

2. Background: Labor market duality in Korea

2. 1. Labor market duality and gaps in labor conditions in Korea

As the 1997 Asian financial crisis led to Korea's rapid integration in a globalized economy, firms began actively employing non-regular staff to reduce labor costs and to increase employment flexibility, given the difficulty and cost of dismissing regular workers (Jones and Urasawa, 2013). As a result, the share of non-regular workers has sharply risen, and it remains stable at a high level, around one-third of all wage workers. Similar to other OECD countries, non-regular employment in the Korean labor market is overrepresented among younger workers, less-educated workers, and females. In addition, due to mandatory retirement practices in Korean firms, the incidence of non-regular employment increases strikingly for older workers (Grubb et al., 2007).

Non-regular workers in Korea receive significantly less in wage and non-wage benefits compared to their counterparts. To begin with the latter, there are significant differences in access to social insurance and employer-provided fringe benefits between regular and non-regular workers. The legal framework requires nearly all wage workers to be covered by the social insurance system. In practice, however, there is a sizable gap between the statutory

coverage and actual coverage, with many non-regular workers excluded (Korea Labor Review, 2009). According to the EAPS (2010), around 80% of regular workers received at least one social insurance and one fringe benefit, while the corresponding figures for non-regular workers were only around 45%. This is of great concern, in that unexpected negative events, such as unemployment or industrial accidents, can be much more painful for non-regular workers not protected by the social safety net (Choi, 2011), and those events may occur more frequently among non-regular workers.

It is also shown that employers provide non-regular workers with fewer training opportunities (EAPS, 2010). This is a logical behavior for employers, since they are aware that non-regular workers will leave the firm in the foreseeable future (Grubb et al., 2007). However, for employees job training is the most important channel through which their productivities are improved. Less exposure to job training may stagnate their human capital accumulation, limiting their mobility towards more stable employment (Choi, 2011).

Most importantly, the wage gap between regular and non-regular workers in Korea is substantial. The EAPS (2010) indicates that non-regular workers were paid only 64.9% of the hourly wages of regular workers. However, unlike the other non-wage benefits, the presence of this “raw” wage gap does not necessarily mean that non-regular workers are discriminated against, since a considerable part of the differential is actually attributed to their productivity differences. A number of studies have measured the “true” wage gap between regular and non-regular workers in Korea, endeavoring to take into account all possible productivity related characteristics, but different results have been found depending on methodology and data used in the analysis (see, for example, Kim and Park, 2006; Lee, 2009; Nam, 2007; Park and Kim, 2007). There is no conclusive evidence on the size of the “true” wage gap, but most studies point out that the estimated “true” wage gap between regular and non-regular workers is statistically non-zero, it is lower than the “raw” wage gap, and thus discrimination against non-regular workers is likely to exist.

In principle, if it is possible to control for all individual and firm characteristics (both observable and unobservable) that might have an impact on wage, the estimated “true” wage gap should indicate the level of discrimination. However, it is very difficult to measure the exact level of discrimination against non-regular workers due mainly to unobserved individual and firm characteristics that might affect both wage and employment type (Lee, 2009). Measuring the exact level of discrimination is not the main interest of this paper. However, in examining these previous studies I want to stress that the “unexplained” wage gap in the

Oaxaca decomposition (Oaxaca, 1973), obtained after controlling for observed human capital characteristics, still matters even though the “unexplained” wage gap is not so close to the “true” wage gap and the anti-discrimination law likely contributes to reducing this “unexplained” wage gap, thus helping to alleviate the problems arising from the large gaps. For these reasons, this paper focuses on the effect of the anti-discrimination law on the gaps in labor conditions between regular and non-regular workers, not on the level of discrimination against non-regular workers.

2.2. Labor reform and the anti-discrimination law

Given that the incidence of non-regular workers in Korea is higher in among vulnerable workers, inferior labor conditions for non-regular workers have played a significant role in deteriorating income inequality (Jones and Urasawa, 2013). In addition, the persistence of sizable gaps in labor conditions drives Korean youths to make an unproductive effort to become regular workers, engendering inefficiency in the whole economy. The high college entrance rate, reaching almost 80%, and an excessive use of private tutoring to enter a prestigious university demonstrates the current situation in Korea, where large differentials in labor conditions provide younger people with incentives to adopt extreme strategies to gain an upper hand over their competitors in this fierce job market.

In order to alleviate the harmful impacts labor market duality produces, the Korean government undertook a labor reform. In November 2004, two draft bills on non-regular employment were submitted to the National Assembly: (i) *Act on the Protection, etc. of Fixed-term and Part-time Employees* and (ii) *Act on the Protection, etc. of Dispatched Workers*. The primary aim of these bills was to stop discrimination against non-regular workers and prevent their overuse by firms. However, the labor reform faced strong opposition from both trade unions and business organizations. Trade unions argued that the principle of “equal pay for work of equal value” should be enshrined in the law, demanding fixed contracts to be allowed only for a reasonable cause. Employers, on the other hand, claimed that the proposed regulations would aggravate labor market rigidities, hampering job creation. After long debates, although none of the both parties were fully satisfied with the bills, they were finally passed in December 2006 and became effective from July 2007.

The labor reform introduced two important changes. First, the maximum period to hire

workers on fixed-term contracts without a reasonable cause was limited to two years⁷. The worker who is still on the job at the end of the two-year period is considered to be a worker with a permanent contract. By directly limiting the maximum use of fixed-term workers, the government aimed to curtail the excessive use of non-regular workers and to provide more stable jobs and regular work. Second, discriminatory treatment against fixed-term, part-time, and dispatched workers was prohibited. Workers can submit complaints about discriminatory treatment in terms of wages and other labor conditions to the Korean Labor Relations Commissions, and employers should be able to provide evidence that their treatment of those workers was not discriminatory.

While the main spotlight was put on the first part of the reform, the maximum period for fixed-term workers, and several studies have been conducted on its impact, the effectiveness of the anti-discrimination law has not been rigorously tested. There have been several studies, such as Kang (2008), assessing the anti-discrimination law and discussing problems associated with the law from a legal point of view. Kang (2008) casts doubt on the effectiveness of the anti-discrimination law based on the fact that the number of cases filed with the Korean Labor Relations Commissions has been below expectations, the cases have been concentrated in particular workplaces, and the relief rate has been low. However, this does not necessarily mean that the law was ineffective. It might be the case that firms have already reacted to the reform, and as a result, unreasonable discriminatory treatment against non-regular workers has already been reduced significantly, as the legislation intended. Therefore, it is important to empirically investigate whether or not the anti-discrimination law has contributed to reducing gaps in labor conditions between regular and non-regular workers, distinguishing the effect of the anti-discrimination law from the effect of the rest of the reform.

To the best of my knowledge, only Choi (2011) estimates the effect of the anti-discrimination law using firm level data. He measures the average treatment effects of the anti-discrimination law on wage and other non-wage benefits using the simplest difference-in-differences approach, and finds significant positive effects for some of his dependent variables. However, my research differs in at least three main respects. First and most importantly, I employ an extended version of difference-in-differences estimation with multiple groups and time periods, focusing on the gradual imposition of the anti-discrimination law. Apart from the two-year maximum

⁷ In the government's original provisions on the use of fixed-term contracts, the maximum period was limited to three years, but further restricted to two years due to trade union pressure.

duration, which took effect in July 2007, the anti-discrimination law has been introduced gradually by firm size. It was first applied in July 2007 to the public sector and firms with 300 employees or more. This gradually expanded to firms with 100 employees or more in July 2008, and five employees or more in July 2009. By applying this gradual implementation to a regression framework, I estimate the unbiased treatment effects.

Second, I use individual data instead of establishment level data. This allows me to measure how much each individual worker's wage and non-wage benefits actually change before and after the reform. For instance, the Workplace Panel Survey data used in Choi (2011) lacks information on individual workers' actual wage, so he relies on survey information provided by a human resources manager at each firm about the general level of relative wages between regular and non-regular workers in that firm. However, the dataset used in this paper contains detailed information on the average monthly income received by each worker for the last three months, which makes it possible to perform more elaborate analysis of the effect of the anti-discrimination law on labor conditions for both regular and non-regular workers and on the evolution of gaps in labor conditions between them.

Lastly, this paper reports distributional impacts of the anti-discrimination law. An interesting feature of the anti-discrimination law is that it was not designed to cover all non-regular workers, only some of them. This consequently leads the anti-discrimination law to influence targeted non-regular workers and non-targeted workers differently, giving rise to distributional issues. This paper checks for heterogenous effects, focusing on the concern that targeted non-regular workers' labor conditions are improved at the expense of their counterparts, and discusses the consequences of the heterogenous effects.

3. Data and methodology

3. 1. Data

This paper employs the Economically Active Population Survey (EAPS) conducted by the Korean National Statistics Office (KOSTAT). It collects a series of information on an individual's labor related characteristics and other demographic characteristics. The survey is answered monthly by about 32,000 individuals in Korea who are 15 years old and over, and individuals in each region level are selected by a stratification procedure designed to be

representative of the national population in that region level.

I use data conducted in March from 2007 to 2010. The rationale for this choice is that, since 2007, the KOSTAT has provided the supplementary survey of the EAPS by employment type every March, which constitutes crucial information for performing the DD estimation⁸. More specifically, the supplementary survey contains information about wage (average monthly wage received for the last three months), social insurance, fringe benefits, and training opportunities, which are used as outcome variables. It also offers information with which I categorize workers by employment type. This enables me to classify regular, non-regular, targeted non-regular, and non-targeted non-regular workers—the main subgroups in the analysis. In order to focus on the treatment effects of the policy for those subgroups, only wage workers are included in the analysis (the economically inactive population, the unemployed population, the self-employed, employers, and contributing family workers are excluded from the sample). As a result, I work with a sample of 104,447 wage workers from an overall sample of 273,471 individuals.

Since the dataset used in the analysis is compiled in March every year, no individual in the 2007 EAPS dataset was affected by the anti-discrimination law, while individuals who worked in the public sector or at a firm with 300 employees or more in the 2008 EAPS dataset were subject to the reform. In the same way, individuals whose workplace consisted of 100 employees or more in the 2009 EAPS dataset and those whose workplace consisted of five employees or more in the 2010 EAPS dataset had to be affected by the reform. This gradual implementation of the anti-discrimination law by firm size is summarized in Table 1.

Unfortunately, the EAPS dataset does not have information on whether workers work in the public sector, which may result in an incorrect treatment assignment, diminishing the validity of the identification strategy. In section 4.3, I describe how I try to overcome this potential challenge. Results of a robustness check performed suggest that the inability to distinguish workers in the public sector does not severely damage the credibility of the DD estimation.

⁸ There is another supplementary survey of the EAPS by employment type conducted in August. In this survey, individuals report their average monthly income received in May, June, and July (for the last three months). Since the implementation of the anti-discrimination law was undertaken in July, it is possible that for some individuals, the income received in July is affected by the policy while the income received in May and June is not. To avoid this, I opt for the survey conducted in March.

Table 1. The gradual introduction of the anti-discrimination law by firm size

Firm size	Year			
	2007	2008	2009	2010
300 employees or more ^a	No	Yes	Yes	Yes
100 employees or more	No	No	Yes	Yes
5 employees or more	No	No	No	Yes
Less than 5 employees	No	No	No	No

NOTE: Yes if firms are subject to the anti-discrimination law; No otherwise.

^a Firms in the public sector belong to the group “300 employees or more”.

The dataset has detailed information on the wage and non-wage benefits an individual worker receives. Monthly wage is transformed into hourly wage to make it easier and more informative to compare wages between full-time and part-time workers. Monthly wage is first divided by 4.3⁹ to estimate weekly wage, and hourly wage is calculated by dividing the estimated weekly wage by average weekly working hours. Hourly wage is expressed in real terms, adjusted to 2010 prices using a consumer price index. I consider workers to benefit from social insurance¹⁰ when they receive at least one type of social insurance (pension, health insurance, or employment insurance); a change from workers who receive no social insurance to those who receive some social insurance can be regarded as an improvement. In the same way, workers are considered to receive fringe benefits when at least one type of fringe benefit (severance pay, bonus, overtime pay, or paid vacation) is provided to them.

The dataset also contains information on individual demographic characteristics (gender, age, educational attainment, marital status, and head of household), household characteristics (rural residence and farming household), and job-related or firm characteristics (occupation, trade union status, industry). These variables are included in the regression model as individual-specific covariates¹¹. The treatment variable is identified as follows: a policy dummy is assigned a value of one for firms and time periods subject to the anti-discrimination law. Tables A.1 and A.2 in the Appendix summarize the definitions and descriptive statistics, respectively, of the main variables used in the empirical analysis.

3.2. Methodological approach: Difference-in-Differences estimation

⁹ A month is assumed to have 4.3 weeks.

¹⁰ Regarding pension and health care, workers are considered to receive benefits from the National Pension Service (NPS) and National Health Insurance System (NHIS) only if they are workplace-based insured persons.

¹¹ A part-time dummy is not included in the regression because it is also used as one of the criteria to classify the subgroups in the analysis: part-time workers belong to non-regular workers and non-targeted non-regular workers. Nevertheless, results remained unchanged when introducing the part-time dummy in the analysis.

The intuition behind the DD method is that to investigate the effect of a specific intervention (“treatment”), the difference in outcomes after and before the intervention for groups affected by that intervention (“treatment groups”) are compared with the same difference for unaffected groups (“control groups”) (Bertrand et al., 2004). Applied to the issue of the anti-discrimination law’s impact on wage, one of the outcome variables, where the variable of interest varies at the firm size level, the DD approach suggests comparing changes in wages for workers from firms that must prohibit discriminatory treatment against workers to firms that are not forced to do so.

The main advantage of the DD estimation is that it can circumvent many omitted variable problems (Angrist and Pischke, 2009). If the average treatment effect of the anti-discrimination law on wage is measured by comparing average wages between the treatment group and control group using a simple OLS estimator, the estimate will be biased, as other characteristics affecting wages may differ by firm size. It is usually difficult to control for all these characteristics in a regression, because some of them are unobservable. On the other hand, if the research question is analyzed by comparing average wages of the same firm size group, for instance firms with 300 employees or more, before and after the policy change, it will also produce bias, since other characteristics affecting wages may have changed as well. In both cases, the OLS estimator is biased, and thus does not measure a causal effect but a correlation. However, under certain assumptions, the DD approach can control for the time-invariant firm size-level characteristics by comparing average wages of the same firm size group over time and shared time trends by comparing differences across firm size groups (Angrist and Pischke, 2009).

However, the credibility of this approach relies on a set of assumptions. First, the parallel trend assumption needs to hold in order for a DD estimator to yield a consistent estimate of the treatment effect (Angrist and Pischke, 2009); that is, in this context, in the absence of the treatment, wage trends would have been the same in both treatment and control groups. Since the analyzed time periods are limited to after 2007 due to unavailability of the supplementary survey of the EAPS before 2007 and the first imposition of the anti-discrimination law applied to some of the firms in July 2007, the trends in the pre-treatment periods cannot be defined in the analyzed time period (2007-2010). Due to this limitation, a formal test of the parallel trend assumption suggested by Galiani et al. (2005) cannot be conducted. Instead, the validity of the assumption is analyzed graphically. Figure 1 illustrates that the average values of the four

dependent variables in the treatment group (firms with 300 employees or more, firms with 100 employees or more, and firms with five employees or more) and control group (firms with less than five employees) followed a parallel evolution from 2007 to 2010. Although some of the firms were treated at different points in time, that is, the treatment effects were not absent in the analyzed time periods, the fact that the trends appear to be very similar in both treatment and control groups gives convincing support to the robustness of the identification strategy.

A second issue is that the DD estimator is inconsistent if an Ashenfelter dip occurs. The Ashenfelter dip indicates that treated individuals might have suffered bad outcomes immediately prior to treatment assignment, either due to the selection of individuals or an anticipation of their participation in the treatment (Ashenfelter, 1978). If firms anticipating the implementation of the anti-discrimination law raised wages for non-regular workers immediately prior to its imposition because they knew they had to do so in the near future, it would render the treatment effect underestimated. However, given exogeneity of the policy and the short time interval between the enactment and implementation of the anti-discrimination law, the effect of the Ashenfelter dip is expected to be trivial.

Finally, the DD estimates would be biased if the composition of the treatment and control groups changed as a result of the treatment (Angrist and Pischke, 2009). This would only be a problem if firms reduced their number of workers in order to be categorized as a smaller firm, for example, from a large firm with 300 employees or more to a medium-sized firm with less than 300 employees. However, there is no evidence of firms having increased the magnitude and frequency of dismissals after 2007. Indeed, my results indicate that firms adopted other strategies to counter the effects of the anti-discrimination law.

As discussed above, the anti-discrimination law has been introduced gradually by firm size, which makes it appropriate to exploit a regression framework. Given the existence of multiple groups and time periods, I opted to employ the general framework suggested by Bertrand et al. (2004) in which DD estimates and their standard errors derive from using OLS in repeated cross-sections of data on individuals in both treatment and control groups for several years before and after a specific intervention. The equation at the individual level is

$$Y_{ist} = \alpha_s + \lambda_t + \gamma X_{ist} + \beta I_{st} + \varepsilon_{ist} \quad (1)$$

where Y_{ist} is the outcome of interest for an individual i in size of her workplace s in year t (hourly wage –in log terms-, social insurance, fringe benefits, and training opportunities); α_s

is a full set of firm size dummies (firms with 300 employees or more, firms with 100 employees or more, and firms with five employees or more); λ_t is a full set of year dummies (2008, 2009, and 2010); X_{ist} is individual-specific covariates (gender, age, age squared¹², dummies for educational attainment, dummies for marital status, a dummy for head of household, a dummy for rural residence, a dummy for farming household, dummies for occupation, a dummy for trade union status, dummies for industry); I_{st} is an indicator for whether the anti-discrimination law affects the workplace in size s in year t ; and ε_{ist} is an error term. The firm size fixed effects α_s capture time-invariant differences in outcomes between the treatment and control groups, while the year fixed effects λ_t capture how both groups are influenced over time by non-treatment forces (Slaughter, 2001). Following the argument of Bertrand et al. (2004), I compute robust standard errors to prevent overestimation of t-statistics and significance levels. In principle, equation (1) is appropriate to estimate wage. However, it is applied to the rest of the dependent variables under the assumption that some of the control variables can also have an impact on the probability of receiving social insurance, fringe benefits, and training opportunities. Hence, the DD estimator β can be interpreted as the effect of the anti-discrimination law on hourly wage, social insurance, fringe benefits, or training opportunities.

Since I investigate how differently the anti-discrimination law has affected the labor conditions of regular and non-regular workers, the sample is divided into two subsamples—regular workers and non-regular workers—and the same estimation model is applied to both subsamples. The non-regular worker sample is further split into two—targeted and non-targeted non-regular workers—to check for the existence of heterogeneous effects of the anti-discrimination law. This exercise allows me to provide a clear picture of the redistributive effects of the anti-discrimination law.

4. Results

4.1. Descriptive evidence

Table A.2 presents the mean values of the main variables in each sample. The first and

¹² Age squared is included taking into account non-linearity.

second columns show the means for regular and non-regular workers, while columns three and four report the means for targeted and non-targeted non-regular workers. As discussed in section 2.1, non-regular workers receive less in wages, social insurance, fringe benefits, and training opportunities compared to regular workers, and the gaps between regular and non-regular workers are quite large. In the case of workers' demographics, a typical non-regular worker is female with low educational attainment¹³ working for a small firm. Female workers account for over half of non-regular workers, but only 38.5% of regular workers. Non-regular workers are generally less educated. Almost three-fourths of non-regular workers do not have tertiary degrees. On the other hand, workers with tertiary degrees are more likely to be regular workers, which explains why demand for higher education is exceptionally high in Korea. Non-regular workers are concentrated in smaller firms with less than 100 employees.

Interestingly, the labor conditions of targeted non-regular workers and non-targeted non-regular workers are also quite different. In general, non-targeted non-regular workers are employed in jobs with poorer labor conditions. The gaps in non-wage benefits are outstanding, as most non-targeted non-regular workers are excluded from social insurance and fringe benefits. In the current situation, the anti-discrimination law does not target the workers in greatest need of improved labor conditions.

Table 2. The penalties of being a non-regular worker after controlling for important productivity related factors

Variables	Year			
	2007	2008	2009	2010
Hourly wage	-0.084*** (0.007)	-0.104*** (0.007)	-0.108*** (0.007)	-0.098*** (0.007)
Social insurance	-1.356*** (0.040)	-1.449*** (0.042)	-1.579*** (0.043)	-1.385*** (0.043)
Fringe benefits	-1.279*** (0.038)	-1.501*** (0.041)	-1.608*** (0.041)	-1.459*** (0.040)
Training opportunities	-0.046 (0.037)	-0.165*** (0.041)	-0.093** (0.039)	-0.182*** (0.038)

NOTE: Robustness standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

¹³ Workers without tertiary degrees are categorized as less educated, as high school education is virtually universal. According to the OECD (2011), in 2009 98% of 25- to 34-year-old Koreans had successfully finished high school, while 63% of those had completed tertiary education: both proportions are the highest among all OECD countries.

Prior to evaluating the effectiveness of the anti-discrimination law, I checked whether or not the gaps in labor conditions are still present after controlling for important productivity related factors. To estimate these “unexplained” gaps, I modified equation (1) by excluding the policy indicator and including a non-regular worker dummy. Year dummies were also excluded; instead, the modified version of equation (1) was estimated for all wage workers for each year separately.

Table 2 shows the “unexplained” penalties of being a non-regular worker based on the four dependent variables and their evolution across time. The “unexplained” wage gaps are statistically significant and negative. The size of the wage penalties are similar to or slightly higher than those found in Lee (2009), whose study applies a fixed effect estimation for the three-way error-components model to firm-employee matched panel data to address endogeneity of employment type. The coefficients for social insurance, fringe benefits, and training opportunities are all negative except for the first estimate of training opportunities (2007). All in all, the results confirm that non-regular workers are treated badly, even taking into account important productivity differences.

The results in Table 2 also show general trends in the “unexplained” gaps. Except in the case of training opportunities, the “unexplained” gaps have increased since 2007, reaching their highest peak in 2009 and beginning to decrease in 2010. Do these trends illustrate the effect of the anti-discrimination law? To find out the answer to the question, I perform the DD estimation.

4.2. The impacts of the anti-discrimination hourly wage, social insurance, fringe benefits, and training opportunities

Table 3 presents the main results of the paper, the average treatment effects of the anti-discrimination law on hourly wage, social insurance, fringe benefits, and training opportunities for regular and non-regular workers¹⁴. The anti-discrimination law significantly increased hourly wages for non-regular workers, and this increase seems to be mainly driven by targeted non-regular workers. The insignificant coefficient for regular workers implies that the anti-discrimination law caused the wage gap between regular and non-regular workers to narrow. Moreover, I could not find evidence that non-targeted non-regular workers had to be badly treated in terms of wages to allocate more resources to targeted non-regular workers. The

¹⁴ Full table is available upon request.

estimate for non-targeted non-regular workers is statistically insignificant.

The coefficients of social insurance obtained using a logit model indicate that the anti-discrimination law significantly increased the probability of receiving at least one type of social insurance for all workers except for non-targeted non-regular workers. That the estimate for non-targeted non-regular workers is insignificant indicates that they were the only group excluded from the trend of the general expansion of social insurance. Firms seem to take advantage of the fact that non-targeted non-regular workers are not subject to the reform in order to reduce labor costs.

The third row of Table 3 provides evidence that the anti-discrimination law led to a significant decrease in the probability that regular workers and non-targeted non-regular workers would receive at least one type of fringe benefit; the corresponding probabilities for non-regular workers and targeted non-regular workers were unchanged. Compared to social insurance, a bestowal of firm-provided fringe benefits is legally bound to a lesser extent, so firms are allowed to freely adjust the level of benefits given to their workers. In order to reduce the level of discriminatory treatment against non-regular workers in terms of fringe benefits, firms seem to opt to reduce fringe benefits bestowed to regular workers, and the anti-discrimination law in turn seems to contribute to avoiding the cut in non-regular workers' fringe benefits.

Finally, the last row of Table 3 presents the average treatment effects of the anti-discrimination law on training opportunities. Similar to the case of fringe benefits, firms reacted to the reform by providing fewer training opportunities to their regular workers, and as a result, the gap in training opportunities between regular and non-regular workers has been reduced. However, unlike the case of fringe benefits, non-targeted non-regular workers' training opportunities were not significantly reduced.

Table 3. The impacts of the anti-discrimination hourly wage, social insurance, fringe benefits, and training opportunities

	(1)	(2)	(3)	(4)
	Regular	Non-regular	Targeted	Non-targeted
Variables	workers	workers	non-regular	non-regular
	workers	workers	workers	workers
Hourly wage	-0.003 (0.006)	0.021* (0.011)	0.032** (0.014)	-0.004 (0.020)
Social insurance	0.109* (0.062)	0.119* (0.064)	0.159** (0.077)	-0.104 (0.122)
Fringe benefits	-0.180*** (0.058)	-0.091 (0.060)	-0.046 (0.070)	-0.294** (0.121)
Training opportunities	-0.085** (0.038)	-0.076 (0.061)	-0.044 (0.070)	-0.191 (0.128)

NOTE: Robustness standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

To obtain a clearer picture of the main beneficiaries of the anti-discrimination law, I disentangled the average treatment effects of targeted non-regular workers by gender, educational attainment, and union status. As Table 4 shows, the reform significantly increased the hourly wage and the probability of receiving social insurance for female targeted non-regular workers and less-educated (without tertiary degrees) targeted non-regular workers. The increases in hourly wage and the probability of receiving social insurance are larger for those workers compared to the average treatment effects for all targeted non-regular workers reported in Table 3, suggesting that the policy had greater success in protecting those vulnerable workers who were more likely to be exposed to discriminatory treatment.

Interestingly, the coefficients of hourly wage and social insurance are greater for workers whose workplaces have trade unions. These heterogeneous effects might be evidence that trade unions have played an active role in pushing firms to comply with the anti-discrimination law. The majority of the members of trade unions are regular workers¹⁵, so they tend to take a position of maximizing the utility of their typical union members given that employment and wages for non-regular workers are correlated to those of regular workers. For these reasons, trade unions' stance for the improvement of non-regular workers' labor conditions is somewhat surprising. While further exploring union effects is beyond the scope of this paper, it should be highlighted that trade unions seem to be faithful to their role as representatives of non-regular workers.

¹⁵ According to the EAPS, the share of regular workers in trade unions is 91.9% in 2010.

Table 4. Heterogenous effects by gender, educational attainment, and union status

Variables	(1) Female	(2) Male	(3) Less educated	(4) More educated	(5) No trade union	(6) Trade union
Hourly wage	0.037** (0.017)	0.032 (0.021)	0.052*** (0.016)	0.015 (0.024)	0.029* (0.016)	0.091*** (0.027)
Social insurance	0.218** (0.099)	0.060 (0.124)	0.174* (0.094)	0.129 (0.134)	0.109 (0.088)	0.435*** (0.158)
Fringe benefits	-0.028 (0.088)	-0.081 (0.117)	-0.014 (0.087)	-0.078 (0.125)	0.002 (0.083)	-0.057 (0.137)
Training	-0.112 (0.095)	0.007 (0.106)	-0.090 (0.096)	0.078 (0.102)	-0.034 (0.089)	0.030 (0.118)

NOTE: Robustness standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

4.3. Robustness checks

One of the main challenges in terms of the validity of the methodology applied in this paper is that the anti-discrimination law was first applied not only to large firms with 300 employees or more but also to firms in the public sector, and the EAPS dataset does not provide information on which public firms are distinguished from private firms. For example, consider a worker in the 2008 EAPS dataset who works at a firm with less than 300 employees, thus belonging to the control group in the analysis. If the worker actually works in the public sector, she should not belong to the control group, but she has to be treated as a treated individual. This kind of wrong treatment assignment can be a threat to the validity of the DD estimation as it generates bias, making the estimator less convincing.

In order to address this concern and reaffirm the robustness of the identification strategy, I performed the following test. First, I calculated the share of workers in the public sector in each industry using information from the Census on Establishments conducted in 2009 by the Korean National Statistics Office (KOSTAT). In this database, each establishment is divided into one of four categories by the form of legal organization: individual proprietorship, incorporated company, non-business corporation, and unincorporated association. By dividing the number of employees that belong to non-business corporations¹⁶ by the number of all employees in each industry, the percentage of workers in the public sector in each industry was computed (Table A.3). Second, I dropped industries whose share of workers in the public sector

¹⁶ The public sector in Korea consists of central administration organizations, local governments, public institutions, public enterprises, and educational institutions. With few exceptions, those institutions belong to the category “non-business corporation” in the Census of Establishments.

is more than 10%. As a result, eight industries with a relatively low share of workers in the public sector remained in the sample. The remaining subsamples account for about two-thirds of the whole sample. Finally, average treatment effects are estimated using the chosen sample.

The results of the test are presented in Table 5. In general, the estimates are not very different from those obtained with the full sample. Targeted non-regular workers' hourly wage and probability of accessing social insurance programs were significantly increased, while the coefficients for fringe benefits and training opportunities remained unchanged. The loss of observation leading to the increase in standard errors seems to make the coefficients for non-regular workers insignificant (the size of the coefficients is as large as the corresponding coefficients found in Table 3). Results suggest that the inability to distinguish workers in the public sector does not severely damage the robustness of the DD estimation. Therefore, now it is more credible that the DD estimator yields an unbiased estimate of the treatment effect.

Table 5. With industries whose share of workers in the public sector is less than 10%

	(1)	(2)	(3)	(4)
	Regular	Non-regular	Targeted	Non-targeted
Variables	workers	workers	non-regular	non-regular
			workers	workers
Hourly wage	-0.003 (0.008)	0.021 (0.014)	0.031* (0.017)	0.005 (0.022)
Social insurance	0.190*** (0.070)	0.130 (0.085)	0.198* (0.109)	-0.019 (0.143)
Fringe benefits	-0.161** (0.066)	-0.093 (0.080)	-0.082 (0.100)	-0.166 (0.141)
Training opportunities	-0.133*** (0.049)	-0.069 (0.083)	0.029 (0.098)	-0.372** (0.159)

NOTE: Robustness standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Finally, I test the robustness of the main findings to a specification change by estimating a slightly modified version of equation (1) placing more emphasis on the effect of seniority in the current job. I excluded age and age squared and added potential work experience, actual work experience, and their squares, respectively. Potential work experience was computed by subtracting years of schooling and six years (school starting age) from age, and actual work experience indicating seniority in the current job was calculated by measuring the time interval between the starting date of the current job and the date of the survey conducted. Results reported in Table 6 are very similar to those from Table 3, reaffirming the robustness of the main findings of this paper.

Table 6. The alternative model replacing age and age squared with potential work experience, actual experience, and their squares

	(1)	(2)	(3)	(4)
	Regular	Non-regular	Targeted	Non-targeted
Variables	Workers	workers	non-regular	non-regular
	Workers	workers	workers	workers
Hourly wage	-0.004 (0.006)	0.024* (0.011)	0.034*** (0.013)	-0.004 (0.020)
Social insurance	0.085 (0.064)	0.132** (0.066)	0.191** (0.080)	-0.136 (0.127)
Fringe benefits	-0.218*** (0.060)	-0.079 (0.063)	-0.017 (0.074)	-0.323** (0.126)
Training opportunities	-0.089** (0.038)	-0.063 (0.061)	-0.035 (0.070)	-0.176 (0.128)

NOTE: Robustness standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

4.4. Discussion

The DD estimates reported in Tables 3 and 4 indicate that the imposition of the anti-discrimination law has significantly reduced gaps in labor conditions between regular and non-regular workers. The anti-discrimination law having a greater impact on labor conditions for the vulnerable groups within the targeted non-regular workers segment also seems encouraging. Although the reduction in gaps in labor conditions has not been achieved through the improvement of all labor conditions for non-regular workers, it can be safely concluded that the policy intervention increased targeted non-regular workers' welfare overall, and thus accomplished its intended goal.

On the other hand, my results also provide evidence that the introduction of the anti-discrimination law drove firms to struggle with the upward pressure on labor costs. Firms reduced costs spent on fringe benefits and training when they were confronted with a situation in which higher wages and more generous social insurance had to be provided to targeted non-regular workers. In addition, by treating non-targeted non-regular workers in a less favorable way compared to the way targeted non-regular workers were treated, firms tried to offset the increase in labor costs.

Therefore, the overall impact of implementing the anti-discrimination law depends on how firms react to the increase in the relative price of targeted non-regular workers. As the relative

price of targeted non-regular workers increases, firms are likely to decrease their use of those workers and to increase the use of their substitutes. Regarding the former, it is likely that firms will lower the employment level of targeted non-regular workers, especially by means of reduced new employment. If this is the case, although the existing targeted non-regular workers' welfare increased due to the anti-discrimination law, its effect on the total welfare of all targeted non-regular workers in the long run may be ambiguous, since the welfare of the people who are willing to take a non-regular job in the future would decrease due to the reduced chance of entering the labor market.

The problem concerning the existence of substitutes is that there are not only regular workers but also non-targeted non-regular workers that can substitute for targeted non-regular workers. Given strict employment protection legislation for regular workers, such substitutions are likely to occur more often. Indeed, it is a growing phenomenon to replace targeted non-regular workers with non-targeted workers such as temporary agency workers, and my results also provide evidence of firms making full use of non-targeted non-regular workers who are not subject to the anti-discrimination law. Hence, the fact that about one-third of non-regular workers are not legally bound by the anti-discrimination law hinders the achievement of other important objectives of the reform, particularly providing more stable jobs in the economy.

5. Conclusion

The Korean experience should serve to provide relevant guidelines for policymakers in countries with dualized or segmented labor markets. The first lesson is straightforward: prohibiting discriminatory treatment against non-regular workers has improved their overall labor conditions, thus reducing the gaps between regular and non-regular workers. However, the aggregate effect of the policy is difficult to predict, as it seems to depend on the price elasticity of demand for targeted non-regular workers and the existence of substitute workers. If the demand for targeted non-regular workers is elastic, the increase in the relative price of targeted non-regular workers driven by the anti-discrimination law is large enough to drive firms to significantly reduce their use of those workers. Their improved labor conditions may hurt the overall welfare of the group in the long run. Therefore, the aggregate effect of the anti-discrimination law is determined by how sensitively firms respond to the relative price change. Future studies should concentrate on empirically studying firms' reaction to the anti-discrimination law.

The imposition of the anti-discrimination law also generates distributional effects because of different profiles of the substitutable workers. The anti-discrimination law is unable to protect non-targeted non-regular workers and provides firms with incentives to replace targeted non-regular workers with non-targeted non-regular workers, not with regular workers. Obviously, this is not a scenario the government expected. Therefore, policymakers who seek to curb the proliferation of precarious employment should pay particular attention to removing this loophole from anti-discrimination laws.

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Table A.1. Definition of main variables

Variables	Definition
Hourly wage	Average pre-tax hourly wage received for the last three months
Social insurance	1 if individual receives at least one type of social insurance; 0 otherwise
Pension	1 if individual benefits from the National Pension System; 0 otherwise
Health insurance	1 if individual benefits from the National Health Insurance System; 0 otherwise
Employment insurance	1 if individual benefits from the Employment Insurance system; 0 otherwise
Fringe benefits	1 if individual receives at least one type of fringe benefit; 0 otherwise
Severance pay	1 if individual receives severance pay from her workplace; 0 otherwise
Bonus	1 if individual receives bonus from her workplace; 0 otherwise
Overtime pay	1 if individual receives overtime pay from her workplace; 0 otherwise
Paid vacation	1 if individual receives paid vacation from her workplace; 0 otherwise
Training opportunities	1 if individual has received job training for the last one year; 0 otherwise
Education	(The reference group is elementary school degree or less)
Middle school	1 if individual has a middle school degree; 0 otherwise
High school	1 if individual has a high school degree; 0 otherwise
Junior college	1 if individual has a junior college degree; 0 otherwise
University	1 if mother has a university degree; 0 otherwise
Graduate school	1 if mother has a graduate degree; 0 otherwise
Marital status	(The reference group is single)
Married	1 if individual is married; 0 otherwise
Bereaved	1 if individual is bereaved; 0 otherwise
Divorced	1 if individual is divorced; 0 otherwise
Head of household	1 if individual is a head of household; 0 otherwise
Rural residence	1 if individual resides in a rural area; 0 otherwise
Farming household	1 if individual belongs to a farming household; 0 otherwise
Trade union	1 if individual's workplace has trade unions; 0 otherwise
Size of firm	(The reference group is less than five employees)
5 ~ 99 employees	1 if the number of employees is between 5 and 99 ; 0 otherwise
100 ~ 299 employees	1 if the number of employees is between 100 and 299 ; 0 otherwise
More than 300	1 if the number of employees is equal to or more than 300; 0 otherwise
Law	1 if individual's workplace is subject to the anti-discrimination law; 0 otherwise

Table A.2. Means of key variables

Variables	Mean			
	Regular workers	Non- regular workers	Targeted non-regular workers	Non- targeted non-regular workers
Hourly wage	1.119	0.753	0.766	0.730
Social insurance	0.792	0.425	0.511	0.273
Pension	0.773	0.370	0.453	0.223
Health insurance	0.782	0.404	0.493	0.247
Employment insurance	0.646	0.382	0.464	0.237
Fringe benefits	0.787	0.388	0.476	0.235
Severance pay	0.739	0.329	0.408	0.189
Bonus	0.733	0.285	0.353	0.166
Overtime pay	0.563	0.206	0.253	0.124
Paid vacation	0.653	0.270	0.345	0.137
Training opportunities	0.342	0.223	0.231	0.210
Female	0.385	0.530	0.557	0.482
Education				
Less educated (without tertiary degrees)	0.524	0.731	0.694	0.798
More educated (with tertiary degrees)	0.476	0.269	0.306	0.202
Size of firm				
Smaller firms (less than 100 employees)	0.746	0.880	0.853	0.926
Larger firms (More than 100 employees)	0.254	0.120	0.147	0.074
Number of observations	67019	37428	23871	13557

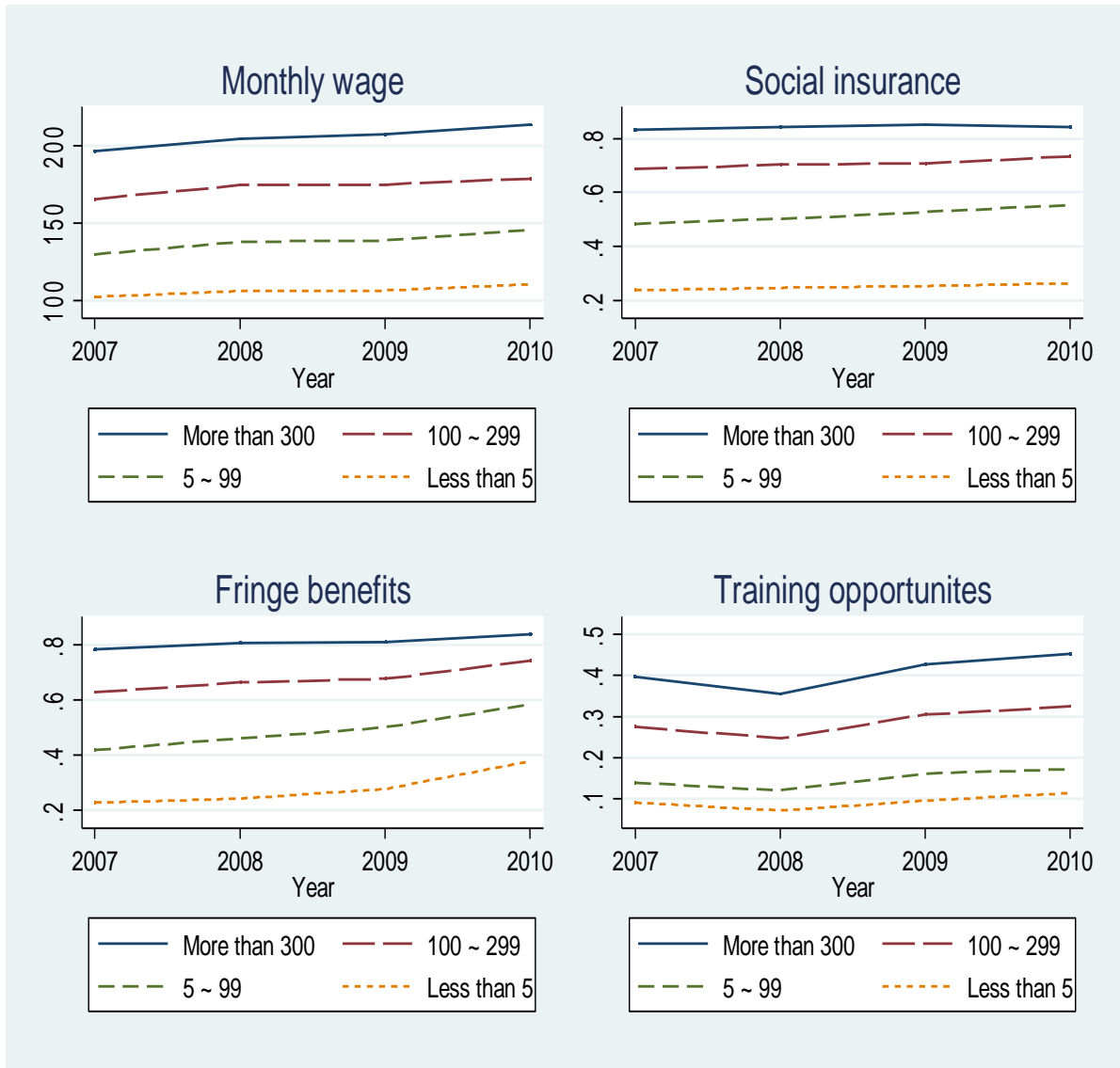
NOTE: Hourly wage is presented in 10 thousands of Korean Won.

Table A.3. Share of workers in the public sector in each industry

Industry	Share
A. Agriculture, forestry and fishing	n/a
B. Mining and quarrying	14,16%
C. Manufacturing	0,78%
D. Electricity, gas, steam and water supply	57,23%
E. Sewage & waste treatment, material recovery and restoration activities of environment	13,90%
F. Construction	0,38%
G. Wholesale and retail sale	1,77%
H. Transportation	5,50%
I. Accommodation and food service activities	0,60%
J. Publishing, video, broadcast communications and information services	12,73%
K. Financial service and insurance activities	22,38%
L. Real estate activities and renting and leasing	3,42%
M. Professional, scientific and technical activities	16,57%
N. Business facilities management and business support services	3,07%
O. Public Administration and Defence ; Compulsory Social Security	100%
P. Education	64,35%
Q. Human health and social work activities	36,74%
R. Arts, sports and recreation related services	20,88%
S. Membership organizations, repair and other personal services	7,72%
T. Private households with employed persons	n/a
U. Extra-territorial organizations and bodies	n/a

SOURCE: Census on establishments in 2009 conducted by Korean National Statistics Office (KOSTAT).

Figure 1. Parallel trend assumption



NOTE: Monthly wage is presented in 10 thousands of Korean Won.



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