

# The Deregulation of Temporary Employment and Workers' Perceptions of Job Insecurity in Japan

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## ***Abstract***

In Japan, non-regular employment, such as part-time and temporary work, has increased as a proportion of the workforce in recent years. This paper examines whether the expansion of temporary employment has caused an increased perception of job insecurity among existing workers. I exploit the temporary staffing deregulation of 2004, which allowed temporary agency staffing for production line work in manufacturing, and use a difference-in-differences (DD) methodology to identify the impact of the legal change on changes in perceptions of job insecurity among low-skilled manufacturing workers. I find that the temporary agency staffing deregulation contributed significantly to a rise in perceived job insecurity among low-skilled manufacturing workers.

Keywords: Job insecurity, Temporary employment, Difference-in-differences, Japan

*JEL* Classification: J21, J63

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# 1 Introduction

In most developed economies, non-regular employment, such as part-time and temporary work has increased as a proportion of the workforce in recent years. The trend seems to be stronger in countries such as France, Italy and Spain, where regular employees have strong job protection, which in turn encourages firms to hire more non-regular workers who can easily be terminated when the reduction of labor is necessary (Booth et al., 2002). Japan, which also has strong employment protection for regular workers, is no exception. Because of the stagnant economy and in response to competitive pressures to lower labor costs, more Japanese firms have been increasingly using non-regular employees instead of using traditional employees as a means to lower labor costs and gain flexibility in hiring and dismissal.<sup>1</sup> One notable phenomenon in the recent Japanese non-regular labor market is the growth of temporary agency employment. Although temporary agency workers<sup>2</sup> only account for a small fraction of the Japanese labor force, their share more than doubled during the period 2002-2005, from 0.9 percent to 2.1 percent.<sup>3</sup>

One possible consequence of this expansion of temporary agencies is a rise in perceptions of job insecurity among existing workers. If the relative cost of agency workers is lower, a firm may choose to replace other types of non-regular employees with agency workers. Regular employees are not likely to be easily replaced by agency workers because of strong job protection, but if a firm can no longer afford job security for regular employees due to intensive competitive pressure brought about by the expansion of temporary agency staffing at other firms, it may choose to downsize and lay off regular employees in order to remain competitive and survive. Whether or not layoffs actually happen in the workplace, the fear of job loss may increase as long as employees are aware that cheaper substitutes are available or firms face considerable pressure to lower labor costs.

Identifying the impact of the expansion of temporary agencies on worker perceptions of job insecurity is difficult, however, because job insecurity is affected by macro shocks and secular trends. Therefore, I exploit the temporary staffing deregulation of 2004, which allowed temporary agency staffing for production line work in the manu-

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<sup>1</sup>According to Houseman and Osawa (2003), “[non-regular workers] are perhaps most easily defined by what they are not: full-time dependent employment with a contract of indefinite duration, or what is generally considered the ‘standard’ work arrangement” (p. 3).

<sup>2</sup>In the literature by Japanese scholars, “dispatched worker” is traditionally used for the Japanese word “*haken*” instead of temporary agency worker, but I translate it as (temporary) agency worker to be comparable to the U.S. terminology.

<sup>3</sup>*Labor Situation in Japan and Analysis: General Overview 2006/2007: The Japan Institute for Labour Policy and Training (JILPT)*. Note it is difficult to estimate the precise number of agency workers in Japan because one survey (Japanese Labor Force Survey) by the Statistics Bureau defines agency workers as a person worked at least 1 hour during the previous week of the survey while the other survey (the Worker Dispatching Business Survey) by the Ministry of Health, Labour and Welfare defines them as a person who was registered and employed at least once in the previous year. However, both surveys shows the number of temporary agency workers has grown rapidly (Gottfried, 2008).

facturing sector, and examine possible impacts of the growing use of temporary agency workers on perceptions of job insecurity of existing workers. No country other than Japan regulates temporary agency employment based on occupational distribution (Gottfried, 2003), and thus this deregulation provides a unique setting for a natural experiment, in which only production workers in the manufacturing sector were exposed to a potential large entry of agency workers. Japan is an interesting case for the study of regular workers' job insecurity because strong employment protection was often partly attributed to the country's economic success before the decade-long recession of 1990s.

Using difference-in-differences (DD) methodology, which allows me to distinguish the effect of the deregulation on job insecurity from other factors affecting job insecurity, I identify the impact of the legal change as the difference between the change in the perceptions of job insecurity of low-skilled manufacturing workers (treatment group) and the change in the perceptions of job insecurity of other nonmanufacturing low-skilled workers (control group). I find that the deregulation significantly increased job insecurity among low-skilled manufacturing workers, especially regular workers, relative to the control group.

However, there remains a possibility that manufacturing workers as a whole were experiencing distinct external shocks unrelated to the deregulation. I address this issue by including high-skilled workers and using a triple-differences (DDD) approach in order to account for manufacturing-specific shocks. The results from the difference-in-differences are robust to the inclusion of the additional control group in the triple difference method, which further supports the hypothesis. Additionally, I test for heterogeneity among workers in firms with different sized establishments and find that firm size matters for job insecurity when workers face potential competition in the workplace.

The paper is organized as follows. Section 2 provides some background on the Japanese labor market and the deregulations on temporary staffing. Section 3 describes the literature on subjective measures of job insecurity and the potential impact of the deregulation on job insecurity. Section 4 describes the data and the methodology I use to identify the impact of the deregulation. The empirical results are presented in Section 5, and the paper concludes in Section 6 by discussing the policy implications of these findings and suggesting directions for future research.

## 2 An Overview

### 2.1 Japanese Industrial Relations and Non-Regular Employment in Japan

The labor market in Japan is known to be less flexible and workers less mobile than in the US and even Europe. Japan was one of the countries with the highest employment protection on the indicator “difficulty of dismissal” for regular employees (OECD,1999).<sup>4</sup> Japanese companies, especially large corporations, use the long-term employment system, more commonly known as lifetime employment, which is defined as “an employment practice where companies hire a specific number of new graduates at fixed times every year, and under contracts without a fixed period of employment, employees continue to be employed at the same company or affiliated companies from the time that they are hired as new graduates to the time they retire, as long as there are no extraordinary circumstances such as a management crisis”.<sup>5</sup> Despite some obvious drawbacks of lifetime employment, many firms are still strongly committed to not laying off any permanent employees.<sup>6</sup> Research in 2003 found that 36.1 percent of firms surveyed said they would basically maintain lifetime employment, 40 percent said “partial adjustment is inevitable”, and 15.3 percent said “fundamental review is necessary”.<sup>7</sup>

Though lifetime employment is no longer a guarantee for many Japanese workers, layoffs still require justification (layoffs must be strictly necessary from a business standpoint to keep the firm in operation),<sup>8</sup> and, prior to layoffs, firms must try other measures, such as voluntary early retirement and cutting work hours, wages, or bonuses.<sup>9</sup> Non-regular workers are more vulnerable to contract termination. This duality in terms of protection has been criticized in the 2008 OECD report *Jobs for Youth: Japan*, which recommends that Japan increase “the employment protection and social security coverage for fixed-term, part-time and temporary agency workers, while easing the employment protection for workers on regular contracts.”

Non-regular employment can be roughly divided into temporary and part-time positions. Within the category of temporary worker, the distinction is made between direct-hire temporary workers, who are hired directly by the employer either for a temporary period of time or on a fixed-term contract, and temporary agency workers,

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<sup>4</sup> *Employment Protection and Labour Market Performance, OECD*: <http://www.oecd.org/dataoecd/9/46/2079974.pdf>

<sup>5</sup> *Labor Situation in Japan and Analysis: General Overview 2004/2005: The Japan Institute for Labour Policy and Training (JILPT)*.

<sup>6</sup> The reports *The Labor Situation in Japan 2002/2003* by JILPT states traditional hiring guidelines, e.g. the long-term employment system, are still the norm at the majority of Japanese companies and the long-term employment system will most likely persist.

<sup>7</sup> *Labor Situation in Japan and Analysis: General Overview 2004/2005: The Japan Institute for Labour Policy and Training (JILPT)*.

<sup>8</sup> The layoff of regular employees is regulated by the Employment Contracts Act and case laws (see Araki, 2002).

<sup>9</sup> In addition to the restrictive regulatory environment, “the implicit social contract that has developed over the years makes it difficult for companies to introduce sweeping changes to their industrial relations practices in rapid fashion without causing loss of morale and risking productivity declines among regular workers” (Houseman and Osawa, 2003, p. 194).

who are employees of a temporary staffing agency that subcontracts out its employees to clients on a short-term basis. Temporary agency employment is regulated based on occupational distribution, but as described below, a series of deregulations, which aimed to make the Japanese labor market more flexible and responsive to business needs, has legalized temporary staffing in many formerly-prohibited occupations.

The rationale for employers to use non-regular workers is straightforward. Because of the protracted recession in the 1990s and future uncertainty as well as intensifying global competition, many firms are employing fewer regular workers and using more non-regular workers so that they can save labor costs. In *Survey of the Diversification of Employment Status 2003*, 55 percent of firms said they use part-time workers and 26.2 percent of firms said they use agency workers because they need to control wage costs. In addition to the cost-saving, firms find it easy to adjust non-regular workforce during a possible downturn, and they report easy acquisition and termination as reasons for using non-regular workers and more flexible staffing arrangement (Morishima, 2001). Indeed, this seems to be the main reason that non-regular employment has grown more rapidly in Japan than in the United States. Because of the Japanese industrial relation system, regular workers in Japan have greater job security than do regular workers in the United States, and therefore Japanese firms have a greater need for temporary agency workers to respond to seasonal or cyclical fluctuations in workload and protect regular workers from such demand fluctuations (Houseman and Osawa, 2003).

## **2.2 Temporary Agency Workers and the Temporary Staffing Services Law**

Temporary agencies attempt to match temporary workers with clients by assigning those whose skills fit the job. Agency workers are defined as “workers under contract to a [temporary staffing agency], who are entrusted with specific duties by the companies to which they are assigned.”<sup>10</sup> There are reasons to use agency workers rather than direct-hire temporary workers. Agency firms have economies of scale in screening and training workers and may be capable of speedier, often better, job matching than direct-hire. While some agency temporary jobs require specialized skills (e.g. product design and development), others are low-skilled jobs (product assembly and clerical jobs). Many male agency workers perform professional or technical works (9.1 percent developing software and 11.1 percent designing machines in 2008). Clerical jobs account for the largest proportion of agency work for female agency workers (39.5 percent of female agency workers were assigned “general clerical work” in 2008). Overall, agency workers only account for a small fraction of the labor force (2 percent of the

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<sup>10</sup>*Labor Situation in Japan and Analysis: General Overview 2009/2010*

labor force, or 5.6 percent of non-regular workers in 2003).<sup>11</sup>

While in the United States temporary staffing agencies are allowed to supply workers for all occupations and jobs, in Japan the occupations and jobs handled by agencies are limited. However, Japan has gone through significant changes in the regulation of temporary staffing in the last two decades. The temporary staffing business had been prohibited by the Employment Security Act of 1947 until temporary staffing was first legalized with the establishment of the Temporary Staffing Services Law in 1985. The initial deregulation lifted the ban on agency staffing for certain occupations. This was called “the positive list approach” because it specified which occupations temporary agency workers were allowed to work in. Then, motivated by the recession during the 1990s and lobbying efforts by temporary staffing industry firms, the government introduced a major revision of the Temporary Staffing Services Law in 1999, which allowed many formerly prohibited sectors to use agency staffing, but several occupations, including production line work in the manufacturing sector, were still not allowed. This was called “the negative list approach” because it specified which occupations temporary agency workers were not allowed to work in. Another revision of the Temporary Staffing Services Law in March 2004 removed most of the remaining restrictions and legalized temporary staffing in production line work in manufacturing.<sup>12</sup>

Since agency staffing in production line work in the manufacturing sector has been legalized, more and more temporary agency workers started working in manufacturing.<sup>13</sup> In a survey conducted in August 2004, 29.3 percent of male temporary agency workers and 4.9 percent of female temporary agency workers were in “services of manufacturing products”; the corresponding numbers were 42.4 percent and 9.9 percent in October 2008.<sup>14</sup> In both survey years, manufacturing was the highest category for male temporary agency workers. Another statistics is provided in quarterly reports by *Japan Staffing Services Association (JASSA)*<sup>15</sup> which conducts survey for its member companies representing a wide range of industries. Its report published in the 4th quarter of 2008 reveals that while the number of agency workers grew by 8 percent in 2005 and 2006 for all industries on average, in the manufacturing sector growth was 51 percent in 2005 and 63 percent in 2006. In summary, it appears that the 2004 deregulation had the intended effect on the manufacturing sector by effectively expanding the supply of temporary labor for production line work.

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<sup>11</sup> *The Labor Situation in Japan 2006/2007*

<sup>12</sup> Temporary staffing is still prohibited in construction, security, dockyards, and to some extent nursing and other medical fields.

<sup>13</sup> However, it is widely believed that there were some legal loopholes that manufacturing firms had used before temporary staffing was legalized (Weathers, 2001; Gottfried, 2009).

<sup>14</sup> *Statistical Report on Worker Dispatching Undertakings*, Ministry of Health, Labour, and Welfare

<sup>15</sup> <http://www.jassa.jp/employer/statistics.html>

## 3 Perceptions of Job Insecurity

### 3.1 Job Insecurity and Economic Implications

Labor economists have traditionally used the duration of jobs and the job loss rate as proxies for job insecurity. Many economists are reluctant to use subjective perceptions of job insecurity because of justifiable concerns that workers' mood at the time of the survey can bias workers' reported perceptions of unemployment risk. Nevertheless, there has been a growing interest among economists in worker perceptions of job insecurity, and empirical evidence supports the claim that subjective job insecurity is significantly correlated with job market realities and not just a state of mind of overly pessimistic workers. Green et al. (2000) report the positive link between a worker's fear and regional unemployment rates, suggesting that individuals take into consideration local labor market conditions when assessing their chance of unemployment. Schmidt (1999) reports that the trends in job insecurity are largely consistent with the trends in involuntary job loss rates.<sup>16</sup> Most importantly, Green et al. (2001), using panel data, find that workers' perception of the risk of unemployment is positively and significantly related to actual unemployment experience in the subsequent year, suggesting that their subjective assessments are to some degree reasonable predictions (see also Stephens, 2004; Dickerson and Green, 2006; Campbell et al., 2007).

Empirical studies have found that correlates of the perceptions of job insecurity are largely in line with expectation. Green et al. (2000) find that being on a temporary job or a part-time job contract raises the fear of job loss. Blanchflower and Oswald (1999) find that job insecurity is lower among older workers, supervisory workers, and workers in the public sector. Manski and Straub (2000) find that expectations of job loss tend to decrease with age and schooling and vary substantially by race (Blacks reporting greater job insecurity) but vary little by sex. Green et al. (2001) find that job insecurity is linked to past individual unemployment experience.

Economists are interested in job insecurity because insecurity about the future has been hypothesized to affect outcomes in the labor market. Workers may increase labor supply as a result of growing job insecurity if they, expecting future job loss, try to work as many hours as possible while they can (Bluestone and Rose, 1998). Workers may suffer slower wage growth if job insecurity reduces their bargaining power (Campbell et al., 2007).<sup>17</sup> In 1995 the former Federal Reserve Chairman Alan Greenspan stated “[the fear of displacement] has doubtless played a significant role in the slowdown in growth of labor compensation as workers have in effect sought to preserve their jobs

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<sup>16</sup>However, job insecurity was unusually high relative to aggregate unemployment in the mid-1990s in the US and Britain (Schmidt, 1999; Green et al., 2000).

<sup>17</sup>In the US, it has been suggested that the use of agency workers contributed to the slow wage growth during the 1990s (Katz and Krueger, 1999; Houseman et al., 2003). For a detailed comparison of non-regular employment in Japan and the United States, see Houseman and Osawa (2003).

by accepting lesser increases in wages”.<sup>18</sup>

It has been pointed out that job insecurity affects workers’ productivity. Facing a threat of job loss, workers may decide to work harder to increase their chances of keeping their current job. This is the prediction of the shirking theory which asserts that the threat of job loss increases work effort. However, interviews conducted by Bewley (1999) reveal that most business people believe that a threat of dismissal is bad for morale.<sup>19</sup> Providing job security may also enhance a firm’s productivity by making workers more committed and highly-involved. Given that job insecurity is negatively correlated with job satisfaction (e.g. Blanchflower and Oswald, 1999), job insecurity may decrease productivity of workers whose motivation to work hard for their current employer has decreased. The fear of job loss also has been hypothesized to encourage workers to invest less in firm-specific human capital. Finally, the consequences of job insecurity could extend beyond the labor market to savings and consumption behavior if households have little confidence to spend due to job insecurity of wage earners; as Hamermesh (2001) points out, “more satisfied workers who are secure in their jobs have a reduced motive to undertake precautionary savings” (p. 3). These economic implications are based on growing anxiety, not actual job loss. As the microeconomic consequences of job insecurity potentially extend beyond the individual to the macro economy by aggregation, workers’ perceptions of job insecurity can reduce output, productivity, and consumption and restrains wage growth at the macroeconomic level.

Job insecurity may also have indirect economic implications. Even though workers are likely to differ in their preferences for job security and may accept higher job insecurity in exchange for higher wage (i.e. a compensating wage differential), one consistent and robust finding in the psychology literature is the adverse mental and physical health effects of job insecurity on workers and families (see the review in Green et al., 2000, and Bertaux and Queneau, 2002). Even after controlling for time-invariant unobservable personal traits, job insecurity significantly lowers both life satisfaction and mental health (Green, 2009). Since the psychological and physical well-being of workers are likely to be adversely affected by job insecurity, some economists are critical of the claim that the fear of job loss incentivizes workers to work hard and leads to higher performance; rather, they argue, the promotion of job security is good for an organization as a reasonable level of job security and a decent quality of working life motivate workers (Bertaux and Queneau, 2002).

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<sup>18</sup>Greenspan’s remarks appear on the website of the Economic Club of Chicago at [http://www.econclubchi.org/History/Excerpts\\_AlانGreenspan1.pdf](http://www.econclubchi.org/History/Excerpts_AlانGreenspan1.pdf)

<sup>19</sup>Adverse effects of job insecurity on morale was pointed out many years ago by Eisenberg and Lazarsfeld (1938): “Just having a job itself is not as important as having a feeling of economic security. Those who are economically insecure, employed or unemployed, have a low morale.” (p. 361)

### 3.2 Potential Effects of the Deregulation on Job Insecurity

If deregulation allows temporary agency staffing in manufacturing, how is manufacturing workers' job insecurity affected? For existing non-regular workers such as part-time workers and direct-hire temporary workers, who are typically used as a buffer enabling the reduction of labor input while keeping regular workers, a potential larger labor supply of agency workers means that firms may substitute agency workers for those existing non-regular workers if the relative cost of agency workers is lower. *Ceteris paribus*, job insecurity of non-regular workers, who have little job protection in the first place, is likely to increase.

For existing regular workers, whether or not job insecurity increases as a result of the expansion of temporary agencies is more contentious. On one hand, because labor laws make it difficult to terminate regular employees and replace with non-regular workers, the recent expansion of non-regular employment may have little effect on job insecurity of regular workers. Job security of regular employees may even improve in the workplace with more non-regular workers who are the first to be laid off in a recession. On the other hand, introducing more non-regular workers may increase job insecurity of regular workers of firms that do not utilize less costly non-regular workers if these firms become less competitive because of permanent workers' higher relative costs and inflexibility. To remain competitive and stay in business, these firms with only regular workers may be forced to downsize by laying off some of its regular employees (and may choose to hire non-regular workers if they need more workers later). Indeed, there has been concern that the rise of temporary agencies might encourage the replacement of regular workers with agency workers (Mizushima, 2004). Still another possibility is that firms use temporary contracts as a probation device and recruit permanent workers from the rank of the temporary workers if they display high ability.<sup>20</sup> Once non-regular workers become regular workers, the existing regular workers may perceive them as a potential threat to their job security.

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<sup>20</sup>Houseman and Osawa (2003) find that temporary jobs are less likely to be stepping stones to future regular jobs in Japan. According to one temporary agency, this temp-to-perm practice is not very common among employees (Gottfried, 2008). Not surprisingly, many temporary agency workers say they would rather be regular, permanent workers. According to Ministry of Health, Labour and Welfare's *Survey of the Diversification of Employment Status, 2003*, while many non-regular workers choose to be so because they are willing to trade compensation and job security for work schedule, 21.6 percent of part-time workers and 40 percent of agency workers chose to be non-regular workers because they could not find a permanent position. See Cohanty (1998) for the similar pattern of US workers.

## 4 Data and Identification Strategy

### 4.1 Measures of Job Insecurity

The data used in this study is taken from *the Japanese General Social Surveys* (JGSS).<sup>21</sup> This survey is a repeated cross-section that was administered from 2000 to 2006, except for 2004, and contains a wide range of demographic, work, and attitudinal questions. In this survey, individuals who are currently in employment or self-employment are asked a question about job security expectations: “Thinking about the next twelve months, how likely do you think it is that you will lose your job or be laid off?” The question measures workers’ insecurity in terms of their unemployment expectation for the subsequent year, and individuals respond on a four-point scale, ranging from “very likely” to “not at all likely.”

I define job insecurity as a binary variable by collapsing the fourfold categories to form a dichotomous variable: 0 for not too likely or not at all likely and 1 for fairly likely or very likely. Figure 1 shows the trends in the fraction of the JGSS respondents who believed that they were likely to lose their jobs in the next 12 months, along with the national unemployment rate. In this short period of time, the workers’ perception of job insecurity and the unemployment rate show a strikingly similar trend. Both the measure of job insecurity and the unemployment rate peak around 2001-2002 and then decrease, as the economic recovery started in 2003. Because this overall trend makes it difficult to uncover the impact of the law, I use a difference-in-differences strategy.

### 4.2 Treatment and Control Groups

I attempt to identify the effect of the temporary staffing deregulation on job insecurity of low-skilled, non-clerical production workers in the manufacturing sector (the treatment group). This group will contain regular workers and non-regular workers (temporary and part-time workers) who do not have college or university degrees, who do not have managerial positions, and who do not earn high wages (more than 4.5 million yen).<sup>22</sup> If low-skilled manufacturing workers consider that the chance of losing their jobs in the near future increased due to the deregulation of temporary agency staffing, one would expect to see an increase in perceived job insecurity among these workers. As a control group, I use nonmanufacturing low-skilled workers, who presumably were not affected by the deregulation. I exclude executives, the self-employed,

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<sup>21</sup> *The Japanese General Social Surveys* are designed and carried out by the JGSS Research Center at Osaka University of Commerce (Joint Usage / Research Center for Japanese General Social Surveys accredited by Minister of Education, Culture, Sports, Science and Technology), in collaboration with the Institute of Social Science at the University of Tokyo.

<sup>22</sup> In the U.S. dollar, this is \$34,000-\$44,000, depending on the exchange rate during the period 2000-2006.

workers in public sector, and workers over 65 years of age. Agency workers are also excluded from the analysis because it was illegal to use temporary agency workers in production line work in manufacturing as discussed above, and thus including temporary agency workers, whose job insecurity is high by definition, for the post-2004 period, can be misleading.

Table 1 compares the treatment group and the control group in terms of observable characteristics. The treatment and the control groups are similar in terms of the job insecurity measure; the prevalence of job insecurity is slightly higher in manufacturing workers (0.20 vs. 0.18) but the difference is statistically insignificant. Compared to low-skilled nonmanufacturing workers, low-skilled manufacturing workers are more likely to be regular workers (0.60 vs. 0.53), union members (0.19 vs. 0.12), and have longer tenure (9.6 vs. 7.3). Nonmanufacturing workers are more likely to be female (0.58 vs. 0.65), have high school diploma (0.68 vs. 0.78), work in small workplaces (0.16 vs. 0.22), and live in a large city (0.08 vs. 0.17). Even though these means are statistically different between the treatment and the control groups, to the extent I control for these factors, any bias due to differences in observable characteristics will be reduced.

Finally, I include in the analysis workers' belief about their ability to find another job with similar compensation should they search for new employment with the question: "About how easy would it be for you to find a job with another employer with approximately the same income and fringe benefits you now have? Would you say very easy, somewhat easy, or not easy at all?" I define "difficult to find a job" as a binary variable which takes a value of 1 for not easy at all, 0 otherwise. This variable will serve as a proxy for workers' personal assessment of tightness in the labor market and mitigate the effect of workers' unobservable disposition (e.g. pessimism). Low-skilled manufacturing workers are more likely to feel it is difficult to find a job with similar compensations (0.60 vs. 0.53).

The validity of the results depends on a control group that nets out the impact of all other factors on the job security trend and controls for contemporaneous shocks to job insecurity. One crude way of checking if the control group is a valid counterfactual is to check for a parallel trend. If the secular trends are the same before the deregulation in 2004, then it is more likely that the counterfactual trends would have been the same after 2004 if there had not been the deregulation. Figure 2 shows job insecurity for the treatment and control groups over time. Job insecurity of the treatment group is similar to that of the control group before 2004 while job insecurity is clearly higher for low-skilled manufacturing workers after 2004. Thus, Figure 2 not only provides visual evidence of a treatment effect on the treated but also a common underlying trend, which suggests that the assumption of the parallel trend appears reasonable.

### 4.3 Basic Difference-in-Differences Estimates

I use a difference-in-differences (DD) methodology, which allows me to distinguish the effect of the deregulation on job insecurity from other factors related to job insecurity and identify the impact of the legal change as the difference between the change in the perceptions of job insecurity of low-skilled manufacturing workers (treatment group) and the change in the perceptions of job insecurity of other nonmanufacturing low-skilled workers (control group). Let  $t$  denote period (before or after 2004), then a simple DD estimate for the effect of the law revision on worker  $i$ 's perceptions of job insecurity ( $JI$ ) is:

$$DD = \{E[JI_{it}|i = manufacturing, t = after] - E[JI_{it}|i = manufacturing, t = before]\} - \{E[JI_{it}|i = nonmanufacturing, t = after] - E[JI_{it}|i = nonmanufacturing, t = before]\}$$

Table 2 reports the raw difference-in-differences estimates of the effect of the deregulation of 2004. Each cell contains the mean for the group labeled, along with standard deviations and number of observations. The hypothesis is that the deregulation contributed to a *relative* increase in the perception of job insecurity among low-skilled manufacturing workers. There was a 14 percentage point decrease in job insecurity for the control group compared with a 6 percentage point decrease for the low-skilled manufacturing workers. Thus, the relative increase for the treatment group was an 8 percentage point increase, supporting the hypothesis. Since the treatment group and the control groups differ in a number of observable characteristics, which are likely to be biasing the raw estimates, I attempt to reduce the bias by estimating the job insecurity equation with controls.

## 5 Regression Results

### 5.1 Difference-in-Differences for Low-Skilled Workers

My objective is to identify the average effect of the deregulation on job insecurity of low-skilled manufacturing workers. I estimate the following equation for job insecurity ( $JI$ ):

$$JI_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 MFG_i + \beta_3 Post2004_t + \beta_4 (MFG \times Post2004)_{it} + \epsilon_{it} \quad (1)$$

The dependent variable is a dummy variable for the job insecurity measure discussed above.  $MFG_i$  is a dummy equal to one for low-skilled manufacturing workers and controls for the time-invariant characteristics of low-skilled manufacturing workers.  $Post2004_t$  is a dummy equal to one for year 2005 and 2006 and controls for any secular trend in job insecurity.  $X_{it}$  represents a set of demographic and other control variables. These control variables are intended to control for workers' selection into the treatment group. I include prefecture dummies, industry dummies, and separate year dummies. In order to make the interpretation of the DD estimate easier, OLS estimations, rather than probit or logit estimations, are presented.<sup>23</sup>

The first column in Table 3 shows the results for all low-skilled workers. The interaction ( $MFG \times Post2004$ ) is positive and significant at the one percent level, indicating that the deregulation increased job insecurity among low-skilled manufacturing workers. The relative increase in job insecurity for the treatment group is a 9.3 percentage point increase. The size of the coefficient is similar to the raw difference-in-differences estimate presented in Table 2. The post dummy is large in magnitude and strongly significant, consistent with the figures above and the raw difference-in-differences estimate in Table 2. The coefficient of the non-regular worker dummy is significantly positive, suggesting that being non-regular workers is significantly associated with greater perceptions of job insecurity as expected.

Despite the wide range of controls included in the regression above, there still remains the possibility that the deregulation led to nonrandom selection of workers. Workers who are pessimistic and insecure by nature may decide not to seek employment in production line work in the manufacturing sector if they think that the chance of job loss is higher due to the deregulation, while confident and optimistic workers may not perceive the potential entry of agency workers as a threat to job security. This sorting among workers increases the share of optimistic workers in manufacturing and may underestimate the effect of the deregulation on job insecurity of production workers. Another possibility of nonrandom selection of workers comes from the firm side. If types of workers that employers demand are different between before and after the deregulation, newly hired workers will be on average different from existing workers. For example, employers in the manufacturing sector may be increasingly hiring those who they think are better able to deal with the repetitive and monotonous job for which workers perform single routine tasks. If those workers are more insecure by nature, then the effect of the deregulation on job insecurity of production workers will be overestimated.

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<sup>23</sup>This is because interaction effects are more complicated in nonlinear models, such as logit and probit models, than in OLS. Interpreting the coefficients and the statistical significance of interaction terms in nonlinear models could be misleading, and the marginal effect from the dprobit command in STATA is not necessarily related to the DD estimate. In linear probability models, the interpretation of the coefficient of the interaction between two variables is straightforward, and the statistical significance of the interaction effect can be tested with a single t-test on the coefficient. See Ai and Norton (2003) for details.

In either case, comparing the perceived job insecurity before and after the deregulation will be problematic, and controlling for observable characteristics may not control for this nonrandom selection. To address this issue, I exclude workers who changed their occupation or entered the labor market after 2004, that is, workers whose job tenure is less than one year in 2005 and less than two years in 2006. Column (2) in Table 3 shows the results when the model excludes workers hired after 2004. The DD coefficient is still significant at the one percent level, and the relative increase in job insecurity for the treatment group is a 6.9 percentage point increase.

## 5.2 Differential Effects for Regular and Non-regular Workers

Next, I examine differential effects for the different labor market groups rather than assuming the common effect. I use the split sample approach and partition the sample into regular and non-regular workers. There are two reasons to believe that job insecurity of regular workers and that of non-regular workers are affected differently. First, regular workers and non-regular workers differ greatly in the degree of employment protection as discussed above. *Ceteris paribus*, the adverse effect of the deregulation on job insecurity should be larger for non-regular workers, who enjoy much less job security, than for regular workers. Second, there is a possibility that the demand for non-regular workers increased relative to the demand for regular workers during this period. As Gottfried (2008) states, “more regular jobs are converted into nonstandard positions and new jobs increasingly are created as nonstandard work arrangements” (p. 181). If more and more temporary jobs are created as a substitute for permanent jobs, then job security of non-regular workers may rise, thereby mitigating the adverse effect of the deregulation.

Column (3) in Table 3 shows the results when the sample is restricted to regular workers. The interaction ( $MFG \times Post2004$ ) is positive and significant at the 5 percent level, and when the model excludes workers hired after 2004 in Column (4), the DD estimate remains significant at the 5 percent level. It seems that, despite strong employment protection, regular workers’ perception of job insecurity increased in response to the law revision.

Column (5) in Table 3 shows the results for non-regular low-skilled workers. The interaction ( $MFG \times Post2004$ ) is positive and significant at the 10 percent level, but when the model excludes workers hired after 2004 in Column (6), the DD estimate is imprecisely estimated. Overall, the results from the difference-in-differences suggest that job insecurity of low-skilled manufacturing workers, especially regular workers, increased after the deregulation of temporary agency employment.

Most personal characteristics do not have statistically significant effects on job in-

security. Somewhat surprisingly, despite job tenure typically being considered as a proxy for firm-specific human capital and thus greater security, longer tenure is not statistically associated with job security.<sup>24</sup> “Difficult to find a job” is uniformly significant and positive, suggesting that those who think they will have a difficulty with finding a job with similar compensations and benefits are more likely to have the fear of job loss. Being a union member is associated with lower job insecurity for regular workers but not for non-regular workers.<sup>25</sup> Having a high school diploma is associated with lower job insecurity only for non-regular workers. Perhaps strong job protection given to regular workers diminishes the positive effect of education on job security. The R-squared is fairly low, meaning that there remains a great deal of variation in job insecurity that is unexplained and due to unobservable factors such as worker’s disposition (e.g. pessimism) and private information that workers may have.

### 5.3 Triple Differences Approach

The evidence presented above suggests that the deregulation increased job insecurity among low-skilled manufacturing workers, especially regular workers. The DD approach is problematic, however, if there were manufacturing-specific shocks which only affected manufacturing workers after 2004, i.e. the DD estimates are biased if manufacturing workers were subject to other forces that affected their perceptions of job insecurity. Then, the comparison of manufacturing and nonmanufacturing workers does not provide a convincing test of the hypothesis, and the DD estimates do not identify the impact of the deregulation on job insecurity. On one hand, for example, intensifying global competition and unfavorable exchange rates are more likely to raise fear of job loss among manufacturing workers than among nonmanufacturing workers, and in this case the effect of the deregulation will be biased upward due to confounding effects of the negative shock increasing job insecurity only for manufacturing workers. On the other hand, if there was a favorable shock to manufacturing workers, the effect of the deregulation will be biased downward in the DD model. Hence, the secular trends in job security among manufacturing workers need to be accounted for to correct the DD estimates.

In order to evaluate the robustness of the DD estimate, I employ a triple differences (difference-in-differences-in-differences, or DDD) approach by using high-skilled workers without any managerial post. Because the policy change introduced more flexible workers at the lower level of firms, job insecurity of low-skilled manufacturing

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<sup>24</sup>I also tried a quadratic specification for tenure to explore the possibility of a U-shaped pattern but dropped it because the result was not statistically significant. The U-shaped pattern may appear if old workers’ skills are judged to be obsolete (Green et al., 2000).

<sup>25</sup>Theoretically, the effect of unions on job security is ambiguous. While unions may protect workers from layoffs, they tend to raise wages and may be concentrated among shrinking industries (Green et al., 2000).

workers should be affected more than that of high-skilled manufacturing workers, and one should expect to see no (relative) increase in job insecurity of high-skilled workers. If there was a distinct shock to manufacturing workers over this period, the effects of these shocks should show up in the perceptions of job security among all manufacturing workers, both low- and high-skilled. Thus, the DDD approach controls for the possibility of contemporaneous shock to manufacturing workers in estimating the impact of the deregulation. My triple-differences approach uses four different groups, and the DDD estimate for the effect of the deregulation on worker  $i$ 's perceptions of job insecurity ( $JI$ ) is:

$$DDD = \{ \Delta E[JI_i | i = \text{low-skilled manufacturing}] - \Delta E[JI_i | i = \text{low-skilled nonmanufacturing}] \} \\ - \{ \Delta E[JI_i | i = \text{high-skilled manufacturing}] - \Delta E[JI_i | i = \text{high-skilled nonmanufacturing}] \}$$

Table 4 reports the raw DD for high-skilled workers and DDD estimates of the effect of the deregulation of 2004. There was a 6 percentage point decrease in job insecurity for the high-skilled nonmanufacturing workers compared with a 12 percentage point decrease for the high-skilled manufacturing workers. Thus, the relative *decrease* in job insecurity for the high-skilled manufacturing workers was 6 percentage points, suggesting that the secular trends for high-skilled workers were favorable for manufacturing workers. The raw DDD estimate, which is the raw difference-in-differences estimate for low-skilled workers (from Table 2) minus the raw difference-in-differences estimate for high-skilled workers, indicates a 14 percentage point increase for low-skilled manufacturing workers. This suggests that, if the secular trends in job security among manufacturing workers are accounted for, the relative increase in job insecurity of low-skilled manufacturing workers is greater than the DD estimates in the previous section. The regression equation for the DDD has the following form:

$$JI_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 MFG_i + \beta_3 LowSkilled_i + \beta_4 Post2004_t \quad (2) \\ + \beta_5 (MFG \times Post2004)_{it} + \beta_6 (LowSkilled \times Post2004)_{it} \\ + \beta_7 (MFG \times LowSkilled)_i + \beta_8 (MFG \times LowSkilled \times Post2004)_{it} + \epsilon_{it}$$

The second level interactions control for changes over time for manufacturing workers ( $MFG \times Post2004$ ) and low-skilled workers ( $LowSkilled \times Post2004$ ), and time-invariant characteristics of low-skilled production workers in the manufacturing sector ( $MFG \times LowSkilled$ ). The third level interaction, which is the DDD estimate, captures all variation in job insecurity of low-skilled workers (relative to high-skilled workers) in manufacturing (relative to nonmanufacturing) after (relative to before) the deregulation. The DDD estimate is immune to shocks to low-skilled workers as well as shocks

to manufacturing workers, and this triple-differences model may generate a more convincing results than the DD model by exploiting three sources of variation instead of two. Of course the DDD estimator is valid only if there was no contemporaneous shock that affected only the treatment group, low-skilled manufacturing workers.

The results are shown in Table 5. In order not to overload the table, I do not explicitly report the coefficients on personal characteristics.<sup>26</sup> The coefficient on the third-level interaction is positive and statistically significant at the 5 percent level, and the size of the coefficients is very similar to the raw DDD estimate presented in Table 4. The DDD estimate remains significant at the 10 percent level when workers hired after 2004 are excluded. When the sample is restricted to regular workers, the DDD estimates are significant and larger in magnitude. In contrast, the DDD estimates are not statistically significant for non-regular workers, suggesting that the statistically significant DDD estimates in columns (1) and (2) are mainly driven by regular workers. The DDD results paint a picture that is largely consistent with the results from the DD model: regular low-skilled manufacturing workers' job insecurity significantly increased after the deregulation, but job insecurity of non-regular manufacturing workers was not affected.

#### 5.4 Heterogeneity and Firm Sizes

In this section, I further explore the effect of the deregulation by interacting the DD and the DDD terms with the establishment size to test for heterogeneity. There are two reasons to expect differential effects among workers in firms with different sized establishments. First, large corporations are likely to provide regular employees with lifetime employment, a practice small or medium size firms may not provide. If larger firms are more strongly committed to not laying off any regular workers, regular employees will feel more secure in larger firms. Second, the firm survey shows small firms are less likely to use agency workers while the majority of large firms uses workers from temporary agencies. Evidence from the employer survey in 2004 shows that 79.1 percent of firms with more than 500 employees use agency workers compared to 27.8 percent of firms with 30-99 employees.<sup>27</sup> This implies that within-firm exposure to agency workers is more likely to happen in larger firms as a need for at least one flexible worker is more likely to arise in larger firms. In this case, non-regular workers are more likely to feel insecure in large firms than in small ones.<sup>28</sup>

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<sup>26</sup>Also, they are in line with the difference-in-differences estimates above. The detailed results can be obtained from the author on request.

<sup>27</sup>*Statistical Report on Worker Dispatching Undertakings*, Ministry of Health, Labour, and Welfare

<sup>28</sup>Houseman (2001) points out another factor: "Larger employers, which generally have more sophisticated human resources departments than small employers, may be better positioned to avail themselves of opportunities presented by the rapidly growing and dynamic temporary help industry. Alternatively, or in addition, temporary agencies may target large employers for business" (p. 165).

Table 6 and 7 present the coefficients of interest from job insecurity DD regressions and triple-differences regressions, respectively. In terms of statistical significance, the results are not very different between the DD regressions and the DDD regressions. The interaction terms are only significant for regular workers of medium size firms. The author speculates that job insecurity of low-skilled workers in large firms is not affected because larger firms are more likely to be strongly committed not to lay off regular employees than medium size firms, while the job insecurity of low-skilled workers in small firms is not affected because small firms are less likely to use agency workers, thereby low-skilled manufacturing workers in small workplace are less likely to have the fear of being replaced.

## 6 Conclusion

In Japan, it is now widely perceived that job security is becoming a thing of the past for many workers. One factor associated with job insecurity is a growing trend toward non-regular employment, as firms are increasingly relying on flexible staffing arrangement, including temporary agency workers. Since agency staffing in production line work in the manufacturing sector was legalized in 2004, production sites have been increasingly using agency workers. Using the deregulation as a natural experiment, this study tested the hypothesis that the expansion of non-regular employment contributed to job insecurity of existing workers. I found that job insecurity of low-skilled regular manufacturing workers significantly increased following the deregulation of temporary staffing services in 2004. The positive and significant results from the difference-in-differences approach are robust to the inclusion of the additional control group in the triple difference approach, which further provides evidence supporting the hypothesis that low-skilled manufacturing workers' job insecurity increased as a result of the deregulation. The evidence from this study provides insights into the role temporary staffing agencies potentially play in perceived job insecurity.

One notable finding in this paper is that job insecurity of regular low-skilled manufacturing workers was affected by the deregulation, while that of non-regular workers was not. Considering that the layoff of regular employees is difficult while that of non-regular workers is not, the finding is somewhat counter-intuitive. One possible explanation for the statistically insignificant results for non-regular workers is that the cost of hiring agency workers is not lower than the cost of non-regular workers once overhead charges to the agency are accounted for, and thus non-regular workers are aware that the firm will not replace existing non-regular workers with agency workers.

As for job insecurity of regular workers, the deregulation of temporary staffing ser-

vices is expected to lower labor costs for firms in the manufacturing sector, and if a firm faces more intensive competitive pressure as a result of the deregulation, the firm may choose to downsize and lay off its regular workers, assuming there is no other recourse. Alternatively, a firm may go bankrupt if it chooses not to lay off its regular workers, which may be the case for small firms. In either case, regular workers lose jobs. Whether fearing downsizing layoffs or bankruptcy, as long as regular workers expect to lose their job, the finding is not contradictory to strong job protection for regular employees in Japan. Indeed, many regular workers have been laid off in the name of restructuring since the 1990s, and one online survey reveals that many regular workers report the fear of job loss.<sup>29</sup>

The widespread non-regular employment may lead to unintended consequences. The main concern for firms should be a change in worker productivity caused by job insecurity. It has been pointed out that the fear of job loss may lower workers' morale (Bewley, 1999). The resulting decline in morale may take a toll on productivity, and the benefit of the labor market deregulation, which offers firms advantages of lower labor costs and flexibility in hiring and dismissal, might be partially or more than offset by the adverse effect on employee morale and productivity caused by increased fear of being replaced among existing workers.

Finally, the results indicate that policies that encourage firms to hire more non-regular employees may not be welfare enhancing. Although well-being calculation is beyond the scope of this paper, the fear of becoming unemployed in the future has been found to be detrimental to workers' mental and physical well-being in the psychology literature. Job security should be arguably a major goal for policy makers if the government's aim is to improve workers' well-being, and the advantages of flexible workforce must be weighted against well-being loss generated by greater job insecurity among not only non-regular workers but also among regular workers, as this study finds that the expansion of non-regular employment translates into less job security even for regular workers.

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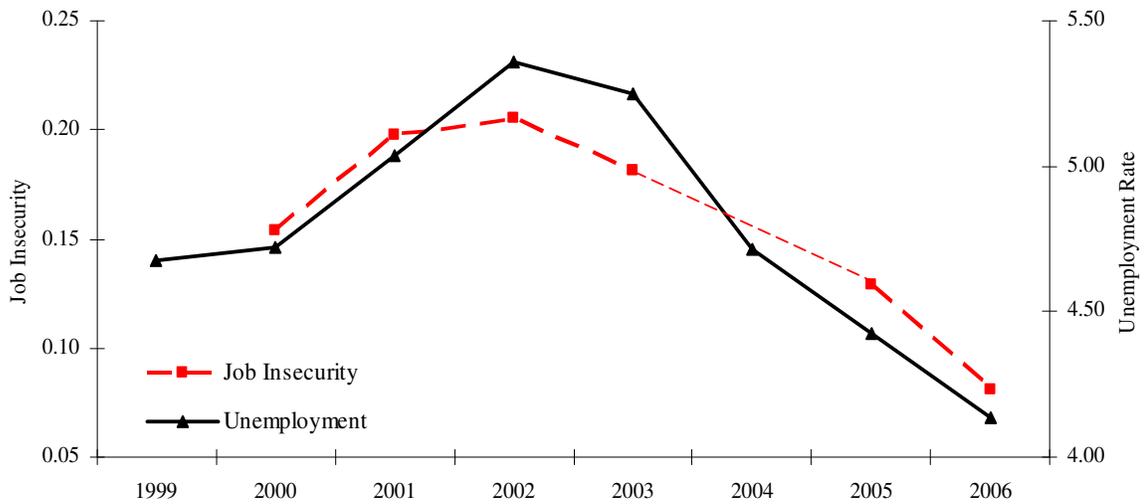
<sup>29</sup>The survey, which was conducted in 2009 by the website PresidentReuters (<http://president.jp.reuters.com>), asked 1,045 regular workers about their fear of job loss, and more than 10 percent of the respondents answered that they were afraid of the possibility of job loss.

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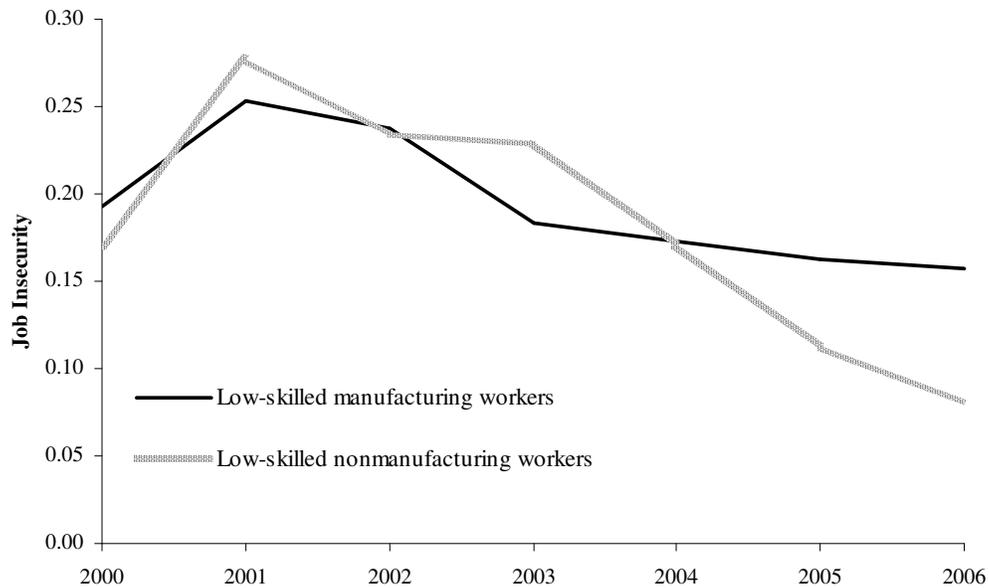
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**Figure 1. National unemployment and percent of workers who believed that they were likely to lose their jobs in the next 12 months**



\*Note: There are no job insecurity data for 2004.

**Figure 2: Job Insecurity of Low-skilled Manufacturing and Nonmanufacturing Workers**



\*Note: There are no job insecurity data for 2004.

Table 1: Summary Statistics

	Low-Skilled Manufacturing Workers (Treatment Group)	Low-Skilled Non-Manufacturing Workers (Control Group)	Difference in Means
Job Insecurity: Likely to Lose Job	0.20 (0.40)	0.18 (0.38)	0.02
Regular Worker	0.60 (0.49)	0.53 (0.50)	0.07 ***
Non-Regular Worker	0.40 (0.49)	0.47 (0.50)	-0.07 ***
Wage: Less than 0.7 million	0.07 (0.26)	0.14 (0.34)	-0.06 ***
Wage: 0.7 million-1.5 million	0.35 (0.48)	0.30 (0.46)	0.05 **
Wage: 1.5 million-2.5 million	0.15 (0.35)	0.16 (0.37)	-0.02
Wage: 2.5 million-3.5 million	0.17 (0.38)	0.16 (0.37)	0.01
Wage: 3.5 million-4.5 million	0.14 (0.34)	0.10 (0.31)	0.03 **
Wage: Unknown	0.12 (0.32)	0.13 (0.33)	-0.01
Union	0.19 (0.39)	0.12 (0.33)	0.07 ***
Tenure	9.63 (8.76)	7.32 (8.11)	2.31 ***
Workhours	38.9 (10.97)	36.2 (15.05)	2.7 ***
Small size firm (<30)	0.16 (0.37)	0.22 (0.41)	-0.06 ***
Medium size firm (30-500)	0.30 (0.46)	0.24 (0.43)	0.06 ***
Large size firm (>500)	0.17 (0.38)	0.14 (0.34)	0.04 **
Unknown	0.37 (0.48)	0.40 (0.49)	-0.03
Female	0.58 (0.49)	0.65 (0.48)	-0.07 ***
Age	43.8 (12.54)	43.3 (12.90)	0.4
Married	0.68 (0.47)	0.69 (0.47)	-0.01
Divorced or Widowed	0.08 (0.28)	0.08 (0.28)	0.00
High School	0.68 (0.47)	0.78 (0.42)	-0.10 ***
Large City	0.08 (0.28)	0.17 (0.38)	-0.09 ***
City	0.51 (0.50)	0.51 (0.50)	0.00
Town or Village	0.41 (0.49)	0.32 (0.47)	0.09 ***
Difficult to Find a Job	0.60 (0.49)	0.53 (0.50)	0.07 ***
Number of observations	569	2,410	

Standard deviations are in parentheses. Means are unweighted. Asterisks indicate tests of the hypothesis that the means differ between the treatment group and the control group. \* indicates  $p < 0.10$ ; \*\* indicates  $p < 0.05$ ; \*\*\* indicates  $p < 0.01$ . All the variables are binary except for age, tenure, and work hours.

Table 2: Job Insecurity Difference-in-Differences Estimates

Low-skilled Workers	Before 2004	After 2004	Time difference for occupation
Manufacturing Workers (Treatment Group)	0.22 (0.41)	0.16 (0.37)	-0.06
Number of observations = 569	[417]	[152]	
Non-Manufacturing Workers (Control Group)	0.23 (0.42)	0.09 (0.29)	-0.14
Number of observations = 2,439	[1,680]	[759]	
Occupation difference at a point in time:	-0.01	0.07	
	Difference-in-Differences:		0.08

Each cell contains the mean for that group, along with standard deviations in ( ) and number of observations in [ ].

Table 3: Difference-in-Differences Regressions Results

	Low-skilled Workers		Regular Low-skilled Workers		Non-Regular Low-skilled Workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing×Post2004	0.093 *** (0.029)	0.069 *** (0.024)	0.088 ** (0.038)	0.076 ** (0.032)	0.124 * (0.073)	0.058 (0.062)
Manufacturing	-0.006 (0.032)	-0.010 (0.033)	0.014 (0.051)	0.011 (0.052)	0.001 (0.042)	-0.003 (0.043)
Post2004	-0.121 *** (0.021)	-0.121 *** (0.021)	-0.126 *** (0.031)	-0.125 *** (0.031)	-0.153 *** (0.044)	-0.162 *** (0.043)
Non-regular Worker	0.054 *** (0.014)	0.052 *** (0.014)	-	-	-	-
Wage: Less than 0.7 million	(Reference Group)					
Wage: 0.7 million-1.5 million	-0.009 (0.027)	-0.007 (0.026)	0.022 (0.065)	0.044 (0.070)	-0.028 (0.026)	-0.027 (0.026)
Wage: 1.5 million-2.5 million	-0.014 (0.034)	-0.017 (0.035)	-0.033 (0.063)	-0.022 (0.069)	-0.019 (0.061)	-0.032 (0.064)
Wage: 2.5 million-3.5 million	-0.040 (0.030)	-0.039 (0.030)	-0.046 (0.055)	-0.033 (0.059)	-0.059 (0.089)	-0.055 (0.091)
Wage: 3.5 million-4.5 million	-0.020 (0.046)	-0.018 (0.046)	-0.035 (0.061)	-0.021 (0.069)	-0.057 (0.122)	-0.063 (0.123)
Wage: Unknown	-0.020 (0.028)	-0.015 (0.030)	-0.042 (0.053)	-0.027 (0.060)	0.000 (0.060)	0.011 (0.067)
Tenure	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.002 (0.002)	-0.002 (0.002)
Union	-0.029 (0.019)	-0.031 (0.020)	-0.054 ** (0.021)	-0.059 *** (0.022)	0.081 (0.072)	0.086 (0.072)
Workhours	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Small size firm (<30)	(Reference Group)					
Medium size firm (30-500)	-0.013 (0.017)	-0.007 (0.018)	-0.031 (0.028)	-0.021 (0.029)	0.027 (0.033)	0.035 (0.032)
Large size firm (>500)	-0.017 (0.030)	-0.012 (0.032)	0.010 (0.039)	0.025 (0.039)	-0.033 (0.042)	-0.035 (0.044)
Unknown	-0.030 (0.024)	-0.025 (0.026)	-0.058 (0.038)	-0.048 (0.039)	-0.006 (0.037)	-0.002 (0.036)
Female	-0.029 (0.023)	-0.040 * (0.023)	-0.015 (0.026)	-0.027 (0.026)	-0.056 (0.058)	-0.073 (0.058)
Age	-0.006 (0.007)	-0.005 (0.007)	0.002 (0.007)	0.003 (0.007)	-0.010 (0.013)	-0.009 (0.014)
Age squared	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
High school	-0.042 * (0.023)	-0.037 (0.025)	-0.022 (0.024)	-0.006 (0.024)	-0.062 * (0.037)	-0.069 * (0.037)
Married	0.006 (0.024)	0.012 (0.024)	0.028 (0.028)	0.036 (0.027)	-0.029 (0.045)	-0.033 (0.048)
Divorced or Widowed	0.021 (0.037)	0.034 (0.038)	0.060 (0.051)	0.072 (0.053)	-0.057 (0.048)	-0.050 (0.053)
Large city	0.034 (0.030)	0.024 (0.032)	0.070 (0.045)	0.051 (0.043)	-0.024 (0.041)	-0.022 (0.042)
City	0.010 (0.022)	0.015 (0.022)	0.013 (0.030)	0.020 (0.030)	-0.002 (0.024)	0.004 (0.024)
Difficult to find a job	0.050 ** (0.022)	0.047 * (0.025)	0.048 ** (0.020)	0.049 ** (0.020)	0.048 ** (0.022)	0.041 * (0.023)
Workers hired after 2004 excluded	No	Yes	No	Yes	No	Yes
R-squared	0.073	0.074	0.093	0.098	0.126	0.133
Number of observations	2,979	2,854	1,609	1,549	1,370	1,305

\* denotes significance at the 10 percent level, \*\* at the 5 percent level, and \*\*\* at the 1 percent level. Standard errors clustered at the regional industry level are shown in parentheses. Prefecture, year and industry dummies are included. In all estimations, the JGSS-provided sampling weight is used.

Table 4: Job Insecurity Difference-in-Differences and DDD Estimates

	Before 2004	After 2004	Time difference for occupation
High-skilled Workers			
Manufacturing Workers	0.17 (0.38)	0.05 (0.22)	-0.12
Number of observations = 183	[124]	[59]	
Non-Manufacturing Workers	0.17 (0.38)	0.11 (0.31)	-0.06
Number of observations = 1,985	[1,331]	[548]	
Occupation difference at a point in time:	0.00	-0.06	
Difference-in-Differences for High-skilled Workers:			-0.06
Difference-in-Differences for Low-skilled Workers (from Table 2):			0.08
		DDD:	0.14

Each cell contains the mean for that group, along with standard deviations in ( ) and number of observations in [ ].

Table 5: Triple-Differences Regressions Results

	All Workers			Regular Workers		Non-Regular Workers	
	(1)	(2)	(3)	(4)	(5)	(6)	
Manufacturing×Low-skilled×Post2004 ( $\beta_8$ )	0.129 ** (0.053)	0.097 * (0.051)	0.140 ** (0.056)	0.130 ** (0.054)	0.093 (0.089)	-0.028 (0.090)	
Manufacturing×Post2004 ( $\beta_5$ )	-0.045 (0.046)	-0.036 (0.048)	-0.064 (0.049)	-0.063 (0.051)	0.009 (0.065)	0.062 (0.079)	
Low-skilled×Post2004 ( $\beta_6$ )	-0.059 ** (0.023)	-0.068 *** (0.026)	-0.077 *** (0.025)	-0.091 *** (0.027)	0.027 (0.044)	0.035 (0.047)	
Manufacturing×Low-skilled ( $\beta_7$ )	-0.017 (0.037)	-0.013 (0.037)	-0.027 (0.043)	-0.024 (0.043)	0.083 (0.064)	0.087 (0.063)	
Manufacturing ( $\beta_2$ )	0.022 (0.033)	0.016 (0.033)	0.046 (0.034)	0.040 (0.035)	-0.086 (0.058)	-0.090 * (0.055)	
Low-skilled ( $\beta_3$ )	0.022 (0.034)	0.018 (0.035)	0.051 (0.034)	0.046 (0.034)	0.008 (0.188)	0.008 (0.209)	
Post2004 ( $\beta_4$ )	-0.062 *** (0.021)	-0.061 *** (0.022)	-0.043 * (0.026)	-0.036 (0.025)	-0.175 *** (0.036)	-0.196 *** (0.044)	
Non-regular Worker	0.074 *** (0.020)	0.070 *** (0.022)	-	-	-	-	
Workers hired after 2004 excluded	No	Yes	No	Yes	No	Yes	
R-squared	0.057	0.059	0.063	0.068	0.105	0.108	
Number of observations	5,041	4,827	3,136	3,017	1,905	1,810	

\* denotes significance at the 10 percent level, \*\* at the 5 percent level, and \*\*\* at the 1 percent level. Standard errors clustered at the regional industry level are shown in parentheses. Prefecture, year and industry dummies are included. Control variables are characteristics used in Table 3. In all estimations, the JGSS-provided sampling weight is used.

Table 6: Difference-in-Differences Regressions Results: Firm size interactions

	Regular			Non-Regular	
	Low-skilled Workers (1)	Workers (2)	Low-skilled Workers (3)	Low-skilled Workers (4)	Workers (5)
Manufacturing × Post2004	0.053 (0.047)	0.012 (0.032)	0.039 (0.061)	0.006 (0.060)	0.107 (0.078)
Manufacturing × Post2004 × Medium firm	0.074 ** (0.031)	0.098 * (0.055)	0.121 ** (0.054)	0.147 ** (0.072)	-0.077 (0.082)
Manufacturing × Post2004 × Large firm	0.023 (0.097)	0.026 (0.055)	-0.054 (0.084)	-0.027 (0.095)	0.202 (0.190)
Workers hired after 2004 excluded	No	Yes	No	Yes	No
R-squared	0.073	0.074	0.095	0.101	0.128
Number of observations	2,979	2,854	1,609	1,549	1,370

\* denotes significance at the 10 percent level, \*\* at the 5 percent level, and \*\*\* at the 1 percent level. Standard errors clustered at the regional industry level are shown in parentheses. Prefecture, year and industry dummies are included. Control variables are characteristics used in Table 3. In all estimations, the JGSS-provided sampling weight is used.

Table 7: Triple-Differences Regressions Results: Firm size interactions

	All Workers		Regular Workers		Non-Regular Workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing $\times$ Low-skilled $\times$ Post2004 (DDD)	0.093 (0.058)	0.047 (0.051)	0.097 (0.069)	0.067 (0.068)	0.086 (0.085)	-0.006 (0.117)
DDD $\times$ Medium firm	0.067 ** (0.031)	0.087 ** (0.041)	0.098 ** (0.049)	0.116 ** (0.051)	-0.075 (0.078)	-0.094 (0.092)
DDD $\times$ Large firm	0.024 (0.091)	0.032 (0.046)	-0.029 (0.074)	0.009 (0.077)	0.194 (0.189)	0.091 (0.115)
Workers hired after 2004 excluded	No	Yes	No	Yes	No	Yes
R-squared	0.057	0.059	0.064	0.069	0.106	0.108
Number of observations	5,041	4,827	3,136	3,017	1,905	1,810

\* denotes significance at the 10 percent level, \*\* at the 5 percent level, and \*\*\* at the 1 percent level. Standard errors clustered at the regional industry level are shown in parentheses. Prefecture, year and industry dummies are included. Control variables are characteristics used in Table 5. In all estimations, the JGSS-provided sampling weight is used.