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Abstract

This study investigates whether the expansion of temporary employment in Japan has caused an increased perception of job insecurity among workers there. Non-regular employment, such as part-time and temporary work, has increased as a proportion of the Japanese workforce in recent years. The deregulation of temporary staffing in 2004 allowed firms to use temporary agency staffing for production line work in manufacturing. Using this legislation as a turning point and analyzing data from the Japanese General Social Survey (JGSS), which contains a question eliciting workers' beliefs about their own job insecurity, the author uses a difference-in-differences (DD) methodology to find that the expansion of temporary employment contributes significantly to a rise in perceived job insecurity among workers.

Keywords

Temporary employment, Perceptions of job insecurity, Japan

THE DEREGULATION OF TEMPORARY EMPLOYMENT AND WORKERS' PERCEPTIONS OF JOB INSECURITY

MASANORI KUROKI*

This study investigates whether the expansion of temporary employment in Japan has caused an increased perception of job insecurity among workers there. Non-regular employment, such as part-time and temporary work, has increased as a proportion of the Japanese workforce in recent years. The deregulation of temporary staffing in 2004 allowed firms to use temporary agency staffing for production line work in manufacturing. Using this legislation as a turning point and analyzing data from the Japanese General Social Survey (JGSS), which contains a question eliciting workers' beliefs about their own job insecurity, the author uses a difference-in-differences (DD) methodology to find that the expansion of temporary employment contributes significantly to a rise in perceived job insecurity among workers.

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 more prevalent 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 a reduction of labor is necessary (Booth et al. 2002). Japan, which also has strong employment protection for regular workers, has witnessed a similar dynamic. Because of the stagnant economy, and in response to competitive pressures, Japanese firms have increasingly taken on non-regular employees as a means to lower labor costs and to gain flexibility in hiring and dismissal.¹ One notable phenomenon in the recent

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¹According 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). *Labor Force Survey* by the Statistics Bureau reports that the share of non-regular employees in the labor force exceeded 30% in 2003, and now more than one-third of workers are non-regular employees.

Japanese non-regular labor market is the growth of temporary agency employment. Although temporary agency workers account for only a small fraction of the Japanese labor force, their share more than doubled during 2002 to 2005, from 0.9% to 2.1%.²

One possible consequence of this expansion of temporary agencies is a rise in perceptions of job insecurity among existing regular employees. 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 policies, 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 an attempt 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 that 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 both job insecurity and the use of temporary workers are likely to be affected by macro shocks such as recessions and expansions. Therefore, I make use of the temporary staffing deregulation of 2004, which allowed temporary agency staffing for production line work in the manufacturing sector for the first time, to 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 occupation (Gottfried 2003); thus, this deregulation provides a unique setting for a natural experiment, in which only production workers in the manufacturing sector were exposed to a potentially large entry of agency workers. Using a difference-in-differences (DD) methodology 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-skill manufacturing workers (treatment group) and the change in the perceptions of job insecurity of other nonmanufacturing low-skill workers (control group).

An Overview: Japanese Industrial Relations and Non-Regular Employment in Japan

The labor market in Japan is known to be less flexible, and the workers less mobile, in comparison with the United States and even Europe. Japan ranks as one of the countries with the highest employment protection by an

²*Labor Situation in Japan and Analysis: General Overview 2006/2007*, The Japan Institute for Labour Policy and Training (JILPT).

indicator capturing the “difficulty of dismissal” for regular employees.³ Japanese companies, especially large corporations, use the long-term employment system, more commonly known as *lifetime employment*, and many firms are still strongly committed to not laying off any permanent employees. Although the layoff of regular employees is permissible if strictly necessary from a business standpoint,⁴ non-regular workers are generally vulnerable to contract termination.

Non-regular employment can be divided roughly into part-time and temporary positions. Within the category of temporary worker, the distinction is made between direct-hire temporary workers and temporary agency workers, who are employees of a temporary staffing agency that subcontracts its employees to clients on a short-term basis. Temporary agency employment is regulated based on occupation, but as described in detail below, a series of deregulations 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 intensifying global competition, many firms are employing fewer regular workers and using more non-regular workers to save on labor costs.⁵ In addition to the cost-saving, firms find it easy to adjust a non-regular workforce during downturns in the business cycle, and they report easy acquisition and termination as reasons for using non-regular workers (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 regular workers in Japan have greater job security than do regular workers in the United States, Japanese firms have a greater need for non-regular workers to respond to seasonal or cyclical fluctuations in workload, protecting regular workers from such demand fluctuations (Houseman and Osawa 2003).

Temporary Agency Workers and the Temporary Staffing Services Law

Temporary agencies operate to match temporary workers with clients, assigning workers whose skills fit the job. There are clear reasons for firms to use agency workers rather than direct hire of temporary workers.⁶ Agency

³*Employment Protection and Labour Market Performance*, OECD. Accessed at <http://www.oecd.org/dataoecd/9/46/2079974.pdf>.

⁴The layoff of regular employees is regulated by the Employment Contracts Act and case laws (see Araki 2002). Firms must try other measures prior to layoffs, such as voluntary early retirement and cutting work hours, wages, or bonuses. 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: 194).

⁵In *Survey of the Diversification of Employment Status 2003*, 55% of firms reported they use part-time workers and 26.2% of firms reported they use agency workers because they need to control wage costs.

⁶In 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.

firms have economies of scale in screening and training workers and may be capable of speedier, often better, job matching than is typical with direct hires. While some agency temporary jobs require specialized skills (e.g., product design and development), others are low-skill jobs (e.g., product assembly and clerical jobs). Overall, agency workers account for only a small fraction of the labor force (2%, or 5.6% of non-regular workers in 2003).⁷

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 the 1985 Temporary Staffing Services Law legalized temporary staffing for certain occupations. Motivated by the recession during the 1990s and by lobbying efforts of temporary staffing industry firms, the government then introduced a major revision of the Temporary Staffing Services Law in 1999, which allowed additional sectors to use agency staffing. Several occupations, however, including production line work in the manufacturing sector, were still excluded from coverage. 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.⁸

Since agency staffing in production line work in the manufacturing sector was legalized, more and more temporary agency workers have started working in manufacturing.⁹ In a survey conducted in August 2004, 29.3% of male temporary agency workers and 4.9% of female temporary agency workers were in "services of manufacturing products"; the corresponding numbers were 42.4% and 9.9%, respectively, in October 2008.¹⁰ In both survey years, manufacturing was the highest category for male temporary agency workers. Another survey provided by Japan Staffing Services Association (JASSA)¹¹ reveals that while the number of agency workers grew by 8% in 2005 and 2006 for all industries on average, in the manufacturing sector, growth was 51% in 2005 and 63% 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.

⁷*Labor Situation in Japan and Analysis: General Overview 2006/2007*, The Japan Institute for Labour Policy and Training (JILPT). Note that estimating the precise number of agency workers in Japan is difficult because one survey (Japanese Labor Force Survey) by the Statistics Bureau defines an agency worker as a person working at least 1 hour during the previous week of the survey whereas another survey (the Worker Dispatching Business Survey) by the Ministry of Health, Labour and Welfare defines him or her as a person who was registered and employed at least once in the previous year. Nevertheless, both surveys indicate that the number of temporary agency workers has grown rapidly (Gottfried 2008).

⁸Temporary staffing is still prohibited in construction, security, dockyards, and to some extent nursing and other medical fields.

⁹It is widely believed, however, that there were some legal loopholes that manufacturing firms had used in order to use temporary workers before temporary staffing was legalized (Weathers 2001).

¹⁰*Statistical Report on Worker Dispatching Undertakings*, Ministry of Health, Labour, and Welfare.

¹¹<http://www.jassa.jp/employer/statistics.html>.

If the deregulation allows temporary agency staffing in manufacturing, how is the perception of job insecurity among existing manufacturing workers affected? For existing non-regular workers such as part-time workers and direct-hire temporary workers, who are typically used as a buffer for the stable employment of regular workers, a potentially 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 debatable. On the one hand, because labor laws make it difficult to terminate regular employees and replace them with temporary workers, the deregulation of temporary employment may have little effect on job insecurity of regular workers. 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 due to permanent workers' higher relative costs and inflexibility. To remain competitive and stay in business, firms with only regular workers may downsize by laying off some of their regular employees (and may then choose to hire non-regular workers if they need more workers later).¹²

Data and Perceptions of Job Insecurity

The data used in this study are taken from the Japanese General Social Surveys (JGSS).¹³ 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 the survey, individuals who are currently in employment or self-employment are asked the question, "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' perception of insecurity in terms of their unemployment expectation for the subsequent year, and individuals respond on a 4-point scale that ranges from "very likely" to "not at all likely." I define job insecurity on a 4-point scale, ordered from 1 signifying "not at all likely" to 4 signifying "very likely."

Labor economists have traditionally used the duration of employment and the involuntary job separation rate as proxies for job insecurity. Justifiable concerns that workers' moods at the time of the survey can bias workers' reported perceptions of unemployment risk contribute to many economists' reluctance to use subjective perceptions of job insecurity.

¹²Indeed, there has been concern that the rise of temporary agencies might encourage the replacement of regular workers with agency workers (Mizushima 2004).

¹³The 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.

Nevertheless, interest in workers' perceptions of job insecurity has been growing among economists, 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. Empirical studies have found that workers' perceptions of the risk of unemployment are positively and significantly related to regional unemployment rates (Green et al. 2000) and actual unemployment experience in the subsequent year (Green et al. 2001). Also, Schmidt (1999) reports that the trends in job insecurity are largely consistent with involuntary job loss rates in the United States.¹⁴ These findings suggest that workers take into consideration local labor market conditions when assessing their chances of unemployment, and their subjective assessments are to some degree reasonable predictions.¹⁵

Economists are interested in job insecurity because insecurity about the future has economic implications. For example, workers may suffer slower wage growth if job insecurity reduces their bargaining power (Campbell et al. 2007).¹⁶ 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 by accepting lesser increases in wages."¹⁷

Job insecurity also affects worker productivity. Facing a threat of job loss, workers may decide to work harder to increase their chances of keeping their current job. Given that job insecurity is negatively correlated with job satisfaction (e.g., Blanchflower and Oswald 1999), however, job insecurity could decrease productivity of workers whose motivation to work hard for their current employer has decreased.¹⁸ 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 points out, "more satisfied workers who are secure in their jobs have a reduced motive to undertake precautionary savings" (2001: 3). The micro-

¹⁴Job insecurity was unusually high, however, relative to aggregate unemployment in the mid-1990s in the United States and Britain (Schmidt 1999; Green et al. 2000).

¹⁵Empirical studies also have found that other correlates of the perceptions of job insecurity are largely in line with expectations. 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 but vary little by gender (e.g., African Americans report greater job insecurity).

¹⁶In the United States, the findings by Katz and Krueger (1999) and Houseman et al. (2003) suggest that the use of agency workers contributed to the slow wage growth during the 1990s.

¹⁷Greenspan's remarks appear on the website of the Economic Club of Chicago, accessed at http://www.econclubchi.org/History/Excerpts_AlanGreenspanI.pdf.

¹⁸Adverse effects of job insecurity on morale were pointed out many years ago by Eisenberg and Lazarsfeld: "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" (1938: 361). See also Bewley (1999).

economic consequences of job insecurity potentially extend beyond the individual to the macro economy by aggregation; workers' perceptions of job insecurity can reduce output and consumption, and restrain wage growth at the macroeconomic level.

Identification Strategy

I make use of the temporary staffing deregulation of 2004 and a difference-in-differences strategy to identify the effect of the growing use of non-regular workers on perceptions of job insecurity among existing workers. Because the deregulation legalized temporary staffing in production line work in manufacturing, I use low-skill, nonclerical production workers in the manufacturing sector as a treatment group. This group will contain regular workers and non-regular workers (part-time and direct-hire temporary workers) who do not have college or university degrees, who do not supervise other workers, and who do not have managerial positions. As a control group, I use nonmanufacturing low-skill workers, who presumably were not affected by the deregulation. The hypothesis is that the fear of job loss among low-skill manufacturing workers increased, relative to that of the control group, due to the deregulation of temporary agency staffing in 2004. I exclude executives, the self-employed, workers in public sector, and workers over 65 years of age. Temporary agency workers are also excluded from the analysis because it was illegal to use temporary agency workers in production line work in manufacturing before 2004, 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 perceptions of job insecurity and the types of employment. The treatment and the control groups are similar in terms of the job insecurity measure; the mean job insecurity is slightly higher in manufacturing workers (1.96 compared with 1.89) but the difference is statistically insignificant. Fractions of respondents in each job insecurity category are also very similar between the treatment and control groups. One notable difference is that low-skill manufacturing workers are more likely to be regular workers than are low-skill nonmanufacturing workers (0.65 compared with 0.56), and the difference is statistically significant at the 1% level.¹⁹

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 what is called a *parallel*

¹⁹Other statistically significant differences occur in observable characteristics. Low-skill manufacturing workers are more likely to be union members (0.25 compared with 0.15), work in a large workplace (0.23 compared with 0.16), and have longer job tenure (11.1 compared with 8.7). Nonmanufacturing workers are more likely to be female (0.52 compared with 0.61), have a high school diploma (0.71 compared with 0.79), and live in a large city (0.08 compared with 0.17).

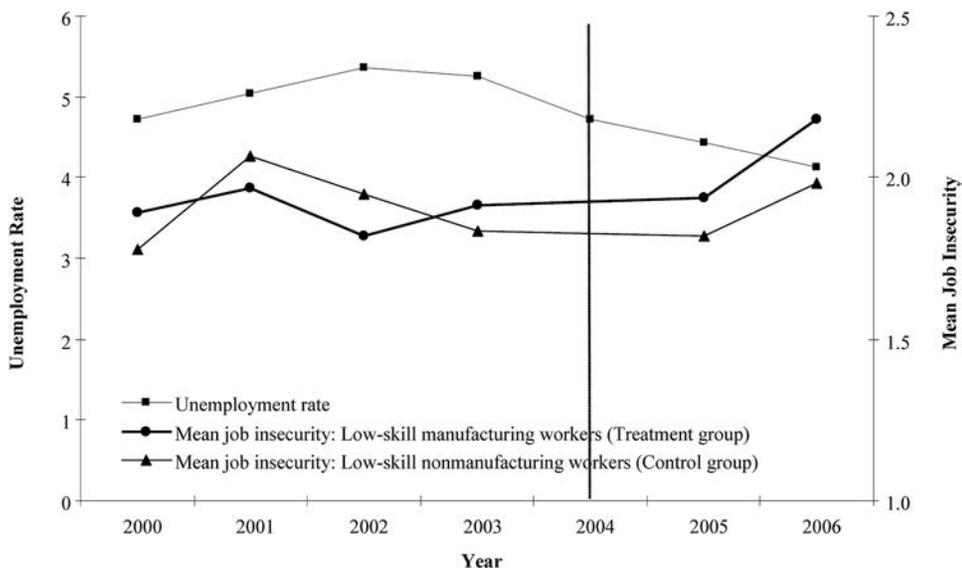
Table 1. Summary Statistics

	Manufacturing workers (Treatment group)	Nonmanufacturing workers (Control group)	Difference
<i>Low-skill workers</i>			
Mean job insecurity	1.96 (0.92)	1.89 (0.89)	0.07
Job insecurity = 4: Very likely to lose job	0.07 (0.25)	0.06 (0.23)	0.01
Job insecurity = 3: Fairly likely to lose job	0.20 (0.40)	0.18 (0.38)	0.02
Job insecurity = 2: Not too likely to lose job	0.36 (0.48)	0.36 (0.48)	0.00
Job insecurity = 1: Not at all likely to lose job	0.37 (0.48)	0.40 (0.49)	-0.03
Regular worker (without managerial position)	0.65 (0.48)	0.56 (0.50)	0.09
Non-regular worker (part-time or temporary)	0.35 (0.48)	0.44 (0.50)	-0.09
Number of observations	454	1,795	

Notes: Standard deviations are in parentheses. Means are unweighted. All the variables are binary except for mean job insecurity.

trend. If the secular trends are the same before the deregulation in 2004, then the counterfactual trends would likely have been the same after 2004 if there had not been the deregulation. Figure 1 shows mean job insecurity for the treatment and control groups over time, along with the national unemployment rate. While mean job insecurity increased with the unemployment rate during the period 2000 to 2001 for both groups, mean job insecurity declined for both groups in 2002 when the unemployment rate continued to increase. Notably, despite the economic recovery that started in 2003,

Figure 1. National Unemployment and Mean Job Insecurity of Low-Skill Manufacturing and Nonmanufacturing Workers



Source: Mean job insecurity calculated from the Japanese General Social Survey and Unemployment rates obtained from the Statistics Bureau (<http://www.stat.go.jp/english>).

Note: Mean job insecurity for 2004 was linearly interpolated because the survey did not take place in 2004.

both groups felt more insecure about their jobs after 2003. Thus, the period 2003 to 2006 seems to be a period of pessimism about job security, as the fall in the unemployment rate was not accompanied by a fall in the fear of job loss; however, the mean job insecurity is clearly higher for low-skill manufacturing workers after 2004. Therefore, Figure 1 provides not only suggestive visual evidence of a treatment effect on the treated but also some evidence in support of a common underlying trend, which indicates that the assumption of the parallel trend appears reasonable.

A simple DD estimate for the effect of the legal revision on worker i 's perceptions of job insecurity (JI) in period t (before or after 2004) is:

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

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 errors and number of observations. The hypothesis is that the deregulation contributed to a *relative* increase in the perception of job insecurity among low-skill manufacturing workers. There was a 0.01 point decrease in feelings of job insecurity for the control group compared with a 0.15 point increase for the low-skill manufacturing workers. Thus, the relative increase for the treatment group was a 0.16 point increase on a 4-point scale, supporting the hypothesis. Since the raw estimates are likely to be biased by a number of observable characteristics, I now turn to an estimation of difference-in-differences regressions with controls. Though the data used are repeated cross-section data and thus unobservable time-invariant individual characteristics (e.g., disposition such as pessimism) cannot be controlled for, or at least not to the extent I control for observable characteristics, any bias due to differences in observable characteristics between the treatment and control groups will be reduced.

Regression Results

Difference-in-Differences for Low-Skill Workers

To identify the average effect of the deregulation on perceptions of job insecurity among low-skill manufacturing workers, I estimate the following equation:

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

The dependent variable JI_{it} is the job insecurity variable discussed above. MFG_i is a dummy equal to 1 for low-skill manufacturing workers, which controls for the time-invariant characteristics of low-skill manufacturing workers. $Post2004_t$ is a dummy equal to 1 for year 2005 and 2006, and controls for any secular trend in job insecurity. The coefficient of the interaction (MFG

Table 2. Job Insecurity Difference-in-Differences Estimates

<i>Low-skill workers</i>	<i>Before 2004</i>	<i>After 2004</i>	<i>Time difference for occupation</i>
Manufacturing workers (Treatment group)	1.89 (0.05)	2.04 (0.09)	0.15 (0.10)
Number of observations = 454	[348]	[106]	
Nonmanufacturing workers (Control group)	1.90 (0.03)	1.89 (0.02)	-0.01 (0.09)
Number of observations = 1,795	[1,329]	[466]	
	Difference-in-Differences:		0.16 (0.14)

Notes: Each cell contains the mean for that group, along with standard errors in parentheses and number of observations in brackets.

$\times Post2004$) is the DD estimate. X_{it} represents a set of demographic and other control variables, which are intended to control for workers' selection into the treatment group. I include prefecture dummies,²⁰ industry dummies, and separate year dummies as well. To make the interpretation of the DD estimate easier, OLS estimation, rather than ordered probit or logit estimations, is presented.²¹

The first column in Table 3 shows the results for all low-skill workers. Heteroskedasticity robust standard errors are used in all regressions.²² The interaction ($MFG \times Post2004$) is positive and statistically significant at the 10% level, indicating that the deregulation increased job insecurity among low-skill manufacturing workers. The relative increase in job insecurity for the treatment group is a 0.21 point increase on a 4-point scale, or roughly an 11% increase from the mean job insecurity of low-skill manufacturing workers before 2004. The coefficient of the non-regular worker dummy is

²⁰There are 47 prefectures in Japan.

²¹This 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 can be misleading, while in linear probability models, the interpretation of the coefficient of the interaction between two variables is straightforward (Ai and Norton 2003). Because of the categorical nature of the dependent variable, however, I also ran ordered probits, which allows the efficient use of ordered qualitative data. Statistical significance of the coefficients of interest does not change.

²²Since I have only two groups, each measured "before" and "after," this is a classic example of the "two by two" cases that feature prominently in the economics literature. In this two-by-two case, standard errors cannot be clustered and thus OLS estimation of difference-in-differences equations is likely to lead to standard errors that are substantially biased downward (Bertrand et al. 2004; Donald and Lang 2007). I am grateful to a referee for pointing this out. To check if common group errors are biasing the standard errors in Equation (1), I collapsed the data by group and by two time periods (before and after) and used an averaged outcome variable for each group in an OLS regression, for which standard errors will generally be valid (Bertrand et al. 2004). The point estimate for the interaction ($MFG \times Post2004$) is statistically significant at the 1% level and very similar to those in Table 3 ($DD = 0.15$). In addition, since this criticism is "indistinguishable from a common criticism of difference-in-differences (DID) analyses: How can one be sure that any observed difference in means is due entirely to the policy change?" (Wooldridge 2003: 136), I attempt to address this issue by excluding workers hired after 2004 and including another control group in the triple difference approach.

Table 3. Difference-in-Differences Regression Results

	Low-skill workers		Regular Low-skill workers		Non-regular Low-skill workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing*Post2004	0.209* (0.117)	0.252** (0.123)	0.292** (0.137)	0.315** (0.137)	0.012 (0.243)	-0.058 (0.272)
Manufacturing	-0.004 (0.089)	-0.043 (0.090)	-0.022 (0.111)	-0.041 (0.112)	0.034 (0.160)	-0.006 (0.161)
Post2004	0.169** (0.071)	0.116 (0.078)	0.135 (0.090)	-0.165 (0.110)	-0.045 (0.106)	-0.146 (0.114)
Non-regular worker	0.220*** (0.069)	0.221*** (0.070)	—	—	—	—
<i>Wage (omitted: less than 0.7 million)</i>						
Wage: 0.7 million–1.5 million	0.007 (0.074)	-0.018 (0.077)	0.248 (0.207)	0.099 (0.209)	-0.070 (0.081)	-0.076 (0.085)
Wage: 1.5 million–2.5 million	-0.044 (0.096)	-0.099 (0.097)	0.046 (0.193)	-0.103 (0.193)	-0.124 (0.143)	-0.209 (0.141)
Wage: 2.5 million–3.5 million	-0.051 (0.102)	-0.089 (0.104)	0.046 (0.194)	-0.093 (0.193)	-0.183 (0.214)	-0.215 (0.234)
Wage: 3.5 million–4.5 million	0.006 (0.114)	-0.040 (0.117)	0.066 (0.200)	-0.077 (0.202)	-0.026 (0.442)	-0.111 (0.468)
Wage: >4.5 million	-0.171 (0.115)	-0.210* (0.117)	-0.183 (0.203)	-0.326 (0.204)	0.105 (0.618)	0.089 (0.594)
Wage: Unknown	0.036 (0.099)	-0.003 (0.104)	0.068 (0.201)	-0.090 (0.203)	0.012 (0.137)	0.020 (0.150)
Tenure	-0.001 (0.003)	0.001 (0.003)	-0.001 (0.003)	0.000 (0.003)	-0.005 (0.006)	-0.001 (0.006)
Union	-0.085 (0.065)	-0.088 (0.066)	-0.119* (0.069)	-0.118* (0.070)	0.166 (0.213)	0.219 (0.213)
Work hours	0.002 (0.002)	0.003 (0.002)	0.000 (0.002)	0.000 (0.003)	0.004 (0.003)	0.006 (0.003)
<i>Firm size (omitted: small size firm [<30])</i>						
Medium size firm (30–500)	-0.078 (0.069)	-0.092 (0.071)	-0.100 (0.086)	-0.091 (0.085)	-0.017 (0.117)	-0.063 (0.123)

continued

Table 3. Continued

	Low-skill workers		Regular Low-skill workers		Non-regular Low-skill workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Large size firm (>500)	-0.205*** (0.079)	-0.217*** (0.083)	-0.136 (0.102)	-0.135 (0.103)	-0.228* (0.123)	-0.243* (0.131)
Firm size unknown	-0.211*** (0.075)	-0.229*** (0.078)	-0.205*** (0.099)	-0.205*** (0.099)	-0.203* (0.118)	-0.239* (0.123)
Female	-0.086 (0.056)	-0.107* (0.058)	-0.090 (0.066)	-0.109 (0.068)	-0.093 (0.117)	-0.126 (0.126)
Age	0.011 (0.014)	0.016 (0.015)	0.042*** (0.018)	0.051*** (0.018)	-0.022 (0.024)	-0.026 (0.025)
Age squared	-0.0001 (0.0002)	-0.0002 (0.0002)	-0.0005** (0.0002)	-0.0006*** (0.0002)	0.0002 (0.0003)	0.0002 (0.0003)
High school	-0.168*** (0.056)	-0.166*** (0.056)	-0.062 (0.075)	-0.041 (0.071)	-0.261*** (0.085)	-0.298*** (0.090)
<i>Marital status (omitted: single)</i>						
Married	-0.134** (0.061)	-0.170** (0.063)	-0.045 (0.072)	-0.070 (0.072)	-0.259** (0.125)	-0.311** (0.137)
Divorced or Widowed	-0.177* (0.096)	-0.205** (0.099)	-0.097 (0.118)	-0.106 (0.121)	-0.302* (0.157)	-0.352 (0.166)
<i>Municipality of residence (omitted: town or village)</i>						
Large city	-0.022 (0.079)	-0.021 (0.080)	0.058 (0.104)	0.037 (0.105)	-0.141 (0.120)	-0.104 (0.125)
City	0.016 (0.048)	0.025 (0.049)	0.017 (0.060)	0.021 (0.061)	-0.017 (0.080)	0.021 (0.084)
Workers hired after 2004 excluded	No	Yes	No	Yes	No	Yes
R-squared	0.096	0.101	0.116	0.120	0.172	0.198
Number of observations	2,249	2,114	1,294	1,233	955	881

Notes: * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level. Robust standard errors are shown in parentheses. Prefecture, year, and industry dummies are included. In all estimations, JGSS-provided sampling weight is used.

significantly positive, suggesting that being a non-regular worker is 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 on unobservable characteristics of workers. Workers who are pessimistic and insecure by nature may decide not to seek employment in production line work 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 the types of workers that employers seek are different 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 whom 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.

In either case, comparing the perceived job insecurity before and after the deregulation will be problematic, as 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 that the level of statistical significance of the DD coefficient increases to 5% when the model excludes workers hired after 2004.

Thus far I have assumed the common effect for all the low-skill manufacturing workers. Now I examine differential effects for the various labor market groups by partitioning the sample into regular and non-regular workers. Two reasons lead me 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. Regular workers have much stronger job protection than do non-regular workers and thus may feel less threatened by a potentially large entry of temporary agency workers. Second, the demand for non-regular workers may have increased relative to the demand for regular workers during this period.²³ 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.

²³Gottfried (2008) states that, in Japan, "more regular jobs are converted into nonstandard positions and new jobs increasingly are created as nonstandard work arrangements" (181).

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% level, and when the model excludes workers hired after 2004 in Column (4), the DD estimate remains significant at the 5% level. It seems that despite strong employment protection, regular workers' perception of job insecurity increased in response to the law revision. In contrast, the DD estimates are imprecisely estimated for non-regular low-skill workers in Columns (5) and (6). Overall, the results from the difference-in-differences suggest that job insecurity of low-skill manufacturing workers, especially regular workers, increased after the deregulation of temporary agency employment.²⁴

Robustness Check: Triple Differences Approach

The evidence presented above suggests that the deregulation increased job insecurity among low-skill manufacturing workers. The DD approach would be problematic, however, if there were manufacturing-specific shocks that affected only manufacturing workers after 2004. In this case, 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. For example, the effect of the deregulation will be biased upward in the DD model if workers in the export-intensive manufacturing sector were adversely affected by intensifying global competition and unfavorable exchange rates during this period.

To evaluate the robustness of the DD estimate, I employ a triple differences (difference-in-differences-in-differences, or DDD) approach by using high-skill workers without any managerial post. Because the policy change introduced more flexible workers at the lower level of firms, job insecurity of low-skill manufacturing workers should be affected more than that of high-skill manufacturing workers, and one should expect to see no (relative) increase in job insecurity of high-skill 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-skill. Thus, the DDD approach controls for the possibility of contemporaneous shocks to manufacturing workers in estimating the impact of the deregulation. My triple-differences approach uses four

²⁴Note that many of the personal characteristics variables do not have statistically significant effects on job insecurity. 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 perceptions of job security. Being a union member is associated with lower job insecurity for regular workers but not for non-regular workers. 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). 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.

different groups, and the DDD estimate for the effect of the deregulation on worker i 's perceptions of job insecurity (JI) is:

$$\begin{aligned} DDD = & \{\Delta E[JI_i \mid i = \text{low-skill manufacturing}] \\ & - \Delta E[JI_i \mid i = \text{low-skill nonmanufacturing}]\} \\ & - \{\Delta E[JI_i \mid i = \text{high-skill manufacturing}] \\ & - E\Delta[JI_i \mid i = \text{high-skill nonmanufacturing}]\} \end{aligned}$$

Table 4 reports the raw DD for high-skill workers and DDD estimates of the effect of the deregulation of 2004. There was a 0.01 point increase in job insecurity for the high-skill nonmanufacturing workers compared with a 0.38 point decrease for the high-skill manufacturing workers. Thus, the relative *decrease* in job insecurity for the high-skill manufacturing workers was 0.39 points, suggesting that the secular trends for high-skill workers were favorable for manufacturing workers. The raw DDD estimate, which is the raw difference-in-differences estimate for low-skill workers (from Table 2) minus the raw difference-in-differences estimate for high-skill workers, indicates a 0.55 point increase for low-skill 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-skill manufacturing workers is greater than the DD estimates in the previous section. The regression equation for the DDD has the following form:

$$\begin{aligned} (2) \quad JI_{it} = & \beta_0 + \beta_1 X_{it} + \beta_2 MFG_i + \beta_3 LowSkill_i + \beta_4 Post2004_t \\ & + \beta_5 (MFG \times Post2004)_{it} + \beta_6 (LowSkill \times Post2004)_{it} \\ & + \beta_7 (MFG \times LowSkill)_i + \beta_8 (MFG \times LowSkill \times Post2004)_{it} + \varepsilon_{it} \end{aligned}$$

The second-level interactions control for changes over time for manufacturing workers ($MFG \times Post2004$) and low-skill workers ($LowSkill \times Post2004$), and time-invariant characteristics of low-skill production workers in the manufacturing sector ($MFG \times LowSkill$). The third-level interaction, which is

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

	Before 2004	After 2004	Time difference for occupation
High-skill manufacturing workers	1.76 (0.06)	1.38 (0.09)	-0.38 (0.11)
Number of observations = 265	[221]	[44]	
High-skill nonmanufacturing workers	1.74 (0.02)	1.75 (0.03)	0.01 (0.04)
Number of observations = 2,437	[1,900]	[537]	
Difference-in-Differences for High-skill Workers:			-0.39 (0.11)
Difference-in-Differences for Low-skill Workers (from Table 2):			0.16
DDD:			0.55 (0.18)

Note: Each cell contains the mean for that group, along with standard errors in parentheses and number of observations in brackets.

Table 5. Triple-Differences Regression Results

	All workers		Regular workers		Non-regular workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Manufacturing*Low-skill*Post2004 ($\beta 8$)	0.576*** (0.173)	0.574*** (0.179)	0.619*** (0.190)	0.567*** (0.193)	0.425 (0.439)	0.704*** (0.350)
Manufacturing*Post2004 ($\beta 5$)	-0.364*** (0.126)	-0.327*** (0.129)	-0.354*** (0.132)	-0.280*** (0.136)	-0.376 (0.364)	-0.717*** (0.224)
Low-skill*Post2004 ($\beta 6$)	0.020 (0.069)	-0.002 (0.073)	0.009 (0.085)	0.013 (0.087)	0.025 (0.122)	-0.102 (0.147)
Manufacturing*Low-skill ($\beta 7$)	-0.060 (0.086)	-0.051 (0.086)	-0.100 (0.098)	-0.088 (0.098)	0.140 (0.202)	0.147 (0.201)
Manufacturing ($\beta 2$)	0.074 (0.075)	0.044 (0.075)	0.105 (0.079)	0.081 (0.079)	-0.106 (0.213)	-0.175 (0.214)
Low-skill ($\beta 3$)	0.003 (0.061)	-0.015 (0.060)	0.022 (0.069)	0.001 (0.067)	-0.103 (0.153)	-0.111 (0.159)
Post2004 ($\beta 4$)	-0.066 (0.046)	-0.120*** (0.049)	-0.073 (0.053)	-0.129*** (0.053)	-0.056 (0.094)	-0.032 (0.117)
Non-regular worker	0.212*** (0.050)	0.213*** (0.053)	—	—	—	—
Workers hired after 2004 excluded	No	Yes	No	Yes	No	Yes
R-squared	0.078	0.080	0.082	0.085	0.125	0.142
Number of observations	4,951	4,698	3,383	3,258	1,568	1,440

Notes: * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level. Robust standard errors are shown in parentheses. Prefecture, year, and industry dummies are included. Control variables are characteristics used in Table 3, plus high education and supervisory responsibility. In all estimations, JGSS-provided sampling weight is used.

the DDD estimate, captures all variation in job insecurity of low-skill workers (relative to high-skill workers) in manufacturing (relative to nonmanufacturing) after (relative to before) the deregulation. The DDD estimate is immune to shocks to low-skill workers as well as shocks to manufacturing workers, and this triple-differences model may generate 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-skill manufacturing workers.

The DDD results are shown in Table 5. In order not to overload the table, I do not report the coefficients on personal characteristics. The coefficient on the third-level interaction is positive and statistically significant at the 1% 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 1% level when workers hired after 2004 are excluded. When the sample is restricted to regular workers, the DDD estimates remain statistically significant at the 1% level. As for non-regular workers, the DDD estimate is statistically significant and positive when workers hired after 2004 are excluded. Overall, the DDD results paint a picture that is largely consistent with the hypothesis that the deregulation of temporary employment contributed to an increase in job insecurity of low-skill manufacturing workers.

Conclusion

In Japan, job security is now widely perceived as becoming a thing of the past for many workers since the decade-long recession in the 1990s. The evidence from this study provides insights into the role temporary staffing agencies potentially play in perceived job insecurity.

If widespread non-regular employment increases the fear of job loss among workers, policies that encourage firms to hire more non-regular employees may have unintended consequences. If a growing fear of job loss lowers workers' morale, and as suggested in the literature, a decline in morale takes a toll on productivity, the benefit of lower labor costs and flexibility in hiring and dismissal might be partially or even more than offset by declining productivity. Additionally, and more directly, policies that create more flexible labor markets may not be welfare enhancing if they increase feelings of job insecurity for workers. The fear of becoming unemployed in the future has been reported in the psychology literature to be detrimental to workers' mental and physical well-being (see the review in Green et al. 2000). The advantages of a flexible workforce must be weighed against the loss of well-being generated by greater job insecurity among workers.

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