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Social Security Contributions and Employment Structure: A microeconometric analysis focused on firm characteristics*

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Abstract

Against the background of the country's aging population, this paper empirically estimates the effect of the social security burden on the employment level and structure in Japan, using firm-level microdata matched with social security insurance data. In particular, we use dynamic panel data methods to estimate labor demand functions and thereby evaluate the degree to which social security contributions influence corporate labor demand. We specifically examine the impact of firm characteristics such as the presence of labor unions and the intensity of competition in the product market. Our empirical results indicate that social security contributions do not have a statistically significant impact on employment. However, companies that face harsh competition in their product and labor markets tend to substitute non-regular workers for regular ones in response to an increase in social security contribution rates.

Keywords: Social security contributions; Employment
JEL classification: H22, H25, H32, H55, J38

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1 Introduction

For Japan, which is facing rapid population aging, carrying out structural reforms to public finances and social security is an urgent issue. As in other OECD countries, social expenditure has been rapidly increasing in Japan as its population ages. Inevitably, to cover these costs, social security contributions (SSCs hereafter) have been increased. However, Japan, which faces a fall in its population growth rate owing to a decrease in the productive-age population, must balance a sustainable social security system with economic vigor. Figure 1 shows the long-term trend in the ratio of SSCs to total labor cost. From approximately 12% in 1980, the ratio rose to 18% in 1990 and peaked at 23% in 2011. Hence, examining how SSCs influence economic activity is an important research topic.

Many theoretical and empirical studies have investigated the shift of SSCs to wage reductions, especially abroad. For example, Brittain (1971) estimates the labor demand function using cross-country data, while Holmlund (1983), using Swedish time-series data for 1950–1979, shows that half of payroll tax had been shifted back to wages. Gruber and Krueger (1991) also conclude that contributions by employers to Workers' Compensation Insurance had been shifted back to insured (employees) in the form of wage reductions, based on industry-level data in the United States.

Although many studies analyze the relationship between SSCs and wages, few have examined the incidence of SSCs in Japan. However, a growing number of recent studies have empirically analyzed whether SSCs affect wages. For example, by using industrial-level data, Tachibanaki and Yokoyama (2008) explore the relationship between SSCs and backward shifting to employees' wages. Similarly, Komamura and Yamada (2004) and Iwamoto and Hamaaki (2006) examine the incidence of employers' contribution rates to social security using panel data on individual health insurance societies throughout Japan. Ito (2009) further analyzes this incidence using firm-level panel data on listed companies.

However, some crucial issues concerning the relationship between SSCs and wages remain. The first of four main issues is overcoming the effect of SSCs on employment. Compared with the amount of research on the SSC–wages relation, few studies have analyzed how SSCs affect employment. Of this scarce literature, Kobayashi et al. (2012) show that companies deal with changes in the public burden such as SSCs and corporate income taxes through various adjustments. In particular, they find that companies tend to adjust employment levels to cope with changes in SSCs. Similarly, Kim's (2008) pioneering research analyzes the relationship between changes in SSCs and employment using panel data on Japanese listed companies. While he finds that an increase in SSCs decreases

employment, this conclusion is somewhat limited given that he utilizes companies' welfare expenses as a proxy variable for SSCs because of data unavailability.

The second issue is the influence on employment structure (i.e., the balance between regular and non-regular workers). In Japan, companies have to bear SSCs when they hire regular workers, but not when they employ non-regular workers[1]. As a result, the influence of SSCs may differ by type of worker[2]. Indeed, the ratio of non-regular workers to total workers has kept pace with the growth in the social security burden. While the ratio was approximately 20% in 1990, it has risen towards 35% recently (Figure 2). As Figure 3 indicates, this increasing ratio of part-time workers and decreasing per-capita income have dragged down SSC revenue. For that reason, some authors point out that the increase of SSCs has a huge impact on employment structure.

The third issue is the consideration of a time adjustment. As Kobayashi et al. (2012) point out, companies may not immediately react to changes in SSC rates, because of the adjustment cost incurred. However, existing studies do not take into account such factors. Further, since adjusting employment is time consuming, analyses that overlook such an adjustment time might be biased[3].

The final issue is the consideration of different responses to SSCs. Companies' responses might vary with their size, employment structure, product market competition, and other characteristics. Ariga and Kambayashi (2010), for instance, show that companies' measures depend on the need to negotiate with labor unions or the intensity of competition in their product markets. In contrast to previous researchers, who have only aimed to grasp the average effect of SSCs on corporate behavior, we also determine the effects on whether firms employ part-timers (extensive margin) and/or on how they change the number of part-timers employed (intensive margin).

Based on the foregoing, this paper empirically estimates how the social security burden influences employment level and structure using firm-level microdata matched with social security insurance data. Since the rates of social health insurance vary among health insurance societies in Japan, we can identify this effect based on these variations. In particular, we use dynamic panel data methods to estimate the labor demand function

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[1] Welfare pension payments, health insurance, and long-term care insurance are provided to employees who work 30 hours or more per week. However, employees whose spouses enter social insurance and whose annual incomes do not exceed 1.3 million yen are not covered by social insurance. From October 2016, however, coverage will be extended to employees (1) working between 20 and 30 hours a week, (2) earning 1,060 thousand yen or more a year, and (3) working for companies that employ 501 workers or more.

[2] Miyazato and Ogura (2010) analyze the empirical incidence of employers' healthcare contributions using micro wage data and find that SSCs narrow the gap between the wage rates of regular workers and those of non-regular workers.

[3] There are many previous studies of employment adjustments. For example, Abe and Noda (2009) estimate the employment adjustment function using firm-level microdata.

and thereby evaluate how SSCs influence corporate labor demand. We also examine the impacts of companies' characteristics such as firm size, the presence of labor unions, and the intensity of competition in the product market.

The remainder of this paper is organized as follows. Section 2 introduces the theoretical background. Section 3 summarizes the empirical literature on the link between SSCs and corporate behavior. Section 4 describes our estimation strategy and explains the data matching method. Section 5 presents and discusses the estimation results. Section 6 concludes and proposes subjects for future study.

2 Theoretical Background

Since Summers (1989) constructed the basic partial equilibrium model about the incidence of SSCs, numerous theoretical models have been suggested. In this section, we explain the theoretical model used herein based on the previous approaches of Gruber and Krueger (1991) and Baicker and Chandra (2006).

2.1 Theoretical Model

Suppose that labor demand (L_d) is given by

$$L_d = L_d(w + t), \tag{1}$$

and further suppose that labor supply (L_s) can be expressed by

$$L_s = L_s(w + at), \tag{2}$$

where w is the wage rate, t represents the SSCs provided by the employer, and $a(0 < a < 1)$ represents employees' monetary valuation of that insurance. If employees regard the contributions as income tax, a takes the value of 0. Conversely, if they regard the contributions as a counter value of the benefits to them, it takes 1[4].

By differentiating the supply–demand equilibrium equation, we obtain the following identities:

[4] This model assumes that SSCs are specific and provided only by employers. Gruber (1997) and Iwamoto and Hamaaki (2006) introduce employees' burden and proportional contributions to their theoretical models.

$$\frac{dw}{dt} = -\frac{\eta^d - a\eta^s}{\eta^d - \eta^s} \tag{3}$$

$$\frac{dL}{dt} = \frac{(a-1)\eta^d\eta^s}{\eta^d - \eta^s} \tag{4}$$

where η^d and η^s are the labor demand and supply elasticity with respect to wages, respectively. Specifically, (3) demonstrates the effect of rising SSCs on wages, while (4) shows that on employment.

When $a = 1$ (i.e., employees regard the contributions as a counter value of the benefits to them), $dw/dt = -1$, and SSCs entirely shift back to employees. In that case, since $dL/dt = 0$, the employment level remains constant. Conversely, if $a = 0$, then the results are identical to those obtained for the incidence of income tax, and the burden ratio between employers and employees varies depending on η^d and η^s.

If labor supply is inelastic ($\eta^s = 0$) or labor demand is completely elastic ($\eta^d = \infty$), (3) is $dw/dt = -1$. Therefore, contributions wholly shift back to employees and employment remains unchanged.

2.2 Graphical Interpretation

Figure 4 depicts the incidence of employers' SSCs. $L_d(w)$ and $L_s(w)$ represent the labor demand and supply curves before the introduction of social insurance, respectively. In this case, equilibrium wages and employment are w_0 and L_0, respectively. Consider the case where SSCs are now introduced and where the statutory contribution is set at t to employers by legislation. In this case, the labor demand curve shifts downward ($L_d(w+t)$). If employees disvalue these contributions (i.e., they do not feel worthy of the social insurance benefit in return for the contributions), the results are identical to those obtained for the incidence of income tax. As a result, the new equilibrium is the point at the interaction of $L_d(w+t)$ with $L_s(w)$. In this situation, the wages and labor cost paid by employers are given by w_1 and $w_1 + t$, respectively. Employment thus decreases to L_1. Although SSCs are statutorily imposed on employees, they only incur a proportion of the burden ($w_0 - w_1$), and employers bear the rest ($w_1 + t - w_o$). Thus, employees and employers share the burden of SSCs even though they are statutorily imposed on the former.

When employees partly feel worthy of the social insurance benefit in return for the contributions, the labor supply curve shifts downward to $L_s(w + at)$. In this case, the

wages and labor cost paid by employers are given by w_2 and $w_2 + t$, respectively. Consequently, the proportion of the burden borne by employees increases. As shown in Figure 4, employees thus cover the majority of the contributions. However, employment increases from L_1 to L_2. Finally, when employees regard the contributions as a counter value of the benefits to them ($a = 1$), the labor supply curve shifts downward to the point where employment returns to the original level (L_0). Employees now absorb the total cost.

2.3 Relationship between the Labor and Product Markets

In this subsection, we present a simple theoretical model of the relationship between the product market and the elasticity of labor demand, as presented by Hamermesh (1993). First, we assume that a firm maximizes profits as follows:

$$\pi = p\big(F(L_d)\big) \cdot F(L_d) - wL_d \tag{5}$$

Here, p is the product price, which is a decreasing function of output because of the incompleteness of the product market. $F(L_d)$ is a production function that transforms labor services into output and $F(L_d)' > 0,\ F(L_d)'' < 0$. By solving the profit-maximizing problem in (5), we ascertain the following first-order condition:

$$F'(L_d)\left(1 + \frac{\partial p\big(F(L_d)\big)/\partial L_d}{F'(L_d)} \cdot \frac{F(L_d)}{p}\right) = \frac{w}{p} \tag{6}$$

$$F'(L_d)\left(1 - \frac{1}{\eta}\right) = \frac{w}{p} \tag{7}$$

where $\eta(\geq 0)$ is the absolute value of the elasticity of product demand. Moreover, the left-hand side of (7) indicates the marginal product revenue and the right-hand side represents real wages. (7) implies that the elasticity of labor demand rises when the elasticity of product demand increases. Therefore, firms that face imperfect product markets because of their high shares of the product market or their provision of differentiated goods and services tend not to adjust their employment levels in response to changes in real wages. This theory is known as the second of Marshall's four laws of derived demand. By contrast, if a firm faces a perfectly competitive product market, $\eta \to \infty$ and (7) becomes $F'(L_d) = w/p$. This condition indicates that a firm that faces a competitive product market tends to adjust employment compared with other firms.

2.4 Possibility of Substitution for Non-regular Workers

Some authors argue that rising SSCs in Japan have stimulated the trend to substitute non-regular workers for regular ones. As noted in footnote 1, welfare pension payments, health insurance, and long-term care insurance are provided to employees who work 30 hours or more per week and those who work three-quarter working days or more per month as regular workers. Otherwise, neither employers nor employees bear SSCs. Since a rise in SSCs does not affect the labor cost of non-regular workers, although it raises that of regular workers, the increase in SSCs is thought to be a possible cause of the growing ratio of non-regular workers[5].

From a theoretical standpoint, if employees regard these contributions as a counter value of the benefits to them, SSCs entirely shift back to them in the form of wage reductions and employment remains unchanged. Therefore, there is no reason for companies to substitute non-regular workers for regular ones. However, since a rise in contributions leads to a decline in employment, this gives rise to the possibility of substituting regular for non-regular workers. If the degree of such substitutability is high, the wage elasticity of labor demand is also thought to be high. Figure 5 depicts the case of the high wage elasticity of labor demand and low wage elasticity of labor supply. When employees partially feel worthy of the social insurance benefit in return for the contributions, equilibrium employment decreases from L_1 to L_2. At that time, if regular and non-regular workers are substitutable (complementary), non-regular employment increases (decreases).

Moreover, other factors such as a minimum wage system, negotiation with labor unions, and concerns about demoralization owing to wage cuts also prevent companies from shifting back to workers. In these cases, a significant decrease in regular employment and substituting other production factors such as non-regular workers might arise.

3 Existing Empirical Studies in Japan

3.1 The Incidence of Employers' Contributions

Most existing studies of the relationship between SSCs and workers focus on whether

[5] Existing studies point out that a change in industrial structure (trend towards a service economy), evolving ICT, and a rise in demand fluctuation in the product market are other factors that can induce an increase in non-regular workers (Asano et al., 2011, Morikawa, 2010b).

employers' contributions shift back to employees as wage reductions. The pioneering research by Tachibanaki and Yokoyama (2008), for instance, evaluates the incidence of employers' SSCs in Japan by estimating a reduced form of the labor wage function using industrial-level data. Their result shows that SSCs increase wages and the authors conclude that the contributions are borne by employers. Similarly, Komamura and Yamada (2004), who estimate a reduced form of the wage function using individual panel data on health insurance societies, also examine the incidence of employers' contributions[6]. However, in contrast to the findings of Tachibanaki and Yokoyama (2008), they conclude that the majority of employers' contributions to health insurance shift back to employees in the form of wage reductions.

Iwamoto and Hamaaki (2006) and Hamaaki and Iwamoto (2010) critically reappraise the results of Tachibanaki and Yokoyama (2008) and Komamura and Yamada (2004). Regarding the former paper, they point out a spurious positive correlation between wages and employers' SSC rates by using trend variables. By modifying the estimation, they thus conclude that employers' contributions seem to at least partly shift back to employees. Concerning the latter paper, they find reverse causality from wages to SSCs. Overall, Iwamoto and Hamaaki (2006) conclude that the incidence estimated by Komamura and Yamada (2004) is overvalued and claim that it is valid for employers' contributions to at least partly shift back to employees.

While these studies aimed to analyze the backward shifting of SSCs by estimating a reduced wage equation, Sakai (2006) and Miyazato and Ogura (2010) took different approaches. Sakai (2006) investigates the incidence of payroll tax by utilizing the introduction of long-term care insurance in 2000 and that of the total remuneration system in 2003 (*sohoshusei*) as natural experiments and finds that the increase in payroll tax is shifted back to employers[7]. Meanwhile, Miyazato and Ogura (2010) analyze the growth in non-regular workers. Since a large proportion of non-regular workers are not obliged to join the social insurance system in Japan, the rise in the SSC rate increases the labor cost of regular workers but not that of non-regular workers. As a result, demand for non-regular workers, which are comparatively inexpensive, might expand. Miyazato and Ogura (2010) therefore confirm that the gap between the wages paid to regular and non-regular workers' contracts[8]. In summary, the consensus that most employers' contributions are

[6] Although the published year of Komamura and Yamada (2004) is earlier than that of Tachibanaki and Yokoyama (2008), a discussion paper version of Tachibanaki and Yokoyama (2008) was released in 2001. The paper by Tachibanaki and Yokoyama (2008) is thus regarded as the pioneering empirical study in Japan.

[7] In this regard, however, Sakai (2006) withholds drawing a conclusion because bonuses are thought to be determined by other factors, such as corporate performance.

[8] Miyazato and Ogura (2010) conduct an instrumental variables regression using a lagged rate of SSCs and the proportion of the elderly in the enrollment of the insurance association as instruments in order

shifting back to employees has been gradually building.

3.2 The Effect on Employment

As our theoretical model explained, the effect of SSCs on employment differs depending on the parameters η^d, η^s, and a. For instance, if labor demand is completely elastic to wages, employers' contributions shift back to employees in the form of wage reductions. However, the impact on employment varies according to a. While a rise in SSCs decreases employment when $a < 1$, employment is unchanged when $a = 1$. However, it is unclear whether companies substitute non-regular workers for regular ones in response to a rise in SSCs.

Empirical studies that analyze how SSCs affect employment are relatively scarce compared with those of wages. Gruber (1994) and Gruber (1997) are pioneering and valuable studies in this regard. Gruber (1994) estimates how mandated maternity benefits influence wage and labor supply. Several state and federal mandates stipulate that childbirth be covered comprehensively in health insurance plans, raising the relative cost of insuring women of childbearing age. He utilizes the differences among states as natural experiments in order to estimate the causal effects on wages and labor supply. Although he presents evidence of a substantial shift in the cost of health insurance from employers to employees, he finds little effect on total labor input for that group. Gruber (1997) also evaluates the effects of changes in mandatory pension contributions using the privatization of pensions in Chile as a natural experiment. The results also confirm that changes in SSCs do not affect employment, although the cost borne by employers is passed over to employers in the form wage reductions. In brief, despite the limited number of empirical studies, many researchers now acknowledge that employees incur SSCs in the form of wage reductions.

Kim (2008) also analyzes how SSCs affect employment using individual panel data on Japanese listed companies but with welfare expenses as a proxy of SSCs because of limited data availability[9]. His empirical result suggests that welfare expenses negatively affect employment.

Empirical studies that analyze the substitution of non-regular workers for regular ones are fewer still. Kim (2008) also examines the effect of welfare expenses on regular employment. He simply calculates the number of regular workers by multiplying the total number of workers by the industry-level ratio of regular workers, which is taken

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to avoid possible endogenous bias, and they draw a similar conclusion.

[9] Since companies vary discretionary welfare expenses in response to changes in SSCs, the estimates presented by Kim (2008) might have possible biases.

from the *Labour Force Survey*, and finds that increasing welfare expenses decreased regular employment until the early 1990s. However, by contrast, his estimation result implies that a rise in contributions has decreased the substitution of non-regular workers for regular ones since the early 1990s.

Baicker and Chandra (2006) also examine the effect of SSCs on employment and the substitution of non-regular workers, using state-level, per-capita medical malpractice payments as an instrument for imputed premiums. Since part-time workers are typically not covered by social insurance, employers tend to replace full-time workers with part-time ones. Indeed, Baicker and Chandra (2006) confirm that a 10% increase in health insurance contributions reduces the aggregate probability of being employed by 1.2% points, reduces hours worked by 2.4% points, and increases the likelihood that a worker is employed only part-time by 1.9% points.

Sakai (2009) and Kobayashi et al. (2012) also analyze the substitution of regular for non-regular workers using questionnaires. Sakai (2009) finds that more than half of small and medium-sized enterprises increase non-regular workers in response to an increase in SSCs. By contrast, Kobayashi et al. (2012) show that while some companies reduce the wages of regular workers in response to an increase in SSCs, few reduce those of non-regular workers.

4 Estimation Strategy and Data

4.1 Estimation Model and Method

In the present paper, we use firm-level panel data in order to estimate a labor demand function that includes the SSC rate paid by employers. Based on existing research, we specify the labor demand functions of regular workers, non-regular workers, and dispatched workers as shown below:

$$\begin{aligned}\ln Regular_{it} = {} & \beta_0 \ln Regular_{it-1} + INS_{it}\beta_1 + \ln RINCOME_{it}\beta_2 + \ln PINCOME_{it}\beta_3 \\ & + \ln VA_{it}\beta_4 + \ln K_{it}\beta_5 + \alpha_i + t_i + \varepsilon_{it}\end{aligned} \tag{8}$$

$$\begin{aligned}\ln Part_{it} = {} & \beta_0 \ln Part_{it-1} + INS_{it}\beta_1 + \ln RINCOME_{it}\beta_2 + \ln PINCOME_{it}\beta_3 \\ & + \ln VA_{it}\beta_4 + \ln K_{it}\beta_5 + \alpha_i + t_i + \varepsilon_{it}\end{aligned} \tag{9}$$

$$\begin{aligned}\ln Dispatched_{it} = {} & \beta_0 \ln Dispatched_{it-1} + INS_{it}\beta_1 + \ln RINCOME_{it}\beta_2 \\ & + \ln PINCOME_{it}\beta_3 + \ln VA_{it}\beta_4 + \ln K_{it}\beta_5 + \alpha_i + t_i + \varepsilon_{it}\end{aligned} \tag{10}$$

where the subscript i indicates companies and t indicates years.

These equations can be interpreted as reduced forms of labor demand functions. $\ln Regular$, $\ln Part$, and $\ln Dispatched$ are the natural logs of the number of regular workers, part-time workers, and dispatched workers, respectively. Since some companies do not employ part-time or dispatched workers, we take the logarithm of the number of workers plus one.

INS represents the SSCs paid by employers. The estimated coefficient, β_1, is the primary concern in this paper. Although companies must pay contributions towards pension payments, health, long-term care, unemployment, and children allowance, we consider only health insurance herein for the following three main reasons. First, because the SSC rates of pension payments and children allowance are cross-sectionally identical for all companies, we can control for these effects using year dummies. Second, the contribution rate of unemployment varies by industry sector. As we explain later, all companies included in our dataset, however, are classified as "other businesses" according to the Ministry of Economy, Trade and Industry (METI). Hence, we can control for the rate of unemployment in the same manner as we can for pension payments and children allowance. Finally, companies have to bear the SSCs of long-term care when they employ workers aged 40 or over. Unfortunately, since we cannot utilize the age composition of employers, we thus exclude the SSC rate of long-term care[10].

α_i is the individual fixed effect, t_i is the year dummy, and ε_{it} is the error term. We also include the interaction terms between SSCs and the following firm characteristic dummies: superiority in product market, barrier to reduce wages, presence of labor unions, and price setting principal of products and services.

$RINCOME$ and $PINCOME$ are price factors that denote the average annual incomes in yen of regular and part-time workers, respectively. Although we should consider the incomes of dispatched workers, we do not have available the appropriate average income for this group. Therefore, we assume that we can control for this variable using the individual fixed effect and year dummy; however, the estimation results for dispatched workers are only used as reference. VA indicates value added (millions of yen) and K is tangible assets (millions of yen).

Many researchers point out that employment is typically adjusted gradually because of the existence of firing costs, negotiation with labor unions, and concerns over declines

[10] If the rate of long-term care is correlated with that of health insurance, endogeneity arises if we exclude the former from the explanatory variables. If the rates of long-term care and health insurance are positively correlated, the estimated coefficient of the latter is positively biased. Indeed, the estimation that included the SSC rate of long-term care as an explanatory variable showed few changes in coefficients.

in employee morale[11]. Hence, we adopt a dynamic model that includes a lagged dependent variable as an explanatory variable. In an ordinary partial adjustment model, $(1-\beta_0)$ means the adjustment speed of employment.

In dynamic panel data models, it is well known that the fixed effects estimator is biased when the number of periods is fixed. In this paper, we utilize the first-differenced (FD) Generalized Method of Moments (GMM) estimator proposed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991) and the system GMM estimator suggested by Blundell and Bond (1998). The FD GMM estimation starts by differencing all regressors, using the GMM instrumented by lagged variables. The system GMM estimator combines the differenced equation with the level equation. The instruments for the level equation are the lagged differences of the variables, which are valid when these differences are uncorrelated with the individual effects[12].

Both these estimators have advantages and disadvantages. While the consistency of the system GMM estimator is established only when the initial conditions satisfy mean-stationary, the FD GMM estimator does not require such a condition. However, the FD GMM estimator suffers from a weak instrument problem when the dynamic panel autoregressive coefficient (β_0) approaches unity, whereas the system GMM does not lead to have such issues[13]. Additionally, the system GMM is efficient since it utilizes more moment conditions. For these reasons, we comprehensively examine the robustness of the presented estimations using both methods.

The consistencies of the FD GMM and system GMM are eliminated when error terms are serially correlated. Therefore, we examine this assumption using the test proposed by Arellano and Bond (1991). To allow for a consistent estimation, GMM estimators also require instruments to be exogenous. Hence, we test this condition using the Sargan test suggested by Arellano and Bond (1991). Further, we examine whether the system GMM estimator is consistent by testing mean-stationary in the initial conditions. In this paper, since most statistical tests indicate that the system GMM estimations do not satisfy the exogeneity of instruments, we show the results of the FD GMM. In the estimations, moreover, we treat the average annual incomes of regular and part-time workers as an endogenous variable.

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[11] For example, Abe and Noda (2009) estimate the adjustment speed of employment using firm-level panel data on listed companies and confirm that the speed has increased recently.

[12] Chigira et al. (2011) explain these estimation methods and tests of dynamic panel data models in detail.

[13] Not only the FD GMM but also the system GMM suffer from a weak instrument problem when the ratio of the fixed effect's (α_i) variance (σ_α^2) to the error's (ε_{it}) variance (σ_v^2) is very large.

4.2 Data and Matching Method

The data used in this paper come from the Basic Survey of Japanese Business Structure and Activities (BSJBSA) published by METI and the Annual Report on Society-Managed Health Insurance (ARSHI) published by the National Federation of Health Insurance Societies. BSJBSA, an annual survey that began in 1991, collects representative statistics on Japanese firms with 50 or more regular employees and more than 30 million yen in capital, including those engaged in the mining, manufacturing, electricity and gas, wholesale, retail, and several services industries. Over 25,000 firms are surveyed every year. ARSHI annually collects information on the SSC rates for employers and employees, the number of insured employees covered by society-managed insurance policies, and average monthly earnings from approximately 1,500 health insurance societies. We match BSJBSA to ARSHI by using the following procedure:

i. We use the company names in BSJBSA and society names in ARSHI.
ii. METI also conducts the "Survey of companies' public burden,"[14] which asks BSJBSA respondent firms about the names of their social insurance societies. We match BSJBSA to ARSHI using these societies' names, too.
iii. Some social insurance societies publish the names of the companies they cover online. We also match the datasets using this information.

After this three-step process, the number of matched companies is approximately 4,600[15]. The final number of companies in the estimation is approximately 4,000 because of missing variables.

All variables except for the SSC rate are obtained from BSJBSA. Based on Morikawa (2010a) and Tanaka (2012), the average annual incomes of regular and part-time workers are calculated as follows. The industry-level monthly income of part-time workers is obtained from the Monthly Labour Survey carried out by the Ministry of Health, Labour and Welfare. By multiplying the average monthly income by 12, we ascertain the industry-level annual income of part-time workers. Since the total wage cost of a firm ($INCOME$), the number of regular workers ($Regular$), and the number of part-time workers ($Part$) are obtained from BSJBSA, we can calculate the firm-level annual income of regular workers using the following formula[16]:

14 The questionnaire was sent to 29,080 firms in January 2010, of which 3,986 firms participated, which corresponded to a 13.7% response rate.

15 We cannot examine the changes in societies that companies join. We therefore assume that all companies continued to hold the same insurance cover during the analyzed period.

16 Since data on average working hours for regular and part-time workers are available at the industry-level in the Monthly Labour Survey, we can calculate their hourly wages (Tanaka, 2012).

$$RINCOME = \frac{INCOME - PINCOME \times Part}{Regular}$$

4.3 Descriptive Statistics

The summary statistics are presented in Table 1. While average ln$Regular$ declined from 2004 to 2007, ln$Part$ and ln$Dispatched$ monotonically grew. As shown in Figure 2, our dataset indicates that regular employment declined, whereas non-regular employment expanded during the mid-2000s. The fact that the standard deviation of ln$Dispatched$ widened also implies that the use of dispatched workers had diversified. Further, average INS declined from 2004 to 2007. Since the Japanese economy was vigorous during this period, many societies could afford to decrease the SSC rate[17][18].

While the annual income of regular workers dropped by close to 10% from 2004 to 2007, that of part-time workers was broadly flat. Value added also gradually fell, a decrease of nearly 10% from 2004 to 2007, while tangible assets also showed a similar tendency.

4.4 Possible Sample Selection Bias

A possible drawback of our dataset is potential selection bias owing to the low matching rate. Although BSJBSA surveys over 25,000 firms, our dataset shrinks to approximately 4,600 in the process of matching to ARSHI. As most matched firms are respondents to the Survey of companies' public burden, possible systematic bias in survey responses might thereby lead to some bias in the estimated results.

The most common approach to overcoming sample selection bias is using Heckman's two-step estimation. For this method, we need those exogenous factors that affect the sample selection mechanism but do not influence labor demand. However, it is usually difficult to find such factors. Therefore, we discuss the possibility of sample selection bias by comparing the descriptive statistics of the estimated sample to that of the population as a whole (i.e., all firms surveyed in BSJBSA).

Table 2 compares the descriptive statistics. The mean numbers of regular and

Although we based our estimation on these hourly wage and working hour figures, the results are similar.

[17] Macro statistics also indicate a similar situation.

[18] The rise and fall of SSCs might have an asymmetric effect on wages and employment insofar as the downward rigidity of wages. This paper only analyzes the period in which the average rate of SSCs decreased. Future research should pay attention to these facts.

dispatched workers, mean value added, and mean tangible assets in the estimated sample are much greater than those in the overall population. By contrast, the average incomes of regular and part-time workers in the estimated sample are relatively slightly less. While it is unclear whether these differences affect the estimated results, Iwamoto and Hamaaki (2009) point out that the estimated results should be stable when we restrict the sample to larger societies, because these firms can set actuarially reasonable rates using the law of large numbers. If similar situations are realized in our sample, we should be able to obtain stable results because the firms included in our dataset are relatively large.

Additionally, as Cameron and Trivedi (2005, p. 801) point out, if selection is only based on the time-invariant characteristics of individual firms, the fixed effects estimator can control sample selection bias. Therefore, if sample selection arises only at the time the survey was conducted, such bias might be controlled by the individual fixed effects. Either way, we should pay careful attention when generalizing our estimation results[19].

5 Estimation Results

5.1 Basic Estimation

Table 3 shows the basic estimation results. Column (1) shows the estimation results of the labor demand function for regular workers. The dependent variable of column (2) is $\ln Part$, while that of column (3) is $\ln Dispatched$. The "FD" in the table means the estimation results using the FD GMM method.

According to the Sargan statistics, the null hypotheses regarding overidentifying restrictions are not rejected by the FD GMM. Further, the Arellano–Bond statistics indicate that the error terms do not have second-order serial correlations at the 5% significance level.

While the coefficients of the SSC rate paid by employers are negative for regular and dispatched workers, the coefficient is positive for part-time workers. Although these coefficients are not statistically significant, the increase in the SSC rate might negatively affect regular workers and positively affect part-time workers. These results, which indicate that SSCs do not have statistically significant impact on employment, concur

[19] When we calculate the descriptive statistics by limiting the sample to survey respondents, they are approximately the same as for the whole population. Therefore, the gap between the estimated sample and population is attributed to the matching process, which used published information online. When limiting the sample to survey respondents, the estimation results do not really change.

with those presented by Gruber (1994, 1997). From the standpoint of economic theory, these results can thus be attributed to an elastic labor supply.

As theoretically expected, the coefficient of ln$RINCOME$ is significantly negative for regular workers, while that of ln$PINCOME$ is not significant for part-time workers and significantly negative for dispatched workers. This result implies a substitutive relationship between part-time and dispatched workers. Since all the coefficients of the lagged dependent variables are statistically significant, this finding suggests that adjusting employment takes time.

5.2 Estimation Including Interaction Terms

Table 4 shows the estimation results including the interaction terms with INS. Because the dummy variables for firm characteristics are obtained from the Survey of companies' public burden, the estimated sample is restricted to survey respondents. We use the following four dummy variables: (1) leading company dummy, (2) dummy of concerns about wage reductions, (3) labor union dummy, and (4) mark-up price dummy. The leading company dummy takes a value of 1 if the company is a leader in its own business sector and 0 otherwise. As theoretically described, companies that have high shares of their product markets tend not to adjust employment levels in response to changes in wages. The dummy of concerns about wage reductions takes a value of 1 if the company is concerned about the deterioration of worker morale or employee turnover following wage cuts and 0 otherwise. The labor union dummy characterizes whether the company has a labor union. As pointed out earlier, employment adjustment costs might increase when companies have a labor union, as they tend not to change employment levels. Finally, the mark-up price dummy takes 1 if the company determines its profit margin for itself and 0 otherwise. If product markets are perfectly competitive, companies cannot determine a price in isolation. This dummy therefore indicates that companies have monopolistic power in their product markets.

The estimated coefficients of INS are significant for regular workers (-0.172) and part-time workers (0.437), implying that companies in the base category substitute part-time workers for regular ones. These coefficients mean that companies in the base category decrease regular employment by 17.2% and increase part-timers by 43.7% in response to 1% point increase in the SSC rate. Indeed, companies classified in the base category are found to be susceptible to changes in the SSC rate. The coefficient of the interaction term with the leading company dummy is estimated to be 0.0832 for regular workers, indicating that leaders tend not to reduce regular employees in response to an increase in INS. This finding is consistent with the theoretical analysis described above.

The coefficient of the interaction term with the labor union dummy is estimated to be 0.0922, suggesting that companies that have labor unions tend not to adjust regular employment levels with variation in INS. This result might indicate that companies that have labor unions face higher employment adjustment costs[20].

The coefficient of the interaction term with the mark-up price dummy is also significantly positive. As companies that can set their own prices based on their mark-up ratios are considered to be competitive, they are also not inclined to alter regular employment even when INS varies. This result is also consistent with our theoretical prediction.

Table 5 shows the descriptive statistics of the dummy variables in 2007. Although the number of firms classified into the base category is only 156, the number rises to 763 when we include firms classified into groups whose coefficient of interaction terms are not significant. In other words, approximately one-third of firms are susceptible to a change in the SSC rate.

5.3 Extensive and Intensive Margins

In this step, we explore the effect of SSCs on whether firms begin to employ part-timers (extensive margin) and on their decisions to change the number of part-timers employed (intensive margin). In this regard, we estimate the following equation using the FD GMM:

$$\begin{aligned} PartDum_{it} = \beta_0 PartDum_{it-1} + INS_{it}\beta_1 + \ln RINCOME_{it}\beta_2 + \ln PINCOME_{it}\beta_3 \\ + \ln VA_{it}\beta_4 + \ln K_{it}\beta_5 + \alpha_i + t_i + \varepsilon_{it} \end{aligned} \tag{11}$$

where $PartDum$ takes 1 if firm i employs part-time workers and 0 otherwise, while all the other variables are as in the previous section.

Because the dependent variable is a dummy, (11) assumes a linear probabilistic model. Since β_1 in (11) indicates the impact of SSCs on whether firms begin to employ part-time workers, we can interpret β_1 as the extensive margin. In addition, we also estimate (9) and (10) after restricting the analysis to firms that employed part-timers in the previous year. In these estimations, we can interpret β_1 as the intensive margin, because β_1 represents the change in the number of part-timers employed.

Table 6 presents the estimation results for the extensive and intensive margins. The

[20] Generally speaking, however, Japanese companies tend not to adjust employment regardless of the presence or absence of labor unions because of employment legislation and the prevailing lifetime employment system. Hence, this result might indicate other effects of firms' characteristics such as firm size.

first column displays the estimation result of (11), while the second is that with the interaction terms. The coefficients of INS are positive but not significant. These results imply that the extensive margin is relatively small. Columns 3–6 present the estimation results of the intensive margin, in which the sample is restricted to firms that employed part-time workers in the previous year. Compared with Table 3 and Table 4, the absolute values of the coefficients for INS and the interaction terms are larger. For instance, the coefficients of INS are significant in the third column (-0.0296) and in the sixth column (0.338) compared with -0.00786 and 0.103, respectively in Table 3. From these results, we can conclude that the intensive margin is much larger than the extensive margin.

5.4 Discussion

Based on the presented theoretical analyses, existing empirical studies, and our estimation results, in this subsection we discuss the effect of SSCs on wages and employment, the effect of SSCs on employment structure, and the discrepancy between the findings of previous studies and our results.

First, our empirical results indicate that SSCs do not have a large influence on employment, allowing us to conclude that these results correspond to the relatively high wage elasticity of labor supply or large employees' monetary valuation of social insurance (a in the theoretical model). These results are consistent with those of Gruber (1994, 1997)[21]. Our results also confirm that companies that do not face harsh market competition or that do have labor unions do not tend to adjust employment in response to changes in SSC rates. These facts imply that the wage elasticity of labor demand and supply differ from one company to another and that SSCs affect employment only in some companies. Our research findings suggest that companies that face high employment adjustment costs or lower competition are not inclined to adjust employment following changes in SSC rates. These results thus correspond to those of Ariga and Kambayashi (2010), which show that firms that have little room to adjust wages because of immediate competition in the product or labor market resort to employment adjustments.

Second, our results demonstrate the complementary relationship between regular and dispatched workers and the substitutable relationship between regular and part-time workers. Hara (2003) confirms the complementary relationship between regular and part-time workers in the whole economy, while Yamaguchi (2011) finds a substitutable

[21] However, our results do not correspond with the findings of Baicker and Chandra (2006). However, given that Baicker and Chandra (2006) analyze the ramifications of the SSC rate increasing drastically, this discrepancy might be expected.

relationship by using firm-level microdata on listed companies. Further, Yamaguchi (2011) shows that Allen's partial elasticity of substitution and Morishima's elasticity of substitution indicate a substitutable relationship between regular and non-regular workers despite using the elasticity estimated by Hara (2003). Therefore, in spite of the results presented by Hara (2003), we find that regular and non-regular workers have a substitutable relationship in line with Yamaguchi (2011).

Finally, we discuss the distinction between previous studies and this paper in terms of how SSCs affect employment. As stated earlier, Kim (2008) finds that an increase in companies' welfare expenses decreases employment, whereas our empirical estimations indicate that SSCs have little effect on employment. These contrasting results might have occurred for the following reasons. First, in contrast to Kim (2008), our dataset might have selection bias. Second, Kim (2008) focuses on large firms, whereas our study includes small firms. Third, Kim (2008) utilizes companies' welfare expenses as a proxy variable, whereas we utilize true SSC rates, which can be considered to be more accurate. Fourth, Kim's (2008) dataset ranges from 1984 to 2003, but ours runs from 2004 to 2007. Some scholars argue that the downward rigidity of wages disappeared around 2000 in Japan[22]. If this were true, it might be natural that Kim (2008) and this paper lea to different outcomes. Future works should be dedicated to exploring these differences further.

5.5 How Much Can SSCs Explain the Rise in Part-time Workers? A Simple Simulation Analysis

To confirm the impact of SSCs on the rise in part-timers, we conduct a simple simulation analysis using the estimation results presented in Table 4. The procedures for a simulation analysis are as follows. First, we calculate individual firms' elasticity of the SSC rate for regular and part-time workers using the estimation results in Table 4. In the next step, we compute a weighted average elasticity. Second, we calculate the effective SSC rate using macro statistics provided by the System of National Accounts calculated by the Cabinet Office and the Japanese Social Security Statistics compiled by the National Institute of Population and Social Security Research. Specifically, the effective rate is calculated by dividing wages and salaries by compulsory employers' actual SSCs. Third, by multiplying the weighted average elasticity by the effective rate of SSCs, we ascertain

[22] See Yoshikawa (2013), for example.

a simulated ratio of part-timers to regular plus part-time workers[23]. The simulation starts in 1995, after which the ratio of part-timers drastically increased.

Figure 6 presents the simulation analysis. The solid line indicates the actual ratio of part-timers, while the dashed line shows the simulated ratio. The actual ratio increased from 13.0% in 1995 to 19.3% in 2007, whereas the simulated ratio increased to 14.9% in 2007. Therefore, approximately 30% of the increase can be explained by the rise in SSCs.

6 Conclusion

Given the aging population in Japan, this paper empirically examined the theoretical effect of the social security burden on wages and employment using firm-level panel data. The presented analysis allowed us to describe four major findings. First, our empirical results indicated that SSCs do not have a statistically significant impact on employment in line with those of Gruber (1994, 1997). In light of previous empirical results on how SSCs influence wages, the burden is considered to be borne by employees in the form of wage reductions rather than job losses. Second, by contrast, non-negligible companies substitute non-regular workers for regular ones in response to an increase in SSC rates. As Sakai (2009) and Kobayashi et al. (2012) point out, companies handle rate variations differently, prompting researchers to consider such diversity in future studies.

Third, we confirmed that the intensive margin, which is the effect of SSCs on how firms that already employ part-time workers change the number of part-timers, is much larger than the extensive margin, which is the effect on whether firms begin to employ part-timers. Finally, our simplified simulation analysis showed that approximately 30% of the increase in part-time workers could be explained by the rise in SSCs.

Our analyses have several limitations, however. The first limitation concerns sample selection. In this paper, we had to match two datasets in order to analyze the relationship between SSCs and company behavior, but many companies were eliminated from the dataset because of the matching process. We thus need a dataset without sample selection bias to obtain more robust empirical evidence.

Second, we analyzed a period in which SSC rates were relatively stable, and thus, researchers should generalize our results with caution. Third, companies might control employment in advance if they anticipate a future increase in SSCs. In that case, even though we do not confirm the instantaneous relationship between SSCs and employment, SSCs might affect long-term employment levels. As far as we know, a theoretical model

[23] This method implicitly assumes that the elasticity of health insurance is applicable to other SSCs such as pension payments and long-term care.

that considers such a long-term effect has not yet been constructed.

Finally, while we conducted a simple simulation analysis in order to assess the impact of SSCs on employment, this simulation was not based on a general equilibrium model. A rise in consumption tax has been discussed in Japan in order to cover the increasing social security burden owing to rapid population aging. To consider the optimal combination of various taxes and SSCs, we must, therefore, construct a general equilibrium model.

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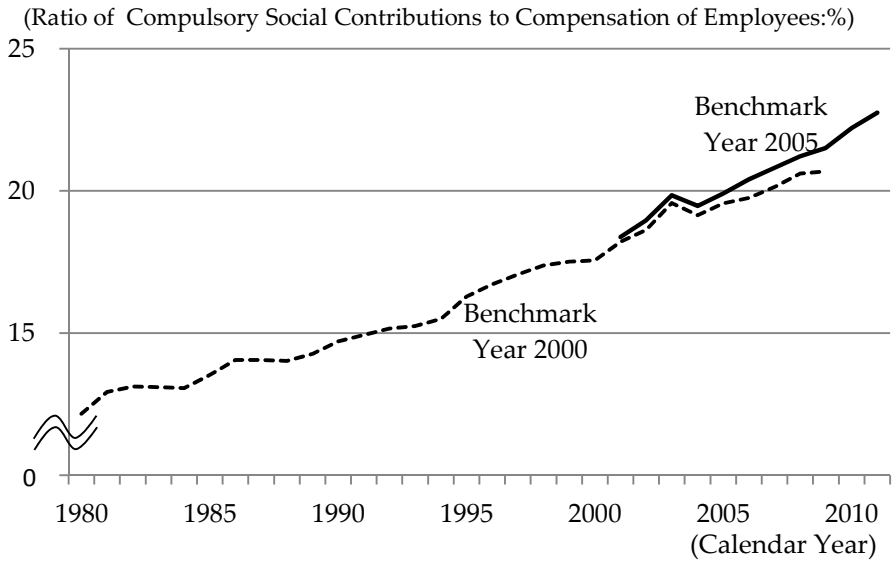
Figure 1 Changes in SSCs



Source: Cabinet Office "National Accounts"

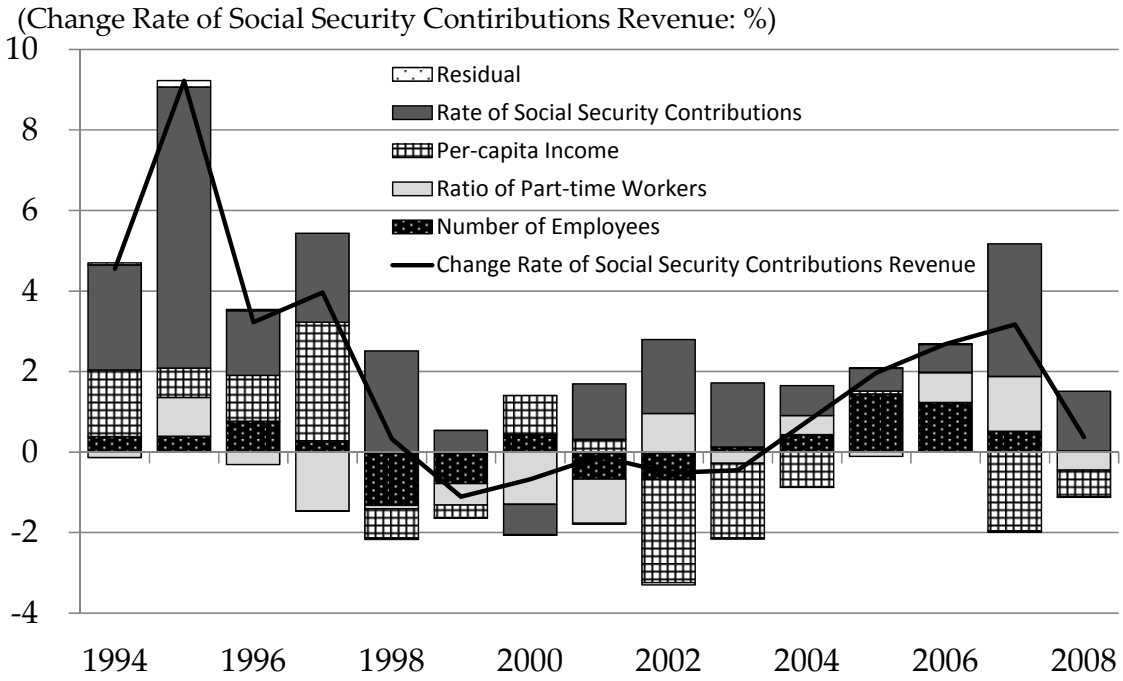
Notes: The benchmark for 2005 is the continuous line, while that for 2000 is the dashed line. These lines are calculated as the ratio of the sum of compulsory employers' actual SSCs and compulsory employees' SSCs to employee compensation.

Figure 2 Changes in the Ratio of Non-regular Employment

Source: Ministry of Internal Affairs and Communications "Labour Force Survey"

Notes: The data source until 2001 is "The Special Survey of the Labour Force Survey," while it the "Labour Force Survey (Detailed Tabulation)" thereafter.

Figure 3 Factors that Affect SSC Revenue



Sources: Cabinet Office "National Accounts;" National Institute of Population and Social Security Research "Annual Report of Social Security Statistics;" Ministry of Health, Labour and Welfare "Monthly Labour Survey"

Notes: This figure is a simple decomposition of SSC revenue.

Figure 4 Incidence of Employers' SSCs

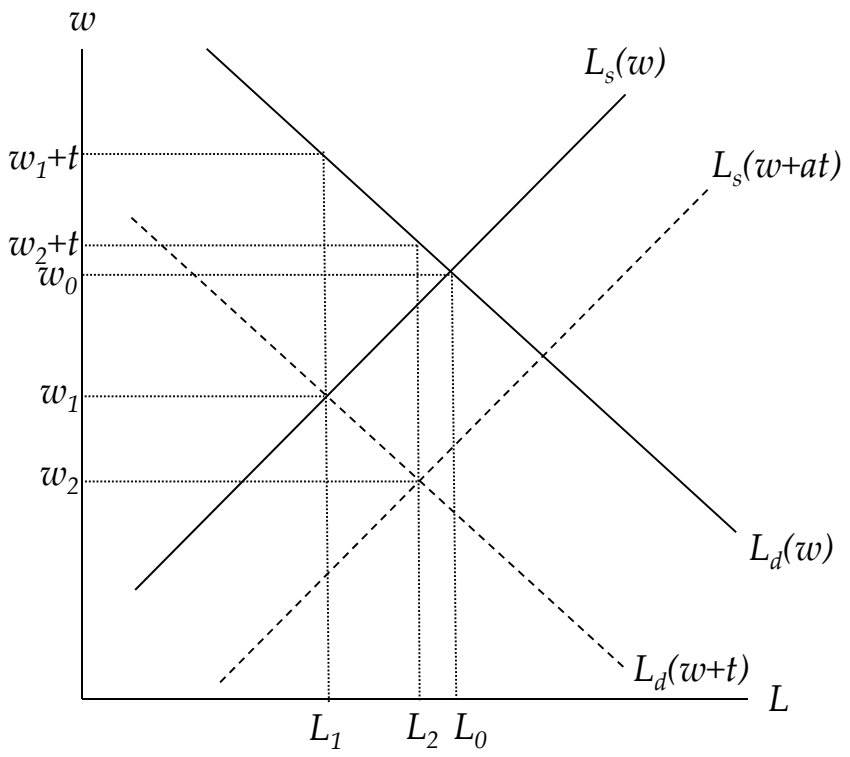


Figure 5 The Case of High Demand Elasticity and Low Supply Elasticity

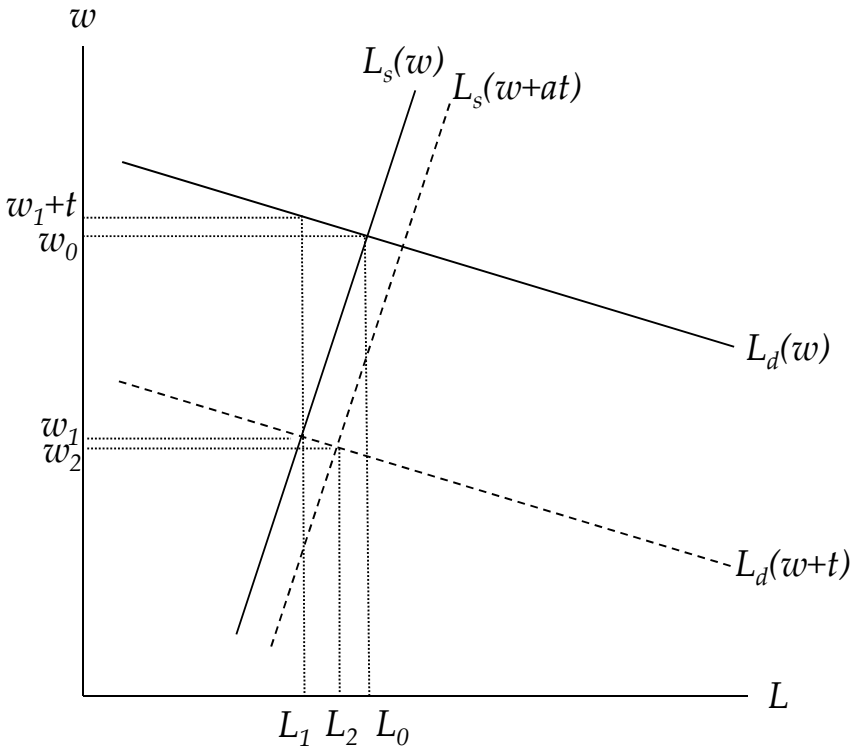
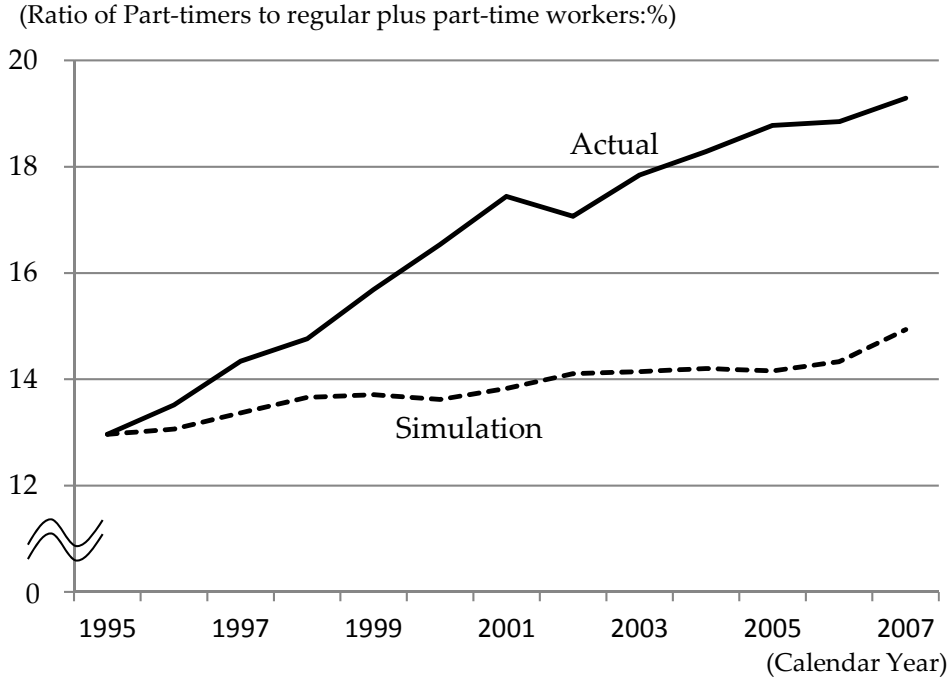


Figure 6 A Simulation Analysis of the Ratio of Part-time Workers



Source: Ministry of Internal Affairs and Communications "Labour Force Survey"

Notes: The data source until 2001 is "The Special Survey of the Labour Force Survey," while it is the "Labour Force Survey (Detailed Tabulation)" thereafter.

Table 1 Descriptive Statistics

		ln*Regular*	ln*Part*	ln*Dispatched*	*INS*	ln*RINCOME*	ln*PINCOME*	ln*VA*	ln*K*
2004	mean	5.37	2.11	1.43	4.10	15.50	14.12	7.60	7.40
	standard deviation	1.30	2.01	1.85	0.45	0.39	0.13	1.57	2.12
	number of firms	2,933	2,933	2,773	2,933	2,933	2,933	2,933	2,933
2005	mean	5.37	2.11	1.43	4.10	15.50	14.12	7.60	7.40
	standard deviation	1.30	2.01	1.85	0.45	0.39	0.13	1.57	2.12
	number of firms	2,933	2,933	2,773	2,933	2,933	2,933	2,933	2,933
2006	mean	5.35	2.21	1.66	4.02	15.44	14.15	7.58	7.36
	standard deviation	1.32	2.00	1.97	0.43	0.36	0.14	1.59	2.12
	number of firms	3,142	3,142	2,971	3,142	3,142	3,142	3,142	3,142
2007	mean	5.33	2.31	1.69	4.01	15.42	14.13	7.53	7.28
	standard deviation	1.31	2.00	2.01	0.42	0.41	0.13	1.58	2.14
	number of firms	3,432	3,432	3,174	3,432	3,432	3,432	3,432	3,432
total	mean	5.35	2.18	1.58	4.05	15.46	14.13	7.57	7.34
	standard deviation	1.31	2.00	1.94	0.44	0.39	0.13	1.58	2.14
	number of firms	12,548	12,548	11,799	12,548	12,548	12,548	12,548	12,548

Table 2 Comparison of the Estimated Sample with the Population

	Estimated Sample			Population		
	mean	standard deviation	number of firms	mean	standard deviation	number of firms
Number of regular workers	760.4	2588.4	12,548	324.9	1210.1	97,150
Number of part-time workers	126.9	952.4	12,548	106.1	781.2	97,150
Number of dispatched workers	58.7	314.0	11,799	27.5	200.0	95,572
Annual income of regular workers (yen)	5,584,868	3,034,934	12,548	5,242,944	3,753,761	97,149
Annual income of part-time workers (yen)	1,382,709	176,756	12,548	1,364,036	182,347	101,830
Value Added (million yen)	13170.6	65476.7	12,548	4701.4	28363.7	89,516
Tangible Assets (million yen)	25518.7	244496.0	12,548	6740.7	90060.1	101,220

Table 3 Estimation Results: Basic Estimation

	(1)	(2)	(3)
	ln*Regular*	ln*Part*	ln*Dispatched*
	FD	FD	FD
INS	-0.00786	0.103	-0.0548
	(0.0130)	(0.0709)	(0.0688)
ln*RINCOME*	-0.197***	0.465	-0.272
	(0.0710)	(0.387)	(0.346)
ln*PINCOME*	-0.278	-1.033	-1.910***
	(0.216)	(0.838)	(0.678)
ln*VA*	0.215***	-0.248	0.190
	(0.0510)	(0.244)	(0.215)
ln*K*	0.0353***	0.0111	-0.0322
	(0.0108)	(0.0521)	(0.0531)
2005 year dummy	0.00678*	0.0208	0.0892***
	(0.00384)	(0.0193)	(0.0194)
2006 year dummy	0.00763	0.163***	0.174***
	(0.00994)	(0.0430)	(0.0417)
2007 year dummy	0.00877	0.124***	0.128***
	(0.00651)	(0.0322)	(0.0456)
ln*Regular* (-1)	0.376***		
	(0.0924)		
ln*Part* (-1)		0.489***	
		(0.0526)	
ln*Dispatched* (-1)			0.298***
			(0.0900)
Sample size	8,385	8,385	7,748
Number of firms	3,310	3,310	3,195
Sargan statistics	16.56	12.81	10.99
(p-value)	(0.167)	(0.383)	(0.529)
Arellano-Bond statistics	0.319	1.808	1.442
(p-value)	(0.750)	(0.071)	(0.149)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4 Estimation Results: Including Interaction Terms

	(1)	(3)	(5)
	ln*Regular*	ln*Part*	ln*Dispatched*
	FD	FD	FD
INS	-0.172***	0.437*	0.101
	(0.0665)	(0.264)	(0.263)
×leading company dummy	0.0832**	-0.189	-0.303
	(0.0362)	(0.268)	(0.268)
×dummy of concerns about wage reduction	0.0693	-0.379	-0.170
	(0.0558)	(0.253)	(0.254)
×labor union dummy	0.0922**	0.101	0.168
	(0.0438)	(0.175)	(0.180)
×mark-up price dummy	0.0734*	-0.0769	-0.0791
	(0.0382)	(0.179)	(0.182)
ln*RINCOME*	-0.330***	0.319	0.0830
	(0.0870)	(0.460)	(0.423)
ln*PINCOME*	-0.514	0.461	-1.325
	(0.316)	(1.362)	(1.100)
ln*VA*	0.308***	-0.152	-0.0104
	(0.0668)	(0.322)	(0.288)
ln*K*	0.0334***	-0.0390	-0.0860
	(0.00936)	(0.0474)	(0.0674)
2005 year dummy	0.00847*	0.0157	0.0750***
	(0.00446)	(0.0244)	(0.0209)
2006 year dummy	0.00983	0.102*	0.135***
	(0.0118)	(0.0578)	(0.0438)
2007 year dummy	0.00788	0.0864**	0.0818**
	(0.00757)	(0.0405)	(0.0409)
ln*Regular* (-1)	0.172*		
	(0.101)		
ln*Part* (-1)		0.387***	
		(0.0591)	
ln*Dispatched* (-1)			0.372***
			(0.0890)
Sample size	5,387	5,387	5,092
Number of firms	2,136	2,136	2,103
Sargan statistics	12.86	12.02	16.11
(p-value)	(0.379)	(0.444)	(0.186)
Arellano-Bond statistics	0.183	1.138	1.846
(p-value)	(0.855)	(0.255)	(0.065)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 Descriptive Statistics of the Dummy Variables in 2007

	Percent
leading company dummy	10.9%
dummy of concern about wage reduction	80.9%
labor union dummy	32.1%
mark-up price dummy	42.8%
sample size in 2007	2229

Table 6 Estimation Results: Extensive and Intensive Margins

	(1)	(2)	(3)	(4)	(5)	(6)
	Part Dummy		ln*Regular*		ln*Part*	
INS	0.0160	-0.00524	-0.0296*	-0.280***	0.338***	1.285***
	(0.0362)	(0.0991)	(0.0168)	(0.104)	(0.105)	(0.476)
×leading company dummy		0.0701		0.0823**		-0.464
		(0.104)		(0.0397)		(0.293)
×dummy of concerns about wage reduction		0.0395		0.175*		-1.020**
		(0.0860)		(0.0970)		(0.479)
×labor union dummy		0.0129		0.0869**		0.148
		(0.0819)		(0.0347)		(0.221)
×mark-up price dummy		-0.0619		0.0809*		-0.182
		(0.0811)		(0.0434)		(0.234)
ln*RINCOME*	-0.0847	-0.0541	-0.380***	-0.349***	1.345***	0.969**
	(0.0963)	(0.0992)	(0.121)	(0.111)	(0.492)	(0.493)
ln*PINCOME*	0.470	0.456	-0.359	-0.449	0.208	0.658
	(0.445)	(0.475)	(0.312)	(0.323)	(1.060)	(1.064)
ln*VA*	0.0839	0.0549	0.352***	0.328***	-0.935**	-0.667*
	(0.0731)	(0.0733)	(0.0972)	(0.0894)	(0.372)	(0.369)
ln*K*	-0.00196	-0.0125	0.0181	0.0201	0.0855*	0.0463
	(0.0203)	(0.0162)	(0.0118)	(0.0123)	(0.0511)	(0.0502)
2005 year dummy	0.00476	0.00636	0.00695	0.00671	-0.0815***	-0.0891***
	(0.00947)	(0.00996)	(0.00560)	(0.00575)	(0.0235)	(0.0244)
2006 year dummy	0.0171	0.0215	0.00283	0.00588	-0.0428	-0.0811
	(0.0166)	(0.0176)	(0.0141)	(0.0138)	(0.0536)	(0.0535)
2007 year dummy	0.0238*	0.0270**	0.00406	0.00426	-0.105**	-0.138***
	(0.0122)	(0.0128)	(0.00941)	(0.00911)	(0.0450)	(0.0453)
Part Dummy (-1)	0.319***	0.337***				
	(0.0400)	(0.0422)				
ln*Regular* (-1)			0.211	0.231*		
			(0.133)	(0.126)		
ln*Part* (-1)					-0.0511	-0.0469
					(0.0439)	(0.0449)
Sample size	5,741	5,387	4,079	3,827	4,079	3,827
Number of firms	2,279	2,136	1,748	1,637	1,748	1,637
Sargan statistics	15.93	15.56	12.48	12.12	8.306	11.47
(p-value)	(0.195)	(0.212)	(0.408)	(0.436)	(0.761)	(0.489)
Arellano-Bond statistics	1.607	1.522	0.234	0.302	-0.154	-0.00244
(p-value)	(0.108)	(0.128)	(0.815)	(0.762)	(0.877)	(0.998)