

Determinants of Welfare and Decision Making of Long-Term Care

Workers in Japan

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Abstract: In this study, we aimed to examine the factors that influence the welfare and decision-making of long-term care workers in Japan. To estimate subjective welfare, we investigated the overall job satisfaction among long-term care workers, and to analyze their decision making, we investigated whether these workers wanted to work or quit their current job. Then, we estimated these dependent variables using the ordinary least squire regression analysis and by using the 11 responses toward job satisfaction as independent variables. According to the results, all factors influenced the well-being of employees; on-the-job training was found to be the most influential factor. Decision making showed less influenced on the workers' well-being, whereas being worthy of the job was found to be the most influential factor in decision making. Moreover, our results also showed that working hours and leisure time also influence job satisfaction of employees. Therefore, to stabilize labor supply in the Japanese long-term care industry, it is important to improve workers' on-the-job training at office and companies and increase their leisure time. In addition, it is important that employees actively communicate with each other for better job satisfaction.

Key words: Japanese long-term care workers; subjective well-being; decision making; job satisfaction **JEL code:** I11, I31, J28

1. Introduction

The importance of long-term care industry is gradually increasing in Japan. A study has estimated that Japan will require approximately 2 million long-term care workers by 2025 (Shimono, 2009)¹. However, this industry is plagued by a high turnover rate of workers, indicating the rising issue of shortage of long-term care workers in Japan.

Since the establishment of long-term care insurance industry, empirical research has been focused on the progress of long-term care workers in Japan. Zhou (2009) estimated Mincer wage function and clarified factors that influence wage. Takaku, Hanaoka, Yamada, and Ishii (2009) studied the shortage of long-term care workers in Japan and determined the factors that influenced wage and labor supply.

Other studies have also focused on stress and job satisfaction of long-term care workers. For example, Imura (2006) analyzed the factors responsible for the burn out of long-term care workers using a survey questionnaire.

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¹ Furthermore, Kawagoe (2009) also estimated labor demand of long-term care industry in Japan.

Kobiyama (2009) and Owa (2010) estimated job satisfaction as the dependent variable and analyzed how it affects labor supply. They argued that assessment of person and treatments, worthwhile for job affect satisfaction and labor supply by workers. In addition, Hotta (2009) estimated stress as a dependent variable and pointed out that communication between workers reduces stress.

In recent years, subjective well-being is being used as a measure of individual's utility, which refers to real policy (Frey, 2008). Moreover, empirical research about welfare and decision making of long-term care workers is important for stabilizing labor supply in the long-term care industry in Japan.

In the present study, we aimed to examine what factors determine the welfare and decision making of long-term care workers in Japan based on previous information. The following are the primary objectives of this study. First, we aimed to clarify that subjective well-being of long-term care workers is influenced by those factors that stem from work, and on-the-job training is the most influential factor. Second, we aimed to clarify whether the employees wanted to remain in their current job or whether they wanted to quit their current job. In addition, the most influential factor on workers' decision making is whether they were worthy of the job. This result is different when compared with workers' well-being. Furthermore, we aimed to clarify that working hours and leisure time also influence the decision making of workers.

The remaining portions of the article are organized as follows. Section 2 describes our method and data, and Section 3 describes our results. In Section 4, we present an argument for future research and discussion, and in Section 5, we conclude the discussion with policy issues.

2. Data and Methods

In this study, we used individual level data obtained from the "*Fact-Finding Survey of Long-term Care Work*" conducted in Japan during 2013. The data is collected anonymously every years via survey questionnaires by the Care Work Foundation under the Ministry of Health, Labor and Welfare in Japan. For collecting data, the workplaces are randomly chosen from the list named "*Welfare and Medical Service Network System (WAMNET)*", and at least three employees are selected from each workplace to complete the questionnaire². The employees complete the questionnaire and return it to the Care Work Foundation without the involvement of their employees. Therefore, this is the most detailed data on companies related to long-term care and their employees. In 2013, total of 17,065 companies and 51,195 employees responded to the questionnaire, and of them, only 7808 companies and 18,881 employees provided valid answers to questions.

The first key variable is employees' job satisfaction that included 12 questions involving 11 detailed satisfaction and their whole work lives.

Figure 1 shows distribution of employees' overall job satisfaction. Most of the employees responded to this question as "3" (*Normal*), followed by "4" (*Moderately satisfied*), "5" (*Satisfied*), "2" (*Moderately dissatisfied*), and "1" (*Dissatisfied*).

 $^{^2}$ When short-listing the companies, the sample not really managed companies are excluded from sample, thus omitting sample selection bias is not occurred.



Figure 1 Histgram of Overall Job Satisfaction

The next key variables are regarding the employees' decision to remain in their current job, or quit their current workplace.

Figures 2 and 3 show the distributions of the responses to Q2 and Q3. Most of the employees responded to Q2 with "5" (*As long as possible*), followed by "6" (*I don't know*), "3" (3-5 years), "2" (1-2 years), "4" (6-10 years), and "1" (*Half a year*). This finding is consistent with the results reported by Hanaoka (2009), who pointed out the differences between reason to quit and desire to work. Figure 3 shows the distribution regarding decision to leave their current workplace. Except for the order of "4" (6-10 years) and "1" (*Half a year*), the responses to Q3 are similar to that of Q2.



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Figure 3 Histogram of Decision to Stay at Workplaces

To analyze the determinants of workers' welfare and decision making, we used the following equation:

 $Y_i = Satisfaction'_{ki} + Control Variables_{ki} + \varepsilon_i$

where i is the index of employees, and k is the index of variables that are described as vector. Left term is dependent variables which is above-mentioned three variables. Table 1 shows summary statistics of these variables. The key explanatory variables are detailed as follows:

- (1) Worthy for job
- (2) Opportunity for career up
- (3) Wage
- (4) Work conditions for working hour and holidays
- (5) Governance of workplaces
- (6) Assessment about person and treatment
- (7) Work environment
- (8) Communication and relationships between employees
- (9) Stability of employment
- (10) Employees' benefit
- (11) Job and ability trainings

	1 =	2 = Moderately	3 =	4 = Moderately	5 = Satisfied	Mean	S.E.
	Dissatisfied	dissatisfied	Normal	satisfied			
Overall job satisfaction	4.3	12.3	54.8	19.1	6.9	31.	0.9
	1= half a year	2= 1-2 years	3=3-5	4 = 6-10 years	5 = as long as	Mean	S.E.
			years		possible		
Decision to continue to	2.2	7.6	13.1	7.3	69.9	4.4	1.1
work							
Decision to stay at workplaces	6.4	13.7	16.4	6.6	56.8	3.9	1.4

 Table 1
 Summary Statistics of Dependent Variables

Values are answer rate for each question items.

Overall job satisfaction is based on results by Care Work Foundation.

Values of decisions are after 6 (= I don't know) is processed as missing value.

Table 2 shows summary statistics of job satisfaction. Most of the employees answered as "1" (*Worthy for job*) followed by "9" (*Stability of employment*) and "4" (*Work conditions for working hours and holidays*). Less number of employees chose the response as "3" (*Wage*) followed by "2" (*Opportunity for career up*), and "11" (*Job and ability trainings*). These results show that long-term care workers are satisfied in terms of worthy of job, working hours and leisure time. The results also show that they are not satisfied with their wages and training.

The second term of right hand is vector of control variables, and the third term is error term. We used monthly wage of employees' and working hours, rank and educations, gender, number of employees at workplaces, job type, marital status, form of organizations, and reason to chose their job as the control variables. Wage and working hour are log of these, and other control variables were considered as dummy variables. Table 3 shows summary statistics of control variables.

Satisfactions	Mean	S.E.
(1) Worthy for job	3.62	0.93
(2) Opportunity for career up	3.06	0.93
(3) Wage	2.65	1.07
(4) Work conditions for working hour and holidays	3.11	1.10
(5) Governance of workplaces	3.09	1.03
(6) Assessment about person and treatments	2.90	0.99
(7) Work environment	3.52	1.06
(8) Communication and relationships between employees	3.47	1.06
(9) Stability of employment	3.33	0.99
(10) Employees' benefit	3.05	1.03
(11) Job and ability trainings	2.91	0.94

Table 2 Summary Statistics of Satisfaction	Table 2	Summary	Statistics	of	Satisfactio
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	Mean	S.E.	Min	Max
Log of working hours	3.55	0.46	0	4.60
Log of wage	12.07	0.51	8.02	13.80
Age	44.02	11.66	15	75
Female dummy	0.79	0.41	0	1
Non regular dummy	0.30	0.46	0	1
Marriage dummy	0.61	0.49	0	1
Occupation dummy (1) Visit care workers	0.35	0.48	0	1
Occupation dummy (2) Service presenter	0.25	0.44	0	1
Occupation dummy (3) Nurse	0.11	0.31	0	1
Occupation dummy (4) Care workers	0.48	0.50	0	1
Occupation dummy (5) Life advisor	0.10	0.31	0	1
Occupation dummy (6) Care manager	0.13	0.33	0	1
Occupation dummy (7) Therapistt	0.02	0.12	0	1
Organization dummy (1) Non-profit organizations	0.39	0.49	0	1
Organization dummy (2) Public organizations	0.08	0.27	0	1

Table 3 Summary Statistics of Control Variables

Female dummy takes 1 value if worker is female.

Non-regular dummy takes 1 value if worker is non regular.

Marriage dummy takes 1 value if worker is married.

Occupation dummies take 1 value if workers' current occupation is these occupations.

Organization dummies take 1 value if workers' workplaces is these organization forms.

3. Results

Table 4 presents the results of our study. In this study, we performed ordinary least squire (OLS) regression analysis with robust standard error of White³. Furthermore, we estimated order Probit estimation and order Logit estimation. The results of statistical significance and sign and order of coefficients are mostly similar to those obtained by OLS⁴. Thus, we can say that the results are robust.

Dependent variable;	A. Overall job satisfaction	B. Decision to continue to work	C. Decision to stay at workpalces
Satisfaction (1) Worthy for job	0.1236 ***	0.1256 ***	0.1946 ***
	[0.01]	[0.01]	[0.02]
Satisfaction (2) Opportunity for career up	0.0207 ***	0.0246 *	0.0847 ***
	[0.01]	[0.01]	[0.02]
Satisfaction (3) Wage	0.0669 ***	-0.0110	0.0222
	[0.01]	[0.01]	[0.02]
Satisfaction (4) Work conditions for working hour and holidays	0.0389 ***	0.0603 ***	0.0745 ***
	[0.01]	[0.01]	[0.02]
Satisfaction (5) Governance of workplaces	0.0476 ***	0.0203	-0.0000
	[0.01]	[0.01]	[0.02]
Satisfaction (6) Assessment about person and treatments	0.0736 ***	-0.0118	0.0999 ***
	[0.01]	[0.02]	[0.02]
Satisfaction (7) Work environment	0.1249 ***	0.0122	0.1467 ***
	[0.01]	[0.02]	[0.02]
Satisfaction (8) Communication and relationships between employees	0.0673 ***	0.0161	0.0199
	[0.01]	[0.02]	[0.02]
Satisfaction (9) Stability of employment	0.0755 ***	-0.0100	-0.0017
	[0.01]	[0.01]	[0.02]
Satisfaction (10) Employees' benefit	0.0767 ***	0.0300 **	0.0528 ***
	[0.01]	[0.01]	[0.02]
Satisfaction (11) Job and ability trainings	0.2318 ***	0.0014	0.0585 ***
	[0.01]	[0.01]	[0.02]

Table 4 Results of OLS Estimations: Satisfaction and Decisions of Employees (Satisfactions)

The first dependent variable was overall job satisfaction. This result is described in Column A. All the 11 factors were found to be statistically significant, and the coefficients were found to be positive. The largest value of coefficient was obtained for "*Job and ability training*" (0.2318), followed by "*Work environment*" (0.1249) and "*Worthy for job*" (0.1236).

The second dependent variable was decision to continue their current job, which is described in Column B. In Column A, all variables have statistical significance. However, in Column B, only four factors, namely, "Worthy for job", "Opportunity for career up", "Work conditions for working hours and holidays", and "Employees benefits" showed statistical significant results. The following variables did not show statistical significance: "Wage", "Assessment about person and treatment", and "Stability of employment". The largest coefficient of variable is not the same to results of Column A. However, the variable with the largest coefficient in Column B was "Worthy for job" (0.1256). This result is consistent with the results reported by Owa (2010); the satisfaction about job increase the tendency of decision to keep working at long-term care industry. The variable with second largest coefficient was "Employments benefits" (0.0300), and the variable with lowest value was "Opportunity for career up" (0.0246). These results are not consistent to those reported by Owa (2010); they found that communication between workers is the second largest factor that influences workers to continue

³ Batschman et al. (2015) pointed out the robustness of OLS at estimation of well-being.

⁴ The results of order Probit and Logit could present as readers' request.

working at the long-term care industry.

Dependent variable;	A. Overall job Satisfaction	B. Decision to continue to work	C. Decision to stay at workpalces
Log of working hours	-0.0029	-0.0096	-0.0113
	[0.01]	[0.03]	[0.03]
Log of wage	-0.0052	0.0268	0.0075
	[0.01]	[0.03]	[0.04]
Age	0.0007 *	-0.0106 ***	0.0042 ***
6	[0.00]	[0.00]	[0.00]
Female dummy	-0.0179	0.0111	-0.0955 ***
	[0.01]	[0.03]	[0.03]
Non-regular dummy	0.0185	-0.1113 ***	-0.1942 ***
	[0.01]	[0.03]	[0.04]
Marriage dummy	-0.0156 *	0.0934 ***	0.1327 ***
	[0.01]	[0.02]	[0.03]
Occupation dummy (1) Visit care workers	0.0014	0.0574 *	0.0937 **
	[0.01]	[0.03]	[0.04]
Occupation dummy (2) Service presenter	0.0193	-0.0339	-0.0981 ***
	[0.01]	[0.03]	[0.04]
Occupation dummy (3) Nurse	0.0564 ***	0.0281	-0.1319 ***
	[0.02]	[0.04]	[0.03]
Occupation dummy (4) Care workers	0.0368 ***	0.0764 ***	0.0386
	[0.01]	[0.03]	[0.03]
Occupation dummy (5) Life advisor	0.0185	-0.0260	-0.0983 **
	[0.02]	[0.03]	[0.04]
Occupation dummy (6) Care manager	0.0193	-0.0827 **	-0.1892 ***
	[0.01]	[0.03]	[0.04]
Occupation dummy (7) Therapist	0.0389	0.0891	-0.3050 ***
	[0.03]	[0.06]	[0.09]
Organization dummy (1) Non-profit organizations	0.0001	0.0089	0.0679 **
	[0.01]	[0.02]	[0.03]
Organization dummy (2) Public organizations	0.0232	-0.0307	0.1314 ***
	[0.02]	[0.04]	[0.05]
Rank dummy	Yes	Yes	Yes
Number of employees dummy	Yes	Yes	Yes
Education dummy	Yes	Yes	Yes
Reason to decided working current job dummy	Yes	Yes	Yes
Number of observations	15258	12106	10846
F value	458.84	18.45	48.54
R2	0.6395	0.0802	0.1819

Table 5	Results of OLS Estimations:	Satisfaction and D	ecisions of Employees:	Continued (Control	Variables)
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***, **, * indicate statistical significance at 1%, 5%, and 10% levels, respectively.

Values of parentheses are standard errors which are robust to heteroskedasticity.

Refer rank of rank dummy is "Normal work", dummies take 1 value if workers are "Managers" and "Middle managers".

Refer number of employees dummy is "1 for 9", dummies take 1 value by each number.

Education dummies take 1 value if workers graduate care profresional schools nad universities, which are six.

Reason to decide working the current job dummy are thirteen, and each variables take 1 value.

The third dependent variable was decision to whether quit their current workplaces, which is described in Column C. Based on statistical significance, except for "*Wage*" and "*Governance of workplaces*", "*Communication and relationships between employees*" and "*Stability of employments*" showed statistically significant differences. Moreover, the value of "*Governance of workplaces*" was found to be negative. Then, coefficient of determinants is larger than that of decision to whether employees want to quit job. Thus, we can say that decision about workplaces is influenced by many factors than that of decision about job. The largest coefficient is "*Worthy for job*", which is 0.1946. This value is larger than that of "*Worthy for job*" in Column B. Therefore, satisfaction regarding employees' worthwhile for job is more effective in decision-making about workplaces than decision-making about job. The second factor with largest value of coefficient is "*Work environment*," which is 0.1469, and the third factor with largest coefficient is "*Assessment about person and treatment*", which is 0.0999. These results are different to those mentioned in Column B.

Answer items	Percent
Shortage of labor	45.0
Lowness of wage on work	43.6
Difficulty in accessing to work paid vacations	34.5
Physical stress	31.3
Mental stress	28.5
Lowness of assessment on working by social	28.2
Difficulty on gent vacations	26.8
Anxiety on working at midnight and accident	21.0
Anxiety about health	14.3
Randomness of working hours	13.4
Anxiety on shortage or difficulty of machines and offices	11.8
Length of working hours	10.8
There are many overtime working without pay	9.2
Anxiety on myself at working	8.9
Disability of employments	7.6
No pay for accident in working	5.9
Can't be regular employees	5.1
Others	3.5

Table 6 Stress and Discontent on Labor and Work Conditions

Based on Fact-Finding Survey of Long-term Care Work at 2013

Finally, we discuss about the control variables. The variables which demonstrated statistical significance are age and marriage dummy variable. However, sign of each variable is different by each estimation. Age variable showed positive effects in Columns A and B and showed a negative effect in Column C^5 . Marriage dummy variable showed negative effect in Column A and positive effects in Columns B and C. However, working hours and wages did not show any statistical significance. This shows that wage has an indirect effect when compared with other workers. Statistical significance of other variables is different by each estimation. Dummy variable for females showed statistical significance in Column C. The dummy variable for care manager, which has extended demand in the labor market of Japanese long-term care workers, was found to be statistically significant in Column C and showed negative effect on decision to remain in their current workplaces. The organization dummy variable even showed statistically significant positive effects in Column C. This result is consistent with the results of Clark and Carine (2018), where private companies showed higher liquidity than that of public companies related to healthcare industry⁶.

4. Discussion

Our results revealed certain aspects of long-term care workers. First, our analysis clarified that the most influential variables on overall job satisfaction were job and training provided to the workers. The third largest influential element was worthy for job. Therefore, to increase workers' welfare, we recommend to improve

⁵ This result is different to that reported by Blanchflower and Oswald (2008), who pointed out that age has a U curve effect on well-being.

⁶ In Japan, Noguchi and Shimizutani (2007) estimated comparative advantage of nonprofit organizations at healthcare industry.

on-the-job training and communication between workers.

Second, the most influential elements on workers' decisions was found to be worthy for job. It indicates workers' decisions about labor supply, which is influenced by positive utility from working. However, satisfaction about leisure time and working hours also influences workers' labor supply. Kuroda (2017) pointed out that the increasing working hours of employees increases their stress and decreases their productivity. Therefore, increasing the positive utility while decreasing the negative utility from working is also an important policy issue. To increase workers' leisure time, it is required to improve the governance and management of each workplace.

Third, the results regarding reserve workers in companies are similar to that of workers' decision about quit their jobs. However, different result was obtained regarding the assessment about person and treatment influences on workers' decision with respect to quitting their workplaces. Therefore, appropriate assessment tool is needed in this matter. Moreover, it shows the decreasing asymmetry of information between employer and employees. Therefore, improvement in communication between workers is also an important variable to be considered.

Based on our results, we have described workers' detailed stress factors in their job and working habits. Figure 6 shows the results and distribution regarding workers' job-related stress⁷. The highest value was obtained for *"Shortage of workers"* (45%), followed by *"Low wage relative to their working"* (43.6%), and *"Difficulty of getting paid leisure"* (34.5%). Therefore, we can say that the workers' negative utility from working stems from the shortage of workers at their workplaces⁸.

However, in this study, we argued that in order to decrease working hours of employees, it is required to improve their efficiency of work. For this, it is required to efficiency staff workers in each office and company. Then, to improve the management policies, appropriate preferential treatment under each organization forms. For example, tax reduction for profit companies and subsidies for nonprofit organizations are effective. Moreover, enactment of new organizational forms, support, and crowdfunding are also effective.

Furthermore, it is also necessary to increase the pay of workers. However, Heyes (2005) has pointed out that hike in wages might decrease the quality of service in long-term care industry. Thus, keeping this in mind, it is important to make reward-based encouragement system that does not decrease workers' motivation related to their workers⁹. To achieve this, it is required to decrease information asymmetry at workplaces. Moreover, this can be achieved by providing efficient on-the-job training. The workers should also effectively communicate between each other.

Our study suffers from some issue that need further analysis. First, this analysis does not analyze causal relationships between independent and dependent variables. In this study, we estimated three variables as dependent variables and detailed factors related to job satisfaction as independent variables. However, it is possible to averse causal relationships between these variables. Therefore, we could not analyze the causal relationships between overall job satisfactions, decisions, and detailed factors related to job satisfaction. Moreover, we could not analyze the relationships between each dependent variables. By analyzing and processing the satisfaction, we have to analyze about satisfaction and decision.

In addition, our study may have involved sample selection bias of selected workers. The interviewers are

⁷ These results are based on individual-level data of "*Fact-Finding Survey of Long-term Care Work*" at 2013. Then, Figure 6 is made by author.

⁸ The workers could provide multiple answers. Therefore, it is possible to measure error bias.

⁹ Frey (1997) pointed out that "Crowding out of intrinsic motivation." More, Benabou and Tirole (2000) pointed out that crowding out of motivation occurred by information asymmetry between principal and agents.

workers who were selected by each company. Therefore, it might have selection bias. Moreover, there might be measurement errors. Therefore, in future studies, similar analysis should be undertaken but with different data.

5. Conclusion

According to the results of this study, in Japanese long-term care industry, the duration of working hours and low wages are serious issues. The duration of working hours have gradually increased, and there is shortage of workers due to the bad management practice of companies. Moreover, workers' wage is relatively low compared to the workers' working hours. Therefore, to stabilize labor supply, it is required to increase efficiency of labor supply and improve companies' management policies. To achieve this, it is required to use artificial intelligence and robot (Sano et al., 2018). Moreover, it is required to analyze human labor supply.

About long-term care workers in Japan, we have some recommendations for further research. First, it is important to have data about workers who already left their job and workplaces. In previous studies, the data used are about workers who are continuing their job and workplaces; therefore, we could not directly analyze why workers had to leave their job and workplaces. In future research, we intend to obtain data targeted at long-term care workers or data targeted at workers who had already left their job and workplaces. With such data, it is possible to analyze the dynamic change in workers' stress and mental health and conduct a more direct analysis as to why workers had left their job and workplaces¹⁰.

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References

Bènabou R. and Tirole J. (2003)."Intrinsic and extrinsic motivation", Review of Economic Studies, Vol. 70, No. 3, pp. 489-520.

- Batschman G., Staub K. and Winkelmann R. (2015). "Consistent estimation of the fixed effects ordered logit model", *Journal of the Royal Statistical Society*, Vol. 178, No. 3, pp. 685-703.
- Blanchflower D. and Oswald A. (2008). "Is well-being u-shaped over the life cycle?", *Social Science & Medicine*, Vol. 66, No. 8, pp. 1733-1749.
- Clark A. and Carine M. (2018). "Ownership and hospital behaviour: Employment and local unemployment", *Social Science and Medicine*, Vol. 202, pp. 152-161.
- Frey B. (1997). Not Just for the Money: An economic Theory of Personal Motivation, Edward Elgar Publishing: London.
- Frey B. (2008). Happiness: A Revolution in Economics, MIT Press: Cambridge.
- Gregg P., Grout P., Ratcliffe A., Smith S. and Windmeijer F. (2011). "How important is pro-social behaviour in the delivery of public service?", *Journal of Public Economics*, Vol. 95, No. 7-8, pp. 758-766.
- Hanaoka C. (2009). "Relative wages and direct care worker turnover in public long-term care insurance system in Japan", *Quarterly* of Social Security Research, Vol. 45, No. 3, pp. 269-286. (in Japanese)
- Hotta S. (2010). "Human resource management to reduce job stress among caregivers in Japan's long-term care insurance facilities", *Quarterly of Social Security Research*, Vol. 46, No. 2, pp. 150-163. (in Japanese)
- Heyes A. (2005). "The economics of vocation or 'why is a badly paid nurse a good nurse?", *Journal of Health Economics*, Vol. 24, pp. 561-569.
- Imura H. (2006). "Stress and burnout in care managers", Journal of the Faculty of Humanities and Social Sciences, Vol. 7, pp. 87-97.
- Kawagoe M. (2009). "The future supply and demand for nurses and caregivers", *Quarterly of Social Security Research*, Vol. 45, No. 3, pp. 214-228. (in Japanese)

¹⁰ Gregg et al. (2013) examined the relationship between no-payment labor work and transfer workplaces by using panel data.

- Kobiyama N. (2010). "Care workers' job satisfaction and willingness of turnover: From the point of certified care-worker and service categories", *Quarterly of Social Security Research*, Vol. 45, No. 4, pp. 444-457. (in Japanese)
- Kuroda S. (2017). "The effects of overwork on health and productivity", *Japanese Journal of Labor Studies*, Vol. 679, pp. 18-28. (in Japanese)
- Noguchi H. and Shimizutani S. (2007). "Nonprofit/for-profit Status and earning differentials in the Japanese at-home elderly care industry: Evidence from micro-level data on home helpers and staff nurses", *Journal of the Japanese and International Economies*, Vol. 21, No. 1, pp. 106-120.
- Owa M. (2010). "Effect of job satisfaction on intention to stay at the workplace among care workers", *Research Journal of Care and Welfare*, Vol. 17, No. 1, pp. 16-23. (in Japanese)
- Sano C., Watanabe H., Sakayori M., Uruno K., Uruno M. and Ambai T. (2018). "Kaigo fukushi shisetsu heno kaigo robotto donyu koka to konngo no kadai oyobi kanousei ni kansuru shitsuteki kento", *Journal of Health and Welfare Statistics*, Vol. 65, No. 3, pp. 22-28. (in Japanese)
- Shimono K. (2009). "Future security of workers in the long-term and care industry", Japanese Journal of Research on Household Economics, Vol. 82, pp. 13-23. (in Japanese)
- Takaku R. (2009). "Compensating differentials for shift work: Evidence from Japanese long term care labor market", *Quarterly of Social Security Research*, Vol. 45, No. 3, pp. 287-304. (in Japanese)
- Yamada A. and Ishi K. (2009). "Determinants of wages and intentions of quitting for long-term care workers: An inter-industry analysis", *Quarterly of Social Security Research*, Vol. 45, No. 3, pp. 150-163. (in Japanese)
- Zhou Y. (2009). "Shortage of long-term care workers in Japan", *Academic Studies Journal of Health Care and Society*, Vol. 19, No. 2, pp. 151-168. (in Japanese)