

Ownership and quality of care provided: A case study of Japanese group homes for the elderly with dementia*

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Abstract:

Some theoretical studies analyzing healthcare and long-term care markets marked by asymmetric information and nonverifiability of service quality discuss that nonprofit providers supply better service quality than for-profit ones. This paper compares the quality of care provided by both in Japanese “group homes for the elderly with dementia” using original survey data. The measures evaluating the service quality are an indicator categorizing daily patient care time and other factors. The deterioration of this indicator in nonprofit providers is found to be smaller than that in for-profit ones during group living. This result suggests that nonprofit providers supply better service quality.

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1. Introduction

Some theoretical studies analyzing healthcare and long-term care (LTC) markets marked by asymmetric information between supply and demand and nonverifiability of service quality discuss that nonprofit providers supply a better quality of service than for-profit ones.

This paper compares nonprofit and for-profit providers in terms of the quality of LTC service provided by them, particularly in Japanese “group homes for the elderly with dementia,” using data from a survey that I conducted in 2003. The analysis uses some evaluation measures based on group home data (usability of facilities, location, and compliance with laws) and one evaluation measure based on user data (an indicator categorizing daily patient care time after considering patients’ physical and mental conditions). The deterioration of the indicator categorizing daily patient care time from the onset of group living until the survey period is found to be smaller in nonprofit group homes than in for-profit ones. This result suggests that nonprofit providers supply a better quality of service than for-profit ones.

Since the introduction of the long-term care insurance system in Japan in April 2000, many for-profit providers have entered some type of Japanese LTC markets. Prior to this system, LTC services for the elderly were classified as welfare and medical services for the elderly. The welfare services for the elderly were provided by local authorities and organizations commissioned by the local authorities (social welfare corporations and so on). The local authorities used to determine the contents of LTC services and service providers on the basis of applicants’ care level requirements. It was mandatory for the applicants to accept the local authorities’ decisions regarding LTC services and service providers. This scheme initiated under the welfare services program for the elderly was referred to as the Sochi system. This system did not guarantee users the freedom to choose the

contents of LTC services and service providers. The long-term care insurance system integrated the welfare and medical services for the elderly. The new system allows a variety of service providers to enter some type of LTC markets upon receiving certifications from local authorities. Users are also authorized to choose service providers and services from a comprehensive menu that includes both the welfare and medical services for the elderly. One of the aims of this system is to promote service provider competitions in order to increase the supply of LTC services and improve the existing service quality. Since the introduction of this system, participation of various business entities, notably that of many for-profit providers, has been observed.^{1,2}

Some theoretical analyses (Easley and O'Hara, 1983; Chillemi and Gui, 1991; Hirth, 1999) describe the market based on a hypothesis presented by Hansmann (1980) that assumes asymmetric information between supply and demand. The hypothesis suggests that uninformed users tend to choose nonprofit providers because they experience anxiety with regard to the opportunistic behavior³ of for-profit providers in markets marked by asymmetric information, such as healthcare and LTC markets. It assumes users to be of the opinion that profit maximization encourages for-profit providers to shirk off their responsibility of providing quality service. Additionally, it assumes users to believe that the nondistribution constraint on nonprofit providers prohibits them from skimping on their service quality. Since uninformed users are mistakenly prone to demand low quality services as compared to well-informed users due to their lack of information, they initially choose nonprofit providers in order to avoid the "shirk off" behavior of for-profit providers assumed by them. Easley and O'Hara (1983) and Chillemi and Gui (1991) theoretically demonstrate that an increase in the number of nonprofit providers in a market contributes to an increase in social welfare. Hirth (1999) formulates the parameter conditions for nonprofit and/or for-profit providers to supply their services in the same market.

On the other hand, Glaeser and Shleifer (2001) demonstrate the difference in the behavioral patterns of nonprofit and for-profit providers by assuming the nonverifiable quality of LTC services instead of asymmetric information. They describe an incomplete contract model and report the result that the service quality of nonprofit providers is higher than that of for-profit ones. In their model, nonprofit providers invest nondistributed profit in the improvement of service quality in order to enhance their reputation or demonstrate their altruism in a concrete form.

The purpose of this paper is to inquire the effect of ownership type on provider behavior. More specifically, I examine whether nonprofit providers supply a better quality of service than for-profit ones. This paper provides an answer to the question of whether user anticipation in Hansmann's hypothesis and Glaeser and Shleifer's (2001) claim are considered reasonable.

This paper focuses on Japanese group homes. To examine the quality of LTC services, an original survey was conducted in September and October 2003 on group homes located in 13 major cities and some cities surrounding the 23 wards of Tokyo and Osaka City. The group homes provide assistance with bathing, voiding, feeding, other daily living care, and rehabilitation training to the elderly with dementia who are in a stable condition. Elderly users rent private rooms in group homes. User expenditures comprise individual payments for LTC services covered by the long-term care insurance system and other expenses such as room rent, haircut, shopping and so on. The main sources of revenue for group home providers are LTC fee set by the Ministry of Health, Labour and Welfare (MHLW) and the room rent determined by the market instead.⁴ Since the room rent is not determined by the MHLW but by the market, I can refer to the implications of previous theoretical literatures based on price competition, contract model, and repeated game without assuming a fixed price.

To evaluate the quality of LTC services, this paper uses some evaluation measures based on

group home data (usability of facilities, location, and compliance with laws) and one evaluation measure based on user data (an indicator categorizing daily patient care time after considering the patients' physical and mental conditions).

The analysis reveals that the deterioration of the indicator categorizing daily patient care time from the onset of group living until the survey period in nonprofit group homes is smaller than that in for-profit ones. This finding suggests that nonprofit providers supply a better quality of service than for-profit ones. In addition, the analysis of group home data shows the superiority of nonprofit providers in terms of the appraised value of land where group homes are located and some measures such as usability of facilities and compliance with laws. Although the superiority of nonprofit providers in terms of the evaluation measures of group home data is partial, it supports the result obtained from user data.

In previous empirical literatures, some researchers examined the difference in the quality of Japanese "home-visit care (home help service)"⁵ provided by nonprofit and for-profit providers. Some local governments in Japan designed some evaluation criteria for third-party assessment of the service quality of home-visit care. Suzuki (2002), Shimizutani and Suzuki (2002), and Kitazaki et al. (2004) analyze the original surveys. In these surveys, service providers furnish answers to questions on whether they satisfy the evaluation criteria designed by the local government. These literatures compare nonprofit and for-profit providers in terms of management, accessibility, information disclosure, staffing intensity, and the total and principal component scores. Based on the principal component score, Suzuki (2002) concludes that for-profit providers supply a better quality of service. However, Shimizutani and Suzuki (2002) do not observe any clear-cut difference between nonprofit and for-profit providers on the basis of the principal component score. On the other hand, Kitazaki et al. (2004) show a result contrary to Suzuki's (2002) result. Their result demonstrates that the quality

of LTC service supplied by nonprofit providers is better than that supplied by for-profit ones in terms of the total score. Furthermore, Noguchi and Shimizutani (2002) empirically show that nonprofit providers employ better quality workers than those employed by for-profit ones. While the surveys analyzed by Suzuki (2002) and Shimizutani and Suzuki (2002) target the service providers in Kanto district, Noguchi and Shimizutani (2002) and Kitazaki et al. (2004) analyze service providers nationwide. Suzuki's (2002) result might only reflect the characteristics of Kanto district.

Many studies on LTC services in foreign countries evaluate the difference in the service quality of nonprofit and for-profit providers, focusing mainly on the US nursing home market. Weisbrod (1988, Chapter 8), Cohen and Spector (1996), Hirth (1993), and Grabowski and Hirth (2003) regard the variables of staffing intensity (percentages of full-time workers, registered nurses, and licensed practical nurses) as measures to evaluate the quality of LTC services. Additionally, some studies (Weisbrod, 1988, Chapter 8; Cohen and Spector, 1996; Spector et al., 1998; Chou, 2002; Grabowski and Hirth, 2003) examine the health condition of patients (death, activities of daily living, pressure ulcer, dehydration, urinary tract infection, physical restraint, catheter, and tube feeding) and consumer satisfaction of users and their families. These international studies continue to provide mixed evidence.

This paper is organized as follows: Section 2 explains the data used in the analysis, Section 3 describes the empirical strategies, Section 4 presents the results, and Section 5 presents the conclusion and future directions of this study.

2. Data

I analyze the data obtained from the survey that I conducted in September and October 2003. The survey referred to the information provided by WAM NET⁶ on group homes. To ensure strict examination, the survey targeted group homes that I was not associated with in any way. Questionnaires were distributed in all group homes in 13 major cities and in some group homes in cities surrounding the 23 wards of Tokyo in Tokyo Metropolis as well as in cities surrounding Osaka City in Osaka Prefecture.⁷ Questionnaires were not distributed in three group homes in some of the 13 major cities because I was associated with them in the past. With regard to group homes in the cities surrounding the 23 wards of Tokyo and those surrounding Osaka City, questionnaires were distributed preferentially in group homes that were closer to the 23 wards of Tokyo and Osaka City due to budgetary constraints. The reason this survey targeted these cities is because for-profit providers supply their services mainly in urban areas. I distributed the questionnaires in 502 group homes, of which 108 sent their responses by mail. This survey targeted chief administrators of group homes to answer questions on group homes and users.^{8,9} The questionnaire provided space for respondents to enter information pertaining to 27 users per one group home.¹⁰ With regard to previous literatures that analyze the US nursing homes, this paper evaluates the measures based on group home and user data.

When considering the appropriate types of measures for evaluating the LTC service quality, I referred to question examples prepared by the MHLW for evaluating the service quality in Japanese group homes and some Japanese laws regarding group homes. The MHLW planned to implement self-evaluation and third-party evaluation. The Ministry prepared question examples for these evaluations to clarify whether group home providers practiced useful activities to improve the quality of LTC services.^{11,12}

When referring to question examples, it is important to note that the MHLW does not inquire

about objective numerical values that indicate the efficiency of group homes with regard to the practice of useful activities to improve the quality of LTC services. For instance, one of the question examples inquires whether group home workers talk to users in a cordial manner to help the latter relax. The answers to these question examples may depend on the respondents' feelings toward such questions. When two group home workers talk to their respective users in a cordial manner to help the users relax, the answer provided by one respondent with a strict sense of judgment may differ from that provided by the other respondent with a lenient sense of judgment. Additionally, for some question examples on user outcome, users may provide more accurate answers than those provided by service providers. The direct use of these question examples as measures for the evaluation of LTC service may fail to obtain a precise measurement of the LTC service quality.

Therefore, this paper first focuses on the quality of respective and concrete group home facilities. The room rent in group homes is not determined by the MHLW but by the market. The evaluation of the usability of facilities appraised on the basis of room rent yields results that can be accredited to previous theoretical literatures based on price competition, contract model, and repeated game without assuming fixed prices. Additionally, one of the question examples prepared by the MHLW inquires whether group homes provide appropriate facilities and/or devices to reassure safety and an independent life for users. This questionnaire includes some concrete questions on respective group home facilities as a modification of the question examples.¹³

The analysis regards group home location as a measure for the same reason, such as the provision of facilities. One of the ordinances also emphasizes the importance of group home location.¹⁴ In this analysis, I use the distance of a station closest to a group home and the appraised value of land on which the group home is located as the two measures for the accessibility of group homes.

This paper also refers to some Japanese laws (Industrial Safety and Health Law, Ordinance on Industrial Safety and Health, Fire Service Act, and Health Promotion Law). Employers are obligated to implement the periodic medical examination of workers,¹⁵ examination of feces of food supply workers,¹⁶ and working environment measurement in harmful workplaces.¹⁷ In public places, administrators of fire prevention are responsible for implementing safety exercises.¹⁸ Further, administrators are required to ensure prevention of passive smoking in public places.¹⁹ The survey questions group home administrators on whether their group homes comply with these laws. The answers to these questions were used as variables in the analysis. Table 1 defines the variables used in the analysis of group home data. Table 2 reports their descriptive statistics.

In addition, I examine a measure based on user data, as seen in previous foreign literatures. This paper evaluates the changes in the indicator categorizing daily patient care time based on patients' physical and mental conditions from the onset of group living until the survey period. To demand LTC services covered by the long-term care insurance system, an elderly person needs to be initially certified by the mayor as an elderly individual requiring care or support. The procedures of "certification of care need" and "certification of support need" determine whether an elderly person requires LTC services in the light of his or her health condition, and if yes, what level of care does he or she require.²⁰

The daily care times for people who are certified as elderly individuals requiring care or support are categorized by indicators ("requiring support," "requiring care level 1," "requiring care level 2," "requiring care level 3," "requiring care level 4" or "requiring care level 5"). "Requiring care level 5" implies that the elderly person requires maximum amount of care. "Requiring support" implies minimum amount of care.²¹ The long-term care insurance system permits elderly persons with dementia, who are certified as requiring care levels 1–5, to demand group home service.²²

“Requiring care levels 1–5” are collectively known as “levels of LTC need.” Table 3 defines the variables used in the analysis of user data. Table 4 reports their descriptive statistics. “Change” implies the deterioration of the indicator categorizing daily patient care time from the onset of group living until the survey period.

The following are the ownership types of the service providers that responded to this survey: medical corporation, social welfare corporation, special nonprofit organization, private company, and private limited company. This paper regards medical corporations, social welfare corporations, and special nonprofit organizations collectively as nonprofit providers and private companies and private limited companies as for-profit providers. All medical corporations provide medical services. On August 22, 2003, immediately before I conducted this survey, 718 group homes provided their services in 13 major cities in addition to the cities in Tokyo Metropolis and Osaka Prefecture. The percentage of for-profit group homes in the surveyed cities was 51.5%. The percentage of nonprofit group homes was 48.5% and comprised 22% group homes operated by social welfare corporations, 19.8% by medical corporations, 6.1% by special nonprofit organizations, and 0.6% by others. As indicated in the notes of Tables 2 and 4, the percentage of for-profit group homes in this analysis is higher than the actual percentage. Likewise, the percentage of group homes operated by medical corporations in this analysis is smaller than the actual percentage.

3. Empirical Strategy

In the following analysis, I examine whether nonprofit group homes supply a better quality of service than for-profit ones using the group home and user data.

This paper considers some rules in the long-term care insurance law and other laws regarding entry into Japanese LTC markets. These laws prescribe that nonprofit providers are eligible for entering the facility and medical services.^{23,24} In the group home survey data, some social welfare corporations and medical corporations supply both facility and group home services. Further, all medical corporations supply both medical and group home services. While examining the difference in the service quality between nonprofit and for-profit providers discussed by previous theoretical studies, it is important to estimate the effect of ownership separately from the effect of facility and medical services.^{25,26}

I conducted three types of analyses in this paper. First, I simply compared the nonprofit and for-profit group homes. Second, I compared the group homes of the nonprofits that supply neither facility services nor medical services and the for-profit group homes. Some social welfare corporations and special nonprofit organizations are the nonprofit providers that supply neither facility services nor medical services. The samples without the group homes of nonprofits that supply facility and/or medical services show the effect of ownership on the quality of group home service without the effect of facility and medical services. Third, as an additional analysis, I compare group homes operated by nonprofit providers that supply facility and/or medical services and those operated by for-profit providers. The comparison between the second and third analyses clarifies the effect of facility and/or medical services.

In the analysis of group home data, I examine the difference in the quality of LTC service between nonprofit and for-profit group homes by a two-sample *t*-test (one-tailed *t*-test). Before examining the result of the two-sample *t*-test, I conducted an F-test with a 5% significance level to check whether the variance of a measure among nonprofit group homes is different from that among for-profit group homes. If the variance is not different, I assume that the variance of the measure

among nonprofit group homes is equal to that among for-profit group homes in the one-tailed t -test. If otherwise, I assume that the variance of the measure among nonprofit group homes is not equal to that among for-profit group homes in the one-tailed t -test (Welch's test).

This paper also evaluates the measures based on user information (the change in the levels of LTC need) by ordinary least squares (OLS), ordered probit model, and treatment effect model presented by Barnow et al. (1980). They point out the importance of considering selectivity bias in program evaluations. When the status of subjects (treatment or control status) is related to unmeasured characteristics that are related to the program outcome, the measurement of the treatment effect includes the effect of the unmeasured characteristics as a selectivity bias. In case the subjects are not randomly assigned to the treatment and control groups, the study needs to obtain unbiased estimators without such a selectivity bias. Hansmann (1980) suggests that users are not randomly distributed between nonprofit and for-profit providers in the US nursing home market. He presents a hypothesis on the less-informed users' tendency to choose nonprofit nursing homes because of their anxiety with regard to the opportunistic behavior of for-profit providers. Holtmann and Ullman (1993), Hirth (1993), Spector et al. (1998), and Noguchi and Shimizutani (2003, 2005) empirically show that users who require more time to be spent in providing care and users with less information prefer nonprofit providers over for-profit ones. These results suggest that the choice of providers is not random. Since the respondents in this survey are group home administrators, it is difficult to completely comprehend the determinant factors of the choice of service providers on the basis of respondents' answers. To exclude the selectivity bias that might result from the relationship between unmeasured determinant factors and the change in daily patient care time, this paper uses the following treatment effect model by Barnow et al. (1980):

$$y_j = \mathbf{x}_j' \boldsymbol{\beta} + \delta z_j + \varepsilon_j \quad (1)$$

$$z_j^* = \mathbf{w}'_j \boldsymbol{\gamma} + u_j \quad z_j = 1 \text{ if } z_j^* > 0, \quad 0 \text{ otherwise.} \quad (2)$$

I define vectors \mathbf{x}_j , $\boldsymbol{\beta}$, \mathbf{w}_j , and $\boldsymbol{\gamma}$ as

$$\mathbf{x}_j = \begin{pmatrix} x_{j1} \\ x_{j2} \\ \vdots \\ x_{jK} \end{pmatrix}, \quad \boldsymbol{\beta} = \begin{pmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_K \end{pmatrix}, \quad \mathbf{w}_j = \begin{pmatrix} w_{j1} \\ w_{j2} \\ \vdots \\ w_{jL} \end{pmatrix}, \quad \text{and} \quad \boldsymbol{\gamma} = \begin{pmatrix} \gamma_1 \\ \gamma_2 \\ \vdots \\ \gamma_L \end{pmatrix}. \quad (3)$$

$j(j=1,2,\dots,n)$ represents a user. y_j indicates the change in the levels of LTC need from the onset of group living until the survey period. The levels of LTC need at the time of survey minus the levels of LTC need at the onset of group living is equal to y_j . z_j is the dummy variable for the ownership type of group homes. The dummy equals 1 for user j who demands LTC service in a group home operated by a nonprofit provider. If user j demands LTC service in a group home operated by a for-profit provider, the dummy equals 0. z_j^* is an unobservable latent variable. \mathbf{x}_j is the vector of determinant factors of the change in the levels of LTC need. \mathbf{w}_j is the vector of variables that influences the decisions of service providers. \mathbf{x}_j and \mathbf{w}_j include constant terms. The error terms ε_j and u_j are assumed to follow bivariate normal distributions with mean 0. The variance of ε_j equals σ^2 . According to Maddala (1983, p. 120), I assume that the variance of u_j equals 1. A correlation coefficient between ε_j and u_j is ρ . $\boldsymbol{\beta}$, $\boldsymbol{\delta}$, and $\boldsymbol{\gamma}$ are parameters. I calculated these parameters by a two-step estimation method. From (2), I found that the event $z_j = 1$ is observed to be equivalent to the event $\mathbf{w}'_j \boldsymbol{\gamma} + u_j > 0$ and is therefore equivalent to $(u_j/\sigma) > -\mathbf{w}'_j \boldsymbol{\gamma}_1$, where $\boldsymbol{\gamma}_1 = (\boldsymbol{\gamma}/\sigma)$. By the same reasoning, the event $z_j = 0$ is equivalent to $(u_j/\sigma) \leq -\mathbf{w}'_j \boldsymbol{\gamma}_1$. Since z_j is binary and u_j/σ is a standard normal variable independent of \mathbf{w}_j , it follows that

$$E(z_j | \mathbf{w}'_j) = \Pr(z_j = 1 | \mathbf{w}'_j) = 1 - \Phi(-\mathbf{w}'_j \boldsymbol{\gamma}_1) = \Phi(\mathbf{w}'_j \boldsymbol{\gamma}_1), \quad (4)$$

where Φ denotes a standard normal distribution function. Further, for each observation j , the

hazard h_j is described as

$$h_j = \begin{cases} E\left(\frac{u_j}{\sigma} \mid z_j = 1\right) = \frac{\phi(\mathbf{w}'_j \boldsymbol{\gamma}_1)}{\Phi(\mathbf{w}'_j \boldsymbol{\gamma}_1)} \\ E\left(\frac{u_j}{\sigma} \mid z_j = 0\right) = -\frac{\phi(\mathbf{w}'_j \boldsymbol{\gamma}_1)}{1 - \Phi(\mathbf{w}'_j \boldsymbol{\gamma}_1)} \end{cases}, \quad (5)$$

where ϕ denotes a standard normal density function. The expectation of y_j follows that

$$E(y_j \mid z_j) = \mathbf{x}'_j \boldsymbol{\beta} + \delta z_j + \lambda h_j, \quad (6)$$

where $\lambda \equiv \rho\sigma$. To estimate (6), first, I obtain \hat{h}_j by a probit estimation of z_j on \mathbf{w}_j . Second, I estimate $\boldsymbol{\beta}$, δ and λ by the linear least square regression of y_j on \mathbf{x}_j , z_j , and \hat{h}_j .

4. Results

The empirical results of the measures based on group home data are summarized in Table 5. Columns 1–4 show the mean and standard deviation of the measures. The columns of two-sample t -test, i.e., 5–7, indicate the results of the evaluation of whether the quality of LTC service provided by nonprofit group homes is better than that provided by for-profit ones. μ_n is the mean of one of the measures among nonprofit group homes. μ_f is the mean of one of the measures among for-profit group homes. When a null hypothesis $H_0: \mu_n = \mu_f$ and the alternative hypothesis $H_1: \mu_n > \mu_f$ are tested, a positive sign (+) with an asterisk implies that the null hypothesis is significantly rejected. When the null hypothesis $H_0: \mu_n = \mu_f$ and the alternative hypothesis $H_1: \mu_f > \mu_n$ are tested, a negative sign (-) with an asterisk indicates that the null hypothesis is significantly rejected.

This paper examines three cases with careful consideration given to the nonprofit providers that supply facility and/or medical services. First, I simply examine the differences in the service quality of nonprofit and for-profit group homes in column 5 (1 and 4). Second, I compare the group homes operated by nonprofit providers that supply neither facility services nor medical services and those operated by for-profits in column 6 (2 and 4). Third, I examine the distinction in the service quality of group homes operated by the nonprofit providers that supply facility and/or medical services and those operated by for-profit providers in column 7 (3 and 4). While the result in column 5 may reflect the effect of facility and/or medical services as well as that of ownership, the result of column 6 indicates only the effect of ownership. Furthermore, a comparison between columns 6 and 7 indicates how effectively the facility and/or medical services increase the quality of group home services.

In column 6, which excludes the effect of facility and medical services, some statistically significant measures show a higher quality of LTC service provided in nonprofit group homes. These measures are “restroom with handrail,” “restroom with western-style toilet bowl,” “bathroom with handrail,” “stairs with low slope,” “log of the appraised value of land (yen),” “periodic medical examination of workers,” and “examination of feces of food supply workers.” They indicate the superiority of LTC service in nonprofit group homes. However, this superiority of service is not observed in all measures. For the measure “bathroom with an even entrance,” the mean of for-profit group homes is significantly higher than that of nonprofit ones.

A comparison between columns 6 and 7 reveals the effect of facility and/or medical services. Some measures (“entrance has an even floor” and “periodic safety exercise”) are positively significant in column 7; however, they are not significant in column 6. These measures may reflect the advantages of diversified management. On the contrary, some positively significant measures in

column 6 (“restroom with handrail,” “restroom with western-style toilet bowl,” “stairs with low slope,” and “log of the appraised value of land (yen)”) are not significant in column 7. With regard to the appraised value of land in columns 6 and 7, the difference in these columns may result from the tendency of some nonprofit providers to establish group homes close to facility services or medical services on an inexpensive and extensive land.

Tables 6–8 summarize the results with respect to the change in the levels of LTC need. I examined the three cases shown in Table 5: a simple comparison between group homes operated by nonprofit and for-profit providers (Table 6), a comparison between group homes operated by the nonprofit providers that supply neither facility services nor medical services and those operated by for-profit providers (Table 7), and a comparison between group homes operated by nonprofit providers that supply facility and/or medical services and those operated by for-profit providers (Table 8).

The estimation results of the change in the levels of LTC need as a dependent variable are shown at the top of Tables 6–8. The probit analysis in the treatment effect model is reported at the bottom of the tables. λ is positively significant in the treatment effect model of Tables 6–8. λ implies that ρ is positive and that the unmeasured characteristics of the choice of nonprofit group homes positively correlate with the deterioration in the levels of LTC need. It is contemplated that the significant positive sign of a nonprofit dummy observed in the OLS and ordered probit model in Table 7 may reflect this positive correlation.

In the treatment effect model, the nonprofit dummy as an explanatory variable is negatively significant at the top of Tables 6–8. This sign implies that the deterioration in the levels of LTC need in nonprofit group homes is smaller than that in for-profit ones. Moreover, the coefficient of the dummy in Table 8 (-1.08) is smaller than that in Table 7 (-0.78). This difference between Tables 7

and 8 suggests that the merit of diversification management between group homes and other services (facility and/or medical services) weakens the deterioration in the levels of LTC need. With regard to other explanatory variables, in Tables 6 and 8, the dummy of the person who moved from another municipality in the same prefecture to the group home (“from the same prefecture”) is also significant. The positive sign implies that the adjustment to the change in the living environment for elderly persons from other municipalities is more difficult than that for elderly persons from the same municipalities.

In the probit estimation of the treatment effect model, the dummy variables of “requiring care level 4,” and “requiring care level 5” at the onset of group living are positively significant in Tables 6 and 7. These signs imply that users requiring a large amount of LTC at the onset of group living tend to choose nonprofit group homes. This property is consistent with Noguchi and Shimizutani (2003).

The probit estimation also shows the relationship between the choice of service provider and the place where users lived before moving into group homes. The dummies of “welfare facilities for the elderly requiring care” and “health service facilities for the elderly requiring care” are positively significant in Table 8 and not significant in Table 7. This suggests that users move from “welfare facilities for the elderly requiring care” and “health service facilities for the elderly requiring care” to group homes operated by nonprofit providers owing to these facility services.

5. Conclusion

In some theoretical studies analyzing healthcare and LTC markets marked by asymmetric

information between supply and demand and nonverifiability of service quality, the ownership type of providers has an effect on the service quality.

This paper examines the difference in the service quality of nonprofit and for-profit providers using the original survey data of Japanese group homes. I evaluated some measures based on group home data (usability of facilities, location, and compliance with laws) and one measure based on user data (the change in the levels of LTC need from the onset of group living until the survey period).

In the analysis of user data, the deterioration in the levels of LTC need in nonprofit group homes is significantly smaller than that in for-profit group homes. This finding suggests that nonprofit providers supply a better quality of service than for-profit providers. The analysis of group home data shows the superiority of nonprofit providers in terms of the appraised value of land where group homes are located and some measures such as the usability of facilities and compliance with laws. Although superiority is observed in limited measures, it supports the result obtained from user data.

The future direction of this study will be to consider the following three factors. First, it is important to specify the reason why the quality of LTC service is different for nonprofit and for-profit providers. Further studies are needed to answer the question of whether the findings of this paper result from asymmetric information or the nonverifiable quality of LTC service.

Second, the evaluation of group home data obtained by third-party evaluation is better than that of the data obtained by self-evaluation, as obtained in this paper, because third-party evaluation is expected to have less difference in terms of the attributes of judgment (strict and lenient judgment) among respondents than self-evaluation. In the group home market, the MHLW made it mandatory in 2004 for all group homes to implement both self-evaluations and third-party evaluations. The data

of these evaluations have to be accumulated.

Third, studies on group home will have to consider terminal care provided by group homes in the future. The Institute for Health Economics and Policy (2003b, pp. 84-91) reports that approximately 45% of surveyed group homes are willing to provide terminal care in the future. If the number of group homes supplying terminal care increases, analyses that consider the efforts of group homes for terminal care will be required.

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¹ “Survey of Institutions and Establishments for Long-term Care” reports the percentage of ownership type in respective LTC markets. For example, the number of group homes in October 2000 was 675 and the percentage of for-profit group homes was 21.2%. In October 2003, the number of group homes increased to 3665 and the percentage of for-profit group homes increased to 42.8%.

² For further details on conditions before and after the introduction of the long-term care insurance system, see Ministry of Health and Welfare (MHW) (2000, Part 1, Chapter 4) and Masuda (2003, Part 2, Chapter 4).

³ Williamson (1996, pp. 378) defines opportunism as self-interest seeking behavior with guile, which includes calculated efforts to mislead, deceive, obfuscate, and confuse. He also states that it should be distinguished from simple self-interest seeking behavior wherein individuals play a game with fixed rules

obeyed by each player.

⁴ Under the long-term care insurance system, the MHLW determines the prices of LTC services covered by the system. On the other hand, the prices of services that are not covered by the system are determined by the markets.

⁵ The home-visit care service comprises assistance with bathing, voiding, feeding, and other daily living care provided at home by certified care workers.

⁶ Since its establishment by the Welfare and Medical Service Agency (WAM), WAM NET (<http://www.wam.go.jp/> accessed on August 11, 2005) has been providing information on welfare and medical services. The prefectural governments authorize appropriate service providers to supply their services and transfer their basic information to WAM NET through an online system. These providers then add and update their information.

⁷ The 13 major cities in this survey are Sapporo, Sendai, Chiba, the 23 wards of Tokyo, Kawasaki, Yokohama, Nagoya, Kyoto, Osaka, Kobe, Hiroshima, Kitakyushu, and Fukuoka. This paper considers government-designated cities and the 23 wards of Tokyo as major cities. On April 1, 2003, immediately before the implementation of this survey, Saitama was ranked as one of the government-designated cities. Since budgetary constraints did not permit the distribution of questionnaires in the group homes of Saitama, I excluded this city from the surveyed area.

⁸ In some cases, the substitutes for administrators answered the questions.

⁹ The questionnaire began with the following sentence: We would like you to answer the following questions, provided the users and workers in your group home have no objections. Some respondents refrained from answering questions on users due to user privacy.

¹⁰ A group home consists of units. The rules regarding the number of units in a group home and the number of users in a unit were determined by the MHW Ordinance No.37 of March 31, 1999 (Article 159). The MHW is a predecessor of the MHLW. The ordinance set 5–9 users in one unit. However, this number was revised by the MHW and MHLW. The notices of the ordinance—the Health Planning Division (HPD, Keikaku ka in Japanese), Health and Welfare Bureau for the Elderly (HWBE, Rôken kyoku in Japanese) Notice No.12 of March 12, 2001 and the Promotion Division (Sinkô ka in Japanese), HWBE Notice No.15 of March 12, 2001—set the maximum number of units in one group home as three (Section 12, 4(4):1). Moreover, the MHLW Ordinance No.28 of March 14, 2003 revised the maximum

number of units in one group home from three to two (Article 159). Since the MHLW changed the maximum number of users in one group home from 27 to 18 by the ordinance six months prior to the implementation of the survey, the survey utilized a form wherein respondents could enter information relevant to a maximum of 27 users per one group home. Japan Group Home Association for People with Dementia (2005) reports the most recent ordinances, notices of the ordinances, and laws regarding Japanese group homes.

¹¹ See the HPD, HWBE Notice No.3 of January 28, 2002 on self-evaluation.

¹² See the HPD, HWBE Notice No.0726002 of July 26, 2002 on third-party evaluation.

¹³ For example, the survey inquires whether the entrance to a group home has an even floor.

¹⁴ Group home providers are instructed to locate group homes in places that enable the users to communicate easily with their families and local residents around the group homes. See the MHW Ordinance No.37 of March 31, 1999 (Article 166:3), the General Affairs Division (Kikaku ka in Japanese), HWBE (Rôzin hoken hukusi kyoku, the predecessor of Rôken kyoku in Japanese) Notice No.25 of September 17, 1999 (Section 12, 4(7):3), and their revisions.

¹⁵ See the Industrial Safety and Health Law (Article 66) and Ordinance on Industrial Safety and Health (Article 44).

¹⁶ See the Ordinance on Industrial Safety and Health (Article 47).

¹⁷ See the Industrial Safety and Health Law (Article 65).

¹⁸ See the Fire Service Act (Article 8).

¹⁹ See the Health Promotion Law (Article 25).

²⁰ The MHW (2000, pp. 129) explains the certification of care and support needs as follows: The certification of care and support needs are approved by the mayor on the basis of the evaluation process during the meetings of the Certification Committee for LTC need that comprises approximately five learned and experienced members from the fields of health, medicine, and welfare. The certification is based on the outcome of the primary evaluation (using a uniform computer software based on the data about the amount of care actually provided to elderly people) formulated with the estimated amount of care required, which is determined on the basis of the investigation of the applicant's mental and physical conditions, and further examination that takes into consideration the opinion letter provided by the primary care physician and special remarks on the applicant's mental and physical conditions.

²¹ For further details regarding the indicators, see the MHW (2000, Part 1, Chapter 4).

²² See the MHW Ordinance No.37 of March 31, 1999 (Article 156).

²³ There are four types of facility services in Japan: “welfare facilities for the elderly requiring care,” “health service facilities for the elderly requiring care,” “sanatorium type medical care facilities for the elderly requiring care,” and “sanatorium type wards covered by medical insurance.” All facility services except the “sanatorium type wards covered by medical insurance” are covered by the long-term care insurance. The MHW (2000, p. 132) provides the following explanations for these facility services. The eligible users of the “welfare facilities for the elderly requiring care” are elderly people who are certified as requiring care because of the difficulties they face in living at home due to constant care needs. The eligible users of the “health service facilities for the elderly requiring care” are elderly people who are certified as requiring care, whose condition of illness is stable, and who do not require medical treatment through hospitalization but require rehabilitation and nursing care. The eligible users of the “sanatorium type medical care facilities for the elderly requiring care” are elderly patients who are certified as requiring care and who are under LTC with stable condition of illness but require constant medical management service because of the use of catheters, etc. The eligible users of the “sanatorium type wards covered by medical insurance” are patients of LTC with stable condition of illness who require highly intensive medical management service or active rehabilitation training. These are patients with specially designated illness who are aged under 40 or between 40 to 64.

²⁴ The eligible ownership types of “welfare facilities for the elderly requiring care” are local governments and social welfare corporations. These ownership types comprise nonprofit organizations. The local governmental service providers have to be appointed by the prefectural governors. The social welfare corporations have to be approved and appointed as service providers by the prefectural governors. (See the Long-term Care Insurance Law (Article 86) and Welfare Law for the Elderly (Article 15).) The eligible ownership types of “health service facilities for the elderly requiring care” are medical corporations, social welfare corporations, local governments, and people appointed by the MHLW. These ownership types comprise nonprofit providers. The service providers are required to seek the prefectural governors’ permission to supply their services. (See the Long-term Care Insurance Law (Article 94).) The eligible ownership types of medical services including the “sanatorium type medical care facilities for the elderly requiring care” and the “sanatorium type wards covered by medical insurance” comprise nonprofit

providers. Medical services in Japan are supplied mainly by medical corporations, doctors, and local governments. The nonprofit providers wanting to supply medical services have to seek the prefectural governors' permission to supply their services. (See the Medical Care Law (Article 7).) The nonprofit service providers that supply the "sanatorium type medical care facilities for the elderly requiring care" have to be additionally appointed by the prefectural governors to supply their services. (See the Long-term Care Insurance Law (Article 107).)

²⁵ Niki (2000, Part 1, Chapter 2) and the Institute for Health Economics and Policy (2003a, pp. 41-45) report that the providers of facility and/or medical services diversify into other types of LTC services.

²⁶ For example, in group homes operated by nonprofit providers that supply facility and/or medical services, some staff members assume the dual responsibility of workers for group homes and workers for facility and/or medical services.

Table 1 Definitions of group home data

Variables	Definitions
<u>Usability of facilities</u>	
Entrance has an even floor	Dummy variable, 1: entrance has an even floor, 0: other
Entrance has handrail	Dummy variable, 1: entrance has handrail, 0: other
Entrance has nonslip floor material	Dummy variable, 1: entrance has nonslip floor material, 0: other
Room has an even entrance	Dummy variable, 1: room has an even entrance, 0: other
Room has nonslip and feasible floor material	Dummy variable, 1: room has nonslip and feasible floor material, 0: other
Restroom with an even floor	Dummy variable, 1: restroom with an even floor, 0: other
Restroom with handrail	Dummy variable, 1: restroom with handrail, 0: other
Restroom with western-style toilet bowl	Dummy variable, 1: restroom with western-style toilet bowl, 0: other
Bathroom with an even entrance	Dummy variable, 1: bathroom with an even entrance, 0: other
Bathroom with nonslip floor material	Dummy variable, 1: bathroom with nonslip floor material, 0: other
Bathroom with handrail	Dummy variable, 1: bathroom with handrail, 0: other
Spacious bathroom	Dummy variable, 1: spacious bathroom, 0: other
Stairs with low slope	Dummy variable, 1: stairs with low slope, 0: other
Stairs with handrail	Dummy variable, 1: stairs with handrail, 0: other
Stairs with slip stopper	Dummy variable, 1: stairs with slip stopper, 0: other
User-friendly door (e.g., sliding door)	Dummy variable, 1: user-friendly door (e.g., sliding door), 0: other
<u>Location</u>	
Log of distance from the closest station (km)	Natural log of distance between the point nearest to the group home among the points appraised by the Ministry of Land, Infrastructure and Transport (MLIT) and the nearest station from that point
Log of the appraised value of land (yen)	Natural log of the appraised value of the point nearest to the group home among the points appraised by the MLIT
<u>Compliance with laws</u>	
Periodic medical examination of workers	Dummy variable, 1: implementing periodic medical examination of workers, 0: other
Examination of feces of food supply workers	Dummy variable, 1: implementing examination of feces of food supply workers, 0: other
Working environment measurement	Dummy variable, 1: implementing periodic tests of indoor air and water quality, 0: other
Periodic safety exercise	Dummy variable, 1: implementing periodic safety exercise, 0: other
Smoke-free policy	Dummy variable, 1: implementing smoke-free policy, 0: other

Table 2 Descriptive statistics of group home data

Variables	Mean	Std. Dev	Min	Max
<u>Usability of facilities</u>				
Entrance has an even floor	0.56	0.50	0	1
Entrance has handrail	0.72	0.45	0	1
Entrance has nonslip floor material	0.31	0.46	0	1
Room has an even entrance	0.83	0.37	0	1
Room has nonslip and feasible floor material	0.34	0.48	0	1
Restroom with an even floor	0.88	0.33	0	1
Restroom with handrail	0.93	0.26	0	1
Restroom with western-style toilet bowl	0.91	0.29	0	1
Bathroom with an even entrance	0.69	0.46	0	1
Bathroom with nonslip floor material	0.54	0.50	0	1
Bathroom with handrail	0.93	0.26	0	1
Spacious bathroom	0.47	0.50	0	1
Stairs with low slope	0.17	0.37	0	1
Stairs with handrail	0.74	0.44	0	1
Stairs with slip stopper	0.46	0.50	0	1
User-friendly door (e.g., sliding door)	0.68	0.47	0	1
<u>Location</u>				
Log of distance from the closest station (km)	0.35	0.96	-2.41	2.09
Log of the appraised value of land (yen)	11.80	0.62	10.41	13.23
<u>Compliance with laws</u>				
Periodic medical examination of workers	0.79	0.41	0	1
Examination of feces of food supply workers	0.34	0.48	0	1
Working environment measurement	0.24	0.43	0	1
Periodic safety exercise	0.59	0.49	0	1
Smoke-free policy	0.51	0.50	0	1
Number of group homes	108			

Note: The percentage of for-profit providers is 63.0%; social welfare corporations, 20.4%; medical corporations, 11.1%; and special nonprofit organizations, 5.6%.

Table 3 Definitions of user data

Variables	Definitions
Nonprofit	Dummy variable, 1: nonprofit provider, 0: for-profit provider
Levels of LTC need	Levels of LTC need at the time of survey (0 = requiring care level 1, 4 = requiring care level 5)
Levels of LTC need at onset	Levels of LTC need at the onset of group living (0 = requiring care level 1, 4 = requiring care level 5)
Change	Change in the levels of LTC need from the onset of group living until the survey period "Levels of LTC need" minus "levels of LTC need at onset" equals "change"
Capacity	Total capacity of the group home
Male	Dummy variable, 1: male, 0: female
User's age	User's age at the time of survey
Number of months since onset	Number of months that the user has lived in the group home
From the same prefecture	Dummy variable, 1: prior to group living, the user had been living in another municipality in the same prefecture where the group home is located, 0: other
From another prefecture	Dummy variable, 1: prior to group living, the user had been living in a prefecture different from where the group home is located, 0: other
Living alone	Dummy variable, 1: prior to group living, the user was living alone, 0: other
Welfare facilities for the elderly	Dummy variable, 1: prior to group living, the user was living in welfare facilities for the elderly requiring care, 0: other
Health service facilities for the elderly	Dummy variable, 1: prior to group living, the user was living in health service facilities for the elderly requiring care, 0: other
Hospital or clinic	Dummy variable, 1: prior to group living, the user was in a hospital or clinic, 0: other
Requiring care level 2	Dummy variable, 1: user requiring care level 2 at the onset of group living, 0: other
Requiring care level 3	Dummy variable, 1: user requiring care level 3 at the onset of group living, 0: other
Requiring care level 4	Dummy variable, 1: user requiring care level 4 at the onset of group living, 0: other
Requiring care level 5	Dummy variable, 1: user requiring care level 5 at the onset of group living, 0: other
Year of establishment	The year that the group home was established

Note: The reference groups of "From the same prefecture" and "From another prefecture" is "From the same municipality."

The reference groups of "Living alone," "Welfare facilities for the elderly," "Health service facilities for the elderly" and "Hospital or clinic" is "Living with the family."

With regard to the users who have lived in group homes since the years prior to the onset of the system of certification of care and support needs, it is contemplated that the respondents answer the oldest results of certification of care need and certification of support need for those users.

Table 4 Descriptive statistics of user data

Variables	Mean	Std. Dev	Min	Max
Nonprofit	0.39	0.49	0	1
Levels of LTC need	1.30	1.10	0	4
Levels of LTC need at onset	1.06	1.00	0	4
Change	0.24	0.81	-3	4
Capacity	17.42	7.05	5	27
Male	0.19	0.39	0	1
User's age	81.92	7.26	51	100
Number of months since onset	12.31	10.37	1	49
From the same prefecture	0.17	0.38	0	1
From another prefecture	0.06	0.23	0	1
Living alone	0.31	0.46	0	1
Welfare facilities for the elderly	0.05	0.22	0	1
Health service facilities for the elderly	0.12	0.33	0	1
Hospital or clinic	0.18	0.39	0	1
Requiring care level 2	0.36	0.48	0	1
Requiring care level 3	0.20	0.40	0	1
Requiring care level 4	0.07	0.26	0	1
Requiring care level 5	0.02	0.13	0	1
Year of establishment	2001.98	1.04	1997	2003
Number of users	896 (89)			

Note: The number in parentheses denotes the number of group homes.

The percentage of for-profit group homes is 59.6%; group homes operated by social welfare corporations, 23.6%; medical corporations, 10.1%; and specific non-profit organizations, 6.7%.

Table 5 Two-sample *t*-test based on group home data

Variables	Nonprofit						For-profit		Two-sample <i>t</i> -test		
	1		2		3		4		5 (1 and 4)	6 (2 and 4)	7 (3 and 4)
<u>Usability of facilities</u>											
Entrance has an even floor	0.63	(0.49)	0.30	(0.48)	0.73	(0.45)	0.51	(0.50)	+	-	+ **
Entrance has handrail	0.78	(0.42)	0.80	(0.42)	0.77	(0.43)	0.69	(0.47)	+	+	+
Entrance has nonslip floor material	0.28	(0.45)	0.20	(0.42)	0.30	(0.47)	0.32	(0.47)	-	-	-
Room has an even entrance	0.85	(0.36)	0.80	(0.42)	0.87	(0.35)	0.82	(0.38)	+	-	+
Room has nonslip and feasible floor material	0.25	(0.44)	0.20	(0.42)	0.27	(0.45)	0.40	(0.49)	- *	-	-
Restroom with an even floor	0.90	(0.30)	0.80	(0.42)	0.93	(0.25)	0.87	(0.34)	+	-	+
Restroom with handrail	0.95	(0.22)	1.00	(0.00)	0.93	(0.25)	0.91	(0.29)	+	+ *** a	+
Restroom with western-style toilet bowl	0.93	(0.27)	1.00	(0.00)	0.90	(0.31)	0.90	(0.31)	+	+ *** a	+
Bathroom with an even entrance	0.68	(0.47)	0.50	(0.53)	0.73	(0.45)	0.71	(0.46)	- a	- *	+
Bathroom with nonslip floor material	0.50	(0.51)	0.50	(0.53)	0.50	(0.51)	0.56	(0.50)	-	-	-
Bathroom with handrail	0.98	(0.16)	1.00	(0.00)	0.97	(0.18)	0.90	(0.31)	+ ** a	+ *** a	+ * a
Spacious bathroom	0.53	(0.51)	0.40	(0.52)	0.57	(0.50)	0.44	(0.50)	+	-	+
Stairs with low slope	0.23	(0.42)	0.30	(0.48)	0.20	(0.41)	0.13	(0.34)	+	+ *	+
Stairs with handrail	0.75	(0.44)	0.80	(0.42)	0.73	(0.45)	0.74	(0.44)	+	+	-
Stairs with slip stopper	0.48	(0.51)	0.60	(0.52)	0.43	(0.50)	0.46	(0.50)	+	+	-
User-friendly door (e.g., sliding door)	0.70	(0.46)	0.70	(0.48)	0.70	(0.47)	0.66	(0.48)	+	+	+
<u>Location</u>											
Log of distance from the closest station (km)	0.37	(0.87)	-0.04	(0.86)	0.51	(0.84)	0.34	(1.01)	+	-	+
Log of the appraised value of land (yen)	11.89	(0.69)	12.27	(0.55)	11.76	(0.70)	11.74	(0.57)	+	+ ***	+
<u>Compliance with laws</u>											
Periodic medical examination of workers	0.98	(0.16)	1.00	(0.00)	0.97	(0.18)	0.68	(0.47)	+ *** a	+ *** a	+ *** a
Examination of feces of food supply workers	0.48	(0.51)	0.60	(0.52)	0.43	(0.50)	0.26	(0.44)	+ **	+ **	+ *
Working environment measurement	0.30	(0.46)	0.30	(0.48)	0.30	(0.47)	0.21	(0.41)	+	+	+
Periodic safety exercise	0.73	(0.45)	0.60	(0.52)	0.77	(0.43)	0.51	(0.50)	+ **	+	+ ***
Smoke-free policy	0.48	(0.51)	0.50	(0.53)	0.47	(0.51)	0.53	(0.50)	-	-	-
Number of group homes	40		10		30		68				

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.

This table shows the mean and standard deviation of measures based on group home data. The numbers in parentheses denote the standard deviations.

The providers of group homes in column 2 supply neither facility services nor medical services.

The providers of group homes in column 3 supply facility and/or medical services.

In cases without "a," we assume that the variance of nonprofit group homes is equal to that of for-profit ones.

In cases with "a," we assume that the variance of nonprofit group homes is not equal to that of for-profit ones.

Table 6 Comparison of user data between nonprofit and for-profit providers

Variables	OLS		Ordered probit model		Treatment effect model		
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Marginal effect
<u>Dependent variable: Change</u>							
Nonprofit	0.04	0.68	0.06	0.68	-1.04	-3.64	***
Capacity	0.01	1.25	0.01	1.46	0.00	1.08	
Male	0.01	0.12	0.01	0.12	0.01	0.10	
User's age	0.00	1.24	0.01	1.27	0.01	1.49	
Number of months since onset	0.02	7.19	***	0.03	7.82	***	0.04
From the same prefecture	0.17	2.34	**	0.22	2.18	**	0.18
From another prefecture	-0.03	-0.47		-0.01	-0.05		-0.01
Constant	-0.55	-1.76	*		-0.34	-1.06	
<u>Dependent variable: Nonprofit</u>							
Living alone					0.03	0.25	0.01
Welfare facilities for the elderly					0.29	1.34	0.11
Health service facilities for the elderly					0.39	2.70	***
Hospital or clinic					-0.13	-1.00	-0.05
Requiring care level 2					0.07	0.67	0.03
Requiring care level 3					0.12	0.96	0.05
Requiring care level 4					0.34	1.95	*
Requiring care level 5					0.73	2.18	**
Year of establishment					-0.36	-8.11	***
Constant					719.31	8.11	***
λ					0.67	3.91	***
Log likelihood			-881.65		-555.91	a	
R ²	0.10						
Pseudo R ²			0.04		0.07	a	
Number of users	896 (89)		896 (89)		896 (89)		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Heteroskedasticity-consistent t-values (White, 1980) are reported in the OLS.
The numbers in parentheses denote the number of group homes.
"a" implies the value of probit estimation in the treatment effect model.

Table 7 Comparison of user data between nonprofit providers without facility and medical services and for-profit providers

Variables	OLS		Ordered probit model		Treatment effect model		
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Marginal effect
<u>Dependent variable: Change</u>							
Nonprofit	0.30	2.47 **	0.42	3.01 ***	-0.78	-2.43 **	
Capacity	0.00	0.97	0.01	1.05	0.00	0.81	
Male	-0.01	-0.13	-0.02	-0.15	-0.02	-0.23	
User's age	0.00	0.51	0.00	0.57	0.00	0.80	
Number of months since onset	0.02	5.12 ***	0.03	5.60 ***	0.03	7.37 ***	
From the same prefecture	0.07	0.83	0.06	0.53	0.08	1.06	
From another prefecture	-0.12	-1.43	-0.15	-0.74	-0.12	-0.93	
Constant	-0.30	-0.86			-0.34	-1.02	
<u>Dependent variable: Nonprofit</u>							
Living alone					-0.12	-0.70	-0.02
Welfare facilities for the elderly					0.19	0.49	0.04
Health service facilities for the elderly					0.30	1.39	0.07
Hospital or clinic					-0.06	-0.31	-0.01
Requiring care level 2					0.12	0.75	0.02
Requiring care level 3					-0.13	-0.63	-0.02
Requiring care level 4					0.52	2.04 **	0.12
Requiring care level 5					1.15	2.77 ***	0.36
Year of establishment					-0.56	-7.66 ***	-0.10
Constant					1115.34	7.65 ***	
λ					0.62	3.56 ***	
Log likelihood			-589.16		-220.36	a	
R ²	0.12						
Pseudo R ²			0.05		0.15	a	
Number of users	636 (63)		636 (63)		636 (63)		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.
Heteroskedasticity-consistent t-values (White, 1980) are reported in the OLS.
The numbers in parentheses denote the number of group homes.
"a" implies the value of probit estimation in the treatment effect model.

Table 8 Comparison of user data between nonprofit with facility and/or medical services and for-profit providers

Variables	OLS		Ordered probit model		Treatment effect model		
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Marginal effect
<u>Dependent variable: Change</u>							
Nonprofit	-0.06	-0.99	-0.10	-1.07	-1.08	-3.38	***
Capacity	-0.00	-0.17	0.00	0.03	-0.00	-0.27	
Male	-0.04	-0.56	-0.06	-0.52	-0.03	-0.51	
User's age	0.00	0.02	0.00	0.07	0.00	0.25	
Number of months since onset	0.02	6.45	***	0.03	7.14	***	0.03
From the same prefecture	0.17	2.26	**	0.23	2.11	**	0.18
From another prefecture	0.03	0.44		0.08	0.44		0.05
Constant	-0.07	-0.24			0.09	0.28	
<u>Dependent variable: Nonprofit</u>							
Living alone					0.08	0.71	0.03
Welfare facilities for the elderly					0.39	1.74	*
Health service facilities for the elderly					0.42	2.74	***
Hospital or clinic					-0.14	-0.97	
Requiring care level 2					0.04	0.34	
Requiring care level 3					0.17	1.27	
Requiring care level 4					0.26	1.35	
Requiring care level 5					0.46	1.17	
Year of establishment					-0.29	-6.23	***
Constant					589.32	6.22	***
λ					0.62	3.27	***
Log likelihood			-746.50		-478.76	a	
R ²	0.09						
Pseudo R ²			0.04		0.06	a	
Number of users	806 (79)		806 (79)		806 (79)		

Note: *** = significant at 1%, ** = significant at 5%, * = significant at 10%.

Heteroskedasticity-consistent t-values (White, 1980) are reported in the OLS.

The numbers in parentheses denote the number of group homes.

"a" implies the value of probit estimation in the treatment effect model.