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# DO NON-PROFIT OPERATORS PROVIDE HIGHER QUALITY OF CARE? EVIDENCE FROM MICRO-LEVEL DATA FOR JAPAN'S LONG-TERM CARE INDUSTRY*

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## *Abstract*

Along with the introduction of the long-term care insurance scheme, the Japanese government in 2000 for the first time allowed for-profit operators to compete head-on with non-profit operators in the provision of at-home care services. This study examines quality differentials between the non-profit and the for-profit sector in Japan's elderly care industry, concentrating on home helpers and staff nurses. Taking advantage of a unique and rich micro-level survey, the study finds that although non-profit operators provide higher quality of care, as measured by simple averages of workers' characteristics, the advantage of non-profits disappears once their higher wage is corrected for. This finding confirms that the seemingly higher quality of care provided by non-profit operators is due to the non-profit wage premium, resulting from their preferential status which provides non-distributional constraints and favorable tax treatment.

*Key Words:* long-term care, nursing homes, non-profit wage premium, quality of care, treatment effect approach
*JEL Classification Code:* I11

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# I. *Introduction*

In 2000, the Japanese government embarked on an ambitious program to reform the country's health care system and introduced a long-term care insurance scheme. Along with this reform, the market for the provision of at-home care for the elderly was deregulated. Until 2000, at-home care for the elderly was provided under the state welfare program, with those qualifying being assigned to a non-profit provider by local government officials. Care services by for-profit providers were not reimbursed by the government, so that only the wealthy were able to afford them, and the market was correspondingly small (Shimizutani and Noguchi, 2004; Mitchell et al., 2006). Following the reform, however, patients are now allowed to choose freely between non-profit and for-profit providers; services are subject to a 10% copayment of the cost, with the remainder covered by the long-term care health insurance, no matter what type of provider users choose. Thus, for the first time, for-profit providers are able to compete directly with non-profit providers in the home-help market.

The government based its policy reforms on the expectation that the entry of for-profits would contribute toward making the market more competitive. With service contents heavily regulated and prices stipulated by the government, competition between providers necessarily concentrates on quality. Despite the great social, economic, and political importance of Japan's health care sector, to date surprisingly little research has been carried out on these reforms and their effects. In particular, little is known about quality differentials between non-profit and for-profit providers in this newly liberalized market.

Unfortunately, researchers have not reached a consensus on how to measure the quality of care. However, it is generally accepted that the quality of long-term care is closely related to the quality of workers. The long-term care industry is very labor intensive in that labor inputs account for a large share, and capital inputs for a small share, of the factors of production. Thus, because of the difficulties involved in measuring the quality of output, we instead focus on labor input characteristics as proxies for the quality of care provided in different types of institutions. Proxies used in this study include workers' age structure in an institution, the ratio of regular workers, workers' skills (professional training inside or outside the facility), and the stability of the supply of services (measured by job stability and the demand for workers in a facility). The study utilizes a large and unique employer-employee matched micro-level database to analyze sectoral quality differentials among home helpers and staff nurses, the two occupational groups accounting for the largest portion - about 40% - of all employees in our dataset.

Our findings show that although non-profit operators provide higher quality of care, as measured by simple averages of workers' characteristics, the advantage of non-profits disappears once their higher wage is corrected for. This finding confirms that the seemingly higher quality of care provided by non-profit providers results from the wage premiums that non-profit providers can pay their workers due to advantages arising from their non-profit status.

The remainder of the paper is organized as follows. The next section briefly reviews the theoretical literature and previous research on quality differentials. Section 3 provides an outline of Japan's long-term care insurance program. Section 4 then describes the data used for our empirical analysis, while Section 5 presents the empirical results. The last section

concludes.

## II. *Previous Research*

The type of question we are trying to address in this study is one that is very new in the case of Japan. Because service contents and prices in Japan's long-term care industry are heavily regulated, providers must by default compete on quality. Yet, there are few other industries in Japan where non-profit and for-profit operators compete. One of the studies that try to examine quality differentials between the two types of providers therefore is as our own (Noguchi and Shimizutani, 2005b), which approaches the question from a different angle. In contrast with the situation in Japan, there is a large body of literature on quality differentials between the non-profit and for-profit sector in the United States. One of the first to provide a theoretical explanation of the quality differentials observed between the two sectors was Hansmann (1980), who argued that the non-distributional constraints, i.e. the fact that non-profit operators are prohibited from distributing net earnings, lead non-profit providers to try to distinguish themselves through quality of service and refrain from opportunistic behavior. Opportunistic behavior, which may potentially arise in the for-profit sector, is possible because of information asymmetries between providers and consumers, preventing the latter from being able to observe the quality of service.

Another explanation of quality differentials is that the different types of providers behave differently. While managers of non-profits may derive greater utility from improving the quality of services as well as increasing profits, managers of for-profits are assumed to maximize profits only. Newhouse (1970) argues that managers in the not-for-profit sector have fewer incentives to lower the quality of services provided since their performance is judged by quality or since they desire to show professional excellence or technical virtuosity by stressing quality.

Many researchers have assessed quantitatively quality differentials between the two sectors. However, it seems fair to say that the empirical findings of studies for the U.S. are inconclusive. While several find better quality of services in the non-profit sector (Weisbrod (1988), Ullmann and Holtmann (1985), Cohen and Spector (1996), Holtmann and Idson (1993) and Gertler (1989)), Gertler (1992) arrives at the opposite result. The overall inconclusiveness of these studies can be partly attributed to the lack of consensus on which variable is an appropriate proxy to measure quality. Some researchers use information disclosure to family, use of sedatives, happiness of family members (Weisbrod (1988)), while others use staff intensity (Cohen and Spector (1996)) or workers' experience (Holtmann and Idson (1993)).

Despite the academic and practical importance of this issue, little research on quality differentials in Japan is available. The only related study is Shimizutani and Suzuki (2002), which find that in the Japanese at-home care industry the quality of service provided by for-profits is not worse than that provided by non-profits. Their analysis is based on a comparison of the total scores of indicators assigned to detailed characteristics of each facility and its employees. Another study is Noguchi and Shimizutani (2005b), in which we use household-level data to examine consumers' choice of providers and find that provider choice is not biased toward non-profits as assumed by Hansmann.

The present study aims to examine the quality differentials between non-profit and for-profit operators in the Japanese long-term cave market. Although there are no variables that allow us to measure the quality of services directly, it is widely accepted that in labor intensive sectors such as the long-term care industry, workers' characteristics are closely related to their quality. In this study we therefore measure the quality of care by using the length of employees' experience, status, and qualifications, as well as job stability as proxies.

## III. *The Japanese Long-term Care Industry*

Japan's market for elderly care underwent fundamental change following the introduction of the public long-term care insurance program in 2000 (see Shimizutani and Noguchi, 2004; Mitchell et al. 2006). Before 2000, only lower-income households were eligible for elderly care services provided by local governments as part of the social welfare scheme. While the financial burden on users of such publicly provided services was negligible, households were not able to choose between providers or service contents and had to accept whatever the government determined. Private long-term care (LTC) providers were allowed to offer their services, but because users had to pay out of their own pockets, this was an option only for the wealthy and the market for privately provided care services was correspondingly small.

However, given the rapid aging of the Japanese population, the government introduced a new public insurance scheme pursuing the following four objectives (Ministry of Health, Labour and Welfare, 2002). First, the approach seeks to mitigate the burden of home care for the elderly traditionally borne by women. Second, the new system aims to make more transparent the relationship between benefits received and premiums paid. Third, by integrating what had been a vertically-divided system of health, medical, and welfare services, the new program was designed to provide a means by which customers would receive comprehensive services from a variety of institutions of their choice. Fourth, by separating long-term care from health insurance coverage, the new insurance program seeks to reduce the number of cases of "social hospitalization" where elderly patients are hospitalized simply because of a lack of viable alternatives, which pushes up medical costs (Mitchell et al., 2006).

Under the new insurance program, once certified by the local government to be eligible for long-term care, all insured persons are entitled to use care services. The new scheme thus considerably widens the range and number of care receivers and explicitly intends to provide both in-home services (at-home care) as well as services at facilities (institutional care).[1] The insured are free to use elderly care from any provider, subject to a 10% copayment of officially

[1] At-home care services include (1) home-visit/day services (home-visit long-term care, home-visit bathing, home-visit rehabilitation, day rehabilitation (day care), home-visit nursing care, day service, welfare devices leasing); (2) short-stay service/short-stay care; (3) in-home medical care management counselling; (4) care services for the elderly with dementia; (5) care services provided in for-profit private homes for the elderly; (6) allowances for the purchase of welfare devices; and (7) allowances for home renovation (handrails, removal of level differences, etc.). Institutional care is provided in three types of nursing homes: (1) long-term care welfare facilities for the elderly (special nursing homes for the elderly); (2) long-term care health facilities for the elderly; and (3) long-term care medical facilities for the elderly. The last type also includes sanatorium-type wards as well as wards for elderly patients with dementia, and hospitals with enhanced long-term care service provision. Medical care *per se* is not included in the LTC program but instead is offered under the national healthcare system (Mitchell et al., 2006).

fixed prices specific to each type of care service.[2]

Turning to financing, the Japanese public LTC system is a pay-as-you-go program. Half of the costs of this scheme are financed by the long-term care insurance contributions from the insured (aged 40 and over) and the remaining half is financed by general tax revenues. At the same time, in order to meet rapidly increasing care needs, entry regulations were changed to create a more market-oriented system of provision. That is, to stimulate the supply of elderly care services, for-profits were allowed to enter the at-home care market, though this is not the case for the institutional care market. Under the public elderly-care program, care providers are not able to set their prices freely since uniform nationwide rates are stipulated for all covered LTC services; in addition, services are standardized. Thus, the policy aims to introduce not price but quality competition in the market for at-home care (Shimizutani and Noguchi, 2004; Mitchell et al., 2006).

## IV. *Data*

The empirical analysis of this study is based on the "Statistical Survey on Nursing Home Employees" (Jigyosho Ni Okeru Kaigo Rodo Jittai Chosa) conducted by the Care Worker Support Center Foundation (Kaigo Rodo Antei Center) in November 2000. The establishments in the sample are randomly chosen from all areas of Japan. The dataset provides information on various characteristics of both workers and facilities. The notable merit of this survey is that it collects information on wages and other characteristics from all employees in each establishment.[3] It contains observations on a total of 39,261 employees with various qualifications, out of which we extract observations on employees with qualifications as a home-helper or staff nurse, for a total of 6,075 home-helpers (24.3% of the total) and 3,686 staff nurses (14.8%) of the total. In the dataset, nursing care providers are divided into seven categories: for-profit providers, and six types of not-for-profit providers, i.e., social welfare corporations, medical corporations, authorized non-profit organizations (NPOs), Co-ops, agricultural cooperatives, and other charitable corporations. Our observations are distributed as follows: of the 1,959 observations in the proprietary sector, 1,633 are home helpers, while 326 are staff nurses; of the 7,802 observations in the non-profit sector, 4,442 are home helpers, while 3,360 are staff nurses.

Table 1 presents summary statistics of the characteristics of both types of employees and facilities. The mean daily wage is approximately one percentage point higher in non-profit than in proprietary facilities, though the difference is not statistically significant. Non-profits seem to prefer workers aged between 40 and 49, while at for-profits, those aged 50 to 59 make up the largest group among home helpers and those aged 30 to 39 the largest group among staff nurses. Non-profit facilities prefer home helpers and staff nurses on a regular basis and are more likely to provide professional training. Most of the facilities respond that they are currently hiring home helpers and staff nurses.

[2] There is a limit to the amount of care that is covered by the insurance scheme. Any care services beyond that limit, which depends on the care category to which a user is assigned by the government, must be paid for by the user at full cost up to a "stop-loss" threshold called the "high-cost long-term care service limit."

[3] However, if the number of employee was greater than 50, then the manager of the establishment randomly selected 50 employees for the survey.

## TABLE 1. DEFINITION AND SUMMARY STATISTICS OF KEY VARIABLES

| Definition | Home Helpers | | | | | Staff Nurses | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | For-profit (n=1,633) | | Non-profit (n=4,442) | | | For-profit (n=326) | | Non-profit (n=3,360) | | |
| | Mean | Standard deviation | Mean | Standard deviation | | Mean | Standard deviation | Mean | Standard deviation | |
| I. Dependent variables | | | | | | | | | | |
| natural log of daily wage | 9.020 | (0.305) | 9.031 | (0.269) | | 9.262 | (0.311) | 9.271 | (0.285) | |
| =1 if extra pay other than basic salary | 0.653 | (0.476) | 0.766 | (0.424) | a | 0.653 | (0.477) | 0.810 | (0.393) | a |
| =1 if male | 0.108 | (0.310) | 0.081 | (0.273) | a | 0.025 | (0.155) | 0.046 | (0.209) | b |
| Age structure | | | | | | | | | | |
| =1 if 20<=age<30 | 0.157 | (0.364) | 0.189 | (0.391) | a | 0.181 | (0.386) | 0.153 | (0.360) | |
| =1 if 30<=age<40 | 0.158 | (0.365) | 0.165 | (0.372) | | 0.294 | (0.457) | 0.290 | (0.454) | |
| =1 if 40<=age<50 | 0.236 | (0.425) | 0.336 | (0.472) | a | 0.221 | (0.415) | 0.340 | (0.474) | a |
| =1 if 50<=age<60 | 0.256 | (0.437) | 0.244 | (0.430) | | 0.166 | (0.372) | 0.154 | (0.361) | |
| =1 if 60<=age<70 | 0.116 | (0.321) | 0.025 | (0.157) | a | 0.058 | (0.235) | 0.033 | (0.179) | a |
| Workers' status | | | | | | | | | | |
| =1 if regular worker | 0.617 | (0.431) | 0.839 | (0.440) | a | 0.733 | (0.429) | 0.923 | (0.328) | a |
| Workers' skills | | | | | | | | | | |
| =1 if professional training inside/outside the organization | 0.716 | (0.451) | 0.825 | (0.380) | a | 0.727 | (0.446) | 0.868 | (0.338) | a |
| Stable supply of services | | | | | | | | | | |
| =1 if no plan to hire regular workers | 0.055 | (0.227) | 0.099 | (0.299) | a | 0.031 | (0.173) | 0.035 | (0.185) | |
| =1 if no plan to hire non-regular workers | 0.026 | (0.158) | 0.042 | (0.200) | a | 0.012 | (0.110) | 0.021 | (0.143) | |
| II. Independent variables | | | | | | | | | | |
| =1 if total number of employees: <29 | 0.178 | (0.383) | 0.070 | (0.254) | a | 0.187 | (0.391) | 0.036 | (0.186) | a |
| =1 if total number of employees: 30-100 | 0.305 | (0.461) | 0.373 | (0.484) | a | 0.331 | (0.471) | 0.376 | (0.485) | c |
| =1 if total number of employees: 100-299 | 0.127 | (0.333) | 0.193 | (0.395) | a | 0.117 | (0.321) | 0.232 | (0.422) | a |
| =1 if total number of employees: 300-499 | 0.039 | (0.194) | 0.036 | (0.185) | | 0.046 | (0.210) | 0.038 | (0.191) | |
| =1 if total number of employees: >=500 | 0.061 | (0.240) | 0.040 | (0.195) | a | 0.193 | (0.395) | 0.051 | (0.219) | a |
| =1 if provision of care planning | 0.745 | (0.436) | 0.874 | (0.331) | a | 0.859 | (0.349) | 0.864 | (0.343) | |
| =1 if provision of home-visit care | 0.931 | (0.253) | 0.762 | (0.426) | a | 0.819 | (0.386) | 0.521 | (0.500) | a |
| =1 if provision of home-visit bathing | 0.192 | (0.394) | 0.241 | (0.428) | a | 0.423 | (0.495) | 0.144 | (0.351) | a |
| =1 if provision of home-visit nursing | 0.110 | (0.313) | 0.135 | (0.342) | a | 0.236 | (0.425) | 0.295 | (0.456) | a |
| =1 if provision of day care | 0.118 | (0.323) | 0.642 | (0.480) | a | 0.230 | (0.422) | 0.592 | (0.491) | a |
| =1 if provision of day care rehabilitation | 0.000 | (0.000) | 0.122 | (0.328) | a | 0.009 | (0.096) | 0.377 | (0.485) | a |
| =1 if provision of short-term stay | 0.026 | (0.158) | 0.463 | (0.499) | a | 0.080 | (0.271) | 0.495 | (0.500) | a |
| =1 if provision of guidance in care management at home | 0.007 | (0.082) | 0.060 | (0.237) | a | 0.000 | (0.000) | 0.156 | (0.363) | a |
| =1 if provision of rental care equipment | 0.233 | (0.423) | 0.094 | (0.292) | a | 0.344 | (0.476) | 0.053 | (0.223) | a |
| =1 if work-related accident compensation insurance for regular workers | 0.814 | (0.389) | 0.637 | (0.481) | a | 0.733 | (0.443) | 0.498 | (0.500) | a |
| =1 if work-related accident compensation insurance for non-regular workers | 0.449 | (0.498) | 0.364 | (0.481) | a | 0.417 | (0.494) | 0.240 | (0.427) | a |
| =1 if health insurance for regular workers | 0.734 | (0.442) | 0.626 | (0.484) | a | 0.730 | (0.445) | 0.497 | (0.500) | a |
| =1 if health insurance for non-regular workers | 0.051 | (0.221) | 0.070 | (0.256) | a | 0.077 | (0.267) | 0.055 | (0.228) | c |
| =1 if health examination | 0.539 | (0.499) | 0.564 | (0.496) | b | 0.537 | (0.499) | 0.549 | (0.498) | |
| =1 if subsidy for uniform or care equipment | 0.765 | (0.424) | 0.873 | (0.333) | a | 0.859 | (0.349) | 0.887 | (0.317) | c |
| =1 if policy for preventing work-related back pain | 0.254 | (0.435) | 0.439 | (0.496) | a | 0.316 | (0.466) | 0.401 | (0.490) | a |
| =1 if policy for preventing work-related accidents | 0.214 | (0.410) | 0.246 | (0.431) | a | 0.230 | (0.422) | 0.233 | (0.423) | |
| =1 if professional training for managers in human resource division | 0.242 | (0.428) | 0.303 | (0.460) | a | 0.175 | (0.380) | 0.309 | (0.462) | a |
| =1 if support for stress at work | 0.421 | (0.494) | 0.239 | (0.427) | a | 0.359 | (0.480) | 0.208 | (0.406) | a |

*Note:* a-c indicate statistically significant differences between the for-profit and non-profit sector means at the 5%, 10%, and 15% levels, respectively, based on F-statistics of ANOVA.

We also examine various facility characteristics. We do not observe any notable difference between the for-profit and the not-for-profit sector in terms of the number of employees. We have several variables measuring the non-wage benefits provided by different types of facilities. For-profit providers more frequently offer work-related accident compensation insurance and health insurance than non-profit facilities. If we compare the benefits regular and non-regular employees receive, regular employees are more likely to be offered work-related accident compensation and health insurance by both types of providers. Finally, non-profit providers offer benefits including professional training inside and outside the facility, additional pay on top of the basic salary, health examinations, subsidies for uniforms and equipment, and preventive care for work-related back pain and accidents.

## V. *Quality Differentials between For-profit and Non-profit Providers*

This section examines the quality differentials between non-profit and for-profit providers. Our data set provides us with four measures of the quality of care provided by nursing homes: (1) workers' age; (2) whether workers receive professional training (either inside or outside the facility); (3) the ratio of regular workers; and (4) job stability and the demand for workers in each facility. Among these measures, (1) and (2) can be justified by human capital theory which tells us that experienced, better qualified workers are more productive. Since data on experience is not available, we use workers' age as a proxy. (3) and (4) try to measure both experience and the relationship between caregivers and care receivers. Regular workers with a longer length of service at the same provider are better motivated and are likely to have greater on-the-job experience than workers who frequently change jobs. Also, frequent changes of care workers are likely to make patients anxious and therefore less satisfied with the service provided.

As already mentioned, 40 to 49-year-olds make up the largest age group among workers at non-profit providers, while at for-profit providers, 50 to 59-year-olds make up the largest share among home helpers and 30 to 39-year-olds the largest share among staff nurses. We also find that the share of regular workers is larger at non-profit than at for-profit facilities. Non-profit providers are also more likely to provide professional training, both inside and outside the facility and, generally speaking, are not planning to hire additional home helpers or staff nurses. Thus, the overall pattern that emerges is that, compared to for-profit facilities, non-profits tend to hire older workers and also tend to provide greater opportunities for workers to upgrade their skills. Further, non-profit facilities offer greater job security than for-profit facilities. In sum, the basic statistics suggest that non-profit facilities may provide better quality of care than for-profit facilities.

However, we should keep in mind that quality differences measured by simple averages cannot fully be explained simply by whether a provider is for-profit or non-profit. Put differently, the fact that non-profits provide better services than for-profits does not prove that non-profits are innately superior to for-profits. Rather, it is possible that the higher quality of care provided by non-profits is the result of the higher wages they pay based on their nondistributional constraints. If for-profits were subject to the same nondistributional constraints, the quality of care might be the same for both types of providers. Below, we will examine this possibility.

In this section, we assess sectoral differences in the quality of service using the treatment effect approach (Barnow et al. (1980)). This approach adjusts a nonrandom allocation of workers with respect to specific treatments. We use two key variables as facility-based treatment indicators: whether or not a facility offers above-average wages, and whether or not a facility offers additional pay to workers' basic salary. Noguchi and Shimizutani (2006) provide evidence for the existence of a non-profit wage premium in Japan's long-term care market. When comparing quality differentials between non-profits and for-profits, we should examine the possibility that wage differentials between the two types of providers affect the allocation of workers, which would then bring about the different patterns of simple averages described above. In other words, it is possible that wage differentials rather than the innate characteristics of the different types of providers are responsible for the differences in quality. The treatment effect approach enables us to examine quality differentials between non-profits and for-profits after controlling for the selection bias caused by wage differentials. Concretely, we estimate the following two-stage model, where in the first stage we use a probit estimation and in the second a full maximum likelihood estimation.

(1) First stage regression

$$Z_i^{l^*} = X_i a_1 + D_i a_2 + \mu_i \quad l = 1, 2$$

$$Z_i^l = 1 \quad \text{if} \quad Z_i^{l^*} \geq 0 \quad \text{or} \quad -\mu_i \leq X_i a_1 + D_i a_2$$

$$Z_i^l = 0 \quad \text{if} \quad Z_i^{l^*} < 0 \quad \text{or} \quad -\mu_i > X_i a_1 + D_i a_2$$

where $Z_i^{l^*}$ refers to worker $i$'s unobserved propensity to choose treatment $l$. There are two treatments in this study. The first is the wage rate ($l=1$) and the second is additional pay on top of the basic salary ($l=2$). $Z_i^l$ is a dichotomous variable and takes 1 if a worker actually chooses the treatment. $X_i$ refers to characteristics of both employees and employers that might affect sector allocation. $D_i$ is a dummy variable for the proprietary status of the facility. $a_1$ and $a_2$ are coefficients. $\mu_i$ is the error term and assumed to follow $N(0, \sigma_\mu^2)$.

(2) Second stage regression

$$Y_i = X_i b_1 + Z_i^l b_2 + D_i b_3 + \varepsilon_i$$

where $Y_i$ is a measure of the quality of care. $b_1$, $b_2$ and $b_3$ are coefficients and $\varepsilon_i$ is the error term, which is assumed to follow $N(0, \sigma_\varepsilon^2)$ and have $cov(\mu_i, \varepsilon_i) = \rho$.

The total effect of for-profit providers on the quality of workers is calculated as the sum of $b_3$ and the product of $b_2$ and $a_2$. Table 2 reports the treatment effects of the wage rate and additional pay on various measures of workers' quality. After controlling for treatment effects, most of the estimated coefficients on the for-profit provider dummies are negative for age, the share of regular workers, the provision of training, and the demand for new workers. These results imply that for-profit providers have younger workers, a greater proportion of non-regular workers, are less likely to provide training, and have a greater demand for new workers. These results suggest that the quality of service provided by for-profits is inferior to that provided by non-profits. However, none of the coefficients are statistically significant. Thus, we cannot confirm that the quality of care provided by non-profits is higher than that provided by for-profits. These results suggest that the seemingly higher quality observed in the comparison of simple averages is brought about by the non-profit sector wage premium and not by any innate characteristics of non-profits.

TABLE 2. THE EFFECTS OF FOR-PROFIT STATUS ON QUALITY OF WORKERS

| | Age structure | | | Workers' status | Workers' skills | Stable supply of services | |
|---|---|---|---|---|---|---|---|
| | Share of workers in their 20s | Share of workers in their 30s | Share of workers older than 40 | Share of regular workers | Professional training (inside or outside) | Job security for regular workers (no plan to hire additional workers) | Job security for non-regular workers (no plan to hire additional workers) |
| I. Home helpers | | | | | | | |
| Panel (1): Treatment (Daily wage > average) | | | | Estimated a2 = −0.037(0.050) | | | |
| For-profit dummy | −0.002 | −0.104 a | −0.029 a | −0.076 a | −0.116 a | −0.074 a | −0.062 a |
| (b3) | (−0.52) | (−21.12) | (−5.69) | (−10.48) | (−8.48) | (−9.33) | (−10.44) |
| Treatment | −0.104 a | 0.226 a | 0.226 a | 0.270 a | 0.369 a | −0.087 a | 0.183 a |
| (b2) | (−20.24) | (61.97) | (49.31) | (38.70) | (10.34) | (−4.040) | (19.470) |
| Total effect | 0.002 | −0.112 | −0.038 | −0.086 | −0.130 | −0.071 | −0.069 |
| (b3 + b2*a2) | (0.01) | (−0.31) | (−0.10) | (−0.23) | (−0.34) | (−0.19) | (−0.19) |
| Log likelihood | 4760.459 | 3115.569 | 2461.131 | −1303.834 | −8717.089 | −4012.635 | −715.351 |
| Panel (2): Treatment (Additional pay to basic salary) | | | | Estimated a2 = −0.109(0.049) | | | |
| For-profit dummy | −0.001 | −0.082 a | −0.002 | −0.056 a | −0.121 a | −0.092 a | −0.070 a |
| (b3) | (−0.36) | (−18.39) | (−0.42) | (−7.94) | (−9.39) | (−11.00) | (−11.81) |
| Treatment | 0.106 a | 0.171 a | 0.152 a | 0.300 a | 0.084 a | −0.307 a | −0.204 a |
| (b2) | (20.33) | (30.28) | (23.84) | (41.17) | (2.46) | (−21.21) | (−26.35) |
| Total effect | −0.013 | −0.091 | −0.010 | −0.072 | −0.126 | −0.076 | −0.059 |
| (b3 + b2*a2) | (−0.05) | (−0.39) | (−0.04) | (−0.29) | (−0.53) | (−0.31) | (−0.24) |
| Log likelihood | 4,927.55 | 2,902.39 | 2,247.76 | −1,387.07 | −8,937.99 | −4,032.97 | −660.23 |
| II. Staff nurses | | | | | | | |
| Panel (1): Treatment (Daily wage > average) | | | | Estimated a2 = −0.289(0.109) | | | |
| For-profit dummy | 0.012 | −0.019 a | 0.012 | 0.039 a | −0.141 a | −0.049 a | −0.015 |
| (b3) | (1.34) | (−2.17) | (−1.48) | (2.94) | (−5.69) | (−3.49) | (−1.45) |
| Treatment | 0.162 a | 0.179 a | 0.125 a | 0.228 a | −0.013 | 0.088 a | 0.068 a |
| (b2) | (26.53) | (−27.92) | (16.81) | (18.59) | (−1.04) | (2.89) | (5.08) |
| Total effect | −0.035 | −0.088 | −0.035 | −0.067 | −0.135 | −0.089 | −0.046 |
| (b3 + b2*a2) | (−0.21) | (−0.52) | (−0.21) | (−0.39) | (−0.77) | (−0.51) | (−0.26) |
| Log likelihood | 2169.915 | 1965.094 | 2182.790 | 126.006 | −3038.086 | −403.753 | 877.138 |
| Panel (2): Treatment (Additional pay to basic salary) | | | | Estimated a2 = 0.073(0.112) | | | |
| For-profit dummy | −0.013 b | −0.041 a | 0.009 | 0.010 | −0.152 a | −0.055 a | −0.028 a |
| (b3) | (−1.91) | (−4.67) | (−1.07) | (0.72) | (−6.29) | (−3.81) | (−2.51) |
| Treatment | −0.0147 | −0.147 a | −0.132 a | 0.233 a | 0.035 | −0.235 a | −0.175 a |
| (b2) | (−0.94) | (−18.43) | (−16.86) | (17.97) | (0.73) | (−29.4) | (−29.11) |
| Total effect | −0.015 | −0.044 | −0.003 | 0.066 | −0.149 | −0.089 | −0.071 |
| (b3 + b2*a2) | (−0.12) | (−0.37) | (−0.03) | (0.53) | (−0.85) | (−0.78) | (−0.60) |
| Log likelihood | 2,504.09 | 2,155.22 | 2,438.45 | 233.02 | −2,969.31 | −86.14 | 1,060.57 |

*Notes:* (1) All the regressions are adjusted for various individual and facility characteristics.
(2) Parameter estimates are reported with t-statistics in parentheses. a and b denote significances level of 5% and 10%, respectively.
(3) No covariance ($\rho$) is statistically significant.

## VI. *Conclusion*

This study has focused on differences in the quality of care between for-profit and non-profit nursing facilities. Although non-profit operators provide a higher quality of care as measured by simple averages of worker characteristics, the advantage of non-profits disappears once their higher wage is corrected for. This finding confirms that the seemingly higher quality of care provided by non-profit operators is due to the non-profit wage premium resulting from their special preferential status which provides non-distributional constraints and favorable tax treatment.

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