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Quality of Child Care in Japan: Evidence from Micro-level Data

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Abstract

This study is a comprehensive empirical assessment on the quality of child care in Japan. Since no single index is entitled to stand for the quality of child care, we adopt three different approaches to measure quality. We take advantage of some unique survey data, which contains the largest sample size and the highest quality currently available in Japan.

The "test score" approach uses several indexes to evaluate the quality and to compare the total scores by different management. We observe that child care centers operated by different types of managements have advantages in different aspects; a specific type of management does not get the highest score in all detailed evaluations.

The "quality of workers" approach adjusts for the non-random allocation of workers to measure the quality of child care closely related with the quality of employees. The results based on the treatment effect model demonstrate that the share of regular or qualified workers and the number of children per worker is better in private-licensed centers than it is in public centers, and thus provide higher quality of services than do the public centers.

The "users' request" approach utilizes the survey on child care users for evaluating the services currently being offered and demanded in future. Our findings are consistent with the "quality of workers" approach in that the quality is better in private-licensed centers regarding parents' convenience and additional care such as extended care and education for children.

These results demonstrate that private licensed centers are more likely to provide higher quality of services than public centers.

1. Introduction

Measuring the quality of child care is fundamental for evaluating the output in the child care industry. Due to asymmetry of information, care users cannot choose facilities without appropriate information on the quality of care. Recently, there has been growing public interest and demand for disclosure of information on the quality of care due to many unfortunate accidents and awareness of unfairness in services between licensed and non-licensed centers[3].

Quality evaluation matters not only for providing information of care and for assuring children's safety. It also creates appropriate references in measuring the efficiency of management in the child care industry. Japanese households in urban areas suffer from a severe undersupply of child care, and higher wage costs are alleged to be the cause of the bottleneck (Noguchi Shimizutani and Suzuki (2003)). However, whether input costs are higher should depend on the quality of output. In other words, there might be room for higher costs, which might be justified by higher quality of care.

This study provides a comprehensive empirical assessment on the quality of child care in Japan. Quality measurement is critical but at the same time is a heavily disputed topic. The main reason is that there is neither a unique quality index nor a consensus on what stands for better quality of care.

Therefore, this study will adopt three different ways to evaluate quality, rather than relying on a single index. Concretely, we take the following measures: "test score" and "quality of workers" approaches as supply-side measures, and the "users' request" approach as a demand-side measure.

The "test score" approach is similar to that taken in a previous U.S. study (Mocan (1995)). This approach classifies various service items associated with user's benefits into several categories. In this study, we adopt 40 detailed items classified into four categories indicating each facility's characteristics. The scoring methods, based on a simple average or principal scores, are very straightforward and most commonly used.

However, some critics might object to the fact that the choice of concrete items depends on each researcher and thus could be biased. Thus, we adopt the second method

[3] Some local governments have just begun to perform objective evaluations on center quality, but this is not widespread at this moment.

called the "quality of workers" approach. The basic strategy is to examine the difference in several objective measures associated with quality of workers by types of management. We utilize the treatment effect model to examine the difference in some "quality" variables including the ratio of regular workers and the stability of workers.

The third method, on the contrary, is to use information on child care users which could be called the "user's request" approach. Concretely, we utilize users' evaluations on the currently provided services and requested demands for quality of care.

To address these issues, we take advantage of our unique survey on child care suppliers and demanders. Our data set contains an unusually large and high-quality data and is, as far as we know, the best available in Japan.

We preview our empirical results. First, the "test score" approach demonstrates that a specific type of management does not get the highest scores in all detailed evaluation aspects. Second, the "quality of workers" approach observes that the shares of regular or qualified workers and the number of children per worker are better in private licensed than public centers. Third, in the "users' request" approach, the quality is better in private licensed centers than it is in public centers regarding parents' convenience. These results show that private-licensed centers are more likely to provide higher quality of services than public centers.

This paper is organized as follows. Section 2 provides a literature review on the quality of child care mainly in the United States. Section 3 describes two data sets used in this study. Section 4 performs the "test score" approach to measure quality. Section 5 compares the quality of workers among different types of management using the "treatment effect" approach. Section 6 employs the "users' requests" approach. Section 7 discusses the results from these three strategies, and the final section concludes.

2. Literature Review

In the United States, dozens of empirical studies have been conducted that compare the quality and efficiency of child care services[4]. Until the beginning of the 1990s, a

[4] As for medical services, there is no measurement for quality that is widely agreed upon. Some support measurement from demanders such as death ratio, survival rate, or re-hospitalization rate, and others insist on some index from suppliers such as beds per doctor, the number of medical doctors or staff nurses, and other factors.

relatively simple index had been used as a proxy to measure quality of child care, such as ratio of qualified workers, employees' educational levels, years of experiences, equipment, and area per child (Chipty and Witte (1994), Mukerjee and Witte (1991), Mukerjee and Witte (1993)). These studies mainly focused on "inputs" to produce child care as quality measures, called a "structural index."

However, recent studies emphasize some new quality measures developed by psychologists rather than the traditional "structural index." Blau (1999), Blau and Mocan (2002) and Mocan (1995,1997) adopt these new "developmental psychological characteristics" measures to indicate interaction between children and child care workers and developmental environments for children. This type of index includes the Early Childhood Environmental Rating Scale (ECERS), the Infant/Toddler Environmental Rating Scale (ITERS), the Caregiver Interaction Scale (CIS), the Teacher Involvement Scale (TIS) and the UCLA Early Childhood Observation Form.

Contrary to the United States, Japan has few empirical studies on quality of child care, though that number has been growing recently. However, most of them are based on personal experiences or specific events, and it is hard to generalize them to measure the quality of care in the child care market as a whole. Also, they are not comparable with empirical works in the United States, using a rich micro-level data.

The Ministry of Health, Labor and Welfare (2001) provides the most comprehensive survey on objective evaluation of the quality of care. This report proposes that quality should be evaluated in four categories: (1) support for child's development, (2) child care support for parents, (3) cooperation with residents and related organizations, and (4) soundness of management and operations. Shiraishi and Suzuki (2002, 2003) follow this criteria and choose 33 items to evaluate. They conclude that quality of child care is better in private-licensed facilities, followed by public-owned centers. However, their studies are seriously hampered by small samples (300 centers) with smaller variables in four limited prefectures. Shimizutani and Suzuki (2002) adopt the similar approach to the Japanese long-term care market.

This study is substantially different from these other studies in Japan. First, we adopt three different approaches to evaluate quality of care, where no consensus is attained. An evaluation based on a single approach might be biased, and robust results could not be obtained. Our study thus provides a whole picture on the quality of care, though it is

disputable, and clear policy implications could be drawn. Second, we take our best available data from suppliers and demanders in Japan described in the next section, while other studies are based on very limited small samples. Third, in the traditionally common "test score" approach, we re-categorize the items of variables to stand for quality so that they could be comparable with previous studies in the United States, including developmental psychological measures.

3. Data Description

We use two different data sets in this study. One is the supply-side survey on child care providers used for the "test score" and "quality of worker" approaches. The other is the demand-side survey on child care demanders for the "users' requests" approach.

The supply-side analysis of this study is based on a unique survey on child care centers conducted by the Price Policy division of the Cabinet Office, Japanese government, in the summer of 2002. This data is, to our knowledge, the most comprehensive survey on child care workers with the largest sample size. We were able to perform the survey with special collaboration and deep understanding by local governments.

Before performing the survey, we visited several local governments, including Tokyo Prefecture, to ask their support in the survey. We explained the purpose of our research and consulted several important issues with officials in charge of child care policies at local governments, including detailed items covered in the questionnaire, and considered the feasibility of each question and preciseness of response.

The sample of the survey contains child care centers located in the entire 729 municipal areas of 10 prefectures around Tokyo: Chiba, Gunma, Ibaragi, Kanagawa, Nagano, Saitama, Shizuoka, Tochigi, Tokyo and Yamanashi Prefectures. Out of 729 districts, we collected data from the 533 local governments. The response rate of 73.1% is remarkably high. The figure would be even higher if we remove some local governments with no child care centers in the administrative region.

Local governments collaborative to the survey provided rich and valuable information on child care facilities within the area, such as type of management, size, service contents, and equipment. Moreover, they collected detailed information on *all* workers in each facility from 20 percent of public centers and 40 percent of licensed private facilities by

individual local governments, which were randomly selected[5]. The sample size is 16,735 workers from 1,382 centers (7,102 workers from 687 public licensed centers and 9,633 workers from 695 licensed private centers).

In addition, we collected the same information from non-licensed facilities operating in Tokyo Prefecture. Non-licensed centers are concentrated in urban areas, where the child care supply is insufficient and where excess demand for care is observed. Note that all non-licensed child care centers are recognized by local governments. After eliminating the samples whose necessary data is missing, we ended up with 911 and 173 workers in 42 nonprofit and 21 for-profit centers, respectively.

On the demand-side, we also performed a survey on households with children younger than five years old in Chiba, Kanagawa, Saitama, and Tokyo Prefectures within 30 kilometers from the center of Tokyo. This survey was conducted from July to September 2002, the same period with the supply-side survey. The sample is 3,100 households with children who are younger than five years old, including both child care users and non users. They were randomly chosen from household registrations. We received responses from 533 households using child care and from 1,020 not using child care centers.

4. The "Test Score" Approach

This section evaluates the quality of care based on the "test score" approach. Concretely, we use 40 detailed items to measure quality, which are categorized into (1) structural index, (2) developmental psychological index, (3) parents' convenience index, and (4) other index, as below. Based on previous surveys conducted in the United States, we categorize closely related items as the developmental psychological index, including developmental circumstances, and child's health and safety[6].

A. Structural Characteristics (10 items)

(a) Child care workers' characteristics

[5] Each local government collected data on child care workers from at least one authorized public and private center even if the number of facilities in the area is small.

[6] In the United States, trained reviewers actually visit each child care center to evaluate quality measures. On the contrary, our data is collected by physical mail.

1. Share of qualified workers
2. Share of regular workers
3. Years of work experience
4. Provision of training program for first-year workers
5. Provision of outside training program
6. Provision of leadership training program

(b) Child care facilities' characteristics

7. Area per child of special room for infants
8. Area per child of nursery room
9. Outside playground area (except public parks near the center as substitute)
10. Inside playground area

B. Developmental Psychological Characteristics (15 items)

(a) Developmental psychology

11. Field day
12. Excursions outside the center
13. Playing in small swimming pools
14. Special rhythm gymnastics for infants
15. Playing outdoors in parks
16. Education for children

(b) Children's health and safely management

17. Diary records for children
18. Health examinations for children
19. Accountability for accidents for parents
20. Communication notes between child care workers and parents
21. Meetings among care workers
22. Health examinations for care workers
23. Collaboration with medical facilities besides affiliated physicians
24. Insurance protection for any accidents or troubles related to children within the center
25. Safety video camera located in the nursery room or outside playground

C. Parent's Convenience Characteristics (10 items)

26. Distance to train station
27. Hours of operation
28. Hours of extensive child care
29. Provision of holiday care
30. Provision of post-acute care
31. Frequency of parents' meetings on weekdays
32. Provision of parents' meetings on holidays (Saturdays)
33. Provision of child care support or consulting
34. Provision of complaint processing system from parents
35. Communication through e-mail with parents

D. Other Characteristics (five items)

36. Provision of care for disabilities
37. Provision of emergent or temporary care
38. Availability for residents to use the garden on holidays
39. Provision of care for foreigners
40. Provision of websites

Based on these items, we calculate scores in four different ways. First, to calculate "small scores," we add up individual items for the four sub-categories. If an item is an indicator variable, we allocate one point for any provision and zero for others. If an item is not measured zero or one, we allocate one point for those with more than average and zero otherwise. Second, we simply add up all 40 items from all sub-categories, called as the "total scores." Third, we apply factor analysis to calculate the first principal component by sub-category, which is called as the "small principal scores." Fourth, we calculate the first principal component for all 40 items, called as the "total principal scores."

Table 1 reports the correlation coefficients between the "small scores" and "small principal scores" in each sub-category. Surprisingly, the coefficients are small. In addition, those between the structural index and other three types of indexes are very low. Therefore, we should note that the quality index measured by the traditional "structural" and

"developmental psychological" indexes could be very different.

In what follows, we use these measures to evaluate the quality of child care in different types of management. First, we will look at the aggregate index. Table 2 shows the "small scores." Public centers have higher scores in the structural index than do private licensed or for-profit. On the contrary, private centers are advantageous in the developmental index or parents' convenience. As a result, the "total scores" are higher for private facilities than for public centers.

On the other hand, Table 3 shows the results of the "small principal scores" to provide a slightly different picture. If we compare the public and private licensed centers, the results on the structural index and parents' convenience are same with those in Table 2. The advantage for private licensed centers disappears in developmental psychological characteristics. The "total principal scores" maintain the results that quality of services in private centers is superior to that in public-owned centers. Private non-licensed facilities are advantageous in the structural index and parents' convenience in Table 3.

We will investigate the difference in more detailed items. The results on the structural index are reported in Table 4. Public centers have better scores in skills or years of experience of child care workers. This is the case for the comparison between public and private non-licensed centers except the number of children per worker. Considering that the non-licensed centers in our study are relatively large to be entitled to receive subsidies, quality provided by public centers is in general superior to that of private facilities.

Table 5 reports the results of the developmental psychological index. Compared with the structural index, quality of service in public-owned centers is more equal with that in private licensed centers. Public centers are still more advantageous than for-profits are.

Furthermore, the result on the parent's convenience characteristics in Table 6 demonstrates that private-licensed centers are much better than public facilities. These findings contrast with the results based on the structural index. Finally, Table 7 shows that private centers provide better quality than public facilities do, except care for those with disabilities.

We could conclude as follows. We observe that public centers are much more dominant in the structural index. The advantage of public centers becomes less clear in the developmental psychological measurements. Private-licensed centers are advantageous in parent's convenience and other characteristics. Thus, we observe that one type of

ownership is not always better than others in all items. Rather, we should note that different centers have advantages in different categories. In other words, the "test score" approach reports that a specific type of management does not provide the highest quality of child care.

5. The "Quality of Workers" Approach

Since the child care industry is labor intensive, the quality of child care workers is naturally associated with the quality of services. In this section, we will focus on the sectoral quality differentials in skills of workers, using our detailed data set.

The basic statistics of the data set are summarized in Table 8. A simple comparison demonstrates that average wage, the treatment variable in this study, is higher for nonprofits than for-profits by 553 yen (39.7%) in hourly wage[7]. Shares of male, regular, or qualified workers do not vary between public and private centers. However, public centers are obviously advantageous in the actual number of children per child care worker.

As observed in the large wage gap, we could not reach our conclusion based on a simple comparison in these variables to measure quality because workers are not randomly allocated. To address this bias, we utilize the treatment effect model (Barnow et.al. (1981)). This model estimates the following two equations simultaneously by the full maximum likelihood: (1) to estimate whether wages for individual workers are higher or lower than the average and (2) to regress treatment effect and other explanatory variables on the continuous or binominal dependent variable to measure the quality of services.

$$(1)\quad Z_i^{l*} = w + \gamma' V_i + w_i \qquad \text{where} \qquad l=1,2$$

$$(2)\quad Y_i = \alpha' X_i + \beta' Z_i^l + \delta' D + e_i \qquad \text{where} \qquad e_i,\ w_i \sim N\left(0,0,\sigma_e^2,\sigma_w^2,\rho\right)$$

where Y_i stands for (1) skills of workers (share of regular workers, or qualified workers) and (2) number of workers per child (the actual number of children per worker in general, regular worker, or qualified worker). Unless an object in the sample is chosen randomly from the binominal treatments, Z_i^{l*} is unobserved. Therefore, we define Z_i^l, in (3) a

[7] The results on monthly or monthly and daily wages are reported in Appendices 1-1 and 1-2.

binominal variable which is actually observed, and estimate (2) and (3) simultaneously.

(3) $Z_i^l = 1$ if $Z_i^{l*} \geq 0$ $(-w_i \leq g'V_i)$

$Z_i^l = 0$ if $Z_i^{l*} < 0$ $(-w_i > g'V_i)$ where l=*1,2*

The results on the difference between public-owned and private licensed child centers are reported in Table 9. We calculate the total effect of being private licensed on quality indicators as the sum of a treatment effect and a multiplied effect of private licensed dummies on the 1st and 2nd stages. The results show that private facilities have higher shares of regular and qualified workers, though they are not significant. Moreover, those facilities are more likely to reduce the number of children per regular and qualified worker. These results mean that the quality of services in private centers is better than those in public ones regarding quality of workers.

Next, we will continue to investigate the difference in quality of care between private-licensed centers and non-licensed ones in the same way. We choose six municipal areas within Tokyo Prefecture where the data on care workers in both non-licensed for-profit and private licensed not-for-profit facilities are available. Table 10 reports that wage rates are higher for private-licensed than non-licensed by 398 yen (28.3%) in hourly wages[8]. A simple comparison shows private-licensed centers are advantageous in most characteristics, such as share of regular or qualified workers.

Table 11 reports the results. The total effects of private non-licensed status show that they are statistically positive for the number of children per worker. Thus, the quality of services provided by private-licensed centers is much better than that of private non-licensed.

In sum, the total effects imply that quality measures such as the shares of regular or qualified workers and the number of children per worker are much better in private-licensed than in public centers. Moreover, we also found that private-licensed centers offer the best quality of services in some aspects among three types of centers.

6. The "Users' Requests" Approach

[8] The results on monthly or monthly and daily wages are reported in Appendices 2-1 and 2-2.

Finally, we will try to evaluate the quality of child care on the demand-side. Specifically, we will mainly investigate the extent to which specific types of services are actually provided and what kinds of services are requested by parents. This strategy is straightforward, and could contribute toward evaluating the quality of care from the user side that was unexplored by the previous two approaches.

We have 532 child care users, randomly selected from Chiba, Kanagawa, Saitama, and Tokyo Prefectures. Out of 532 households, 363 households utilize services provided by public-owned facilities and 125 use private-licensed facilities. The remaining households use services from private non-licensed centers[9]. Note that there is no regulation for those services and provision of services depends on each center.

Table 12 reports the results. The upper table shows the results on current services and services requested by parents. First, we look at the difference in shares of requested services between public and private licensed centers. Parents using public centers are not satisfied with extended care, care on holidays and education for children. They are more satisfied with only a few items such as education for English or provision of transportation. The most requested service is care for diseased children or post acute care. However, more than half of public or private-licensed centers do not provide them.

These results imply that private licensed centers provide higher quality of services, especially in flexible operation hours and parents' convenience. If we compare private-licensed with non-licensed, licensed centers provide better services in education for children, lunch meals, care support or consulting, and transportation. On the other hand, non-licensed centers provide services that are more flexible for the operation hours or care for diseased children.

The lower part in Table 12 reports additional various services provided. If we compare those between public and private-licensed, the latter provides higher quality in many items, such as child care support centers, monitoring children with cameras, keeping daily records, and claim acceptance. Contrary to the upper parts, the quality of non-licensed centers is not better than that of public facilities in many items.

One might suspect that different types of care centers are used by households with

[9] Note that only eight households use subsidized non-licensed centers. The others use non-subsidized profit centers. In that sense, private non-licensed centers in this section are not precisely comparable with those in previous sections.

different characteristics. In order to address this possibility, we choose several important services contents and regress the response to those services currently provided and demanded in future on many household characteristics. They include family demographics, employment condition (working hours and income) and other variables. Table 13-1 presents the basic statistics of variables used in the regressions. Table 13-2-1 and Table 13-2-2 report the results. Basically, they replicate what we observe from a simple comparison. As regards services currently provided, extended care service, education, care if in disease are provided more in private licensed facilities than public ones. There is no difference in transportation and child care supports are more offered in public centers. As regards services demanded, public centers have higher figures in most of services except care if in diseases. Private non-licensed centers are required to provide education, child care supports and transportation, compared with private licensed centers.

In sum, the "users' requests" approach reveals the following. The quality measured in requested services by parents is better in private-licensed centers than it is in public centers. If we measure the quality of services in additional care services, this is also the case. Private-licensed centers are more likely to provide a higher quality of services. These results are also confirmed after controlling for household characteristics.

7. Conclusion

This study is a comprehensive empirical assessment on the quality of child care in Japan, using unique survey data with the largest sample and the best quality available in Japan. We have an empirical challenge in this study on how to measure the quality of child care. We adopt three types of approaches generally used as quality measurements: "test score," "quality of workers," and "users' request" methods.

The "test score" approach demonstrates that no specific type of management gets the highest scores in all detailed evaluation aspects. The "quality of workers" approach finds that the quality of private-licensed facilities is better than the public or private non-licensed facilities. Moreover, the "users' request" approach finds the results consistent with the "quality of workers" approach such that the quality is better in private-licensed than public centers regarding parents' convenience and additional care such as acute and temporary care.

These results show that private-licensed centers are more likely to provide various needs demanded by parents and thus to provide a higher quality of services than any other types of centers. Together with the results of Noguchi, Shimizutani and Suzuki (2003), higher wage rates in public centers cannot be justified by higher quality of services.

The Japanese government has currently been promoting the introduction of market competition and efficiency into various industries, including the child care, long-term care, and medical care industries, which used to be considered non-market sectors. Under the circumstances, those who believe that a Hausmann-type of "non-distributional constraint" may be anxious about the worsening of the quality of care, since market competition and efficiency may concentrate on lowering costs, not on the quality of services. Our conclusions on private-licensed centers' behavior in child care market might provide us with clues to solve the problem of how to properly balance between the costs and quality of care.

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Table 1: Correlation coefficients among small scores and small principal scores

(1)Small Scores

	Structural	Developmental Psychological	Parent's Convenience	Other
Structural Characteristics	1.00			
Developmental Psychological Character	0.06	1.00		
Parent's Convenience Characteristics	-0.15	0.20	1.00	
Other Characteristics	0.00	0.25	0.30	1.00

(2)Small Principal Scores

	Structural	Developmental Psychological	Parent's Convenience	Other
Structural Characteristics	1.00			
Developmental Psychological Character	-0.15	1.00		
Parent's Convenience Characteristics	-0.23	0.07	1.00	
Other Characteristics	-0.15	0.09	0.29	1.00

Table 2: Small scores and total scores

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)		(X) vs (Z)		(Y) vs (Z)	
	(X)	(Y)	(Z)						
Structual Characteristics	5.54	4.53	4.39	(X) > (Y)	**	(X) > (Z)	**		
Developmental Psychological Characteristics	11.67	11.90	10.67	(X) < (Y)	**	(X) > (Z)	**	(Y) > (Z)	**
Parent's Convinience Characteristics	3.62	4.93	4.39	(X) < (Y)	**	(X) < (Z)	**	(Y) > (Z)	**
Other Characteristics	1.92	1.98	1.76						
Total Score	22.77	23.39	22.86	(X) < (Y)	**				

(note) ** refers to significance level of 5%. The blank cells means no significant difference.

Table 3: Small principal scores and total principal scores

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)		(X) vs (Z)		(Y) vs (Z)	
	(X)	(Y)	(Z)						
Structual Characteristics	0.26	-0.35	2.63	(X) > (Y)	**	(X) < (Z)	**	(Y) < (Z)	**
Developmental Psychological Characteristics	0.15	0.06	-2.06			(X) > (Z)	**	(Y) > (Z)	**
Parent's Convinience Characteristics	-0.54	0.42	1.80	(X) < (Y)	**	(X) < (Z)	**	(Y) < (Z)	**
Other Characteristics	0.05	-0.02	-0.23			(X) > (Z)	**		
Total Score	-0.15	0.23	-2.42	(X) < (Y)	**	(X) > (Z)	**	(Y) > (Z)	**

(note) ** refers to significance level of 5%. The blank cells means no significant difference.

Table 4: Structual Characteristics

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)	(X) vs (Z)	(Y) vs (Z)
	(X)	(Y)	(Z)			
(a) Child care workers' characteristics						
1 Qualified workers per child (compared with the standard)	1.32	1.24	1.41	(X) > (Y) **	(X) < (Z) **	(Y) < (Z) **
2 Share of qualified workers	0.79	0.86	0.75	(X) < (Y) **	(X) > (Z) **	(Y) > (Z) **
3 Years of workers' experiences	14.60	7.95	9.40	(X) > (Y) **	(X) > (Z) **	(Y) < (Z) **
4 Provision of training program for freshmen	0.85	0.81	0.39	(X) > (Y) **	(X) > (Z) **	(Y) > (Z) **
5 Provision of outside training program	0.92	0.94	0.76		(X) > (Z) **	(Y) > (Z) **
6 Provision of leadership training program	0.92	0.86	0.22	(X) > (Y) **	(X) > (Z) **	(Y) > (Z) **
(b) Child care facilities' characteristics						
7 Area per child of special room for infants (compared with the s	2.92	1.88	2.40	(X) > (Y) **		(Y) < (Z) **
8 Area per child of nursery room (compared with the standard)	1.68	1.70	4.23		(X) < (Z) **	(Y) < (Z) **
9 Outside playground area	6.52	4.62	1.84	(X) > (Y) **	(X) > (Z) **	(Y) > (Z) **
10 Inside playground area	1.51	0.92	3.60	(X) > (Y) **	(X) < (Z) **	(Y) < (Z) **

(note) 1. ** refers to significance level of 5%. The blank cells in last three columns mean no significant difference.
2. Outside playground area in number 9 excludes public parks near the center as substitute.

Table 5: Developmental Psychological Characteristics

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)	(X) vs (Z)	(Y) vs (Z)
	(X)	(Y)	(Z)			
(a) Developmental psychology						
11 Field day	0.99	0.97	0.54		(X) > (Z) **	(Y) > (Z) **
12 Excursions outside the center	0.99	0.99	0.87		(X) > (Z) **	(Y) > (Z) **
13 Playing in small swimming pools	0.99	0.99	0.93		(X) > (Z) **	(Y) > (Z) **
14 Special rhythm gymnastics for infants	0.88	0.83	0.75	(X) > (Y) **	(X) > (Z) **	(Y) > (Z) **
15 Playing outdoor in parks	4.70	4.58	5.03	(X) > (Y) **		
16 Education for children	0.18	0.23	0.04	(X) < (Y) **	(X) > (Z) **	(Y) > (Z) **
(b) Children's health and safely management						
17 Diary record for children	0.92	0.92	0.98			(Y) < (Z) **
18 Health examination for children	1.00	0.99	0.89		(X) > (Z) **	(Y) > (Z) **
19 Accountability for accidents for parents	0.96	0.96	0.96			(Y) > (Z)
20 Communication notes between child care workers and parents	0.96	0.96	0.97			
21 Meeting among care workers	0.98	0.97	0.91		(X) > (Z) **	(Y) > (Z) **
22 Health examinations for care workers	0.99	0.99	0.87		(X) > (Z) **	(Y) > (Z) **
23 Collaboration with medical facilities besides affiliated physician	0.09	0.33	0.27	(X) < (Y) **	(X) < (Z) **	
24 Enrollment into the insurance for any accidents or troubles related to children within the center	0.99	0.98	0.97			
25 Safety video camera located at nursery room or outside play gr	0.02	0.11	0.07	(X) < (Y) **	(X) < (Z) **	

(note) 1. ** refers to significance level of 5%. The blank cells in last three columns mean no significant difference.

Table 6: Parent's Convinience Characteristics

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)	(X) vs (Z)	(Y) vs (Z)
	(X)	(Y)	(Z)			
26 Distance to stations	23.18	22.62	12.09		(X) > (Z) **	(Y) > (Z) **
27 Hours of operation	10.98	11.67	12.70	(X) < (Y) **	(X) < (Z) **	(Y) < (Z) **
28 Hours of extensive child care	18.48	18.87	19.71	(X) < (Y) **	(X) < (Z) **	(Y) < (Z) **
29 Provision of holiday care	0.02	0.05	0.14	(X) < (Y) **	(X) < (Z) **	(Y) < (Z) **
30 Provision of post-acute care	0.00	0.02	0.17	(X) < (Y) **	(X) < (Z) **	(Y) < (Z) **
31 Frequency of parents' meeting in weekdays	0.91	0.92	0.62		(X) > (Z) **	(Y) > (Z) **
32 Provision of parents' meeting on holidays (Saturdays)	0.21	0.45	0.53	(X) < (Y) **	(X) < (Z) **	
33 Provision of child care support or consulting	0.65	0.63	0.38		(X) > (Z) **	(Y) > (Z) **
34 Provision of complaint processing system from parents	0.61	0.81	0.37	(X) < (Y) **	(X) > (Z) **	(Y) > (Z) **
35 Communication through e-mails with parents	0.09	0.24	0.20	(X) < (Y) **	(X) < (Z) **	

(note) 1. ** refers to significance level of 5%. The blank cells in last three columns mean no significant difference.

Table 7: Other Characteristics

	Public	Private and Licensed	Private and Non-licensed	(X) vs (Y)	(X) vs (Z)	(Y) vs (Z)
	(X)	(Y)	(Z)			
36 Provision of care for disabilities	0.58	0.49	0.15	(X) > (Y) **	(X) > (Z) **	(Y) > (Z) **
37 Provision of emergent or temporary care	0.27	0.31	0.40	(X) < (Y) **	(X) < (Z) **	(Y) < (Z) **
38 Availability for residents to use the garden on holidays	0.18	0.23	0.04	(X) < (Y) **	(X) > (Z) **	(Y) > (Z) **
39 Provision of care for foreigners	0.59	0.58	0.57			
40 Provision of websites	0.29	0.39	0.42	(X) < (Y) **	(X) < (Z) **	

(note) 1. ** refers to significance level of 5%. The blank cells in last three columns mean no significant difference.

Table 8: Key variable definitions and summary statistics (public and private -licensed)

Variables	Total (n=16,735)		Public facility (n=7,102)		Licensed private facility (n=9,633)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
I. Treatment variables						
Monthly wage including various types of compensation	251199.420	(109,289.240)	301723.260	(127964.500)	213950.360	(73546.430)
Daily wage including various types of compensation	12348.050	(5,236.330)	15032.540	(5923.050)	10368.880	(3541.350)
Hourly salary including various types of compensation	1518.930	(636.165)	1837.180	(745.635)	1284.290	(404.341)
Natural logarithm of monthly wage	12.339	(0.447)	12.508	(0.499)	12.214	(0.355)
Natural logarithm of daily wage	9.336	(0.413)	9.527	(0.449)	9.195	(0.317)
Natural logarithm of hourly wage	7.248	(0.385)	7.426	(0.436)	7.116	(0.278)
=1 if monthly wage > average monthly wage	0.412	(0.492)	0.638	(0.481)	0.265	(0.441)
=1 if daily wage > average daily wage	0.413	(0.492)	0.668	(0.471)	0.245	(0.430)
=1 if hourly wage > average hourly wage	0.402	(0.490)	0.640	(0.480)	0.246	(0.431)
II. Quality of services						
Share of regular workers	0.944	(0.126)	0.949	(0.116)	0.940	(0.131)
Share of qualified workers	0.837	(0.178)	0.822	(0.198)	0.846	(0.164)
Actual number of children per worker	7.076	(3.923)	7.681	(4.420)	6.680	(3.505)
Actual number of children per regular worker	8.793	(4.780)	9.730	(5.100)	8.181	(4.455)
Actual number of children per qualified worker	8.265	(9.275)	8.352	(5.524)	8.208	(11.058)
III. Employees' characteristics						
Working days in April, 2002	21.274	(1.916)	20.858	(1.741)	21.581	(1.980)
Average working hours per day in 2002	7.738	(0.823)	7.813	(0.799)	7.683	(0.836)
=1 if male	0.015	(0.121)	0.010	(0.097)	0.019	(0.135)
Years of age	33.764	(10.613)	36.959	(9.957)	31.408	(10.465)
Years of age squared	1252.640	(786.580)	1465.120	(743.890)	1095.980	(780.451)
=1 if age is equal to or greater than 20 and less than 30	0.456	(0.498)	0.305	(0.460)	0.568	(0.495)
=1 if age is equal to or greater than 30 and less than 40	0.211	(0.408)	0.234	(0.423)	0.193	(0.395)
=1 if age is equal to or greater than 40 and less than 50	0.245	(0.430)	0.353	(0.478)	0.165	(0.371)
=1 if age is equal to or greater than 50 and less than 60	0.079	(0.270)	0.103	(0.305)	0.061	(0.239)
=1 if age is equal to or greater than 60	0.008	(0.088)	0.003	(0.054)	0.011	(0.106)
Years of experience	9.615	(9.167)	12.862	(9.977)	7.221	(7.689)
Years of experience squared	176.474	(279.913)	264.951	(315.093)	111.243	(229.999)
=1 if university graduate	0.040	(0.196)	0.040	(0.197)	0.040	(0.196)
=1 if community college graduate	0.670	(0.470)	0.644	(0.479)	0.690	(0.463)
=1 if professional training school graduate	0.229	(0.420)	0.249	(0.433)	0.214	(0.410)
=1 if others	0.061	(0.239)	0.066	(0.249)	0.057	(0.231)
=1 if qualified child care worker	0.918	(0.274)	0.939	(0.240)	0.903	(0.297)
=1 if regular worker	0.825	(0.380)	0.793	(0.405)	0.849	(0.358)
=1 if nonregular worker with long hours of work	0.131	(0.337)	0.165	(0.371)	0.105	(0.307)
=1 if care worker with short hours of work	0.044	(0.205)	0.041	(0.199)	0.046	(0.210)
=1 if chief or director of child care workers	0.078	(0.269)	0.105	(0.307)	0.057	(0.234)
IV. Facility characteristics						
=1 if licensed public facility authorized by municipal government	0.424	(0.494)	1.000	(0.000)	0.000	(0.000)
=1 if licensed private facility authorized by municipal government	0.576	(0.494)	0.000	(0.000)	1.000	(0.000)
=1 if founded in or earlier than 1945	0.008	(0.088)	0.011	(0.106)	0.005	(0.071)
=1 if founded after 1945 and in or before 1955	0.179	(0.383)	0.137	(0.344)	0.209	(0.407)
=1 if founded after 1955 and in or before 1965	0.118	(0.323)	0.155	(0.362)	0.091	(0.287)
=1 if founded after 1965 and in or before 1975	0.333	(0.471)	0.363	(0.481)	0.311	(0.463)
=1 if founded after 1975 and in or before 1985	0.279	(0.449)	0.254	(0.435)	0.298	(0.457)
=1 if founded after 1985 and in or before 1995	0.031	(0.172)	0.040	(0.196)	0.023	(0.151)
=1 if founded after 1995	0.053	(0.224)	0.039	(0.194)	0.063	(0.243)
=1 if land is owned by city	0.402	(0.490)	0.843	(0.364)	0.088	(0.284)
=1 if land is owned by prefecture or county	0.036	(0.186)	0.044	(0.206)	0.030	(0.170)
=1 if land is owned by public cooperation	0.029	(0.169)	0.024	(0.152)	0.033	(0.180)
=1 if land is owned by social welfare cooperation	0.340	(0.474)	0.003	(0.052)	0.580	(0.494)
=1 if land is rented from other organization	0.193	(0.394)	0.086	(0.281)	0.269	(0.443)
Number of employees	18.731	(7.666)	16.505	(6.875)	20.372	(7.804)
=1 if number of employees is equal to or less than 13	0.260	(0.439)	0.361	(0.480)	0.185	(0.388)
=1 if number of employees is greater than 13 and equal to or less than 1	0.261	(0.439)	0.262	(0.440)	0.260	(0.439)
=1 if number of employees is greater than 18 and equal to or less than 2	0.242	(0.428)	0.219	(0.414)	0.259	(0.438)
=1 if number of employees is greater than 23	0.237	(0.425)	0.157	(0.364)	0.296	(0.456)
=1 if flexible capacity	0.742	(0.438)	0.614	(0.487)	0.835	(0.371)
=1 if separate branch	0.035	(0.184)	0.047	(0.211)	0.026	(0.160)
Actual number of children/maximum number of children (0 years old)	0.708	(0.495)	0.751	(0.450)	0.643	(0.550)
Actual number of children/maximum number of children (1-2 years old)	1.184	(0.897)	1.281	(1.102)	1.035	(0.374)
Actual number of children/maximum number of children (3 years old)	1.033	(0.286)	1.078	(0.236)	0.965	(0.339)
Actual number of children/maximum number of children (4 years old)	1.043	(0.401)	1.073	(0.463)	0.996	(0.276)
=1 if special care provided (extra hours of care)	0.692	(0.462)	0.529	(0.499)	0.812	(0.391)
=1 if special care provided (holiday care)	0.039	(0.193)	0.018	(0.133)	0.054	(0.225)
=1 if special care provided (nighttime care)	0.005	(0.074)	0.002	(0.041)	0.008	(0.090)
=1 if special care provided (disability care)	0.565	(0.496)	0.635	(0.481)	0.513	(0.500)
=1 if special care provided (temporary care)	0.322	(0.467)	0.282	(0.450)	0.352	(0.478)
=1 if special care provided (post acute care)	0.016	(0.125)	0.006	(0.078)	0.023	(0.150)
=1 if special care provided (special education program)	0.109	(0.311)	0.016	(0.126)	0.176	(0.381)
Total hours of care	2.434	(0.094)	2.397	(0.108)	2.461	(0.072)

Table 9: The effects of private licensed facility dummy and the treatments on quality of workers (Hourly wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Hourly wage>average		Private licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	800.2	0.127 (0.019)	**a**	0.056 (0.007)	**a**	0.102 (0.498)	
Share of qualified workers	3281.8	0.026 (0.009)	**a**	-0.006 (0.005)		0.030 (0.145)	
Actual number of children per worker	-23599.5	-0.218 (0.219)		-0.749 (0.155)	**a**	0.256 (1.247)	
Actual number of children per regular worker	-25437.2	-3.970 (0.320)	**c**	-1.841 (0.189)	**a**	-3.153 (15.342)	**a**
Actual number of children per qualified worker	-30613.8	-0.985 (0.699)	**b**	-0.172 (0.381)		-0.878 (4.271)	**a**

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.

(2) a-c describes significant difference at 5%, 10%, and 15% levels.

(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -0.72(S.D. =0.08).

Table 10: Key Variable definitions and summary statistics (Private -licensed and private non-licensed)

Variables	Total (n=1,084)		Licensed profit facility (n=173)		Licensed private facility (n=911)	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Monthly wage including various types of compensation	245,454.300	(99,248.270)	160,255.500	(61,035.020)	261,633.700	(96,833.300)
Daily wage including various types of compensation	11,977.690	(4,283.691)	8,535.509	(2,648.747)	12,631.370	(4,222.813)
Hourly salary including various types of compensation	1,515.744	(522.665)	1,050.647	(246.432)	1,604.067	(514.491)
Natural logarithm of monthly wage	12.315	(0.468)	11.895	(0.459)	12.395	(0.426)
Natural logarithm of daily wage	9.325	(0.371)	9.007	(0.300)	9.385	(0.352)
Natural logarithm of hourly wage	7.268	(0.330)	6.934	(0.208)	7.331	(0.311)
=1 if monthly wage > average monthly wage	0.411	(0.492)	0.029	(0.168)	0.483	(0.500)
=1 if daily wage > average daily wage	0.387	(0.487)	0.069	(0.255)	0.448	(0.498)
=1 if hourly wage > average hourly wage	0.413	(0.493)	0.058	(0.234)	0.481	(0.500)
Share of regular workers	0.854	(0.221)	0.853	(0.271)	0.854	(0.210)
Share of qualified workers	0.857	(0.234)	0.739	(0.216)	0.879	(0.231)
Actual number of children per worker	5.554	(2.703)	2.001	(1.740)	6.229	(2.296)
Actual number of children per regular worker	6.363	(2.810)	2.448	(1.829)	7.125	(2.285)
Actual number of children per qualified worker	10.426	(22.150)	2.570	(1.992)	11.923	(23.864)
Working days in April, 2002	21.596	(2.415)	19.436	(3.921)	22.004	(1.732)
Average working hours per day in 2002	7.359	(1.066)	7.660	(1.393)	7.302	(0.983)
=1 if male	0.045	(0.208)	0.017	(0.131)	0.050	(0.219)
Years of age	34.001	(11.683)	34.919	(11.949)	33.827	(11.631)
Years of age squared	1,292.438	(932.276)	1,361.301	(933.382)	1,279.361	(932.004)
=1 if age is equal to or greater than 20 and less than 30	0.486	(0.500)	0.445	(0.498)	0.494	(0.500)
=1 if age is equal to or greater than 30 and less than 40	0.201	(0.401)	0.208	(0.407)	0.200	(0.400)
=1 if age is equal to or greater than 40 and less than 50	0.185	(0.389)	0.197	(0.399)	0.183	(0.387)
=1 if age is equal to or greater than 50 and less than 60	0.103	(0.305)	0.127	(0.334)	0.099	(0.299)
=1 if age is equal to or greater than 60	0.023	(0.150)	0.023	(0.151)	0.023	(0.150)
Years of experience	8.019	(8.175)	6.682	(7.803)	8.273	(8.223)
Years of experience squared	131.076	(252.487)	105.181	(226.964)	135.993	(256.868)
=1 if university graduate	0.078	(0.269)	0.116	(0.321)	0.071	(0.258)
=1 if community college graduate	0.551	(0.498)	0.480	(0.501)	0.564	(0.496)
=1 if professional training school graduate	0.242	(0.428)	0.237	(0.426)	0.243	(0.429)
=1 if others	0.129	(0.336)	0.168	(0.375)	0.122	(0.327)
=1 if qualified child care worker	0.708	(0.455)	0.665	(0.473)	0.717	(0.451)
=1 if regular worker	0.686	(0.464)	0.728	(0.446)	0.678	(0.467)
=1 if nonregular worker with long hours of work	0.058	(0.234)	0.092	(0.291)	0.052	(0.221)
=1 if care worker with short hours of work	0.059	(0.236)	0.040	(0.198)	0.063	(0.242)
=1 if chief or director of child care workers	0.040	(0.195)	0.064	(0.245)	0.035	(0.184)
=1 if number of employees is equal to or less than 5	0.007	(0.086)	0.023	(0.151)	0.004	(0.066)
=1 if number of employees is greater than 5 and equal to or less than	0.110	(0.313)	0.630	(0.484)	0.011	(0.104)
=1 if number of employees is greater than 10	0.883	(0.322)	0.347	(0.477)	0.985	(0.123)
Actual number of children/maximum number of children (0 years old)	0.812	(0.299)	0.554	(0.339)	0.845	(0.276)
Actual number of children/maximum number of children (1-2 years old	1.067	(0.314)	0.864	(0.651)	1.088	(0.248)
Actual number of children/maximum number of children (3 years old)	1.071	(0.261)	0.238	(0.497)	1.112	(0.154)
Actual number of children/maximum number of children (4 years old)	0.946	(0.211)	0.000	(0.000)	0.956	(0.189)
=1 if special care provided (extra hours of care)	0.685	(0.465)	0.653	(0.477)	0.692	(0.462)
Total hours of care	2.469	(0.063)	2.556	(0.085)	2.456	(0.046)

Table 11: The effects of for-profit facility dummy and the treatments on quality of workers (hourly wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Hourly wage>average		Profit licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	-270.600	0.022 (0.060)	**a**	-0.016 (0.034)		0.059 (0.179)	
Share of qualified workers	-263.350	-0.005 (0.055)		-0.227 (0.033)	**a**	0.510 (1.555)	
Actual number of children per worker	-2661.430	-0.443 (0.337)		-3.042 (0.285)	**a**	6.824 (20.817)	**a**
Actual number of children per regular worker	-2513.164	0.404 (0.531)		-2.760 (0.309)	**a**	6.886 (21.007)	**a**
Actual number of children per qualified worker	-5018.682	-0.010 (4.476)		-0.505 (3.100)	**a**	1.172 (3.576)	**a**

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.
(2) a-c describes significant difference at 5%, 10%, and 15% levels.
(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -2.39(S.D. =0.28).

Table 12: Results on Child Care Users

Service contents	Public Owned Centers			Private Licensed Centers			Private Non-licensed Centers		
	Current	Request	(share)	Current	Request	(share)	Current	Request	(share)
Extended hours	290	46	12.7	114	4	3.2	36	0	0.0
Holiday care	31	90	24.8	19	21	16.8	9	2	4.5
Disability Care	121	6	1.7	22	1	0.8	5	3	6.8
Education	86	109	30.0	74	14	11.2	10	7	15.9
Education(English)	9	87	24.0	27	39	31.2	2	5	11.4
Meals (lunch)	336	9	2.5	114	7	5.6	31	4	9.1
Light Meals (Morning)	188	4	1.1	56	2	1.6	8	1	2.3
Support, Consulting	228	25	6.9	53	7	5.6	14	5	11.4
Transportation	17	18	5.0	11	14	11.2	1	9	20.5
Washing Seats,Towels	5	71	19.6	0	28	22.4	5	7	15.9
Care if in disease	13	220	60.6	4	89	71.2	3	24	54.5
Post Acute Care	0	185	51.0	5	63	50.4	3	19	43.2
Others		31	8.5		7	5.6		3	6.8
Number of Users			363			125			44

Additional services	Public Owned Centers			Private Licensed Centers			Private Non-licensed Centers		
	Current	Request	(share)	Current	Request	(share)	Current	Request	(share)
Fields Atheletics	357	12	3.3	116	2	1.6	15	5	11.4
Excursions	358	10	2.8	115	2	1.6	28	6	13.6
Pooling	362	9	2.5	116	4	3.2	28	2	4.5
Rhythm	195	55	15.2	76	12	9.6	17	8	18.2
Health examinations	357	16	4.4	120	2	1.6	30	3	6.8
Outdoors	355	8	2.2	113	4	3.2	33	6	13.6
Openness to use gardens	28	42	11.6	13	6	4.8	2	0	0.0
Accountability of Accidents	271	24	6.6	105	7	5.6	18	5	11.4
Interviews with Parents (daytime)	308	3	0.8	58	19	15.2	14	3	6.8
Interviews with Parents (nighttime, holidays)	93	117	32.2	35	23	18.4	11	11	25.0
Child care support center	194	34	9.4	42	20	16.0	8	5	11.4
Watching children though cameras	43	86	23.7	18	34	27.2	1	13	29.5
Daily Records	231	39	10.7	80	21	16.8	24	1	2.3
Communication between worker and parents	312	35	9.6	101	12	9.6	36	1	2.3
Notice of meals in advance	284	32	8.8	99	12	9.6	31	2	4.5
Claims	24	119	32.8	20	56	44.8	6	6	13.6
HPs on internet	3	65	17.9	7	19	15.2	5	5	11.4
Communication through e-mails	0	149	41.0	2	50	40.0	2	14	31.8
Number of Users			363			125			44

Table 13-1 : Basic Statistics of the Main variables in the Survey on Child Care Users

Variables	# Obs.	Mean	S.D.	Min	Max
Extended Hours (currently provided)	533	0.83	0.37	0	1
Extended Hours (not available but demanded)	533	0.09	0.29	0	1
Holiday Care (currently provided)	533	0.12	0.32	0	1
Holiday Care (not available but demanded)	533	0.21	0.41	0	1
Education (currently provided)	533	0.32	0.47	0	1
Education (not available but demanded)	533	0.24	0.43	0	1
Support, Consulting (currently provided)	533	0.55	0.50	0	1
Support, Consulting (not available but demande	533	0.07	0.25	0	1
Transportation (currently provided)	533	0.05	0.23	0	1
Transportation (not available but demanded)	533	0.08	0.27	0	1
Care if in disease (currently provided)	533	0.04	0.20	0	1
Care if in disease (not available but demanded)	533	0.63	0.48	0	1
Users of Public Centers (=1)	533	0.68	0.47	0	1
User of Private Non-licensed Centers (=1)	533	0.08	.2637145	0	1
Number of Family Members	525	3.37	1.20	1	8
Residence of Mother's parents (co-residence)	533	0.05	0.21	0	1
Residence of Mother's parents (same municipal	533	0.25	0.43	0	1
Residence of Mother's parents (within an hour)	533	0.33	0.47	0	1
Time to mother's workplace (minutes)	523	26.21	19.88	0	105
Mother's firm size (number of workers)	523	401.72	846.22	0	3000
Employee's status (Full time)	533	0.41	0.49	0	1
Employee's status (Part time)	533	0.33	0.47	0	1
Employee's status (Temporary)	533	0.03	0.17	0	1
Monthyl working hours	520	103.76	67.64	0	280
Years of Experience	512	4.64	5.57	0	23
Mother's education (University graduate)	533	0.29	0.46	0	1
Mother's education (two year college graduate)	533	0.39	0.49	0	1
Mother's education (senior high school)	533	0.26	0.44	0	1
Mother's age	525	34.18	4.49	23	47
Father's age	492	36.45	5.72	23	58
Mother's annual income	468	282.34	193.37	20	950
Father's annual income	489	562.61	254.05	20	1500
Desirability of current centers (ranks)	524	1.31	0.70	1	7
Residential Status (own house=1)	533	0.35	0.48	0	1
Own Experience for Child Care Centers	533	0.22	0.42	0	1

Table 13-2-1 : The Effect of Facility Status on Demand for Child Care

Variables	Extended Hours				Holiday care				Education			
	current		future		current		future		current		future	
Users of Public Centers (=1)	-0.168 (0.041)	a	0.105(0.024)	a	-0.035(0.034)		0.120(0.052)	a	-0.316(0.063)	a	0.268(0.043)	a
User of Private Non-licensed Centers (=1)	0.019 (0.103)		-	-	-0.043(0.030)		-	-	-0.173(0.035)	a	0.285(0.144)	a
Number of Family Members	0.030(0.021)		0.022(0.014)	c	0.029(0.013)	a	0.036(0.026)		' -0.029(0.023)		0.050(0.024)	a
Residence of Mother's parents (co-residence)	0.124 (0.071)		-0.044(0.038)		0.329(0.234)	a	-	-	-0.118(0.106)		0.550(0.187)	a
Residence of Mother's parents (same municipality)	0.082 (0.045)	c	0.008(0.036)		-0.011(0.031)		-0.044(0.062)		0.129(0.072)	a	0.175(0.073)	a
Residence of Mother's parents (within an hou	0.054 (0.045)		-0.028(0.031)		-0.012(0.029)		-0.015(0.057)		0.096(0.057)	b	0.103(0.061)	b
Time to mother's workplace (minutes)	0.003 (0.001)	b	0.001(0.001)		0.002(0.001)	b	'-0.0002(0.002)		-0.004(0.002)	a	-0.001(0.002)	
Mother's firm size (number of workers)	0.00001(0.00003)		0.000001(0.00002)		0.000001(0.0000001)		-0.000001(0.00003)		-0.00002(0.00003)		0.00002(0.00003)	
Employee's status (Full time)	-0.069(0.143)		0.032(0.099)		0.375(0.136)	a	0.410(0.164)	a	0.023(0.152)		0.608(0.127)	a
Employee's status (Part time)	0.074(0.104)		0.018(0.078)		0.114(0.083)	b	0.326(0.141)	a	0.083(0.129)		0.660(0.108)	a
Employee's status (Temporary)	-0.262(0.230)		0.504(0.266)	a	0.442(0.239)	a	0.133(0.246)		0.675(0.163)	a	0.692(0.129)	a
Monthly working hours	0.0006(0.0008)		-0.0002(0.0005)		-0.001(0.0004)	a	-0.002(0.001)	b	0.002(0.001)	a	-0.002(0.001)	a
Years of Experience	-0.006(0.005)		0.005(0.004)		-0.006(0.003)	b	'-0.011(0.006)	b	-0.006(0.006)		-0.012(0.006)	b
Mother's education (University graduate)	0.092(0.113)		-0.041(0.061)		0.186(0.151)	c	-0.387(0.080)	a	0.996(0.003)	a	-0.199(0.110)	c
Mother's education (two year college graduat	-0.045(0.129)		-0.096(0.070)		0.027(0.081)		-0.339(0.121)	a	0.997(0.005)	a	-0.342(0.117)	a
Mother's education (senior high school)	0.042(0.118)		-0.069(0.050)		0.198(0.152)	b	'-0.312(0.089)	a	0.993(0.005)	a	-0.227(0.091)	b
Mother's age	0.0006(0.007)		-0.005(0.005)		-0.012(0.005)	a	0.009(0.008)		-0.012(0.008)	c	-0.016(0.008)	a
Father's age	0.004(0.006)		-0.006(0.004)	c	0.004(0.003)		-0.008(0.007)		0.007(0.007)		0.009(0.006)	
Mother's annual income	0.0002(0.0002)		0.000001(0.0001)		-0.0001(0.0001)		0.0003(0.0002)	b	-0.0002(0.0002)		0.0003(0.0002)	c
Father's annual income	0.00002(0.0001)		0.00001(0.0001)		0.0001(0.0001)		'-0.0002(0.0001)		0.0004(0.0001)	a	0.00001(0.0001)	
Desirability of current centers (ranks)	-0.007(0.030)		0.042(0.016)	a	0.032(0.015)	a	0.036(0.033)		0.037(0.030)		-0.009(0.035)	
Residential Status (own house=1)	0.011(0.048)		-0.031(0.029)		-0.030(0.025)		0.010(0.058)		-0.083(0.048)	b	-0.048(0.050)	
Own Experience for Child Care Centers	0.024(0.051)		-0.016(0.030)		-0.036(0.024)		-0.072(0.058)		0.025(0.056)		-0.046(0.054)	
Number of Observations	388		359		388		350		388		388	
Likelihood	-174.35		-101.51		-103.85		-181.70		-176.19		-177.41	
Pseudo R squared	0.10		0.22		0.26		0.09		0.24		0.19	

(Note) The coefficients are marginal effects. Figures in Parentheses are standard errors. a-c describes significant difference at 5%, 10%, and 15% levels.

Table 13-2-2 : The Effect of Facility Status on Demand for Child Care

Variables	Support, Consulting		Transportation		Care if in disease	
	current	future	current	future	current	future
Users of Public Centers (=1)	0.214(0.068) a	0.046(0.021) b	0.002(0.005)	-0.008(0.022)	-0.008(0.009) a	-0.102(0.063) c
User of Private Non-licensed Centers (=1)	-0.213(0.118) b	0.423(0.173) a	-0.001(0.009)	0.093(0.078) b	0.019(0.024) b	-0.155(0.117)
Number of Family Members	-0.163(0.032) a	0.024(0.010) a	-0.001(0.002)	0.003(0.008)	0.003(0.003) a	-0.034(0.027)
Residence of Mother's parents (co-residence)	0.325(0.131) b	-0.013(0.038)	0.045(0.092)	-	- -	-0.255(0.204)
Residence of Mother's parents (same municipality)	0.019(0.077)	0.044(0.038)	-0.009(0.007) c	0.048(0.037) c	0.0002(0.002)	0.287(0.070) a
Residence of Mother's parents (within an hou	0.087(0.068)	0.064(0.034) a	0.007(0.008)	' 0.033(0.028)	-0.002(0.002)	-0.051(0.065)
Time to mother's workplace (minutes)	-0.006(0.002) a	0.0004(0.0005)	-0.0003(0.0003) c	0.0003(0.0006)	0.0001(0.0001)	0.00001(0.002)
Mother's firm size (number of workers)	.00003(0.00004)	0.000001(0.00001)	-0.000005(0.000005)	-0.000009(0.00001)	-0.0000001(0.000001)	-0.00002(0.00003)
Employee's status (Full time)	-0.250(0.192)	0.017(0.065)	0.083(0.083) a	0.066(0.075)	-0.228(0.160) a	0.037(0.172)
Employee's status (Part time)	-0.083(0.157)	-0.004(0.050)	0.096(0.082) a	0.046(0.055)	-0.023(0.020) a	-0.099(0.138)
Employee's status (Temporary)	-0.087(0.225)	- -	0.624(0.372) a	0.703(0.257) a	- -	-0.156(0.212)
Monthly working hours	-0.0001(0.001)	0.0004(0.0003)	-0.0002(0.0001) a	-0.0003(0.0003)	0.0001(0.0001) a	-0.00003(0.001)
Years of Experience	0.009(0.008)	-0.001(0.002)	0.001(0.001) b	0.002(0.002)	0.001(0.0005) b	-0.006(0.007)
Mother's education (University graduate)	0.439(0.180) a	-0.006(0.043)	0.763(0.357) a	-0.058(0.029) b	0.981(0.078) a	0.287(0.131) b
Mother's education (two year college graduat	0.444(0.198) a	-0.027(0.040)	0.652(0.351) a	-0.105(0.049) a	0.936(0.171) a	0.314(0.139) a
Mother's education (senior high school)	0.483(0.153) a	-0.026(0.032)	0.804(0.341) a	-0.044(0.024) c	0.998(0.011) a	0.354(0.106) a
Mother's age	-0.002(0.010)	0.003(0.003)	0.001(0.001)	0.003(0.003)	-0.000001(0.0002)	0.007(0.009)
Father's age	0.026(0.009) a	-0.002(0.002)	-0.001(0.001) c	-0.006(0.003) a	0.0004(0.0004) b	-0.007(0.007)
Mother's annual income	0.0003(0.0002) c	-0.0002(0.0001) b	-0.00004(0.00003)	-0.000002(0.000007)	-0.00001(0.00001) a	-0.0003(0.0002)
Father's annual income	0.0001(0.0001)	-0.0001(0.0001) a	0.0000003(0.00001)	0.0001(0.00004) a	-0.000001(0.00001)	-0.0002(0.0001)
Desirability of current centers (ranks)	0.043(0.043)	0.017(0.010) b	-0.0001(0.003)	0.018(0.009) b	-0.002(0.002)	-0.037(0.038)
Residential Status (own house=1)	0.022(0.065)	-0.008(0.018)	0.008(0.009)	-0.014(0.017)	0.0002(0.002)	-0.020(0.059)
Own Experience for Child Care Centers	0.048(0.070)	-0.029(0.017) c	0.006(0.010)	-0.019(0.017)	0.050(0.028) a	-0.030(0.066)
Number of Observations	388	375	388	379	368	388
Likelihood	-212.68	-86.02	-50.14	-69.41	-45.84	-229.08
Pseudo R squared	0.20	0.20	0.25	0.25	0.36	0.10

(Note) The coefficients are marginal effects. Figures in Parentheses are standard errors. a-c describes significant difference at 5%, 10%, and 15% levels.

Appendix Table 1-1 : The effects of private licensed facility dummy and the treatments on quality of workers (Monthly wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Monthly wage>average		Private licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	924.9	0.097	a	0.053	a	0.070	
		(0.017)		(0.007)		(0.335)	
Share of qualified workers	3366.7	0.011	a	-0.008		0.017	
		(0.010)		(0.005)		(0.080)	
Actual number of children per worker	-23503.2	-0.295		-0.757	a	0.249	
		(0.207)		(0.154)		(1.189)	
Actual number of children per regular worker	-25273.1	-3.850		-1.824	a	-2.935	a
		(0.304)		(0.189)		(14.015)	
Actual number of children per qualified worker	-30525.8	-0.711		-0.136		-0.613	a
		(0.696)		(0.381)		(2.927)	

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.
(2) a-c describes significant difference at 5%, 10%, and 15% levels.
(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -0.69(S.D. =0.07).

Appendix Table 1-2 : The effects of private licensed facility dummy and the treatments on quality of workers (Daily wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Daily wage>average		Private licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	397.4	0.089 (0.016)		0.058 (0.007)	**a**	0.053 (0.318)	
Share of qualified workers	2610.6	0.023 (0.016)		-0.006 (0.006)	**a**	0.026 (0.159)	
Actual number of children per worker	-24262.7	- -		-0.802 (0.153)	**a**	- -	
Actual number of children per regular worker	-25713.9	-5.893 (0.216)	**a**	-2.360 (0.200)	**a**	-4.529 (27.268)	**a**
Actual number of children per qualified worker	-31240.6	7.465 (0.467)	**a**	1.148 (0.397)	**a**	6.738 (40.569)	**a**

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.

(2) a-c describes significant difference at 5%, 10%, and 15% levels.

(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -0.63(S.D. =0.08).

Appendix Table 2-1 : The effects of for-profit facility dummy and the treatments on quality of workers (monthly wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Monthly wage>average		Private licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	-222.9	-0.157 (0.042)		-0.085 (0.031)	**a**	0.081 (0.236)	**a**
Share of qualified workers	-216.8	-0.011 (0.045)		-0.230 (0.031)	**a**	0.668 (1.937)	
Actual number of children per worker	-2798.4	3.552 (0.213)	**a**	-2.872 (0.236)	**a**	12.732 (36.917)	**a**
Actual number of children per regular worker	-2475.9	0.794 (0.397)	**b**	-2.600 (0.287)	**a**	8.192 (23.754)	**a**
Actual number of children per qualified worker	-4971.838	2.023 (3.846)		0.317 (3.017)		1.087 (3.152)	**a**

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.

(2) a-c describes significant difference at 5%, 10%, and 15% levels.

(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -3.20(S.D. =0.34).

Appendix Table 2-2 : The effects of for-profit facility dummy and the treatments on quality of workers (daily wage>average)

Dependent variables indicating quality of workers and services	Log-likelihood	Daily wage>average	Private licensed facility dummy		Total effect (t-statistics)	
Share of regular workers	-263.215	0.078 (0.041)	0.004 (0.030)	a	0.071 (0.232)	a
Share of qualified workers	-262.429	0.016 (0.062)	-0.220 (0.033)	a	0.377 (1.232)	
Actual number of children per worker	-2655.990	-0.364 (0.374)	-2.995 (0.283)	a	4.470 (14.600)	a
Actual number of children per regular worker	-2516.336	0.498 (0.586)	-2.728 (0.319)	a	5.155 (16.836)	a
Actual number of children per qualified worker	-5015.190	3.118 (6.520)	0.575 (3.431)		2.193 (7.162)	a

(1) All regressions are adjusted for employee and facility characteristics, area dummie, and facility dummies.
(2) a-c describes significant difference at 5%, 10%, and 15% levels.
(3) The first stage estimates show that the coefficients for the dummy variable for private licensed is -1.61(S.D. =0.23).