Services for Child Care Support as Social Infrastructure: Impact on Birthrate and Migration of Children and Review of Best Practices[*]

Katsuyoshi Nakazawa

Associate Professor, Faculty of Economics, Toyo University

Shumpei Yaoita

Associate Professor, College of Community Studies, Shukutoku University

Akira Yokoyama

Professor, Faculty of Policy Studies, Chuo University

Abstract

A family's function of taking care of its members by itself has weakened due to the family size becoming smaller and women becoming more active in working outside the home. Moreover, various issues such as the increase in the number of children waiting to be admitted to nursery schools and the decline in the birthrate are being pointed out, especially in urban areas. In view of such situation, this paper focuses on the childcare support programs offered by local governments (municipalities) as social infrastructure for childcare support, and evaluates the effects of these programs quantitatively. The paper also aims to identify and study problems with these programs, which have been clarified through an interview survey.

The first part of the paper describes the quantitative evaluation regarding whether or not the local government's socioeconomic characteristics and their childcare support programs successfully create an environment that encourages people to have children, from two perspectives, i.e. birthrate and migration of children. The evaluation results show that the increased availability of nursery schools induces the migration of people who have children, and that it is important to increase the number of nursery schools in the Tokyo metropolitan area in particular.

The second part of the paper discusses the developments and problems within the municipal childcare support programs, which have been made clear through interviews with government-designated cities in the Tokyo metropolitan area. To address the serious shortage of nursery schools, these cities have increased the quantity of childcare services. However, as Japan as a whole has entered the phase of population decrease, the decline in the number of children is unavoidable even in the urban areas, and thus building more nursery schools could result in increasing a negative legacy in the future.

Municipalities that implement best practices increase not only tangible facilities such as nursery school buildings but also intangible services in order to make effective use of their resources. Such expansion of intangible infrastructure improves the efficiency in supplying childcare services and supplements the shortage of nursing schools through adjustment or by reducing the mismatch between the supply and demand of nursing schools, thereby making a great contribution to solving the issue of children on waiting lists. These best practices

suggest that when municipalities decide on and implement policies for strategic infrastructure development, they should consider how to combine and coordinate tangible and intangible infrastructure resources so that these resources complement each other, and how to ultimately improve the "quantity" and "quality" of childcare services.

Keywords: Child care support programs, children on waiting-lists, birthrate, migration of children, mismatch between supply and demand of childcare services, concierge services for people who have children, asymmetric information

JEL Classification: H42, H75, I18, J13, R23

I.   Introduction

The necessity for expanding the childcare support service has increased because the environment concerning childcare support has changed rapidly. For example, a family's function of taking care of its members by itself has weakened due to the family size becoming smaller and women becoming more active in working outside the home. Moreover, various issues such as the increase in the number of children waiting to be admitted to nursery schools and the decline in the birthrate are being pointed out, especially in urban areas. It is necessary to construct a total childcare support system as a "social infrastructure" which contains not only tangible facilities expansion (e.g., Increasing the number of nursery schools and staff) but also intangible services such as easing of asymmetric information between municipal administrations and families with children.

Especially, the decrease in total fertility rate (TFR) in the metropolitan area including Tokyo is a serious problem. From the Ministry of Health, Labour and Welfare (MHLW) *Vital Statistics 2014* reports that TFR in Tokyo is 1.09 which is the lowest value of all prefectures in Japan.[1] On the other hand, 12% of women who are of suitable age for birth are living in Tokyo.[2] Moreover, the marriage rate in Tokyo is 7.1‰, which is the highest value of the all prefectures in Japan.[3] In Japan, the ratio of children who were born out of wedlock's parents is extremely low. Therefore, in the metropolitan areas, especially Tokyo, the linkage from marriage to birth becomes interrupted. One reason why the gap between the high marriage ratio and low birth rate in the metropolitan areas might be that the supply has not caught up with the demand for child care support. The number of children wait-listed to be cared for in nursery schools but not able to use them because they are at full capacity is 21,371 people. These children in the big cities such as government-designated major cities,

[1] The national average TFR is 1.41.
[2] National Institution of Population and Social Security Research (2014) *Demographic Yearbook*. Women who are suitable age for giving birth are defined as those between 15 and 45 years of age.
[3] National average of the marriage rate is 5.5‰.

core cities and municipalities in Tokyo and Osaka metropolitan areas are 16,746 people in number, representing 78% of the total.[4]

Against this background, we focus on the child care support system in the Tokyo metropolitan area. In this paper, we empirically explore the effect of child care support policies on the birthrate and inter-municipal child migration. We evaluate whether the current child care support policy has produced the environment that encourages birth and child care. Then, we examine the features and problems of child care support in governmental-designated major cities in the Tokyo metropolitan area through hearings with policymakers. These cities are the top runners of child care support policy. The cities are not only expanding the nursery schools' capacity but are also developing various intangible supports. Our hearings should provide a useful contribution concerning the ideal way to think about the child care support policy in the future.

The remainder of this paper is organized as follows. Section II takes a general view of the current state of the waiting-list child problem which is serious in the metropolitan areas. Then, we run empirical analysis concerning the influence of the municipal child support policy: especially on the nursery school's capacity on birthrate and child migration in Section III. Section IV describes the summary of features and problems from hearings with policymakers of governmental-designated major cities in the Tokyo metropolitan area (e.g., Yokohama city, Kawasaki city, and Chiba city) as the top runners of the child care support system. Section V concludes the paper.

## II.　Current state and policy of waiting-list children problem

MHLW issues a report concerning waiting-list children called the *Taiki-Jidou Torimatome* (*Consolidating waiting-list children*) every year. The report describes the availability ratio of nursery schools and the number of waiting-list children of nursery schools at the time of April 1st. Figure 1 describes the change in the rate of utilization of nursery schools and the number of waiting-list children of nursery schools over the years. The rate of utilization increases over the years, suggesting the need for nursery school increases. Especially, the rate of utilization of children aged 3 years and under is very high because kindergarten, which is established not for child care but for pre-school education, can accept children aged 3 years and over.

The total number of waiting-list children of nursery schools was 21,371 at April 1, 2014. The number of children decreased from 2010 (26,275 people). The reason for the decrease of the number of waiting-list children was that the national government introduced the waiting-list children decrease policy in 2003. Moreover, municipalities changed the child support policy, especially expanding nursery schools in preparation for the new child support system that was named "Kodomo-Kosodate Shin-Shien Seido" (The new system of child

---

[4] Tokyo metropolitan area is composed of Chiba, Saitama, Tokyo, and Kanagawa prefectures. Osaka metropolitan area is composed of Kyoto, Osaka, and Hyogo prefectures.

Figure 1
Child care support policies according to municipal size.
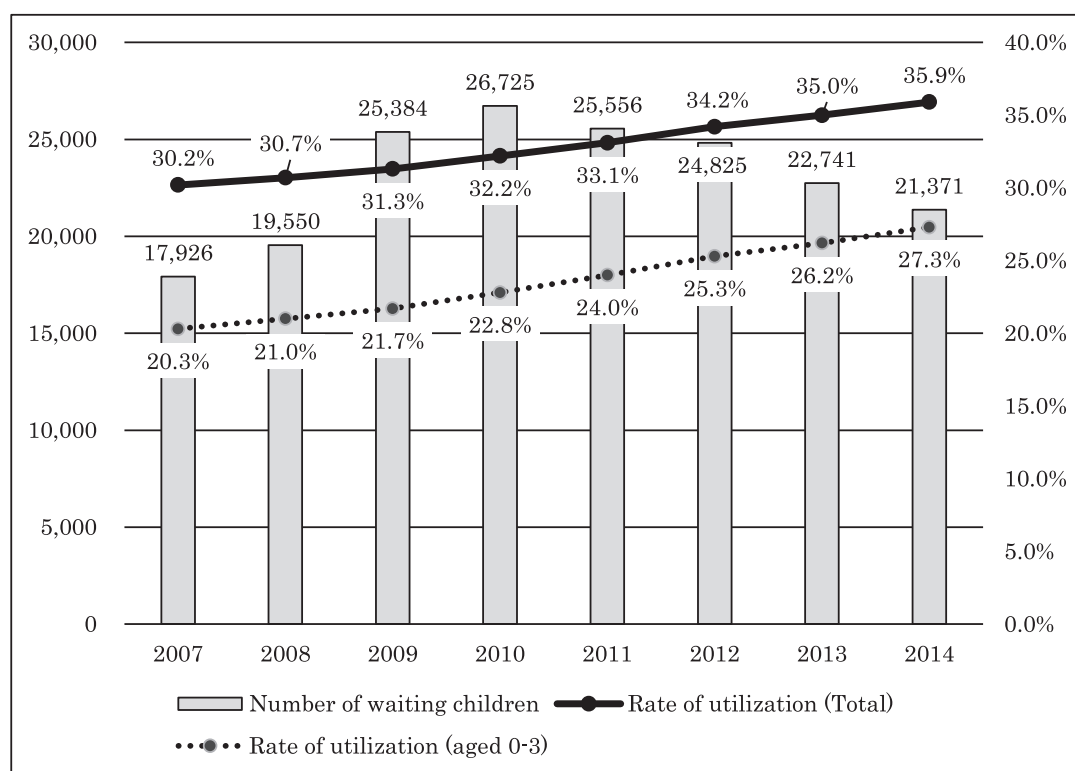
Note: MHLW, *Taiki-Jidou Torimatome* (*Consolidating waiting-list children*)

Table 1
Number of children using nursing care and waiting-lists according to age division

	Number of children using nursing care		Number of children in waiting-lists	
Aged 0-2	858,957	37.90%	18,062	84.50%
Aged 0	119,264	5.30%	3,507	16.40%
Aged 1-2	739,693	32.60%	14,555	68.10%
Aged over 3	1,407,856	62.10%	3,309	15.50%
Total	2,266,813	100.00%	21,371	100.00%

Note: MHLW, *Taiki-Jidou Torimatome* (*Consolidating waiting-list children*)

Table 2

Number of children using nursing care and waiting-lists according to urban and rural areas

	Number of children using nursing care		Number of children in waiting-lists	
Metropolitan areas	1,238,938	54.70%	16,746	78.40%
Other prefectures	1,027,875	45.30%	4,625	21.60%
Total	2,266,813	100.00%	21,371	100.00%

Note: MHLW, *Taiki-Jidou Torimatome* (*Consolidating waiting-list children*)

care).

Table 1 arranges the number of users of nursery schools and waiting-list children according to age. Almost all of the waiting-list children are categorized under 2 years old (84.5%). Especially, the 1 year old and 2 year old children make up 68.1% of the total waiting-list children. The reason why the waiting-list children are concentrated between 1 year old and 2 year old children is that the period of the system of childcare leave for working mothers comes when the child turns 1 years old. A mother who hopes to return to her office wants to entrust her child to a nursery school but could not find an opening.

Table 2 shows the number of waiting-list children according to the area. 78.4% of the total waiting-list children are in the governmental-designed cities, core cities, and municipalities in the Tokyo and Osaka metropolitan areas. Therefore, the problem of waiting-list children is peculiar problem to big cities. On the other hand, in the rural areas, capacity in nursery schools does not come up and some schools are closed.

To sum up the problem of waiting-list children, the share of the number of waiting-list children of nursery schools is concentrated in children aged 1 to 2 years and in the big cities. Section 3 empirically explores the influence of the municipal child support policy: especially the nursery school's capacity, on the birthrate and child migration.

III.　Influence of child support policy on birthrate and child migration

III-1.　Purpose of analysis

The child support policy of municipalities is executed for children and their parents who live in the municipality. However, it is difficult to understand the policy effect quantitatively because we cannot understand the improvement of welfare by the policy directly. The degree of ease of child care is different between the regions because it closely connects with the at-home supporting ability, the regional socio-economic environment, and the women's work. The Cabinet Office (2005) reports that the implementation degrees of the child care support policies are different according to the population scale of the municipalities (see Figure 2). Figure 2 shows that the big cities tend to execute various kinds of child care support. However, the big cities also tend to face the problem of waiting-list children.

Figure 2
Child care support policies according to municipal size.
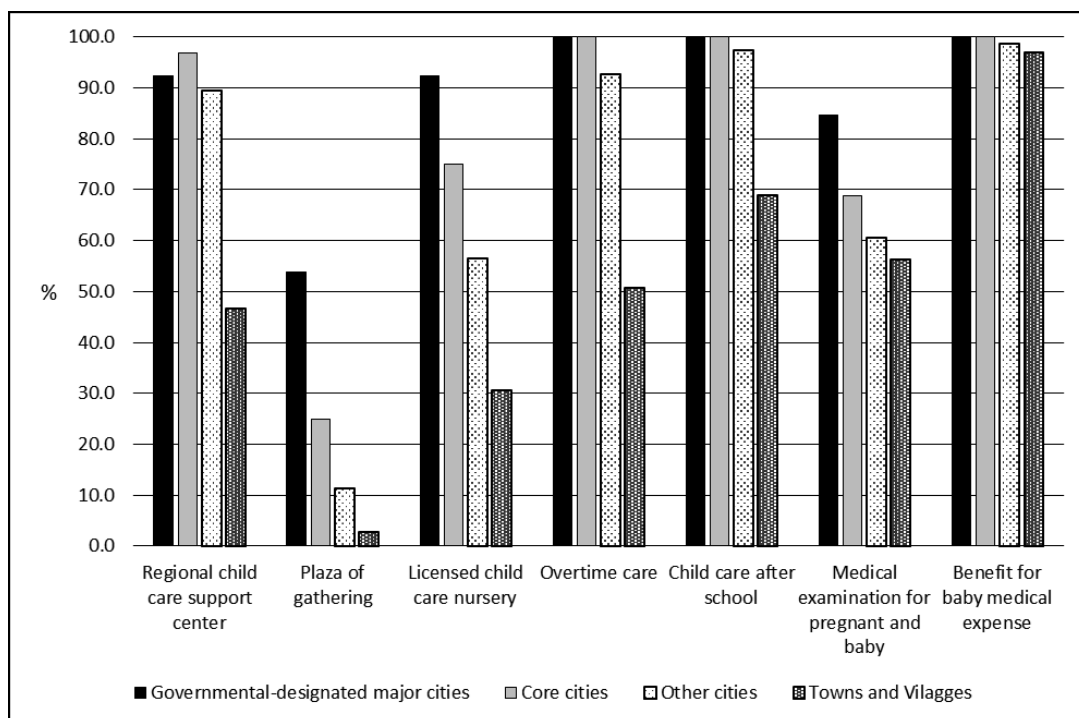
Note: Cabinet Office (2005) *Investigation of Original Child Care Support Policies of Municipalities.*

In this section, we try to examine the effect of child care support policy of municipality on "formation of environment that bears child and fosters easily." As the indexes of the policy results, we adopt "birthrate" and "net migration rate of children." When the municipality arranges the environment that eases birth and caring for a child, it will have a positive influence on the birth decision. Moreover, the differences in the child care support policy among the municipalities might cause the inter-municipal migration of parents who have children because they want to keep working while raising children under a serious waiting-list child problem in the urban area.

Previous literature examines the relationship between the child care support policy and birthrate, however, as far as we know, no previous literature examines the relationship between child care support policy and migration of parents who have a child.

III-2.   *Child care support policy and birthrate*

A large body of previous literature confirms that the income and non-income child care support policy have a positive effect on birthrate. Previous literature that focuses on the child care support policy on the municipality level, which is the same as our focus, is Abe and Harada (2008) and Miyamoto and Arawatari (2013). These papers are based on the

child demand function of the family advocated by Becker (1965) and Hotz et al. (1997). The model assumes that the child is made normal goods, husband's income and housework time are non-flexible, and the wife's labor is the trade-off at the child care time. Women's wage might have a positive or negative effect on birthrate. There is a possibility of having a positive influence on the birth determination through the increase of the income of the household, on the other hand, there is also a possibility of having a negative influence on the birth determination by the increase of the opportunity cost of the wife. As for the enrichment of the child care support policy, especially increasing the number of nursery schools, would have a positive influence on the birth determinant because the mother could keep working while raising children and the opportunity cost of wife would be decreased. The birthrate of a municipality can be assumed to be changeable depending on the factor of child care support from the family. From the above mentioned assumption, we set the estimation equation as follows.

$$FR_i = \beta_0 + \beta_1 Income_i / Land_i + \beta_2 WW_i + \beta_3 Double\_income_i + \beta_4 Own\_house_i$$
$$+ \beta_5 Rw\_child_i + \beta_6 R\_sup_i + \beta_7 Kinder_i + \beta_8 D\_Taiki_i + \beta_9 AID_i + \beta_{10} Univ_i + u_i \tag{1}$$

Subscript i shows the municipality. The definitions of each variable are as follows.

FR: Fertility rate, %
  • *GFR*: Number of births per 1,000 people of women from 15 to 45 years old.
  • *TFR*: Total fertility rate from 2003 to 2007.
Income/Land: Ratio of income and land price, %
  • Proxy indicator of balance between income and living cost of household.
  • Average income per capita/average of house land price in 2004.
WW: Women's wage of the suitable age for birth, 10,000 JPY
  • "Amount of wage and salary" between women 18 years old and 44 years old according to prefectures.
Double_income: Ratio of double-income households per total households, %
Own_house: Ratio of one's own house households per total households, %
Rw_child: Ratio of households with children per total households, %
R_sup: Ratio that relatives other than parents are cohabiting among households with children per total households, %
Kinder: Ratio of nursery schools on the register children per total children, %
D_Taiki: Dummy variable that takes 1 when the municipality has waiting-list children.
Aidi: Average income support by the municipality per child, 1,000 JPY
Univ: Advancement rate such as universities, %

Abe and Harada (2008) and Miyamoto and Arawatari (2013) use average income per capita as the index of family income. At the same time, they use the average of the house land price as the proxy indicator of the cost of living and childcare. However, it is difficult

to adopt the two variables into estimation together because the variables have high correlation and we have confirmed the multicollinearity.[5] The average of the house land price that is the proxy indicator of the living cost and childcare cost is to be examined by the balance with the income level. Therefore, we adopt the variable of *Income/Land* that is the proxy indicator of the balance between the income and living and childcare cost of the household.

Abe and Harada (2008) employ the TFR of municipality from 1998 to 2002. Miyamoto and Arawatari (2013) employ the GFR of municipality in 2004. Though TFR is an indicator that excludes the influence of woman's population structure, the numerical value in a single year does not exist. In this paper, we employ GFR in 2005. Moreover, we also employ the average GFR from 2005 to 2007 because the child care support policy would influence the GFR with lag. Finally, we employ TFR from 2003 to 2007 as reference.

The key regressors of the estimation are *Kinder*, *D_taiki*, and *Aid* that reflects the child care support policy and situation of the municipality. These variables are employed from the *Survey on Social Welfare Institution 2004* (MHLW) and Ministry of Internal Affairs and Communications 2004. The other explanatory variables reflect the situation of families with children in the municipality. These variables are employed from *National Census* in 2005.

III-3.   *Child care support policy and migration*

In the urban area with the trade-off problem of keeping working while raising children under a serious waiting-list child problem, parents who have a child might decide to move to a municipality that further enhances the child care support. This is the typical "welfare magnet" phenomenon. The early empirical study is Cebula and Korn (1975), Cebula (1978, 1979). A large body of literature that explore the inter-local-governmental migration reacted to the regional differential of welfare services by age, race, and sex (e.g., Southwick 1981; Gramlich and Laren 1984; Gramlich and Rubinfeld 1982; Blank 1988; Islam 1989; Enchautegui 1997; Borjas 1999; Levine and Zimmerman 1999). On the other hand, previous literature on the welfare magnet is very sparse. Nakazawa (2007) and Nakazawa and Kawase (2011) explore the relationship between the capacity of welfare facilities for the elderly and their migration empirically. As authors' knowledge, there is no previous empirical study on migration of children.

In this paper, we use the same data generating method as Nakazawa (2007) and Nakazawa and Kawase (2011) that combine the population data from *Basic Resident Register* and the number of deaths from *Vital Statistics*. Population by age group in the *Basic Resident Register* is presented at five-year intervals. The entire population of a given age group will enter the next-older age group every five years. We compared the population in 2005 with the population in 2010, and categorized the differences according to those who migrated in, those who migrated out, and those who died. For instance, a change in the number of persons aged 0–4 for a specific municipality from 2005 to 2010 is defined by the following ex-

---

5 The correlation coefficient is 0.80.

pressions:

$$N_{5-9}^{2010} - N_{0-4}^{2005} = -(D_{0-4}^{2005} + D_{1-5}^{2006} + D_{2-6}^{2007} + D_{3-7}^{2008} + D_{4-8}^{2009}) + (IM - OM)^{2010-2005} \qquad (2)$$

In this expression, N is the total population of the age group, IM is the number of inflows, OM is the number of outflows, and D is the number of deaths. The superscript indicates the year of investigation, and the subscript indicates the age group. NM is assumed to be the number of net migration (the number of inflows minus the number of outflows) and thus we rewrite equation (2) as follows:

$$NM_{0-4}^{2005-2010} = (IM - OM)_{0-4}^{2005-2010} = (D_{0-4}^{2005} + D_{1-5}^{2006} + D_{2-6}^{2007} + D_{3-7}^{2008} + D_{4-8}^{2009}) + N_{5-9}^{2010} - N_{0-4}^{2005} \qquad (3)$$

We then obtained net migration from 2005 to 2010 according to age group by combining the population by age group in the *Basic Resident Resister* with the number of deaths in the *Vital Statistics of Japan* as shown in equation (3). To calculate the number of death as equation (3), we convert the number of death at intervals of five years old into intervals of one year old. First, we employ the death rate of every one year old from *The 20th Lifetable* (MHLW). Then, we adds them up every five years old and calculate the death ratio according to age. For example, the death rate of 0 to 4 years old is 0.28%, 0.04%, 0.03%, 0.02%, and 0.01% respectably. The sum of death rate of 0 to 4 years children is 0.38%. The death ratios according to age are 0.736, 0.111, 0.079, 0.053, and 0.026 respectably. The number of deaths according to age and year is calculated by the death ratio times the number of deaths every five years old. The number of net migration of children of each municipality is estimated through the above-mentioned procedure. Then, the net migration rate of a certain age group is calculated from the number of net migration in a certain age group divided by the number of children of the age group.

$$NMR_{0-4}^{2005-2010} = NM_{0-4}^{2005-2010} / population_{0-4}^{2005} \qquad (4)$$

RNM_i^{0-4} indicates the net migration rate of five years of the 0–4 years old population in 2005 (5–9 years old population in 2010), and RNM_i^{5-9} indicates the net migration rate of five years of 5–9 years old population in 2005 (10–14 years old population in 2010). We employ the data from 2005 to 2010 to avoid the effect of the Great East Japan Earthquake in 2011. Moreover, we add the variables of the net migration rate of 30–39 years old and that of 40–49 years old to identify the general migration pattern at the parents age regarding welfare induced migration.

We employ almost the same explanatory variables as the estimation for birthrate. However, the aim of estimation is different. The estimation for the birthrate is aimed at the decision of having a child, and the net migration is aimed at the decision of a family who has a child. We estimate the 743 cities for which we can use the data. Table 3 shows the descriptive statistics.

Table 3
Descriptive statistics

Variables	Average	Standard dev.	Min.	Max.
GFR	39.28	7.26	11.49	69.74
GFR_average	38.53	6.67	18.58	65.56
TFR	1.40	0.21	0.74	2.09
RNM0_4	1.23	7.60	-33.54	40.58
RNM5_9	-0.42	4.04	-18.28	13.75
RNM30_39	-0.22	4.89	-14.84	30.37
RNM40_49	-0.02	2.01	-8.80	11.08
Income/Land	102.24	101.62	4.94	902.19
WW	229.09	25.79	186.90	296.40
Two_income	47.27	8.22	30.95	70.22
Own_house	69.67	13.30	14.66	96.04
Rw_child	48.85	8.70	22.92	87.51
R_sup	11.39	7.82	0.31	43.66
Kinder	20.49	9.29	0.00	50.54
D_Taiki	0.32	0.47	0.00	1.00
Aid	113.13	58.15	24.94	422.71
Univ	40.85	21.33	0.00	90.74

III-4. *Estimation result*

We run the ordinary least squares (OLS) with robust standard errors of White's method. The result is shown in Table 4.

First, we examine the estimation result of birthrate. *Income/Land* is positive for birthrate and significant at the 10% level for average GFR and the 1% level for TFR. When the balance of income and living and childcare cost is positive, the birthrate will increase. *WW* is negative for birthrate and significant at the 1% level. High women's wage level decreases birthrate through the increase of the opportunity cost of wife. The key regressors that reflect the child care support policy are not significant. The child care support policy of the municipality is irrelevant to the determination of having a child.

Second, we examine the estimation result of net migration of children. *Income/Land* is not significant for 0–4 years old children and significantly negative for 5–9 years old children. Moreover, women's wage level is significantly positive for both estimation results. These variables have a completely different effect on the determinant of birth and migration. The variables of net migration rate of 30–39 years old have a positive effect on both results. A strong factor to explain the child's migration includes the accompaniment migration ac-

Table 4
Estimation result of nationwide municipalities

	GFR		GFR_ave		TFR		RNM0_4		RNM5_9	
Income/Land	0.006		0.005	*	0.000	***	0.003		-0.004	**
	(1.51)		(1.82)		(3.71)		(0.97)		(-1.72)	
WW	-0.088	***	-0.084	***	-0.004	***	0.036	***	0.015	***
	(-8.42)		(-9.51)		(-14.27)		(4.70)		(2.89)	
Two_income	0.321	***	0.347	***	0.009	***	-0.154	***	-0.057	**
	(6.21)		(8.14)		(7.17)		(-3.80)		(-2.25)	
Own_house	-0.380	***	-0.355	***	-0.004	***	0.206	***	0.029	*
	(-12.79)		(-14.02)		(-5.33)		(9.10)		(1.89)	
Rw_child	0.475	***	0.460	***	0.007	***	0.087	**	0.109	***
	(10.23)		(11.89)		(5.94)		(2.36)		(3.88)	
R_sup	-0.330	***	-0.378	***	-0.006	***	0.022		0.012	
	(-5.07)		(-7.06)		(-3.85)		(0.38)		(0.36)	
Kinder	0.031		0.007		0.000		0.048		0.056	***
	(0.81)		(0.22)		(0.48)		(1.59)		(3.23)	
D_Taiki	0.007		-0.060		0.001		0.004		0.824	***
	(0.01)		(-0.12)		(0.08)		(0.01)		(3.53)	
Aid	0.000		0.001		0.000	***	-0.002		-0.002	
	(-0.05)		(0.34)		(2.80)		(-0.59)		(-0.65)	
Univ	0.019		0.022	*	-0.001	**	0.008		0.010	**
	(1.44)		(1.90)		(-1.99)		(0.90)		(1.97)	
RNM30_39							1.184	***	0.365	***
							(16.26)		(7.67)	
RNM40_49							-0.315	**	0.284	***
							(-2.20)		(2.64)	
Constant	49.152	***	46.343	***	1.855	***	-19.809	***	-9.799	***
	(10.97)		(12.0)		(15.78)		(-5.67)		(-4.10)	
Obs	743		743		743		743		743	
R-sq	0.380		0.439		0.486		0.609		0.569	

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively.

cording to the parents' migration. The key regressors that reflect the child care support policy are not significant for 0–4 years old children. The result is against our assumption that is described in Section II. If parents who have children want to move to municipalities with enhanced child care support policies, the incentive of parents with 0–4 years old children should be stronger than those with 5–9 years old children because the waiting-list children problem is most serious for 1–2 years old children. The reason that we targeted the cities throughout the country, as described in Section II, is that the waiting-list children problem is peculiarity in big cities. Therefore, we run estimation for cities in the Tokyo metropolitan area. We also run the OLS with robust standard errors of White's method. The estimation result is shown in Table 5.

First, we examine the estimation result of birthrate. *Income/Land* is positive for birthrate and significant at the 5% or 1% level. The effect of the balance of income and living and childcare cost on increasing birthrate is clear in the Tokyo metropolitan area. *WW* is negative for birthrate and significant at the 1% level, which is the same as the nationwide estimation result. High women's wage level decreases birthrate through the increase of the opportunity cost of the wife. The key regressors that reflect the child care support policy are also not significant, as is the case for the nationwide estimation result. The child care support policy of the municipality is irrelevant to the determination of having a child.

On the other hand, the child migration of the Tokyo metropolitan area is clearly different from the result of the nationwide estimation result. *Income/Land* and *WW* are significantly negative for both estimation results. The variables of the net migration rate of 30–39 years old also have a positive effect on both results. The key regressor of *Kinder* is significantly positive for child's migration against the result of the nationwide result. As we described above, the waiting-list children problem is peculiarity in big cities and it is difficult to keep working while raising children. The result reflects the situation and parents who have a child and want to keep working immigrate to a municipality where nursery schools have the leeway to accept children. Therefore, the child care support policy of expanding the nursery schools in the big cities influences not the decision of birth but rather the decision of migration because the mother who wants to keep working while raising children wants entrust her child to the nursery school when the child turns around 1 years old. The result indicates that the capacity of nursery schools in the big cities has not overtaken the demand. It is necessary to reexamine the available child care support policy by region.

Finally, the advancement rate such as universities of the municipality has a positive effect on 5–9 years old children's migration both nationwide and in the Tokyo metropolitan area. The parents of children in this age category want not only child care support but also a high educational platform because these children reached the age of an elementary school entrance or a junior high school entrance between 2005 to 2010. Therefore, the point estimate of *Kinder* of the age group is lower than the age group of 0–4 years old.

Table 5
Estimation result of the municipalities in the Tokyo metropolitan area

	GFR		GFR_ave		TFR		RNM0_4		RNM5_9	
Income/Land	0.047	***	0.031	**	0.001	***	-0.027	***	-0.010	*
	(3.10)		(2.18)		(3.99)		(-2.66)		(-1.78)	
WW	-0.074	**	-0.073	**	-0.002	***	0.086	***	0.052	***
	(-2.50)		(-2.53)		(-2.71)		(3.49)		(3.75)	
Two_income	0.078		0.145		0.002		-0.260	**	-0.225	***
	(0.57)		(1.06)		(0.67)		(-2.49)		(-3.92)	
Own_house	-0.463	***	-0.399	***	-0.008	***	0.174	**	0.068	**
	(-4.44)		(-3.99)		(-2.87)		(2.18)		(2.20)	
Rw_child	0.701	***	0.614	***	0.017	***	0.282	***	0.075	
	(5.09)		(4.65)		(4.36)		(2.88)		(1.29)	
R_sup	-0.594	*	-0.529	*	-0.004		-0.115		0.089	
	(-1.91)		(-1.97)		(-0.58)		(-0.40)		(0.92)	
Kinder	-0.228		-0.230		-0.006		0.340	***	0.143	***
	(-1.30)		(-1.41)		(-1.37)		(3.37)		(2.81)	
D_Taiki	-1.494		-0.570		-0.029		-1.733		0.946	
	(-0.92)		(-0.35)		(-0.87)		(-1.31)		(1.65)	
Aid	0.021		0.018		0.001	***	-0.034	***	-0.018	***
	(1.22)		(1.11)		(2.48)		(-2.66)		(-3.04)	
Univ	-0.013		-0.005		0.000		0.030		0.021	**
	(-0.47)		(-0.20)		(-0.42)		(1.35)		(1.92)	
RNM30_39							1.103	***	0.172	**
							(6.95)		(2.03)	
RNM40_49							-0.890	**	0.243	*
							(-2.58)		(1.85)	
Constant	53.273	***	49.647	***	1.272	***	-33.000	***	-13.286	**
	(4.10)		(4.01)		(4.01)		(-3.22)		(-2.29)	
Obs	146		146		146		146		146	
R-sq	0.488		0.457		0.602		0.728		0.598	

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively.

IV. Implication from best practices concerning the policy of waiting-list child problem

In the future, in the case that the number of children declines in urban area, the child care support policy of increasing nursery schools will not be efficient.

We will have some adjustments for the policy of child care support and education. One of the adjustments is "migration", which is suggested in Section III. Another one is institutional adjustment by cities' policies.

This section discusses our interviews with Yokohama City, Chiba City and Kawasaki City that have good practices concerning policies for the waiting-list child problem. We confirm a policy suggestion concerning the infrastructure maintenance related to child-care support in the future.

IV-1. The waiting-list child problem in the Tokyo metropolitan area.

The Tokyo metropolitan area consists of major cities such as metropolitan Tokyo, Saitama City, Yokohama City, Chiba City and Kawasaki City, etc. These cities become "government-designated cities" by the law, and are different from other cities. For instance, they can set up "the administrative district" in the city. This corresponds to the differences of size or characteristics of the administrative area of the cities. A city has an "urban area" and "suburbs area", and they are different from population and age distributions. To correspond to these differences, they set up "the administrative district ".

Viewing Yokohama City, Chiba City and Kawasaki City at the level of the entire city, the scale of children on the waiting-list was large. However, these cities were able to decrease the number of children on the waiting-list by examining the situations of each area within these cities carefully and taking precise measures. The first case of this was Yokohama City. The contents of activities in Yokohama is called the "Yokohama model" and provides useful suggestions to the government and other municipalities.

Chiba City has measured actively and correctly the number of children on waiting-lists since fiscal year 2011, and resolved the waiting-list child problem in April, 2014. Kawasaki City resolved the waiting-list child problem in April, 2015.

In the cases of Yokohama City, Chiba City and Kawasaki City, it turned out that the policy has actively been promoted under strong commitment by the mayors. Besides, each mayor increases the budget allocated in the child-care support plan.

We found that the activities of each city have commonality in promoting the entry of private companies and nonprofit organizations and in increasing the number of nursery schools. The cities also expanded the assistance to the small-scale child care model businesses and the subsidies for fees of child-care in nursery schools.

The most remarkable activity in these cities was to enhance "the matching function" that adjusted the supply and demand of child care services. Customers have little information about child care services. Therefore, these cities support "matching" of supply and demand,

Table 6
The Number of Children on waiting lists in Yokohama City,
Chiba City and Kawasaki City (April, 2014)

Yokohama City	April, 2012	April, 2013	April, 2014
Number of Prescool-age Children	191,770	190,106	188,540
Number of Children in Nursery School	43,332	47,072	50,548
Number of Children on waiting list	179	0	20

Chiba City	April, 2012	April, 2013	April, 2014
Number of Prescool-age Children	49,995	49,049	48,022
Number of Children in Nursery School	11,908	12,478	13,274
Number of Children on waiting list	123	32	0

Kawasaki City	April, 2012	April, 2013	April, 2014
Number of Prescool-age Children	80,547	80,909	80,963
Number of Children in Nursery School	18,074	19,399	20,930
Number of Children on waiting list	615	438	62

Note: Yokohama City, Chiba City and Kawasaki City

and they can allocate existing resources of the child care efficiently. Yokohama City connects the suppliers of child care services with the real estate holders. In case of new entrants, even if they would like to provide child care services, they cannot do so without facilities. On the other hand, new operators are difficult to find the holders to rent a real estate. As a result, the amount of supply of child care services is limited. Therefore, the city connects new entrants with the real estate holders, then real estate holders can easily rent to new entrants. As a result, the supply of child care services can increase. Indeed, Yokohama has increased capacities of the nursery schools to about 800 people over the original plan in fiscal year 2013.

IV-2. *Policy implication from interviews*

By interviewing personnel in Yokohama, Chiba and Kawasaki Cities, we have found some implications for the policy of children on waiting-lists in the municipalities.

First, the strong initiatives and commitments of the mayors are essential for decreasing the number of children on the waiting-lists. They usually gain the necessary political influence through elections. They settle on a concrete vision and the execution plan based on such political powers. Next, they conduct organizational changes of the administration and deal with the policy of waiting-list children. The policy of children on waiting-list is one of themes that gathers political support easily compared to other reforms. Moreover, the mayors in such cities take initiatives based on strong political power and address the policies of

waiting-list children. Therefore, administration staffs have been supported by mayors' strong initiatives and commitments and they can promote the policy smoothly.

Second, regarding the children experiencing waiting-list problems, it is important to classify them into the age categories and regional categories. For decreasing the number of children on waiting-lists, the cities need new establishments and an increase in the number of the nursery schools. It is also important to effectively allocate their resources effectively in order to deal with the children on waiting-lists problem. It is required for them to classify these problems into categories and grasp the current situations.

Consider an example of Yokohama City. The number of children on waiting-lists in the one-year and two-year old categories was at a high level of 66.7% in 2012. On the other hand, the number for four-year and five-year old children was low at 3.9%. If it is possible to use the facilities of four-year and five-year old children flexibly and to accept one-year old children and two-year old children instead of them, the waiting-list child problem will be mitigated.

Third, the reason that we have to consider classifying the waiting-list child problem into regional categories is based on asymmetric information. Most users hope that they will be able to move their children to nursery schools near their homes or the closest station, and they select the nursery school by these conditions. As a result, entrance needs concentrate on nursery schools near the closest station or their homes and their capacities are exceeded. This causes the number of children on waiting-list increases.

Actually, assuming there are two districts, one has excess capacity in nursery schools and the other does not. If the cities can provide their parents with the information and move them to another nursery school which is vacant, they will mitigate the waiting-list child problem. Indeed, Yokohama and Chiba and Kawasaki Cities have expanded the "concierge service" as activities in order to adjust mismatches among these regions.

These coordinators provide information to users to utilize their resources effectively. By our interviews, we found out that they can match the supply and demand of the child care efficiently and mitigate the waiting-list child problem. The maintenance of soft infrastructure is effective for solving the waiting-list child problem.

Fourth, there is the role of public nursery schools. The maintenance of new establishments and the increase of the number of nursery schools are important for the policies of the waiting-list child problem. There are two options. One is the maintenance of public nursery schools and the other is the entry of private business operators. In fact, Yokohama, Chiba and Kawasaki are making efforts regarding the latter method. At the same time, public nursery schools are expected to assume new roles such as securing the quality of the personnel training and child care services. In Kawasaki city, they address these issues by strengthening child care resources and cooperating with public nursery schools and private business operators. On the other hand, in Chiba city, they have set up a standard concerning equipment and operations exceed country standard in order to control the quality of private nursery schools. And they strictly select nursery school maintenance and operators using audits by outside experts. They maintain the quality of the child care by an arrangement using itiner-

ant teaching personnel who were experienced managers of public nursery schools.

Fifth, we will be able to consider the possibilities of cooperation among cities. Yokohama City has concluded an agreement with Kawasaki City in October, 2014. The agreement is the "Coordinated agreement concerning the children on waiting-list measures" which utilizes their owned lands, state owned lands, and private grounds adjacent to cities, and jointly operates maintenances such as nursery schools. When Yokohama citizens use facilities in Kawasaki and vice versa, it was decided that fees would be reduced. They also decided to provide their parents information and facilities adjacent to both cities. In this manner, by cooperation between the two cities, they are able to mitigate the mismatches between the child care needs and the services offered.

By forming "polycentric" networks, the municipalities complementary utilize their own resources and enable improvement of citizen services by their synergistic effects.

On the other hand, there remained some issues in our interviews.

First, there remains an issue of entrance requirements. Table 7 shows the transition of the number of children on waiting-lists according to each entrance requirement in Yokohama City. This table shows that children on waiting-lists are concentrated in families in A (Workers outside for more than 20 days per a month and more than 8 hours per a day) and H (Job seekers). Thus, we have to consider providing support and opportunities for them to leave their children temporarily during their job hunting activities etc. This suggests that there are various needs for the child-nurturing support policy. Thus, it might be important to provide various infrastructures and services that correctly correspond to various needs.

Second, there is the risk concerning promotion of the entry of private business operators. Private business operators will consider "marketability" and "withdrawal cost (sunk cost)" for business continuity. If the marketability of the region lowers, new entrants will decrease, and some existing business operators will exit.

Moreover, they have to consider the possibilities of "bankruptcies" and "the failure of management." Chiba City sets the conditions of credit, audit and others when the city authorizes some businesses such as corporations. For example, in the aspect of audit, the city regularly audits twice a year, does the itinerant teaching and checks the content of the child care and the execution situation and the financial situation of the subsidies. Moreover, after the establishment is opened, the city conducts questionnaire surveys for users and confirms their

Table 7
The transition of the number of children on waiting-lists according to each
entrance requirement in Yokohama City.

		A	B	C	D	E	F	G	H	Total
April, 2014	number	5	1	1	0	3	0	1	9	20
	%	25.00%	5.00%	5.00%	0.00%	15.00%	0.00%	5.00%	45.00%	100.00%
April, 2013	number	0	0	0	0	0	0	0	0	0
	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
April, 2012	number	41	9	27	7	32	9	6	48	179
	%	22.90%	5.00%	15.10%	3.90%	17.90%	5.00%	3.40%	26.80%	100.00%

Note: Yokohama City

levels of satisfaction. In addition, the city makes a manual concerning the case of "bankrupt-cy", and prepares it directed toward emergencies.

V.   Conclusion

In this paper, we focused on the childcare support programs offered by local governments (municipalities) as social infrastructure for childcare support, and evaluated the effects of these programs quantitatively. The paper also studied problems with these programs, which have been clarified through an interview survey. Moreover, we focused on the Tokyo metropolitan area as a research field. Because mothers who want to keep working while raising children in the area face a negative situation because the area has the problem of waiting-list children of families who want their children to be cared for in nursery schools but there are no openings.

 The first part of the paper describes the quantitative evaluation regarding whether or not the local governments' socioeconomic characteristics and their childcare support programs successfully create an environment that encourages people to have children from two perspectives, i.e. birthrate and migration of children. The evaluation results show that the increased availability of nursery schools induces the migration of people who have children, and that it is important to increase the number of nursery schools in the Tokyo metropolitan area in particular.

For these problems, some cities such as "the government-designated cities" in the Tokyo metropolitan area use original approaches. These approaches consider not only the increase of the number of nursery schools but also the number of children in the future and financial constraints, as well as by promoting the expansion of soft service. In this manner, the policy model was performed by complementing hard infrastructure and soft infrastructure that utilize resources concerning child-nurturing support effectively. This policy model is also reflected in a new system in Japan that has just started in April, 2015.

The second part of the paper discusses the developments and problems within the municipal childcare support programs, which have been made clear through interviews with government-designated cities in the Tokyo metropolitan area. In our interviews with Yokohama, Chiba and Kawasaki Cities, we have identified the following.

New establishments and the increase of the number of nursery schools require the entry of private business operators as much as possible. The city has been shifting in the direction of playing the roles of improving the quality level of child care and providing matching between the operators of nursery schools and users. These policy shifts can be evaluated as being foresighted rational selections under the trends of declining population and the lower birthrate in the future. While at the same time, issues remain concerning the incentive of the new entrants (private business operators). If resolution of the problem of children on waiting-lists is achieved, potential marketability will lower in the area, and their incentive will be lowered also. As a consequence, they will not be able to supply service which meets the needs of child care, and thus the problem of the children on waiting-list might reoccur. And,

under the trends of declining population and the lower birthrate in the future, if the scale of market downsizes, private business operators might not invest for the medium and long term.

Then, they have to consider that how they can secure the incentive for the entry of private business operators for the mid or long-term. Also, the securing of nursery teachers and personnel training are problems to be solved. In even big cities, they face the same issues. Therefore, each city addresses the issues of working on execution, salary improvement the support of lodgings rental, employment supports and others . It will be required that they strengthen cooperation with educational institutions such as universities which have training courses for nursery teachers in the future.

In urban areas which increase needs for infrastructure maintenance concerning child-nurturing support, they need to utilize resources and maintain infrastructure effectively and efficiently. In strategic policy selection actions by municipalities, they have to consider that they may combine hard infrastructure with soft infrastructure that is incompatible for the policy target and coordinate the infrastructure development to enhance the quantities and qualities of child care services. Also, they need to promote cooperation between the public sector and the private sector and association of public administrations as seen Yokohama and Kawasaki. It is important to study the consensus process of the infrastructure maintenance.

Municipalities that implement best practices increase not only tangible facilities such as nursery school buildings but also intangible services so as to make effective use of their resources. Such expansion of intangible infrastructure improves the efficiency in supplying childcare services and supplements the shortage of nursing schools through adjustment or by reducing the mismatch between supply and demand of nursing schools, thereby making a great contribution to solving the issue of children on waiting lists. These best practices suggest that when municipalities decide on and implement policies for strategic infrastructure development, they should consider how to combine and coordinate tangible and intangible infrastructure resources so that these resources complement each other, and thus ultimately improve the "quantity" and "quality" of childcare services.

Concerning the interviews
1) Yokohama City
   July 28, 2014, Mr. Masato Yamada (Former Vice Mayor of Yokohama City)
   September 4, 2014 Ms. Akiko Shibuya (Yokohama City)
2) Chiba City
   October 10, 2014, Mr. Yasuyuki Katagiri and Mr. Shinsuke Akiba (Chiba City)
3) Kawasaki City
   October 27, 2014, Mr. Keiya Sato, Mr. Seiichi Sudo Mr. Shinichi Manabe and Mr Yu Niimura (Kawasaki City)

Questions;
　　(1) About the current state of the children on waiting lists in your city
　　(2) Efforts and subjects of children on waiting lists in the past in your city
　　(3) The role of each administration district office, for cooperation, etc.
　　(4) Regarding the presence or absence of cooperation with neighboring municipalities
　　(5) For the national government, the presence or absence of cooperation with prefectures.
　　(6) A reference for initiatives such as models in other city.

References

Abe, K. and Harada, Y., (2008), Influence of Child Care Support Policy on Birthrate: Analysis on the Municipal Data, *Kaikei-Kensa Kenkyu*, 38, pp. 1–16. In Japanese

Ito, Y, Tanaka R, and Watanabe T., (2013), The process and future issues of the children on waiting list in Yokohama, *Chosa Kihou*, vol172, pp. 11–17

Becker, G. S. (1965), A Theory of the Allocation of Time, *The Economic Journal*, 75 (299), pp. 493–517.

Blank, R. M. (1988), The Effect of Welfare and Wage Levels on the Location Decisions of Female-Headed Households, *Journal of Urban Economics*, 24 (2), pp. 186–211.

Borjas, G. J. (1999), Immigration and Welfare Magnets, *Journal of Labor Economics*, 17 (4), pp. 607–637.

Cebula, R. J. (1978), An Empirical Note on the Tiebout-Tullock Hypothesis, *Quarterly Journal of Economics*, 92 (4), pp. 705–711.

Cebula, R. J. (1979), A Survey of the Literature on the Migration-Impact of State and Local Government Policies, *Public Finance,* 34 (1), pp. 69–84.

Cebula, R. J. and Korn, R. M. (1975), Public Policies and Migration Patterns in the United States, *Public Finance*, 30 (2), pp. 186–196.

Enchautegui, M. E. (1997), Welfare Payments and Other Economic Determinants of Female Migration, *Journal of Labor Economics*, 15 (3), pp. 529–554.

Gramlich, E. M. and Laren, D. S. (1984), Migration and Income Redistribution Responsibilities, *Journal of Human Resources*, 19 (4), pp. 489–511.

Gramlich, E. M. and Rubinfeld, D. L. (1982), Micro Estimates of Public Spending Demand Functions and Tests of the Tiebout and Median-Voter Hypothesis, *Journal of Political Economy*, 90 (3), pp. 536–560.

Hotz, V., Klerman, J., and Wilis, R., (1997), The Economics of Fertility in Developed Countries, In: Rosenzweig A., and O. Stark, (eds) *Handbook of Population and Family Economics*, vol. 1A. Amsterdam, Elsevier, pp. 275–347.

Islam, M. N. (1989), Tiebout Hypothesis and Migration-impact of Local Fiscal Policies, *Public Finance*, 44 (3), pp. 406–418.

Levine, P. B. and Zimmerman, D. J. (1999), An Empirical Analysis of the Welfare Magnet Debate Using the NLSY, *Journal of Population Economics*, 12 (3), pp. 391–409.

Nakazawa, K., (2007), Inter-municipal Movement of Elderly, *Zaisei Kenkyu*, 3, pp. 142–

159. In Japanese

Nakazawa K. and Kawase, A., (2011) Empirical Analysis on Welfare Magnet, *Keizai-Sei-saku Journal*, 8(1), pp. 2–9. In Japanese.

Miyamoto, Y. and Arawatari, R., (2013), Comparison of the Effects of Income and Non-income Support on Birthrate: Analysis on the City Data, *Nihon-Keizai Kenkyu*, 68, pp. 70–87. In Japanese.

Southwick Jr., L. (1981), Public Welfare Programs and Recipient Migration, *Growth and Change*, 12 (4), pp. 22–32.

Willis, R. J. (1973), A New Approach to the Economic Theory of Fertility Behavior, *Journal of Political Economy* 81 (2), pp. S14–S64.