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ABSTRACT

Public versus Private Provision of Daycare: An Experimental Evaluation*

This paper provides experimental estimates of the impact of a voucher for private care within the Nordic system of universal provision of public care. The private daycare voucher acted as a significant boost for new daycare entrepreneurs to enter the market thus increasing the overall daycare provision in the municipalities participating in the experiment. In a market that was providing high-quality, low-cost public daycare, a voucher is nevertheless found to have a significant, positive effect for the use of private daycare with zero to negligible effects on the use of public care and labor force participation.

JEL Classification: H42, J2, J13

Keywords: social experimentation, vouchers, daycare use, labor force participation

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1. Introduction

Government expenditure in the Nordic countries on family services, including formal daycare provision, ranges from about 1 ½ per cent of GDP in Finland to 2 ¼ per cent of GDP in Denmark in the late 1990's (Figure 1). The ageing population as well as increasing competition from the new entrants to the EU, and globalization in general, are putting a strain on the financing of publicly subsidized welfare services and have introduced a need for re-structuring (Kautto and Kvist, 2002).

[FIGURE 1 ABOUT HERE]

Research on alternative ways of financing daycare is therefore appreciated. Bringing in elements of competition, for example, in the form of quasi-markets may increase the efficiency of the daycare market (Steuerle et al., 2000). This paper relies on an experimental setting to evaluate the impact of increased private provision due to a private daycare voucher on labor force participation and use of private and public daycare in a market that is already providing high-quality, low-cost public daycare.

Evidence points to the private daycare voucher resulting in an exogenous shift in the supply of private daycare places in the treated areas. The results indicate that the voucher for private care has a significant, positive effect (3-5 percentage points) for the use of private care, especially in areas that suffer from excess demand for daycare services (6-7 percentage points). Weak evidence points to increased labor force participation and use of public care, as well as increased private care use, within areas that initially reported excess demand for daycare.

The next section examines the literature on daycare financing and vouchers specifically. Section 3 explains the voucher experiment in more detail while section 4 explains the

econometric method used in the analysis. Section 5 includes a description of the data. The results are presented in section 6 while section 7 concludes.

2. Public provision of private goods versus quasi-market

Theoretical studies unanimously agree that public provision of a private good, such as children's daycare, improves welfare and is economically efficient (Blomquist and Christiansen, 1995, 1999). However, a universal provision of a publicly provided good, such as daycare, is subject to a large deadweight loss (Besley and Coate, 1991). The deadweight loss in daycare is considerable in the Nordic countries, first, because of the universal nature of the subsidy regardless of household income and, second, because the direct parental contribution is small throughout the income distribution.

An extensive public provision of daycare may discourage private providers from entering the market for daycare (for theoretical discussion on the "crowding out", see, for example, Bergstrom et al., 1986). Hence, on one hand, heavily subsidized public provision of daycare may prevent competition from private providers due to high barriers to entry. On the other hand, parents' willingness to pay for private daycare may be low since under the system of public provision of daycare they may be used to paying low fees (see, for example, Deaton and Muellbauer, 1980 for further details on habit formation in consumption).

Vouchers in general increase consumer choice, and hence increased consumer satisfaction, and may therefore lead to increased competition between providers (Steuerle et al., 2000)[1]. Specifically, a quasi-market may be more responsive to changes in demand.

Figure 2 depicts the decisions of parents between public daycare provision, private (non-subsidized) daycare provision and voucher-subsidized private provision assuming that

[1] However, Besharov and Samari (2000) note the importance of calibrating the daycare voucher payments to the local market conditions to prevent subsidies meant for low-income families to benefit more affluent families or increasing profits for providers.

families have well-behaved preferences and use only one type of care. On the x-axis is the amount or quality of daycare purchased (*CC*) and on the y-axis all other goods (*Y*). The budget constraint for publicly provided daycare is rectangular because in the Finnish context it is provided largely free of charge, or for a low fee, which allows the household to spend its income on alternative consumption (*Y*). The children attending public daycare receive *CC1* amount of care.

[FIGURE 2 ABOUT HERE]

Private daycare provision may be a more desirable option for some households according to parental preferences (for example, better opening hours or a more convenient location). However, the budget constraint *CC2* for privately provided daycare is very steep[2]. In other words, the household must give up many units of *Y* to purchase an additional unit of *CC*. Figure 2 depicts a situation in which the utility of choosing the public daycare provider is higher than the utility derived from privately provided daycare because the extra cost outweighs the extra benefit derived from attending a private daycare provider.

A private daycare voucher shifts the budget constraint for private care from *CC2* to *CC3*. Because the voucher subsidizes the cost of private daycare to the parents, the new budget constraint is much flatter depending on the amount of the voucher. Hence depending on the slope of the budget constraint, the household could reach a higher level of utility *I(voucher)* and a higher level of *CC* as depicted in Figure 2.

According to this simple analysis, a private daycare voucher can be expected to increase the use of private daycare on average, either as a substitution away from public daycare to private daycare or as new entrants to the daycare market. In the former case it can be

[2] The two goods, public daycare and private daycare, are substitutes as most daycare is provided full-time and hence the budget constraints CC1 and CC2 are drawn as separate lines not allowing a combination of both types of care.

expected that the hours of work of the main caretaker in the household (usually the mother) will stay the same or increase if the previously used public provision did not adequately accommodate her working behavior. In the latter case there should be an increase in the participation probability of mothers of pre-school age children.

3. The Finnish voucher experiment

The daycare is provided by municipalities, which finance it through municipality taxes and contributions from the central government. However, the payment by the consumers of daycare only covers approximately 15% of the total cost of daycare[3]. The high level of public expenditure has led to pressures to enhance its effectiveness (Hemmings et al., 2003). The large public provision of daycare has led to an inefficient outcome where many municipalities suffer from excess demand while at the same time others experience excess supply[4]. Overall, more than 20% of municipalities could not meet the requirement for universal daycare provision (Palokangas, 1995).

By the beginning of 1995, 33 municipalities, out of 450, reported wanting to take part in a voucher experiment for private childcare and all were accepted[5]. Out of the 33 participating municipalities, 13 were cities and half of the remaining participants were small municipalities of less than 10,000 inhabitants. Six municipalities are excluded from the analysis due to inconsistencies in their participation, for example, a few municipalities started the voucher experiment before others in 1994.

[3] Users pay a means-tested fee, which is fixed by the municipality, of up to €168 per child (in 1998).

[4] Palokangas (1995) find that overall the supply and demand for daycare do not meet; in 1994, there was an oversupply of about 7100 places but also excess demand of 2800 places varying by region mostly for 3-6 year olds and part-time places. The Ministry of Social Services and Health (1998:20) find that most excess demand was found in the municipalities of Espoo, Vantaa, Helsinki (which are in the treatment group of the experiment), Savonlinna, Lahti and Lappeenranta (which are in the control group of the experiment).

[5] 21 municipalities chose a means-tested voucher (€140-366/month/child for 0-2 year olds; €128-343/month/child for 3-6 year olds) while 12 municipalities gave out a lump-sum voucher (€304/month/child on average for 0-2 year olds; €263/month/child on average for 3-6 year olds).

Each municipality pays a subsidy to the private daycare provider chosen by the family. The amount of the subsidy varies by municipality. The private daycare providers face the same laws regarding child-staff ratios and educational requirements of the staff as publicly provided daycare and are regularly inspected by the municipality[6]. However, families choosing the voucher and using privately provided daycare, on average, and perhaps subjectively, valued the quality to be better than those using public care[7].

For the municipalities, using vouchers has been cheaper than producing the care themselves (Heikkilä and Törmä, 1996). On average, the voucher cost €50 less per child per month than the publicly provided care. The savings varied by municipality depending on the amount of the voucher. While the private care accounted for approximately 6% of all daycare provision, the average costs for the municipalities were only 1.5% of total daycare spending. The cost of private care provision is between 60% and 90% of the comparative public care.

The private daycare voucher had a major boost on the supply of care; 22% of the private daycare entrepreneurs who were in operation in 1998 started operating at the start of the voucher experiment. Of the entrepreneurs that started their business during the experiment, 59% reported that the reason for starting was the private daycare voucher (Ministry of Social Services and Health, 1997:26). The experiment ended in 1997 and private daycare subsidy was adopted nationally. By 2002, a fifth of all daycare centers (approximately 3,000 in total) in Finland were private enterprises accounting for about 6% of all daycare places[8].

Overall, the universal public provision led to excess supply of daycare at the national level. Thus, our estimates provide a lower bound estimate for most countries where excess demand is experienced nationally. However, many municipalities in the experiment

[6] Average child/staff ratio is 4.2 in daycare centres and 2.8 in childminder care.
[7] The subjective quality is reported to be better in the private sector in terms of co-operation between the family and the daycare centre. Public care was considered especially good in terms of food, rest and safety.
[8] The Ministry of Social Services and Health (1998) interviewed municipality representatives after the experiment finished in 1997 and found that private daycare is available in 85% of the bigger municipalities (over 10,000 inhabitants) and 53% of the smaller municipalities (less than 10,000 inhabitants).

(including three in the capital region) experienced excess demand. Hence using this information we can also evaluate the impact of the voucher under the conditions of demand outstripping the supply of daycare services.

4. Econometric method

Exogenous variation induced by, for example, a policy change in the main explanatory variables is especially useful in situations in which the estimates are ordinarily biased by omitted variables or selection bias (Meyer, 1995). Studies based on experiments also avoid any strict behavioral assumptions.

To estimate the effect of the voucher on the use of childcare and labor force participation of mothers, I rely on propensity score matching, pairing mothers with similar observed characteristics in the treated and non-treated areas. Propensity score matching highlights the support problem in a way that is often overlooked in a regression analysis. The lack of common support may lead to biased estimates of the effect of the treatment on the treated (see Heckman et al., 1997 for details). Hence, it is crucial that the common support is as large as possible otherwise the matching is done on the tails of the two distributions i.e. matching individuals that are quite different than the rest of the population.

A primary assumption underlying matching is the conditional independence assumption (CIA), which states that the treatment status is random conditional on a set of observable characteristics X. The CIA will be satisfied if X includes all of the variables that affect both participation and outcomes (see, for example, Rosenbaum and Rubin, 1983). Rather than matching on X it is equivalent to match on $P(X)$, thus avoiding the problem of dimensionality.

All matching estimators can be written as follows:

$$\hat{E}(Y_0 \mid \hat{P}(X_i)) = \sum_{j=1}^{J} w(\hat{P}(X_i), \hat{P}(X_j))Y_{0j} \qquad (1)$$

,where subscript *i* denotes treated individuals and *j* indexes the untreated comparison group observations. The matching estimator constructs an estimate of the unobserved counterfactual for each treated observation by taking a weighted average of the outcomes of the untreated observations. The difference between the various matching estimators lies in the type of weighting placed on the *j*th observation in constructing a counterfactual for the *i*th treated observation.

This paper uses two alternative matching estimators: the nearest neighbor estimator and the Epanechnikov kernel matching estimator. The nearest neighbor matching estimator assigns the weight of 1 to the comparison observation with the closest propensity score to each treated observation and 0 to all other observations[9]. The nearest neighbor estimator does not impose a support condition but instead constructs a counterfactual for every treated observation no matter how large the distance is to the propensity score of the nearest comparison group observation. Hence, to overcome this potential problem, the nearest neighbor estimator is combined with a caliper. A caliper defines an interval around each treated unit within which the propensity score of a control individual should lie for it to be included in the estimation. The nearest neighbor matching in this paper is done with replacement[10].

Rather than relying on a single control, it is possible to construct a synthetic individual based on a group of control individuals. The weight attached to each control is given by a kernel. The kernel matching potentially assigns a non-zero weight to several observations in the comparison group in constructing the counterfactual for each treated observation[11].

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[9] The weighting for the nearest neighbor matching estimator takes the following form: $$w(\hat{P}(X_i),\hat{P}(X_j)) = \begin{cases} 1 & if \quad j = \arg\min_{k\in\{D=0\}} \{|P(X_i) - P(X_k)|\} \\ 0 & otherwise \end{cases} \quad (2)$$

[10] Matching without replacement keeps variance low at the cost of potential bias while matching with replacement keeps bias low at the cost of larger variance.

[11] The standard form for the weighting function is given by:

Asymptotically, all the matching estimators produce the same estimate because they all end up comparing only exact matches. However, in finite samples, different matching estimators produce different results because of the variation in the weighting (see Dehejia and Wahba, 2002 for details)[12].

A further threat to the validity of the estimates results from the fact that the experiment determines partial equilibrium effects. In other words, the impact of the treatment is estimated when only a proportion of the population is treated. The following estimation assumes no general equilibrium effects i.e. that the persons outside the experimental treatment area are not affected by the treatment. In the statistics literature this assumption is called the stable unit treatment value assumption (SUTVA).

5. Data description

The estimation uses data from the Income Distribution Survey[13] (referred to as IDS from hereon) from 1994 until 1997. The IDS is a rotating panel survey interviewing 10,000 households per year. Each household is interviewed for two consecutive years. The interview data is linked with data from administrative registers, for example, on income and subsidies. All the data are provided on an annual basis, for example, employment participation is reported as months per year.

$$w(\hat{P}(X_i), \hat{P}(X_j)) = \frac{K\left[\frac{\hat{P}(X_i) - \hat{P}(X_k)}{a_n}\right]}{\sum_{k \in \{D=0\}} K\left[\frac{\hat{P}(X_i) - \hat{P}(X_k)}{a_n}\right]} \quad (3)$$

where $K(.)$ is a kernel function and a_n is a bandwidth. This paper uses the Epanechnikov kernel which takes the following form:

$$K(y) = \begin{cases} \frac{3}{4}(1 - y^2) \text{ if } |y| < 1 \\ 0 \quad \text{otherwise} \end{cases} \quad (4)$$

[12] The choice of the matching estimator depends on the data. For many and evenly distributed comparison observations, the multiple nearest neighbor provides the best estimates while for many and asymmetrically distributed comparison observations kernel matching may be the best choice. Local linear matching should be used when there are many observations with the propensity score near zero or one.

[13] Tulonjakotilasto in Finnish.

The information on the municipality of residence is not released in the IDS due to confidentiality reasons. Instead Statistics Finland has, on request, created dummies to identify the experimental regions including any variation in the type of voucher.

The daycare voucher experiment was administered between 1.3.1995 and 31.7.1997. Hence the pre-treatment period is 1994. The experiment began on 1.3.1995 hence the first two months of the year are not affected by the experiment. Similarly, in 1997 the last five months of the year are not affected by the experiment. However, this should not affect the estimation results and any bias resulting from the time frame should reduce the coefficient estimates.

[TABLE 1 ABOUT HERE]

The estimating sample includes all the mothers with pre-school age children (aged 0-6) who are married or cohabiting and whose partner works[14] (see Table 1 for details). Some regions were dropped from the sample because they do not represent either the control or the treatment region, for example, in some cases the private daycare voucher was used prior to the start of the experiment. Single mothers are not used in the analysis because of the small sample sizes, especially for the treatment region. The unit of observation is a pre-school age child, hence each mother observation is weighted by the number of pre-school age children. The standard errors are corrected to account for clustering at individual level The sample size for 1994-97, inclusive, is 6,651, of which 2,618 are mothers of 0-2 year old children and 4,033 are mothers of 3-6 year old children. The sample used in the analysis further drops 1,525 observations from the pre-experiment period (1994).

[TABLE 2 ABOUT HERE]

[14] Non-employed fathers are dropped from the analysis because of the requirement to work in one type of voucher.

Table 2 reports the summary statistics separately for the control region *G=0* and the treatment region *G=1* prior to the start of the experiment (1994). Column 3 of Table 2 reports the results of a test for differences in the means between the control and the treatment region. There are no significant differences in the working status of the control and treatment region, however, the use of private and public daycare are 7 percentage points lower in the control region compared to the treated region before the start of the experiment. Another significant difference between the control and the treatment region is the level of unemployment, which is almost 6 percentage points higher in the control region[15]. Significant difference exists also for the size of the household.

There are significant differences in the level of education between the control and the treated region for both mothers and fathers of the pre-school age children. Mothers are more likely to have finished their schooling at the baccalaureate level in the control region whereas, in the treated population, significantly more women have acquired at least a Masters degree. A similar trend is observed for fathers' level of education. Therefore on average the treated region is more educated. These differences are partly due to the fact that the capital region accounts for about 50% of the treated areas and that there is over 30 percentage point difference in the proportion of rural municipalities between the two groups.

Throughout the analysis, the main variables of interest are labor force participation, use of public care and use of private care (referred to as *LFP*, *PUB* and *PRIV*, respectively, from hereafter). Employment participation in the IDS is provided only as months worked per year. Similarly, the use of daycare is reported as months per year for each type of care. *LFP* takes the value 1 if the individual has worked at least one month a year either full-time, part-time or

[15] Unemployment figures are included in the analysis since VATT estimates that 1% decrease in average unemployment rate increases the demand for daycare by 2,500 places.

as an entrepreneur[16]. Similarly, the binary variables for *PUB* and *PRIV* take the value 1 for those who have used any public or private daycare services, respectively. Sensitivity analysis is conducted using six months and twelve months as the cut-off points, however, this has no significant impact on the results[17].

The family benefits and maternal and paternal leave are more generous for parents with children below three years old than for parents with older pre-school age children. Hence the consequent kink in the budget constraint motivates the examination separately for 0-2 and 3-6 year olds.

To account for the possible bias due to self-selection of municipalities into the treatment discussed in Section 3, we estimate the voucher effect with propensity score matching. The propensity score matching estimation uses information from the period of experimentation (1995-1997).

The matching methods include the nearest neighbor and the Epanechnikov kernel estimation with caliper/bandwidth values of 0.1, 0.01, and 0.005. The common support is examined both graphically and with appropriate test statistics.

The propensity score is estimated with a probit where the covariates are mother's and father's age and their level of education, interaction of mother's and father's age, the household size, age of the youngest child, number and age of pre-school children, age of the pre-school age child interacted with father's and mother's age, interaction between the number of pre-school age children and the age of the youngest child, father's earnings, father's earnings interacted with the size of household, father's trade union status and year dummies.

[16] The share of part-time employees is only slightly higher than 10% among female employees and hence no difference between full-time and part-time employment is taken into account in the estimation.
[17] The results are available from the author upon request.

Finally, it is possible to identify three municipalities within the experiment region that suffer from excess demand for daycare[18]. Unfortunately, it is not possible to identify similar excess demand regions within the control area due to data confidentiality reasons.

6. Empirical results

The results for the whole country are reported in section 6.1 while section 6.2 presents the analysis for parts of the country that experienced excess demand for daycare prior to the start of the experiment.

6.1 Whole country

The propensity score matching estimates for the impact of the private daycare voucher experiment are presented in Table 3. Heikkilä and Törmä (1996) report that 55% of the families who chose the private daycare voucher were new customers to the private sector care hence the expectation is that there is a significant impact of the voucher especially on the use of private daycare.

The distribution of propensity scores is reported in Figure 3. The top histogram corresponds to the treated (*G=1*) group, while the bottom histogram corresponds to the control (*G=0*) group. In these histograms, each bin has a width of 0.05. Figure 3 shows that there is thick support providing strong identification throughout the distribution of propensity scores.

[FIGURE 4 ABOUT HERE]

Table 3 reports propensity score matching estimates of the impact of the private daycare voucher for the whole country. Nearest neighbor matches are reported with a caliper of 0.1, 0.01 and 0.005. Similarly, kernel estimates use a bandwidth of 0.1, 0.01 and 0.005. As

[18] These municipalities are identified as suffering from excess demand for daycare by the Ministry for Social Affairs and Health in Finland in their publication "Lasten päivähoitoselvitys – syyskuu 1997".

indicators of match quality, the table reports the proportion of matched treated observations and, as an indicator of the thickness of the common support, the number of control observations accounting for 50% of the matches[19]. When a few controls are used several times, the precision of the estimates suffers (Abadie and Imbens, 2002). Standard errors are obtained by bootstrap with 100 replications.

[TABLE 3 ABOUT HERE]

None of the estimates for the younger age group are significant. On the other hand, for the older age group the use of private daycare has increased significantly as a result of the experiment. The nearest neighbor kernel gives a 3-4 percentage point increase for the use of private daycare, while using the Epanechnikov kernel the impact increases to up to 5 percentage points. Even the nearest neighbor estimates with a caliper of 0.005 results in over 95% of common support with 176 observations accounting for 50% of the matches.

The estimates for *LFP* and *PUB* are not significantly different from zero, hence the new entrants to private care were previously using informal childcare while being employed.

6.2 Areas of excess demand

Municipalities that experience excess demand for daycare are expected to exhibit a zero or a positive impact of the voucher on the labor force participation. The former result would occur if new users had moved from informal care use to private care customers whereas in the latter case the private daycare voucher would release previously non-employed mothers to work. In the data it is possible to identify three municipalities within the experiment region that experienced excess demand for daycare prior to the voucher experiment. The following

[19] These statistics are reported for the nearest neighbor estimates only but they are the same for the Epanechnikov kernel estimates.

analysis includes these three municipalities as the treated while the non-experimental municipalities provide a control group.

[FIGURE 5 ABOUT HERE]

The results in Table 4 give the impact of the private daycare voucher on *LFP*, *PUB* and *PRIV* of the treated group in the areas that experienced excess demand for daycare. The results are reported separately for the mothers of children aged between 0-2 and 3-6. The distributions of propensity scores are reported in Figure 4 and show somewhat less support at the right-hand tail of the distribution that the estimates for the whole country.

[TABLE 4 ABOUT HERE]

Similarly to the results for the whole country, the results for the 0-2 year olds are insignificant with respect to *LFP* or the use of either type of care. The impact on *PRIV* is substantial for the older age group with a significant increase in use of between 6-7 percentage points. The matching is not as good as for the whole country; the percentage matched drops to between 90-96% matched. However, as a proportion of the treated observations the support is thicker than previously although sample sizes go down considerably. A weak positive impact on *LFP* is also found with both sets of estimates ranging from 5-7 percentage points.

The estimates for the areas of excess demand also show the differences between the matching methods. With the Epanechinov kernel (*EK*), there is a trade-off between bias and precision and, as shown with the *EK* estimates, the variance overall is lower than for nearest neighbor.

Interestingly, *EK* provides significant positive estimates for the use of public care as a result of the private care voucher (8-10 percentage points). This finding supports Epple and

Romano (1996), whose theoretical framework predicts that the combined public and private use of a good, such as daycare, will be higher under a "dual-provision regime" such as analyzed here, than under either alternative. However, the results for the whole country reported in Section 6.1 reject their prediction.

As an overall conclusion, the impact of the private care voucher is positive for the use of private daycare. The results regarding labor force participation and use of public care are more open to interpretation , however, weighing the pros and cons leads to less weak support for any impact on labor force participation and use of public care.

7. Conclusion

This paper provides experimental estimates on labor participation as well as public and private daycare use of a switch from a predominantly public daycare system to a quasi-market with a voucher for private daycare.

The main finding is that consumers reacted positively to the introduction of a private daycare voucher, moving from informal care use to customers of private daycare. The use of private care increased by 3 to 5 percentage points for older pre-school age children. None of the estimates are significant for the 0-2 age group. However, since the use of public daycare did not decrease concomitantly, this raises some doubts regarding the ability of the private provision to decrease the dead-weight losses associated with public care provision, at least in the short-run.

Most likely the increased use of private daycare relieved some previously unmet demand for daycare that the public sector could not provide, for example, increased flexibility. This conclusion is supported by findings for areas of the country that suffered from excess demand for daycare. In excess demand areas, the labor force participation increased by over 5

percentage points, while public and private daycare use increased by 5-9 percentage points each.

Interestingly, the combined public and private use of daycare is found to be higher under a "dual-provision regime" than under either alternative in areas with excess demand for daycare, but not in the whole country.

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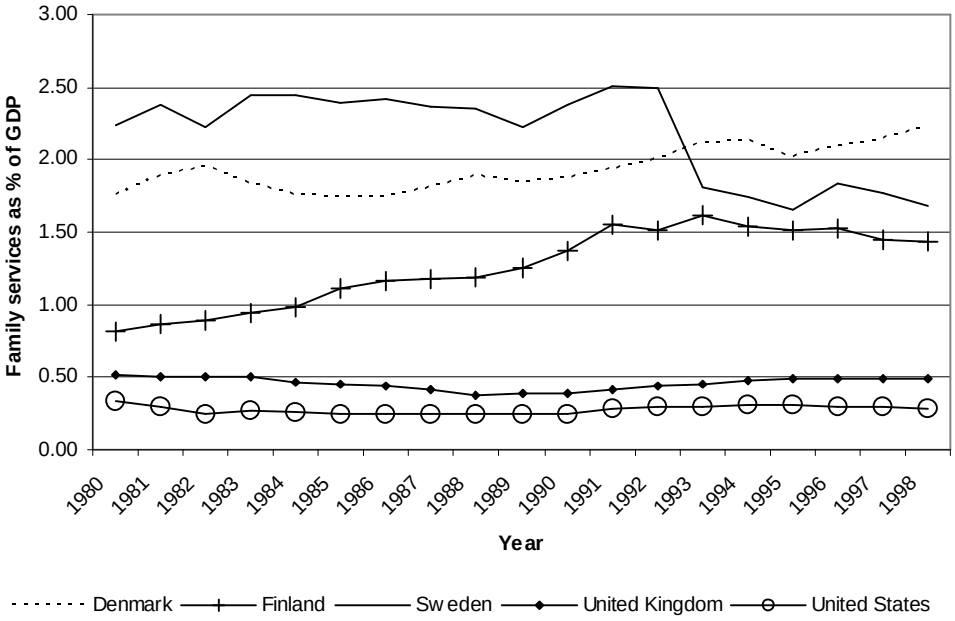
Figure 1: Expenditure on family services, % of GDP



Source: OECD Social Expenditure Database
Note: Family services includes the following sub-categories: formal daycare, personal services, household services, other family benefits in kind.

Figure 2: Budget constraint effect of a private daycare voucher

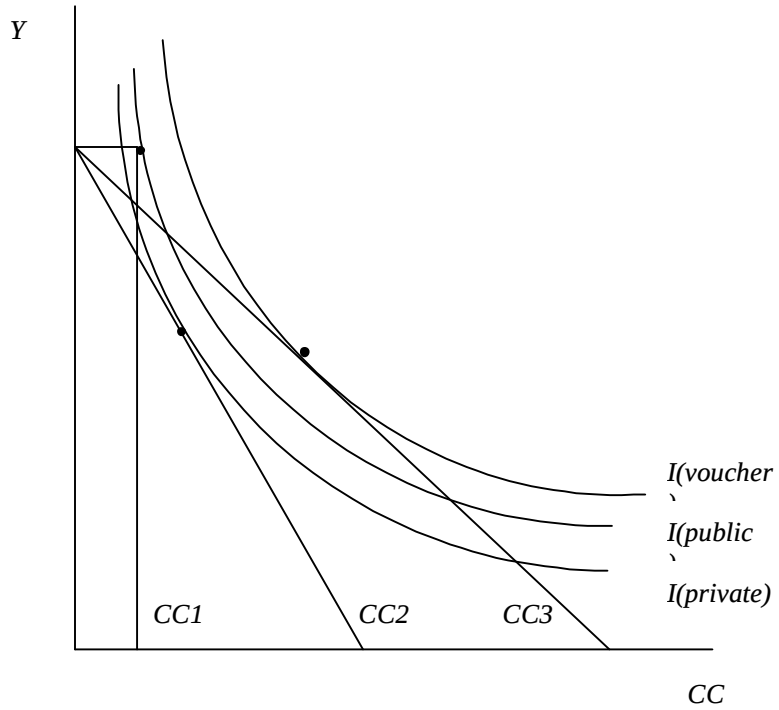
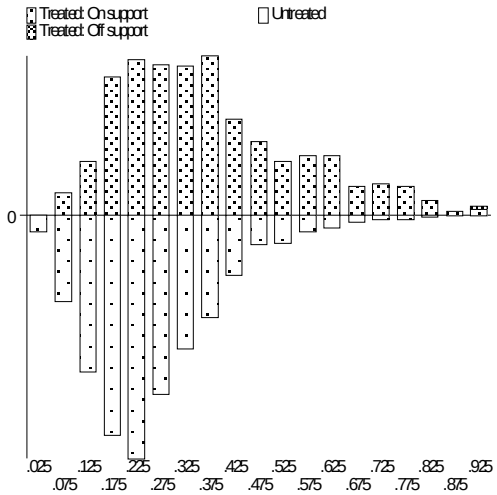


Figure 3: Distribution of propensity scores in whole country

0-2 year olds



3-6 year olds

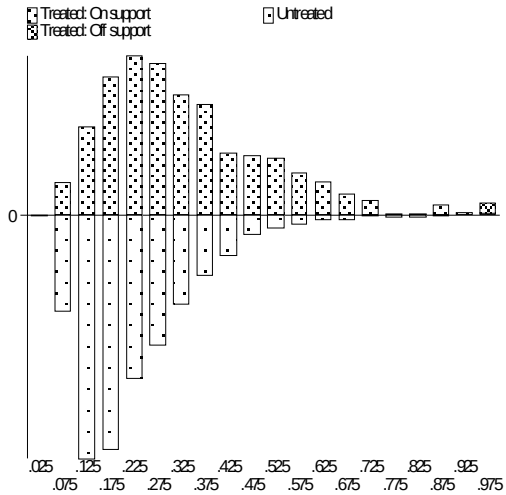
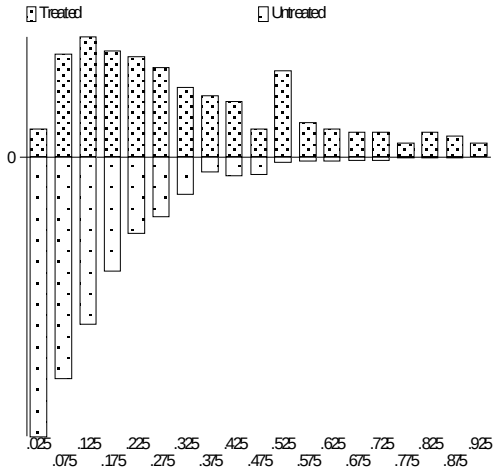


Figure 4: Distribution of propensity scores in areas of excess demand

0-2 year olds



3-6 year olds

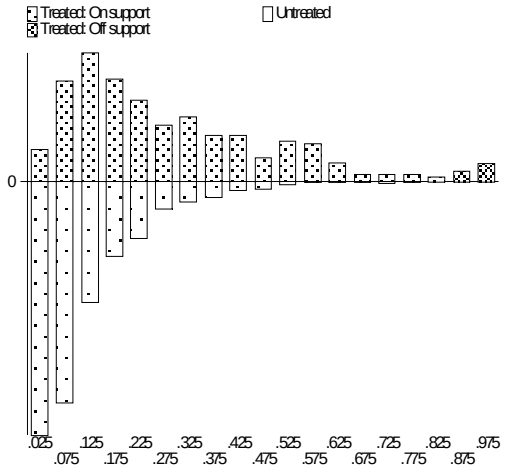


Table 1: Sample derivation (1994-97)

	Number of observations
Original 1994-97 data	29,083
Drop voucher problem regions	27,676
Drop households without 0-6 year olds	20,427
Drop men and children	5,904
Drop single parents	4,511
Drop if father not employed	4,355
Drop 1994	1,525
Expand data by child aged 0-6	5,126

Table 2: Pre-experiment summary statistics (1994)

	Control G=0		*Treated G=1*		*Difference*
LFP	0.692	(0.462)	0.665	(0.473)	
PUB	0.347	(0.476)	0.417	(0.494)	**
PRIV	0.038	(0.191)	0.115	(0.320)	***
Age	32.605	(4.874)	32.977	(4.563)	**
Dad's age	35.622	(5.476)	34.900	(5.118)	
No. of children <7	1.838	(0.870)	1.772	(0.673)	
Age of youngest child	2.200	(1.867)	2.223	(1.789)	
Size of household	4.613	(1.375)	4.297	(1.017)	***
Mother's schooling					
Compulsory school	0.106	(0.308)	0.102	(0.303)	
Baccalaureate	0.450	(0.465)	0.366	(0.482)	**
Baccalaureate plus vocational	0.316	(0.465)	0.309	(0.463)	
Bachelors	0.048	(0.213)	0.046	(0.210)	
Masters and above	0.081	(0.270)	0.177	(0.375)	***
Father's schooling					
Compulsory school	0.181	(0.385)	0.118	(0.323)	***
Baccalaureate	0.485	(0.500)	0.348	(0.476)	***
Baccalaureate plus vocational	0.165	(0.371)	0.156	(0.378)	
Bachelors	0.065	(0.247)	0.100	(0.310)	**
Masters and above	0.104	(0.303)	0.279	(0.415)	***
Capital region	0.001	(0.030)	0.499	(0.501)	***
Cities	0.373	(0.484)	0.274	(0.446)	***
Densely populated municipalities	0.194	(0.396)	0.120	(0.326)	***
Rural municipalities	0.432	(0.496)	0.107	(0.310)	***
Unemployment rate	0.213	(0.047)	0.158	(0.050)	***
Number of observations	1,134		391		

Note: Standard deviations in parenthesis. *** denotes significance at 1% level, ** at 5% level and * at 10% level of significance.

Table 3: Propensity score matching estimates for whole country (1995-97)

	LFP		*PUB*		*PRIV*		
	Age 0-2	*Age 3-6*	*Age 0-2*	*Age 3-6*	*Age 0-2*	*Age3-6*	
NN 0.1	-0.012	-0.006	0.028	0.003	0.019	0.043	**
	(0.036)	(0.026)	(0.035)	(0.036)	(0.015)	(0.019)	
	[99.83]	[99.24]	[99.83]	[99.24]	[99.83]	[99.24]	
	{104}	{164}	{104}	{164}	{104}	{164}	
NN 0.01	-0.012	-0.006	0.021	0.009	0.018	0.039	**
	(0.038)	(0.026)	(0.034)	(0.035)	(0.015)	(0.018)	
	[97.24]	[97.72]	[97.24]	[97.72]	[97.24]	[97.72]	
	{108}	{170}	{108}	{170}	{108}	{170}	
NN 0.005	-0.011	-0.011	0.018	0.013	0.018	0.030	*
	(0.039)	(0.026)	(0.033)	(0.034)	(0.015)	(0.018)	
	[95.17]	[95.82]	[95.17]	[95.82]	[95.17]	[95.82]	
	{108}	{176}	{108}	{176}	{108}	{176}	
EK 0.1	-0.009	-0.009	0.004	0.010	0.014	0.051	***
	(0.023)	(0.018)	(0.024)	(0.021)	(0.011)	(0.013)	
EK 0.01	-0.014	-0.008	0.005	0.003	0.005	0.050	***
	(0.025)	(0.020)	(0.025)	(0.021)	(0.012)	(0.015)	
EK 0.005	-0.012	-0.005	0.012	0.011	0.004	0.038	**
	(0.027)	(0.020)	(0.025)	(0.022)	(0.013)	(0.015)	
N	2,006	3,120	2,006	3,120	2,006	3,120	
T	580	790	580	790	580	790	

Note: LFP: labor force participation. PUB: use of public daycare. PRIV: use of private daycare. NN: nearest neighbour. EK: Epanechnikov kernel. N: number of observations. T: number of treated observations. Standard errors reported in parentheses. Standard errors obtained by bootstrapping (100 replications). *** denotes significance at 1% level, ** at 5% level and * at 10% level of significance. Percentage of treated observations matched to a control observation in square brackets. Number of control observations responsible for 50% of matches in curly brackets.

Table 4: Propensity score matching estimates for areas of excess demand (1995-97)

	LFP			*PUB*			*PRIV*		
	Age 0-2	*Age 3-6*		*Age 0-2*	*Age 3-6*		*Age 0-2*	*Age3-6*	
NN 0.1	-0.033	0.065	*	-0.030	0.063		0.000	0.073	***
	(0.042)	(0.037)		(0.050)	(0.053)		(0.020)	(0.026)	
	[100.00]	[96.72]		[100.00]	[96.72]		[100.00]	[96.72]	
	{48}	{77}		{48}	{77}		{48}	{77}	
NN 0.01	-0.018	0.068	*	-0.011	0.070		-0.004	0.065	***
	(0.045)	(0.038)		(0.043)	(0.051)		(0.022)	(0.025)	
	[93.65]	[93.18]		[93.65]	[93.18]		[93.65]	[93.18]	
	{57}	{83}		{57}	{83}		{57}	{83}	
NN 0.005	-0.035	0.056		-0.019	0.073		-0.012	0.062	**
	(0.048)	(0.039)		(0.040)	(0.051)		(0.024)	(0.026)	
	[86.29]	[89.39]		[86.29]	[89.39]		[86.29]	[89.39]	
	{64}	{89}		{64}	{89}		{64}	{89}	
EK 0.1	0.018	0.052	**	0.016	0.095	***	0.018	0.063	***
	(0.027)	(0.025)		(0.039)	(0.030)		(0.014)	(0.021)	
EK 0.01	0.036	0.052	*	0.030	0.080	**	0.020	0.061	***
	(0.032)	(0.029)		(0.038)	(0.032)		(0.015)	(0.019)	
EK 0.005	0.029	0.038		0.028	0.085	***	0.010	0.059	***
	(0.035)	(0.027)		(0.036)	(0.030)		(0.017)	(0.020)	
N	1,721	2,718		1,721	2,718		1,721	2,718	
T	299	396		299	396		299	396	

Note: LFP: labor force participation. PUB: use of public daycare. PRIV: use of private daycare. NN: nearest neighbour. EK: Epanechnikov kernel. N: number of observations. T: number of treated observations. Standard errors reported in parentheses. Standard errors obtained by bootstrapping (100 replications). *** denotes significance at 1% level, ** at 5% level and * at 10% level of significance. Percentage of treated observations matched to a control observation in square brackets. Number of control observations responsible for 50% of matches in curly brackets.