Vikman, Ulrika

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Ulrika Vikman

Department of Economics
Uppsala University
P.O. Box 513
SE-751 20 Uppsala
Sweden
Fax: +46 18 471 14 78

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Does Providing Childcare to Unemployed Affect Unemployment Duration?*

Ulrika Vikman †

May 6, 2010

This paper examines if the probability of leaving unemployment changes for unemployed parents with young children when childcare is available. To investigate this, I use the heterogeneity among Swedish municipalities before the implementation of a 2001 Swedish childcare reform making it mandatory for municipalities to offer childcare to unemployed parents for at least 15 hours per week. In the study difference-in-differences and difference-in-difference-in-differences methods are used. The results indicate a positive effect on the probability of leaving unemployment for mothers when childcare is available, but no effect is found for fathers. For mothers, some heterogeneous effects are also found, with a greater effect on the probability of leaving unemployment for work when childcare is available for mothers with only compulsory schooling or university education and mothers with two children.

Keywords: Unemployment duration, Childcare.
JEL: J13, J64

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†Department of Economics, Uppsala University, Ulrika.Vikman@nek.uu.se

1 Introduction

This paper evaluates whether making childcare available for unemployed parents affects their probability of finding work. In Sweden subsidized childcare is available for all families with young children when both parents work. A reform implemented in July 2001 forced Swedish municipalities to also offer childcare to unemployed parents for at least 15 hours per week. The reform was mainly motivated for child investment reasons, but an additional aim with the reform was to make it easier for unemployed parents to search and find work. It is therefore interesting to see if the reform affected the parents' probability to start working.

According to search theory, an unemployed individual may influence his or her probability of receiving a job offer through the intensity and time that the individual devotes to searching for work. An unemployed individual will accept a job offer if the wage is equal to or larger than the individual's reservation wage (for a review of search theory, see Mortensen 1987).

Offering childcare to unemployed parents may change both their search intensity and reservation wage and therefore the probability of leaving unemployment for work. For an unemployed parent with a young child, two obstacles to leaving unemployment exist when there is no childcare available for them. The first is finding time to search for a job while caring for the child. The second is finding temporary childcare after being offered a job until the child can be put in regular childcare. Although all working parents in Sweden are offered childcare, there is usually some waiting time

before a parent entering the workforce can find a childcare placement for his or her child[1]. When unemployed parents are offered childcare, these obstacles are reduced, and the duration of unemployment might decrease.

There may, however, be an opposite effect if an unemployed parent is offered childcare. If the unemployed parent appreciates time at home without the child, this extra leisure time increases the parent's utility and then decreases his or her willingness to start working, or increases the parent's reservation wage, which might increase the duration of unemployment. Thus, childcare for unemployed parents makes it possible for the parent to increase his or her search intensity, but it may also increase the parent's reservation wage. The net effect is therefore an empirical question.

This paper is related to two strands of the literature. The first is search theory and determinants of unemployment duration. Empirically, both labor market conditions and individual characteristics have been evaluated (see, for example, Røed and Zhang 2003, Arulampalam 2001 and Carroll 2006, who evaluate the effects of unemployment insurance, scarring from earlier unemployment spells and individual characteristics on unemployment duration). The second is the literature on the effect of subsidized childcare on the female labor supply in particular (for a survey, see Anderson and Levine 2002). Both lack of childcare availability and the cost of childcare are barriers to employment, especially for low-income families (Kisker and Ross 1997). What differs in this study is that the parents have already decided to enter the labor force, and childcare is always available

[1]In the majority of the municipalities, most parents who apply for childcare in May are offered a placement in September, when older children leave childcare for preschool. At other times of the year, some municipalities find it harder to offer childcare.

for parents leaving unemployment. In this paper, I join the two strands of literature by evaluating how availability of childcare during unemployment affects unemployment duration. To my knowledge, this has not been done before.

Before the reform, implemented in July 2001, a majority of the municipalities offered childcare to unemployed parents. This heterogeneity permits the use of a difference-in-differences (DD) approach to evaluate the effects of childcare availability on the probability of leaving unemployment. As the childcare reform did not affect parents whose youngest child was old enough to be in preschool class[2] or primary school, these parents can be used as a control group in the estimation, making it possible to also use a difference-in-difference-in-differences (DDD) strategy. To include all unemployed parents, not just those leaving unemployment for work, the DD (and DDD) strategy will be applied to a proportional hazard model (see section 3.3) to determine how the probability of finding work (hazard rate) changes for unemployed parents when childcare is available[3].

In the DD estimation, two different control groups are used: parents with young children in control municipalities and parents in treatment municipalities whose youngest children are old enough to be enrolled in preschool class or primary school. Both control groups are used in the DDD estimation. In the first DD estimation, using parents in other municipalities as the control, positive and significant effects of childcare

[2]Preschool class, compared to childcare, is more similar to primary school, but it is not compulsory; see section 2.1.

[3]The same strategy is used by Clotfelter et al. (2008), using a policy intervention in North Carolina to evaluate whether higher salaries keep teachers in high-poverty schools.

availability on the probability of finding work are found for mothers with young children. Unfortunately, positive effects are also found in placebo estimations, but the point estimates are smaller. When the second control group is used, the sample size decreases, and all estimates are insignificant. When controlling for several individual characteristics and time effects in the DDD estimation, I find that the probability of leaving unemployment increases by 17 percent for mothers when childcare is available, significant at the 5 percent level. For fathers with young children, no effects are found in any of the estimations.

For mothers, some heterogeneous effects are also found. Mothers with only compulsory school or any university education had a higher probability of finding work when childcare was available, while no effect could be found for those mothers with a high school education of two years or less. Likewise, no effect could be found for mothers with only one child, while mothers with two children had a 35 percent higher probability of finding work when childcare was available during unemployment.

The remainder of the paper proceeds as follows: section 2 summarizes family policies in Sweden, particularly the Swedish childcare reform; in section 3, the econometric method is described; and section 4 presents the data. The results are discussed in section 5 before concluding in section 6.

2 Childcare and the childcare reform in Sweden

2.1 Family policies in Sweden

Sweden has very generous family policies compared to other European countries. At the time for this study there were paid parental leave for 390 days[4], pay for care of sick children, cash support and subsidized childcare (for an overview, see Björklund 2006). Both mothers and fathers utilize the paid parental leave, but most parents then return to their employment. In 2001, 43.3 percent of all one-year-old children and 79.3 percent of all two-year-old children in Sweden were in childcare (Swedish National Agency for Education 2002). The municipalities are responsible for ensuring that childcare is available for those parents that are entitled to childcare according to the law, and the fees are largely subsidized. The municipalities may make agreements with other parties to provide the actual childcare services (SFS 1985). To guarantee high-quality childcare, a preschool curriculum including goals and guidelines for the activities offered in childcare was created in Sweden in 1998 (Swedish National Agency for Education 1998).

In Sweden, municipalities must provide free preschool classes beginning in the autumn of the year in which the child turns six years old. One year later, the child starts compulsory school. In the 2001-2002 school year, 93 percent of all six-year-old children in Sweden attended a preschool class (Swedish National Agency for Education 2002).

[4]In January 2002, this was extended to 480 days.

2.2 The childcare reform

The Swedish childcare reform implemented between July 2001 and January 2003 consists of four parts. Offering childcare to unemployed parents, the part of the reform investigated in this study, was the first to be implemented, in July 2001. Both the second and third parts were introduced in January 2002. The second part made it mandatory for municipalities to offer childcare for at least 15 hours each week, for children whose parents are on parental leave with a younger sibling. The third part introduced a cap on childcare prices, leading to a considerable reduction in childcare costs (for an evaluation of this part, see Lundin et al. 2008). This part was not mandatory for the municipalities, but those that introduced the cap were offered extra grants by the central government. The fourth part, implemented in January 2003, was the introduction of universal free childcare for all four- and five-year-old children for at least 525 hours per year (Swedish National Agency for Education 2007). The part of the reform used in this study was implemented mainly to prevent isolation of the children of unemployed parents and to increase their opportunity to meet other children and take part in childcare activities, but the government also thought that the reform would allow unemployed parents to search for work more effectively (Swedish National Agency for Education 1999).

During the spring of 1998 and the spring of 2001, the Swedish National Agency for Education conducted surveys to see in which municipalities unemployed parents were offered childcare. Two questions were asked: first, could parents who already had a childcare placement keep the child

in childcare if they became unemployed, and second, would childcare be available for unemployed parents where the child had not been in childcare before?

In the analysis, the municipalities are grouped according to their responses to the first question. For some parents in the control group, the variable indicating that childcare is available will then be wrong, indicating that childcare is available when it is not. Because this categorization will put some parents who should be in the treatment group in the control group, the effect of childcare availability will be underestimated[5].

The municipalities can then be divided into three different groups according to their responses to the surveys. The first group consists of those municipalities that did not offer unemployed parents any childcare. This is the clean treatment group of municipalities in the estimations. The second group consists of those municipalities where unemployed parents could keep their childcare placement, but only for a limited number of months (ranging from 2 to 12 months). Parents in this group of municipalities will belong to either the control or treatment group depending on how long they have been unemployed in relation to how many months childcare is available[6]. In the third group of municipalities, unemployed parents could keep their childcare placement with no restrictions in months even before the reform. Therefore, the reform introduced no change, and these munic-

[5]This problem will be minimized by only including those parents with unemployment insurance because to be eligible for UI, the parent must have been employed previously and would thus have had childcare available; see section 4.

[6]Because a proportional hazard model is used, variables may change in the estimation; therefore, it is possible for parents in these municipalities to change from control status to treatment status. See section 3.3

ipalities are used as the control group. A total of 208 municipalities were classified into these three groups, and the number of municipalities in each group is shown in table 1. The remaining 81 Swedish municipalities did

Table 1: Municipality Groups

Municipalities where:	
1. Clean Treatment Group (Childcare was not available for unemployed parents before the reform)	14
2. Treatment and Control (Childcare was available for a limited number of months before the reform)	43
3. Clean Control Group (Childcare was available with no time limits before the reform)	151

not respond to one or both surveys or changed their policies. Because it is not possible to know when they changed their policies, they are removed from the analysis.

The control municipalities also offered different amount of hours in childcare to unemployed parents ranging between 3 hours per week to no time restriction There were however only 9 control municipalities offering less than 15 hours of childcare per week before the reform. In the analysis I only take into account if childcare is available for any hours since the parent then have at least some time to search for work and if offering a job the child has a childcare placement.

Since the municipalities are responsible for providing subsidized childcare, and also do it to a very large extent, there are few alternative childcare services in Sweden. The implication is that for those families where publicly provided childcare was not available before the reform there existed basically no other alternatives; if the parent became unemployed, the child

had to leave childcare.

In table 2, descriptive statistics (means) for the different municipality groups are shown for the year 2000. As can be seen, the unemployment rate is higher in the treatment municipalities, and these municipalities also have smaller populations on average. The cohort sizes of children aged 2-6 years and the shares of women are similar for all three groups, while the share of immigrants is slightly smaller in those municipalities that, before the reform, only offered childcare to unemployed parents for a limited number of months.

Table 2: Descriptive statistics (means) of municipality groups, 2000

	Treatment	Limited	Control
Unemployment (%)	4.952	3.994	4.144
Population	18,566	20,145	35,607
Children age 2-6	0.054	0.054	0.055
Immigrants	0.106	0.087	0.107
Women	0.500	0.498	0.500
N	14	43	151

The reform had a positive effect on the rate of participation in childcare among children of unemployed parents. The share of children of unemployed parents in childcare increased from 65 percent in 1999 to 82 percent in 2002, when the reform was implemented (Swedish National Agency for Education 2003). As the unemployment rate decreased during the same period of time, the total number of children of unemployed parents in childcare was unchanged, but the changes are heterogeneous across the groups of municipalities.

Unfortunately, the childcare reform was not the only reform imple-

mented on July 1, 2001, that may have had an effect on unemployed parents' probability of entering the workforce. On the same date, the first part of an unemployment insurance reform that introduced a new two-tiered benefit structure for some individuals and raised the benefit level was implemented. Bennmarker et al. (2007) used this reform to evaluate whether the higher benefits increased the unemployment duration. They found, consistent with theory, that unemployment durations increased for men, but for women, the unemployment duration decreased. They mentioned the Swedish childcare reform as a plausible explanation for the difference between men and women. This UI reform affected those with higher earlier earnings more, and although I am not able to control for earlier earnings, heterogeneous effects over education could be expected if this reform had a differential effect on individuals with higher earlier wages. Education level is included as a control variable in the estimations, but I also divide the sample according to education to search for heterogeneous effects; see section 5.3.

3 Econometric method

3.1 Difference-in-differences

In difference-in-differences (DD), the identifying assumption is that there are parallel trends between the treatment group and the control group. If this assumption is fulfilled, the estimation gives the treatment effect of the treated. In this case, the treatment group consists of those parents

with children aged between two and six years living in municipalities that did not offer any childcare to unemployed parents before the reform. It is then possible to use two different control groups. The first consists of parents with children of the same age living in municipalities where childcare was available for unemployed parents before the reform, that is, the control municipalities. The second consists of unemployed parents whose youngest child is aged between six[7] and ten years living in the same municipalities as the treatment group. These parents with older youngest children were not affected by the childcare reform because their children attend school every day, giving them time to search for jobs. In summary, the treatment group consists of target parents living in treatment municipalities, the first control group consists of target parents living in control municipalities, and the second control group consists of non-target parents living in treatment municipalities.

The first DD estimation with control municipalities is then given by:

$$\mathbf{x}'\boldsymbol{\alpha} = \alpha_1 Z^m + \alpha_2 Z^t + \alpha_3 Z^m Z^t \tag{1}$$

where Z^mequals one if the municipality did not offer childcare to unemployed parents before the reform and Z^t equals one after the reform date. α_3 is the DD parameter estimating the effect of childcare availability on the probability for the target parents in the treatment municipalities to start working. The second DD estimation, using non-target parents as the

[7]If the child is six years old, he or she will be in childcare during the spring and begin preschool class in August. Unemployed parents with six-year-old children will then be in the target group until July, and from August onward they will be in the non-target group.

control group, is given by:

$$\mathbf{x}'\boldsymbol{\lambda} = \lambda_1 Z^a + \lambda_2 Z^t + \lambda_3 Z^a Z^t \tag{2}$$

where Z^a equals one if the parent belongs to the target group (that is, if the parent's youngest child is between two and six years old) and λ_3 is the DD parameter.

To obtain an unbiased estimator in equation 1, the assumption is that the trends are equal for unemployed parents with young children in the different municipalities. For equation 2 to give an unbiased estimator, the trend has to be equal for parents with children of different ages within the municipalities. Estimations are performed with both control groups, both with and without additional covariates, to control for differences in the groups and thereby increase the efficiency of the estimation.

In ordinary DD estimation, the control group is untreated, but in this case, the control group is treated all the time (as with parents in the control municipalities, equation 1) or can be seen as treated all the time (as with parents with older youngest children, equation 2). Instead of the interaction term, I will therefore use a dummy, $CC_{m(a)t}$, that equals one if childcare (or school for parents with older children) is available for the unemployed parent. In the first DD estimation, in which the control group consists of target parents in the control municipalities, even those parents living in municipalities that only offered childcare for a limited number of months will be included. Because the covariates are allowed to vary in the hazard model, a parent who was unemployed for more months than childcare

was available before the reform will first have childcare ($CC_{mt} = 1$) and then lose it ($CC_{mt} = 0$). To control for any difference between these municipalities and the others, an additional dummy variable for municipality, Z^{m2}, that equals one if the parent was living in one of the municipalities only offering childcare for a limited number of months before the reform is included. In the estimation with additional covariates, the equation then becomes[8]:

$$\mathbf{x}'\boldsymbol{\alpha} = \alpha_1 Z^{m1} + \alpha_2 Z^{m2} + \alpha_3 Z^t + \alpha_4 CC_{mt} + \alpha_5 u_{mt} + \boldsymbol{\gamma}\mathbf{S}(\mathbf{t}) + \boldsymbol{\delta}\mathbf{W}(\mathbf{i}) \qquad (3)$$

where u_{mt} is local unemployment, $\mathbf{S}(\mathbf{t})$ captures seasonal effects and $\mathbf{W}(\mathbf{i})$ controls for individual characteristics. In the DD estimation when parents with older youngest children are in the control group, only municipalities that did not offer childcare before the reform are included, and the estimation with additional covariates is:

$$\mathbf{x}'\boldsymbol{\lambda} = \lambda_1 Z^a + \lambda_2 Z^t + \lambda_3 CC_{at} + \lambda_4 u_{mt} + \boldsymbol{\gamma}\mathbf{S}(\mathbf{t}) + \boldsymbol{\delta}\mathbf{W}(\mathbf{i}) \qquad (4)$$

Because there is one additional dimension to compare over, it is possible to run placebo estimations. The placebo estimation for equation 3 will be run with only non-target parents with older youngest children. The parents living in treatment municipalities where childcare were not available before the reform will, in this placebo estimation, have $CC_{mt} = 0$ before the

[8] $Z^{m1} = 1$ for those municipalities that did not offer any childcare before the reform, and $Z^{m2} = 1$ for those municipalities offering childcare for a limited number of months. Both are otherwise equal to zero.

reform date and $CC_{mt} = 1$ after. The placebo estimation for equation 4 uses the control municipalities where childcare was available for unemployed parents before the reform, but parents with younger children will have $CC_{at} = 0$ before the reform date.

If α_4 and λ_3 are close to zero in the placebo regressions this indicates that the assumptions are realistic. If this is not the case in any of the estimations, there may be both municipality trends and trends within groups of parents with the youngest child of different ages. To control for both of these trends, difference-in-difference-in-differences (DDD) estimation can be used.

3.2 Difference-in-difference-in-differences

In a basic DDD-estimation, $\mathbf{x}'\boldsymbol{\beta}$ is given by:

$$\mathbf{x}'\boldsymbol{\beta} = \beta_1 Z^m + \beta_2 Z^a + \beta_3 Z^t + \beta_4 Z^m Z^a + \beta_5 Z^m Z^t + \beta_6 Z^a Z^t + \beta_7 Z^m Z^a Z^t \qquad (5)$$

where Z^m indicates if a municipality did not offer childcare before the reform, Z^a indicates if the parent belongs to the target group with the youngest child between two and six years old and Z^t indicates time after the reform. β_7 gives the effect of childcare because $Z^m Z^a Z^t$ measures the difference in availability of childcare for the target group in the treatment municipalities. As in the DD estimation, I use CC_{mat}, which equals one if childcare (or school) is available instead of $Z^m Z^a Z^t$. The difference for the target group in the treatment municipalities when childcare is available will still be measured by β_7, as can be seen in table 3.

As in the first DD estimation, apart from the change of the DDD variable

Table 3: Difference-in-difference-in-differences

Treatment municipality $Z^m = 1$	After $Z^t = 1$	Before $Z^t = 0$	Diff: After-Before
Target $Z^a = 1$	$\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 + \beta_7$	$\beta_1 + \beta_2 + \beta_4$	$\beta_3 + \beta_5 + \beta_6 + \beta_7$
Non target $Z^a = 0$	$\beta_1 + \beta_3 + \beta_5 + \beta_7$	$\beta_1 + \beta_7$	$\beta_3 + \beta_5$
DD_T			$\beta_6 + \beta_7$
Control municipality $Z^m = 0$	After $Z^t = 1$	Before $Z^t = 0$	Diff: After-Before
Target $Z^a = 1$	$\beta_2 + \beta_3 + \beta_6 + \beta_7$	$\beta_2 + \beta_7$	$\beta_3 + \beta_6$
Non target $Z^a = 0$	$\beta_3 + \beta_7$	β_7	β_3
DD_C			β_6
$DDD=DD_T-DD_C$			β_7

to CC_{mat} in equation 5, I include an additional variable for those municipalities offering childcare for a limited number of months before the reform, Z^{m2}, in addition to interactions of this variable with Z^a and Z^t. I also include u_{mt}, $\mathbf{S(t)}$ and $\mathbf{W(i)}$ to control for local unemployment, seasonal effects and individual characteristics.

The full model to be estimated will be:

$$\begin{aligned}\mathbf{x'\beta} =& \beta_1 Z^{m1} + \beta_2 Z^{m2} + \beta_3 Z^a + \beta_4 Z^t + \beta_5 Z^{m1} Z^a + \beta_6 Z^{m2} Z^a + \beta_7 Z^{m1} Z^t \\ &+ \beta_8 Z^{m2} Z^t + \beta_9 Z^a Z^t + \beta_{10} CC_{mat} + \beta_{11} u_{mt} + \boldsymbol{\gamma}\mathbf{S(t)} + \boldsymbol{\delta}\mathbf{W(i)}\end{aligned} \tag{6}$$

In both the DD and the DDD estimations, the standard errors are clustered on municipalities.

Because childcare has traditionally been performed by mothers, the availability of childcare to unemployed parents may affect mothers and

fathers differently. Therefore, the estimations will be done separately for men and women.

3.3 Proportional hazard model

To estimate how the availability of childcare affects the probability of becoming employed for unemployed parents with younger children, the DD and DDD estimations are applied to a proportional hazard model (Cox 1972). In this model, the conditional hazard rate (the probability of leaving unemployment), $\lambda(t|\mathbf{x}, \boldsymbol{\beta})$, is factored into separate functions according to:

$$\lambda(t|\mathbf{x}, \boldsymbol{\beta}) = \lambda_0(t)\phi(\mathbf{x}, \boldsymbol{\beta}) \tag{7}$$

where $\lambda_0(t)$ is the baseline hazard capturing any state dependence and $\phi(\mathbf{x}, \boldsymbol{\beta})$ is a function of $\mathbf{x}(t)$. Only the current value of $\mathbf{x}(t)$ matters, not the entire history of $\mathbf{x}(t)$, but $\mathbf{x}(t)$ is allowed to vary over the unemployment spell. The model is semiparametric, where the baseline hazard is unspecified and the functional form of $\phi(\mathbf{x}, \boldsymbol{\beta})$ is fully specified as:

$$\phi(\mathbf{x}, \boldsymbol{\beta}) = \exp(\mathbf{x}'\boldsymbol{\beta}) \tag{8}$$

The $\boldsymbol{\beta}$-vector is found by partial likelihood estimation, and the baseline hazard drops out in the estimation but may be estimated in a second step. This second step is not done in this study because the interest here is the effect of availability of childcare and not whether there is any state dependence. The results will be interpreted as hazard ratios, $\exp(\beta_i)$. If x_i

changes by one unit, the probability of leaving unemployment will change by $1 - \exp(\beta_i)$.

The strength of this model is that it is possible to include time-varying covariates and handle right-censored data; i.e., a parent whose unemployment spell ends in an outcome other than employment can still be included in the analysis.[9]

4 Data

The data set used in this study includes register data of all individuals in Sweden together with all unemployment spells registered at the labor market office in Sweden. The propensity to register at the labor market office is very high among unemployed individuals because registration is required to receive unemployment benefits.

My sample consists of unemployed parents, with their youngest child being between two and ten years old, who registered at the labor market office between July 2000 and June 2002 and lived in one of the 208 municipalities where it is possible to classify the availability of childcare before the reform[10]. As mentioned in section 2.2, municipalities could offer childcare to unemployed parents differently according to whether or not they already had a childcare placement for their child. To minimize the risk of parents being miscategorized as having childcare in the control municipal-

[9]The problem is whether there is unobserved heterogeneity, which causes a selection problem. If this is the case, β is probably underestimated, but the asymptotic bias is towards zero; see Van den Berg (2001).

[10]see table 1, section 2.2

ities when they did not, only those parents with unemployment insurance are included because an unemployed individual must have some employment history to be eligible for unemployment insurance. Of the mothers in the sample, 83 percent have UI, and for fathers, the number is 88 percent. All spells are censored at the reform date, July 1st, 2001 (or, for spells beginning after the reform date, one year later) because it is very unlikely that the municipalities that did not offer childcare before the reform would be able to provide childcare to all unemployed parents immediately at the reform date.

The time span was chosen to be as close as possible in time to the reform date, but still long enough to control for seasonal effects. Because parents are entitled to paid parental leave for more than a year (390 days at the time of the reform), parents with youngest children older than two years old are used to minimize cases in which an unemployed parent has a spouse on parental leave taking care of the child. Because it is unclear whether childcare is available for unemployed parents participating in labor market programs, these parents' unemployment spells are censored when they participate in any form of program. Also, if a parent's employment is subsidized by the government, the spell is censored. If a parent has temporary work for ten days or less, this is included in the unemployment spell.

To control for individual heterogeneity, I use a large number of covariates, including 5 dummies for education level, 20 dummies for regions, age and age squared, and dummies for being an immigrant, a disabled worker and being married. Seasonal effects are captured by 11 time-varying dummies for month. As all spells are censored on July 1st, a control variable

for entering month will also be included to control for the fact that the unemployment spells are allowed to be of different lengths depending on when the parent became unemployed. Local labor market conditions are captured by time-varying municipal unemployment rates. Sample characteristics and the reasons for ending the unemployment spells are shown in tables 4 and 6 for target parents and tables 5 and 7 for non-target parents. In these tables, parents are divided into groups according to the municipalities in which they live and whether their unemployment spell began before or after the reform date. In the estimation, only ordinary work implies leaving unemployment; the remaining destinations are censored.

Table 4 shows that, for target mothers in the treatment municipalities, the mean unemployment duration is approximately the same after the reform compared with before, while in the other municipality groups, the mean duration increased. There are also more target mothers in the treatment municipalities whose unemployment spells ended in work after the reform. As seen in table 5, this is not the case for the non-target mothers, where no particular change can be seen in spells that end in work. The mean duration increases for the non-target mothers living in the treatment municipalities, but even more for the non-target mothers in the control municipalities. For the non-target mothers living in municipalities only offering childcare for a limited number of months, the mean duration decreases. For the target fathers in the treatment municipalities, the mean unemployment duration decreased (table 6), but it decreased even more for the non-target fathers in the same municipalities. It is also notable in these tables (4-7) that, even though the total shares of immigrants were

Table 4: Descriptive statistics - target women

	Before reform			After reform		
Municipality	Treatment	Limited	Control	Treatment	Limited	Control
Duration (Days)	55.0	57.2	56.6	55.1	60.8	61.4
Age	32.5	32.5	32.8	32.4	32.8	33.1
Immigrants	0.142	0.255	0.247	0.159	0.258	0.254
Married	0.437	0.464	0.458	0.439	0.468	0.469
Elementary school < 9 years	0.0145	0.0237	0.0187	0.0125	0.0236	0.0187
Elementary school	0.115	0.114	0.125	0.126	0.119	0.121
High school ≤ 2 yeras	0.371	0.366	0.354	0.355	0.332	0.327
High school ≤ 3 yeras	0.279	0.281	0.257	0.278	0.289	0.269
University < 3 years	0.150	0.146	0.146	0.167	0.149	0.154
University ≥ 3 years	0.0697	0.0666	0.0948	0.0587	0.0844	0.108
Number of spells	1378	3800	21245	1277	3650	21244
Percent of spells ending in:						
Work	32.37	32.74	33.54	36.81	33.89	33.75
Subsidized work	1.45	0.87	0.93	1.10	0.82	1.07
Labor market program	13.43	12.16	10.11	14.41	11.70	11.52
Other destination	5.37	5.37	6.81	8.46	7.07	8.23
Studies	7.62	7.84	8.05	6.50	6.82	7.23
Censored due to time	39.77	41.03	40.56	32.73	39.70	38.19

Table 5: Descriptive statistics - non-target women

	Before reform			After reform		
Municipality	Treatment	Limited	Control	Treatment	Limited	Control
Duration (Days)	60.4	67.9	60.4	61.1	63.4	67.1
Age	36.7	37.1	37.3	37.1	37.1	37.6
Immigrants	0.157	0.283	0.251	0.196	0.297	0.268
Married	0.485	0.510	0.460	0.468	0.476	0.462
Elementary school < 9 years	0.0168	0.0229	0.0258	0.0190	0.0274	0.0265
Elementary school	0.111	0.135	0.119	0.113	0.114	0.117
High school ≤ 2 yeras	0.409	0.364	0.384	0.392	0.359	0.361
High school ≤ 3 yeras	0.208	0.236	0.202	0.222	0.240	0.211
University < 3 years	0.151	0.151	0.158	0.152	0.150	0.160
University ≥ 3 years	0.104	0.0891	0.108	0.0963	0.107	0.122
Number of spells	952	2448	12877	893	2370	13027
Percent of spells ending in:						
Work	37.18	35.38	35.43	37.40	35.27	35.81
Subsidized work	1.89	1.35	1.12	1.79	1.60	1.42
Labor market program	15.97	11.60	11.70	14.89	13.12	12.24
Other destination	4.52	6.17	6.11	8.96	6.92	7.58
Studies	6.62	6.33	7.95	5.15	8.23	7.37
Censored due to time	33.82	39.17	37.70	31.80	34.85	35.59

Table 6: Descriptive statistics - target men

	Before reform			After reform		
Municipality	Treatment	Limited	Control	Treatment	Limited	Control
Duration (Days)	72.5	68.6	68.5	70.5	72.4	74.7
Age	35.0	36.3	36.1	35.4	36.4	36.3
Immigrants	0.168	0.316	0.295	0.164	0.328	0.294
Married	0.455	0.582	0.551	0.481	0.552	0.565
Elementary school < 9 years	0.0161	0.0297	0.0244	0.0179	0.0284	0.0244
Elementary school	0.102	0.141	0.134	0.099	0.132	0.131
High school ≤ 2 yeras	0.629	0.480	0.465	0.586	0.460	0.429
High school ≤ 3 yeras	0.156	0.162	0.156	0.161	0.169	0.155
University < 3 years	0.0599	0.104	0.120	0.0792	0.118	0.136
University ≥ 3 years	0.0336	0.0800	0.0943	0.0568	0.0918	0.121
Number of spells	685	1950	9759	669	1863	10200
Percent of spells ending in:						
Work	50.95	41.23	44.73	46.79	40.74	42.53
Subsidized work	2.34	2.00	2.38	1.94	2.47	2.18
Labor market program	13.87	13.23	11.24	16.44	13.26	12.35
Other destination	6.42	5.28	6.89	7.62	6.92	7.63
Studies	3.21	3.28	3.87	2.84	3.60	3.28
Censored due to time	23.21	34.97	30.89	24.36	33.01	32.03

Table 7: Descriptive statistics - non-target men

	Before reform			After reform		
Municipality	Treatment	Limited	Control	Treatment	Limited	Control
Duration(Days)	78.4	73.9	75.6	72.7	79.1	82.9
Age	40.4	40.7	40.9	40.5	40.9	41.0
Immigrants	0.163	0.254	0.235	0.167	0.271	0.253
Married	0.604	0.621	0.620	0.620	0.640	0.606
Elementary school < 9 years	0.0244	0.0337	0.0349	0.0190	0.0409	0.0343
Elementary school	0.165	0.158	0.156	0.154	0.155	0.139
High school ≤ 2 yeras	0.578	0.515	0.495	0.582	0.474	0.481
High school ≤ 3 yeras	0.124	0.121	0.125	0.103	0.155	0.129
University < 3 years	0.0750	0.0945	0.0953	0.0989	0.0991	0.108
University ≥ 3 years	0.0338	0.0742	0.0881	0.0437	0.0732	0.106
Number of spells	533	1334	6655	526	1271	6905
Percent of spells ending in:						
Work	53.28	45.95	48.82	53.99	46.50	46.27
Subsidized work	2.06	2.92	2.67	1.90	2.52	3.20
Labor market program	12.76	13.19	11.93	16.54	11.72	12.06
Other destination	6.38	6.52	6.31	7.60	8.34	7.01
Studies	3.19	3.15	3.01	1.14	2.52	2.72
Censored due to time	22.33	28.26	27.26	18.82	28.40	28.73

similar in the treatment and control municipalities (see table 2), the share of unemployed immigrant parents was lower in the treatment municipalities compared with the other municipalities.

Figure 1 shows the fraction of unemployed mothers with young children, leaving unemployment for work in a specific month out of those who were unemployed at the beginning of that month. The solid line

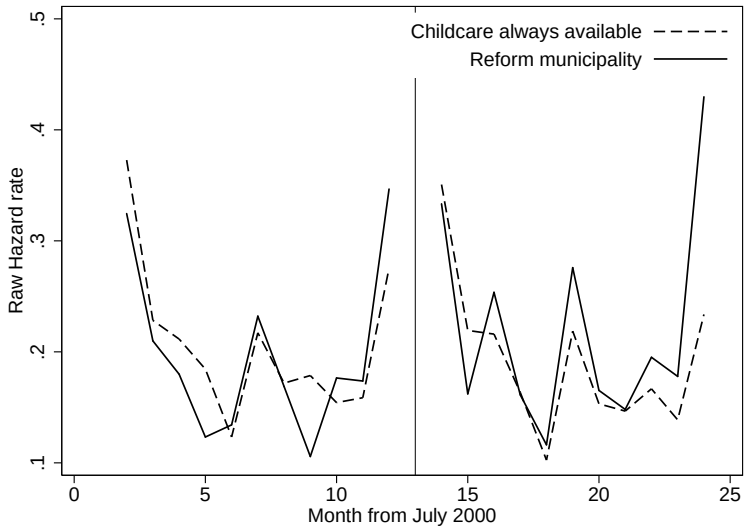

Figure 1: Raw hazard rates, target mothers, July 2000 to June 2002

represent those municipalities where no childcare was available before the reform (treatment municipalities), and the dashed line represents those municipalities where childcare was available without any time restriction before the reform (control municipalities). Mothers living in one of the municipalities only offering childcare for a limited number of months before the reform are not included in the figure[11]. The vertical line indicates

[11]These mothers will be included in the first DD estimation and the DDD estimation, where the treatment status may change.

July 2001, when the reform was implemented. It is hard to see any clear change after the reform, but beginning in October 2001 (month 16), the proportion of unemployed mothers finding work is higher in the treatment municipalities.

If there are municipality-specific reasons other than the availability of childcare causing the difference in the proportions of mothers finding work, we would also see this effect for mothers with older children, as shown in figure 2. Even here, the proportion of mothers finding work is

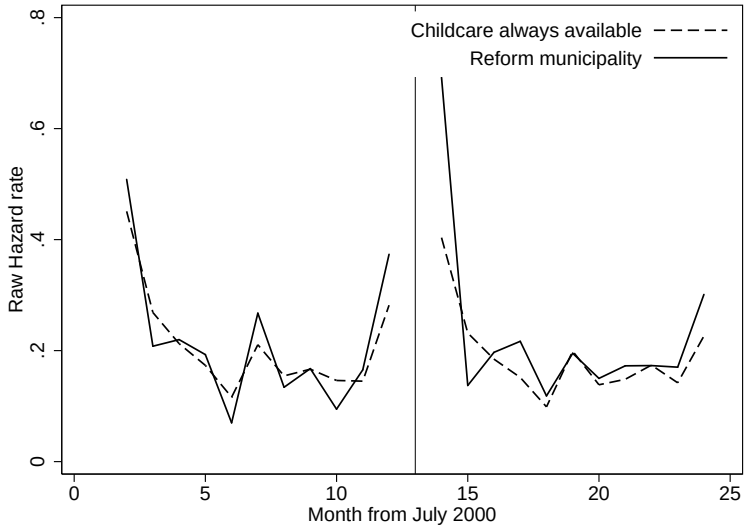

Figure 2: Raw hazard rates, non-target mothers, July 2000 to June 2002

higher at the end of the period, but the effect seems smaller than for the target group.

The same figures for fathers are shown in figures 3 and 4. In line with the descriptive statistics in tables 6 and 7, there is a clearer increase in leaving unemployment for the non-target fathers in the treatment municipalities after the reform than for the target fathers.

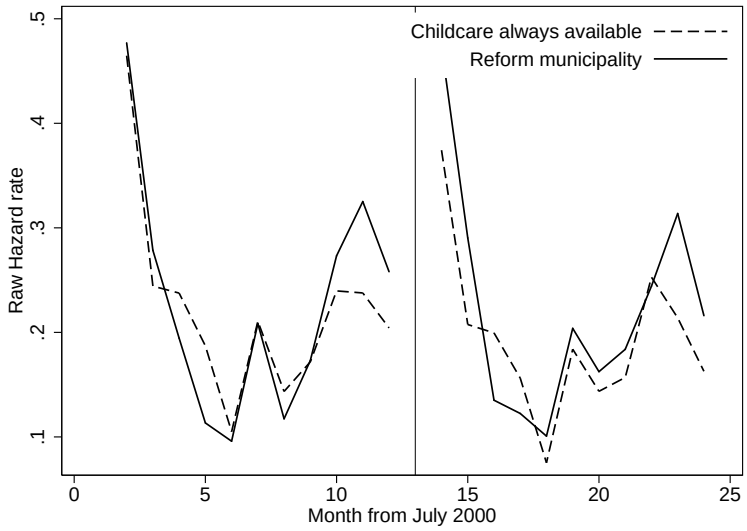

Figure 3: Raw hazard rates, target fathers, July 2000 to June 2002

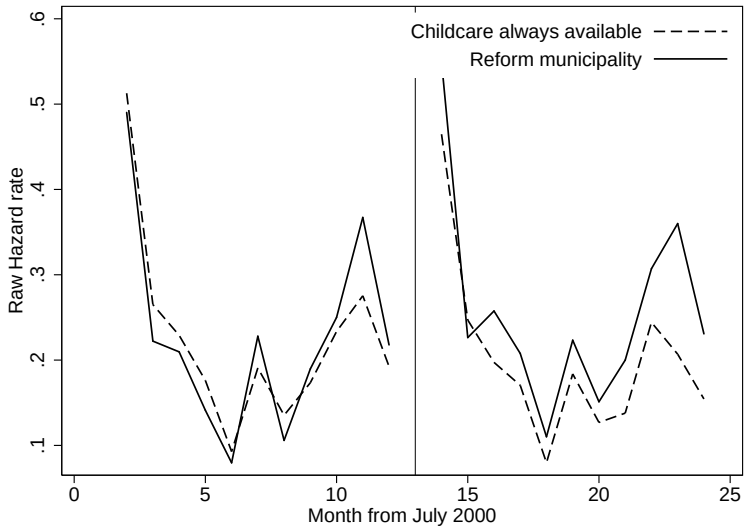

Figure 4: Raw hazard rates, non-target fathers, July 2000 to June 2002

From the descriptive statistics and these figures, it appears that there are effects on the probability of finding work for mothers, but not for fathers, when childcare is available for unemployed parents. Because there are similar effects for parents with older youngest children (non-target group), it is very important to control for municipality characteristics, which is done by including the monthly local unemployment rates, population and share of children aged 2-6 years.

5 Results

5.1 Difference-in-differences

Estimation results of the effects of childcare availability from the first DD estimation, with parents living in municipalities where childcare was available before the reform as the control group, are given in the first row of table 8. Standard errors are given in parentheses and p-values in brackets. For both mothers and fathers, the estimates are greater than zero in all estimations, but it is only for mothers that the estimates are significantly different from zero. Because the estimates increase when additional covariates are included in the full model and therefore some unobserved heterogeneity is taken away, more unobserved heterogeneity will probably increase the estimates even more. The estimated effect is large, with an increased probability of finding work of 21 percent for mothers if childcare is available when the parent is unemployed.

The problem is that there are probably reasons other than childcare

Table 8: Estimation results for childcare, DD over municipalities

	Mothers		Fathers	
	basic	full	basic	full
Target Group	0.159	0.189	0.0395	0.0803
	(0.0757)	(0.0681)	(0.0711)	(0.0622)
	[0.0359]	[0.0056]	[0.578]	[0.197]
N	52594	52594	25126	25126
Placebo Estimation				
Non Target group	0.0834	0.143	0.121	0.156
	(0.0835)	(0.0760)	(0.0899)	(0.0716)
	[0.318]	[0.0604]	[0.179]	[0.029]
N	32567	32567	17224	17224

Standard errors clustered on municipality in parentheses,
P-values in brackets.

that are captured by the childcare variable because there are estimates greater than zero even in the placebo estimations (second part of table 8), where parents with older children are compared, and no effect would be found if the assumption for this DD estimation were fulfilled. In the basic estimation with no additional covariates, the effect is insignificant for both mothers and fathers. For mothers, the effect is also smaller than for the target group. This also gives an expectation that the estimates in the DDD estimation will be smaller for mothers than they are in this estimation. However, for fathers, the point estimate is bigger and significant in the full model with additional covariates when estimated for parents with older youngest children. This is in line with the figures depicting the proportion of fathers leaving unemployment in a specific month, where the effect seemed larger for fathers in the non-target group (see figures 3 and 4). Estimation results and standard errors are shown in table 13 for the target

group and in table 14 for the placebo estimations in the Appendix.

In this first DD estimation parents living in municipalities offering childcare to unemployed parents for a limited number of months before the reform are also included. This means that the estimates are determined also by parents losing their childcare placement. The effect may be asymmetric between getting and loosing childcare and I have therefore also done estimations without the municipalities offering childcare a limited number of months. This gives similar estimates for mothers but the precision decreases. For fathers the estimates differs more but for the target group the estimates are still insignificant.

The results from the second DD estimation within treatment municipalities with parents with older youngest children as the control group are shown in table 9. As there were only 14 municipalities where childcare was not available before the reform, the sample size is much smaller. None of the estimates are significant at any sufficient level, but the estimates are greater than zero for mothers and smaller than zero for fathers.

In the placebo estimations, none of the estimates are significantly different from zero and all are close to zero, which indicates that the assumption for this DD is fulfilled. Estimation results and standard errors from these DD estimations are shown in table 15 for the treatment estimation and in table 16 for the control estimation in the Appendix.

Table 9: Estimation results for childcare, DD over age of youngest child

	Mothers		Fathers	
	basic	full	basic	full
Treatment Municipalities	0.150	0.132	-0.115	-0.0974
	(0.0988)	(0.114)	(0.103)	(0.111)
	[0.129]	[0.249]	[0.265]	[0.380]
N	4500	4500	2413	2413
Placebo Estimation				
Control Municipalities	0.0142	0.0252	0.0169	0.0110
	(0.0247)	(0.0252)	(0.0358)	(0.0361)
	[0.565]	[0.318]	[0.637]	[0.761]
N	68393	68393	33519	33519

Standard errors clustered on municipality in parentheses,
P-values in brackets.

5.2 DDD-estimation

Estimation results from the DDD estimations are shown in table 10 (for more results, see table 12 in the Appendix.) The first and third columns show estimates from the basic DDD model with no individual or seasonal covariates. The estimates are insignificant but greater than zero for mothers and smaller than one for fathers.

Table 10: Estimation results for childcare from the DDD estimation

	Mothers		Fathers	
	Basic	Full	Basic	Full
Childcare	0.0971	0.158	-0.0943	-0.0164
	(0.0787)	(0.0765)	(0.0925)	(0.0819)
	[0.217]	[0.0386]	[0.308]	[0.841]
N	85161	85161	42350	42350

Standard errors clustered on municipality in parentheses,
P-values in brackets.

In column 2 and 4 of table 10 (and table 12), all covariates are included. The probability of leaving unemployment increases for both mothers and fathers compared with the basic model without any covariates, but it is only for mothers in the full model that the estimates is significantly different from zero. For mothers, the probability of leaving unemployment for work increases by 17 percent when childcare is available for unemployed parents.

When excluding parents living in municipalities offering childcare a limited number of months before the reform the precision decreases, due to the decreased variation, giving insignificant results, but the point estimate for mothers still gives an increased probability of finding work of 10 percent.

As was expected from the first DD estimation, when target parents in other municipalities were the control group, the estimates were smaller for mothers in the DDD estimation compared with the first DD estimation. It is though surprising that the estimates is still so large. What would be expected is an estimate that is approximately the difference between the DD for the target and the non-target groups. There could be expected to be small differences since parents with children starting pre-school class are censored in the DD for the target parents. In the basic estimations the differences between the DD estimations and the estimate in the DDD estimations are similar but for every added covariate the differences increases. In the full DDD estimation with all covariates the estimates for mothers are more than 0.1 larger than the differences between the DD estimations.

5.3 Heterogeneous effects

For mothers, a large effect is found, but there may be heterogeneous effects; therefore, the sample of women is divided by level of education, number of children, age group, immigrant status and marital status, respectively, to see if there are heterogeneous effects over any of these dimensions[12]. Estimation results and standard errors from the different estimations are shown in table 11. The estimates from the DDD with all unemployed mothers are shown in the first row of table table 11.

When the sample was divided according to number of children, no effect could be seen for those mothers with only one child. The estimates are less than zero but insignificant. The greatest effect seems to be for those women with two children, for whom the hazard ratio (when controlling for individual characteristics) indicates that the probability of leaving unemployment for work increases by 35 percent when childcare is available. Even for mothers with more than two children, the estimate is larger than for the whole population, but it is only significant at any sufficient level when all additional covariates are included.

When the sample is divided over education level, all groups, except for those mothers with two or fewer years of high school education, have higher estimates than when all mothers are included. For those mothers with no more than two years of high school, no effect at all could be seen. The greatest effect seems to be for those mothers with very low education and secondly with university education. If the UI reform implemented

[12]The same is done for fathers, but no heterogeneous effects are found.

Table 11: Estimation results for childcare from DDD estimations, different subsamples

	Mothers		
Population	Basic	Full	N
All	0.0971	0.158**	85161
	(0.0787)	(0.0765)	
One child	-0.112	-0.129	27923
	(0.117)	(0.111)	
Two children	0.216*	0.300***	40019
	(0.117)	(0.112)	
> 2 children	0.155	0.269**	17219
	(0.154)	(0.134)	
Compulsory school or less	0.289*	0.347**	12378
	(0.153)	(0.144)	
High school ≤ 2 years	-0.089	-0.021	30169
	(0.119)	(0.117)	
High school 3 years	0.197	0.270**	20937
	(0.141)	(0.123)	
More than high school	0.290**	0.315**	21677
	(0.141)	(0.158)	
Age ≤ 30 years	0.0614	0.123	21428
	(0.141)	(0.122)	
Age 31-35 years	0.121	0.194	27513
	(0.130)	(0.126)	
Age > 35 years	0.0543	0.133	36220
	(0.103)	(0.113)	
Swedish born	0.125	0.165**	63763
	(0.0779)	(0.0776)	
Immigrant	0.0175	0.130	21398
	(0.166)	(0.166)	
Married	0.189	0.272**	39527
	(0.120)	(0.124)	
Not married	0.0247	0.0774	45634
	(0.0845)	(0.0843)	

Standard errors clustered on municipality in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

at the same time (see section 2.2) had affected the unemployed mothers, those mothers with the highest earlier wages, and therefore probably those with the highest education, should have had a lower probability of finding work than other mothers. As such is not the case, the effects of the UI reform are probably similar in the control groups and therefore captured by the estimation strategy.

No heterogeneous effects over the mothers' age or immigrant status were found. Because most of the mothers were born in Sweden, the hazard ratio for Swedish-born mothers is similar to that for all mothers. Finally, married unemployed mothers seem to be more affected by availability of childcare than unmarried unemployed mothers.

6 Conclusions

In this paper, I have evaluated the effects of availability of childcare during unemployment on parents' probability of finding work using a reform implemented in Sweden in July 2001. The reform made it mandatory for Swedish municipalities to offer childcare to unemployed parents for at least 15 hours each week. Before the reform, the majority of municipalities already did this, but those that did not can be used as a treatment group in a difference-in-differences (DD) framework. In the DD estimations, two different control groups were used: parents with young children living in municipalities already offering childcare to unemployed parents before the reform and parents living in treatment municipalities whose youngest child was older than childcare age. Both of these control groups were

then used in a difference-in-difference-in-differences (DDD) estimation. In both the DD and DDD estimations, a basic model, with only time and group dummies and their interactions, and a full model, with individual characteristics and seasonal effects also included, were estimated.

In the first DD estimation, with parents in other municipalities as the control group, the point estimate in the full model gave an increased probability of 21 percent of finding work for mothers when childcare is available, significant at the 1 percent level. Unfortunately, when doing placebo estimation using parents with older youngest children, a positive effect of 15 percent was found, but the standard error is larger, giving a p-value of 6 percent. This indicate that there are probably other reasons than the childcare reform giving increased probability of finding work in the treatment municipalities. In the second DD estimation, with parents with older youngest children as the control group, the point estimate was positive but insignificant. This is probably because the variation is only over 14 municipalities, and therefore, the sample size decreased substantially.

From the DD estimations, especially the first, it seems important to control for trends both within groups of parents and within municipalities, which is done in the DDD estimation. Here, the full model gives that the probability of finding work increased by 17 percent for mothers when childcare was available, significant at the 5 percent level.

Unfortunately the precision disappears when mothers living in municipalities only offering childcare a limited amount of months before the reform are removed from the analysis. The point estimate is still large but reduced which indicate that the effect of childcare availability when

unemployed may be smaller than estimated with the full sample.

For fathers, no effect could be found in any of the estimations. In the full DDD estimation, the estimate was close to zero, but the standard error was large.

When dividing the sample of mothers into different sub-populations, there was no effect of childcare availability for those mothers with two or fewer years of high school education, but large effects for both mothers with only compulsory school or less and mothers with a university education. The probability of finding work for mothers with two children increased with the availability of childcare, while no effect was found for mothers with only one child.

As was mentioned in the introduction, the expected effect is ambiguous because the availability of childcare may both decrease and increase the unemployment duration, depending on how its availability affects the parents' search intensity and reservation wage. For most mothers, the possibility to increase the search intensity seems to dominate. It is somewhat surprising that no effect was found for fathers when such large effects were found for mothers, but this may be because the responsibility for caring for children still rests mainly with mothers (Statistic Sweden 2003).

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Appendix

Table 12: Estimation results from the DDD estimation

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Childcare	0.0971	0.158	-0.0943	-0.0164
	(0.0787)	(0.0765)	(0.0925)	(0.0819)
Z^{m1}	0.0382	0.0706	0.0526	0.0677
	(0.107)	(0.0958)	(0.0927)	(0.0930)
Z^{m2}	-0.0663	0.0290	-0.0495	0.00651
	(0.155)	(0.0621)	(0.2039)	(0.0777)
Z^{t}	-0.0784	-0.112	-0.147	-0.148
	(0.0207)	(0.0250)	(0.0246)	(0.0286)
Z^{a}	-0.0147	-0.0847	-0.0173	-0.0369
	(0.0190)	(0.0173)	(0.0220)	(0.0231)
$Z^{m1} * Z^{t}$	0.0823	0.0437	0.198	0.141
	(0.0872)	(0.0798)	(0.0601)	(0.0602)
$Z^{m2} * Z^{t}$	0.0760	0.0747	0.0856	0.0737
	(0.0364)	(0.0352)	(0.0561)	(0.0493)
$Z^{m1} * Z^{a}$	0.0652	0.0837	-0.0784	-0.0574
	(0.0608)	(0.0520)	(0.0813)	(0.0829)
$Z^{m2} * Z^{a}$	0.0274	0.0228	-0.0360	0.00270
	(0.0288)	(0.0295)	(0.0880)	(0.0610)
$Z^{t} * Z^{a}$	0.00547	0.00802	0.0135	0.00303
	(0.0223)	(0.0226)	(0.0310)	(0.0314)
Entrying month		-0.148		-0.280
		(0.0135)		(0.0190)
Elementary school		0.00529		0.0532
		(0.0425)		(0.0545)
High school ≤2 years		0.195		0.150
		(0.0405)		(0.0542)
High school ≤3 years		0.277		-0.0469
		(0.0404)		(0.0515)
University < 3 years		0.193		-0.166
		(0.0436)		(0.0538)
University ≥ 3 years		0.223		-0.126
		(0.0522)		(0.0508)

Continued on next page

	Mothers		Fathers	
Continued from last page	(1)	(2)	(3)	(4)
Age		-0.0341		0.0246
		(0.0113)		(0.0117)
Age squared		0.000344		-0.000449
		(0.000157)		(0.000145)
Immigrant		-0.236		-0.460
		(0.0224)		(0.0340)
Disable		-1.286		-1.514
		(0.0410)		(0.0645)
Married		0.0096		0.00760
		(0.0131)		(0.0145)
Municipality unemployment		-3.559		-0.0426
		(1.029)		(1.2204)
Population		-0.000604		-0.000818
		(0.000128)		(0.000226)
Share of children age 2-6		-9.350		-16.736
		(3.531)		(4.308)
N	612222.48	605305.27	373915.86	366745.31
-2 LOG L	85161	85161	42350	42350

Standard errors clustered on municipality in parentheses.

Table 13: Estimation results from the DD over municipalities, target parents

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Childcare	0.159	0.189	0.0395	0.0803
	(0.0757)	(0.0681)	(0.0711)	(0.0622)
Z^{m1}	0.175	0.181	0.138	0.13446
	(0.0937)	(0.0742)	(0.0778)	(0.0804)
Z^{m2}	0.00205	0.0911	-0.0345	0.0576
	(0.153)	(0.0533)	(0.258)	(0.0921)
Z^{t}	-0.0621	-0.0937	-0.121	-0.136
	(0.0216)	(0.0223)	(0.0248)	(0.0296)
Entrying month		-0.139		-0.273
		(0.0201)		(0.0229)
Elementary school		-0.0801		0.138
		(0.0621)		(0.0854)
High school ≤2 years		0.162		0.239
		(0.0579)		(0.0866)
High school ≤3 years		0.226		0.0739
		(0.0595)		(0.0847)
University < 3 years		0.177		-0.0744
		(0.0592)		(0.0878)
University ≥ 3 years		0.179		0.00948
		(0.0697)		(0.0698)
Age		-0.0507		0.0308
		(0.0160)		(0.0159)
Age squared		0.000542		-0.000568
		(0.000237)		(0.000215)
Immigrant		-0.259		-0.457
		(0.0266)		(0.0374)
Disable		-1.204		-1.512
		(0.0553)		(0.0963)
Married		-0.0190		-0.0140
		(0.0176)		(0.0200)
Municipality unemployment		-4.081		-0.575
		(1.029)		(1.374)
Population		-0.000614		-0.000786
		(0.000119)		(0.000222)
Share of children age 2-6		-9.194		-15.916
		(3.543)		(4.851)
N	52594	52594	25126	25126
-2 LOG L	344788.19	341130.87	197078.93	193358.86

Standard errors clustered on municipality in parentheses.

Table 14: Estimation results from the DD over municipalities, non-target parents

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Childcare	0.0834	0.143	0.121	0.156
	(0.0835)	(0.0760)	(0.0899)	(0.0716)
Z^{m1}	0.131	0.184	0.224	0.221
	(0.104)	(0.0913)	(0.0875)	(0.0891)
Z^{m2}	-0.0265	0.0662	0.0150	0.0629
	(0.148)	(0.0647)	(0.191)	(0.0752)
Z^{t}	-0.0676	-0.108	-0.127	-0.133
	(0.0209)	(0.0249)	(0.0278)	(0.0274)
Entering month		-0.165		-0.287
		(0.0225)		(0.0275)
Elementary school		0.118		-0.0270
		(0.0651)		(0.0620)
High school ≤2 years		0.234		0.0649
		(0.0651)		(0.0612)
High school ≤3 years		0.333		-0.180
		(0.0652)		(0.0681)
University < 3 years		0.220		-0.240
		(0.0688)		(0.0742)
University ≥ 3 years		0.275		-0.284
		(0.0770)		(0.0886)
Age		0.0568		0.0528
		(0.0224)		(0.0233)
Age squared		-0.000797		-0.000747
		(0.000298)		(0.000277)
Immigrant		-0.204		-0.457
		(0.0303)		(0.0422)
Disable		-1.345		-1.533
		(0.0566)		(0.0968)
Married		0.0537		0.0327
		(0.0211)		(0.0251)
Municipality unemployment		-2.868		0.630
		(1.202)		(1.269)
Population		-0.000562		-0.000876
		(0.000150)		(0.000247)
Share of children age 2-6		-9.668		-17.558
		(4.214)		(4.871)
N	32567	32567	17224	17224
-2 LOG L	220359.99	217290.11	145989.93	142664.38

Standard errors clustered on municipality in parentheses.

Table 15: Estimation results from the DD over age of youngest child, treatment municipalities

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Childcare	0.150	0.132	-0.115	-0.0974
	(0.0988)	(0.114)	(0.103)	(0.111)
Z^t	-0.0207	-0.0424	0.0768	0.139
	(0.0852)	(0.0907)	(0.0572)	(0.0747)
Z^a	0.0774	0.0152	-0.0984	-0.178
	(0.0537)	(0.0643)	(0.0842)	(0.0718)
Entrying month		-0.212		-0.256
		(0.0393)		(0.0595)
Elementary school		-0.0483		0.138
		(0.207)		(0.222)
High school ≤2 years		0.398		0.248
		(0.215)		(0.238)
High school ≤3 years		0.561		0.0439
		(0.196)		(0.208)
University < 3 years		0.376		-0.0369
		(0.203)		(0.289)
University ≥ 3 years		0.504		0.303
		(0.170)		(0.272)
Age		-0.0663		0.0129
		(0.0501)		(0.0351)
Age squared		0.000946		-0.000306
		(0.000691)		(0.000432)
Immigrant		-0.123		-0.220
		(0.114)		(0.0625)
Disable		-1.259		-1.509
		(0.125)		(0.157)
Married		0.0708		0.0290
		(0.0436)		(0.0566)
Municipality unemployment		-5.187		5.883
		(2.738)		(3.854)
Population		-0.00553		-0.0106
		(0.00438)		(0.00525)
Share of children age 2-6		-0.302		-1.121
		(13.485)		(19.155)
N	4500	4500	2413	2413
-2 LOG L	24050.585	23697.599	16847.527	16456.383

Standard errors clustered on municipality in parentheses.

Table 16: Estimation results from the DD overage of youngest child, control municipalities

	Mothers		Fathers	
	(1)	(2)	(3)	(4)
Childcare	0.0142	0.0252	0.0169	0.0110
	(0.0247)	(0.0252)	(0.0358)	(0.0361)
Z^t	-0.0845	-0.109	-0.150	-0.140
	(0.0211)	(0.0253)	(-0.0264)	(0.0283)
Z^a	-0.00412	-0.0698	-0.000423	-0.0335
	(0.0220)	(0.0206)	(0.0305)	(0.0275)
Entering month		-0.149		-0.288
		(0.0153)		(0.0217)
Elementary school		0.0228		0.0953
		(0.0482)		(0.0649)
High school ≤2 years		0.201		0.185
		(0.0452)		(0.0646)
High school ≤3 years		0.269		-0.0175
		(0.0456)		(0.0604)
University < 3 years		0.210		-0.113
		(0.0479)		(0.0621)
University ≥ 3 years		0.223		-0.103
		(0.0600)		(0.0568)
Age		-0.0446		0.0262
		(0.0125)		(0.0143)
Age squared		0.000479		-0.000476
		(0.000174)		(0.000177)
Immigrant		-0.220		-0.437
		(0.0207)		(0.0334)
Disable		-1.333		-1.495
		(0.0456)		(0.0759)
Married		0.0099		0.0128
		(0.0148)		(0.0163)
Municipality unemployment		-1.880		1.103
		(1.018)		(1.317)
Population		-0.000467		-0.000567
		(0.000090)		(0.000115)
Share of children age 2-6		-4.928		-12.156
		(3.297)		(3.927)
N	68393	68393	33519	33519
-2 LOG L	480864.73	475029.73	288538.76	282892.52

Standard errors clustered on municipality in parentheses.

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