IFAU
Institute for Evaluation of Labour
Market and Education Policy

Childcare and the division of parental leave

Anna Norén

WORKING PAPER 2015:24

The Institute for Evaluation of Labour Market and Education Policy (IFAU) is a research institute under the Swedish Ministry of Employment, situated in Uppsala. IFAU's objective is to promote, support and carry out scientific evaluations. The assignment includes: the effects of labour market and educational policies, studies of the functioning of the labour market and the labour market effects of social insurance policies. IFAU shall also disseminate its results so that they become accessible to different interested parties in Sweden and abroad.

IFAU also provides funding for research projects within its areas of interest. The deadline for applications is October 1 each year. Since the researchers at IFAU are mainly economists, researchers from other disciplines are encouraged to apply for funding.

IFAU is run by a Director-General. The institute has a scientific council, consisting of a chairman, the Director-General and five other members. Among other things, the scientific council proposes a decision for the allocation of research grants. A reference group including representatives for employer organizations and trade unions, as well as the ministries and authorities concerned is also connected to the institute.

Postal address: P.O. Box 513, 751 20 Uppsala
Visiting address: Kyrkogårdsgatan 6, Uppsala
Phone: +46 18 471 70 70
Fax: +46 18 471 70 71
ifau@ifau.uu.se
www.ifau.se

Papers published in the Working Paper Series should, according to the IFAU policy, have been discussed at seminars held at IFAU and at least one other academic forum, and have been read by one external and one internal referee. They need not, however, have undergone the standard scrutiny for publication in a scientific journal. The purpose of the Working Paper Series is to provide a factual basis for public policy and the public policy discussion.

ISSN 1651-1166

Childcare and the division of parental leave[a]

by

Anna Norén[b]

November 3, 2015

Abstract

Despite several policies aimed at increasing fathers' participation in the caring of children, Swedish mothers still use the bulk of the paid parental leave which may have several negative consequences for the family e.g. in terms of weaker labor market attachment for the mother. Division of parental leave is likely affected by how parents value the costs associated with parental leave. I investigate whether a reduction in the care burden, or a decreased non-monetary cost, of parental leave through the availability of childcare for older siblings affects how the leave is divided. The effect of access to childcare is evaluated by utilizing the regional heterogeneity of the implementation of a childcare reform in Sweden in 2002 that gave children of parents on parental leave with a younger sibling the right to stay in childcare. Results suggest that availability of childcare for an older sibling during parental leave does not impact the division of parental leave between mothers and fathers.

Keywords: Childcare, Parental leave, Gender equality
JEL-codes: H31, J13, J16

[a] I am grateful to Erik Grönqvist, Matz Dahlberg, Kristiina Huttunen, Ulrika Vikman, Mikael Elinder and Eva Mörk for helpful comments and suggestions. I would also like to thank participants at IIPF conference 2014.

[b] Department of Economics, Uppsala University. Email: anna.noren@nek.uu.se

Table of contents

1 Introduction

Sweden has one of the world's most generous parental leave systems. The primary purpose of the parental leave insurance is to enable parents to combine work and family life. Sweden is on the frontier of gender neutral parental leave outtake and there is an outspoken policy goal of equal child care responsibility between parents. Despite this, Swedish women still use the bulk of the parental leave. In 2012, women used 76 percent of the total paid parental leave days (Swedish Social Insurance Agency, 2013). An unequal responsibility for the care of children may have several consequences for the family, some of which may be regarded as adverse. It is a likely candidate for the explanation of the earnings gap between men and women (Gupta et al., 2008, Lundberg and Pollak, 2007, and Albrecht et al., 2014). The father's involvement in childcare has also been highlighted as an important component of child development (see for example Tamis-LeMonda and Cabrera, 2002). Furthermore, common for many of the OECD countries is that sickness absence rates are higher for women than for men which may be the result of women taking a more active part in child care during the first years (Angelov et al., 2013). Deepening our understanding of spouses' decisions of time allocation in the household is important so as to aid policies directed toward a more equal responsibility for the care of children.

In this paper, I will evaluate whether making childcare available for children of parents on parental leave due to the birth of a younger sibling has an impact on the division of parental leave between mothers and fathers. Until recently, access to childcare in Sweden was mainly reserved for children of working parents or parents who study. But after the implementation of a reform on January 1st 2002, Swedish municipalities were obligated to offer childcare for at least 15 hours per week to all children aged 1-5, including those whose parents were either unemployed or on parental leave with a younger sibling.[1] Prior to this reform, some municipalities already allowed older siblings to keep their spot in daycare. This heterogeneity in the implementation of the reform is exploited in a difference-in-differences approach to evaluate the effects of gaining the possibility to keep the older sibling in childcare. I will estimate a reduced form model in which parents

[1] The reform had additional components which will be described in section 3.

before and after the reform in municipalities where children could keep their spot will be compared to parents before and after the reform in municipalities were they could not keep their child in pre-school[2] prior to the reform.

The knowledge about what motivates fathers to increase their responsibility for the care of their children is limited. Several attempts have been made by the Swedish government to increase the father's share of the parental leave by reforming the parental leave regulations through reserving benefit days for each parent, and by introducing tax credits to parents who share the leave equally. But this seem to have had limited or no effect on the division of the responsibility of child care (Ekberg et al., 2013, Eriksson, 2005, Karimi et al., 2012, and Swedish Social Insurance Agency, 2010). Another potential determinant that could affect the division of the caring responsibility is the care burden during the parental leave. Being on parental leave can be demanding, especially when there are older siblings to look after as well. Access to childcare for the older child could therefore be an important relief in everyday life by decreasing the care burden and thus make parental leave more attractive. This could have implications for the division of parental leave.

If access to childcare makes the parental leave less demanding, this could impact the way that parents value the leave and hence how it is divided. In which direction the division would be affected is ambiguous. Given that mothers take the bulk of the child care responsibility they are likely to be less sensitive to changes in the cost of parental leave, whereas fathers could be more sensitive to such changes. A less demanding parental leave could increase the father's share if fathers regard the parental leave as relatively more attractive. On the other hand, mothers may also be sensitive to changes in the cost of parental leave and if they value the reduction in care burden higher it could increase their parental leave outtake. It could also be that both parents value the reduction in the care burden equally, in which case the reform would leave the division of the leave unaffected.

This paper finds no evidence that availability of childcare for an older sibling during parental leave would have an effect on the father's take-up of parental leave for the second

[2] In Sweden, pre-school is integrated into childcare. The terms childcare, pre-school and daycare will be used interchangeably throughout the paper.

born child. Difference-in-differences estimates of the effect of the reform on fathers' parental leave are small and not statistically different from zero. Nor is there any evidence of the reform having an effect on the division of parental leave between the mother and the father.

Making parental leave less demanding may also have implications for the health of the parents. Caring for only one child during parts of the day may decrease the amount of stress during parental leave and hence have a positive effect on parent's health. On the other hand, children in childcare are most likely subject to increased probability of attracting infections that could be transferred to other members of the family. Keeping an older sibling in childcare could therefore have a negative impact on parental health. In an additional analysis, this paper investigates whether access to childcare during parental leave has an effect on the number of days on sick leave during the infant's first year of life. Results suggest that we cannot reject the hypothesis of no effect of access to childcare during parental leave on mother's and father's sick leave absence during the first year of the infant's life.

The rest of the paper is organized as follows. In the following section, I provide a short overview of earlier literature on family policies and discuss potential channels through which childcare may affect the division of parental leave. Section 3 summarizes family policies in Sweden and describes the reform used for identification. In Section 4, I describe the empirical strategy and Section 5 describes the data. Section 6 reports the main results, and finally Section 7 concludes.

2 Access to childcare and the division of parental leave

This section begins with a short overview of earlier literature on the effects of family policies, followed by a discussion of the potential mechanisms through which access of childcare can affect the division of parental leave.

2.1 Previous literature

Parents' decision of whether or not to stay at home and care for their child is certainly affected by access to childcare. There are several studies documenting the impact of

childcare on child care decisions. Most of the economic literature on the role of access to childcare has focused on maternal employment (for a review, see Waldfogel, 2002). The impact of universal childcare on children's cognitive development has also received attention, and both positive and negative effects have been identified (Baker et al., 2005). Anderson and Levine (1999) study how child care decisions are affected by the costs of childcare; their results suggest that there is a negative relationship between the price of childcare and female labour supply. Since childcare in Sweden is subsidized, the Swedish context is different. Using the exogenous variation in childcare prices that resulted from a reform in Sweden in the early 2000's Lundin et al. (2008) find that reduced childcare prices do not seem to affect female labour supply. A related study by Vikman (2010) exploits another part of the same reform and finds that availability of childcare increases the probability of leaving unemployment.

As with earlier literature on effects of childcare, the focus of studies on parental leave policies has mainly been on the effects on female labour supply, fertility (see for example Lalive et al., 2014, Lalive and Zweimüller, 2009, Schönberg and Ludsteck, 2007 and Björklund, 2006), and children's scholastic performance (Liu and Nordström Skans, 2010). It has been suggested that a generous parental leave system has contributed to the relatively high labour force participation of women found in most Nordic countries. Recently however, potential drawbacks of a generous parental leave system have been pointed out. Since women use the bulk of the leave, increased durations of paid parental leave extend women's time away from the labour market which may have a negative effect on their career possibilities (see for example Gupta and Smith, 2002, Albrecht et al., 2003, Karimi et al., 2012, and Albrecht et al., 2014).

Evidence on effects of parental leave policies on the allocation of time within the household in a Swedish context is limited (Ekberg et al., 2005, Eriksson, 2005, Karimi et al., 2012, and Duvander and Johansson, 2012). Ekberg et al. (2013) study the effects of a reform of parental leave in Sweden that reserved parental leave days for the father. Despite increasing the father's share, there is no evidence of behavioral effects in the household. In 2008, a gender equality bonus was also introduced which gives tax credits to parents who share the leave equally. This reform does however not seem to have

affected the division of parental leave (Duvander and Johansson, 2012, Swedish Social Insurance Agency, 2010, and Swedish Social Insurance Agency, 2014).

2.2 Mechanisms

Although policies aimed at increasing fathers' participation in the caring of children show no behavioral effects on the time allocation within the household, little is known about potential effects of changes in the burden – or non-monetary costs – of taking care of children on the division of parental leave. Access to pre-school for older siblings during parental leave can be regarded as a decreased burden for the parent on leave since there is one less child to look after during parts of the day. It gives the opportunity to focus on the infant and perhaps also makes the leave less time intensive. If the older sibling(s) can stay in childcare, the non-monetary cost of being at home with the infant is reduced. Whether and how this will affect the division of parental leave depends on how each parent value the cost reduction and on the spouses' bargaining power within the household.

If both parents value the non-monetary cost reduction equally, which would be the case if they for example find it equally burdensome being on parental leave, the division could be left unaffected. There may however be differences in the sensitivity to changes in the costs of parental leave between mothers and fathers. Given that mothers use the larger part of the leave they may be less sensitive, whereas fathers who use little leave may be more sensitive, to changes in the costs of parental leave. If fathers value the cost reduction more than mothers the fathers may use more leave and hence impact the division. Furthermore, if both parents value the reduction in the care burden equally the division may still be affected via an unequal bargaining power within the household. If fathers have a higher household bargaining power due to a larger share of the income, a decreased burden of the leave could imply that fathers use this to increase their share of the paid parental leave. Gender norms may however also impact the bargaining power when time allocation within the household is negotiated. There may be norms and beliefs about who is more suitable to care for children (Swedish Social Insurance Agency, 2013 and Dahl, 2014). If women are the main caretaker in the family this may increase her bargaining power with respect to child care. A reduction in the non-monetary cost of

parental leave can thus also increase the length of the maternal leave and leave fathers' parental leave unaffected.

3 Family policies in Sweden

One of the cornerstones in family policy in Sweden is the subsidized publically provided childcare. A large share of the Swedish children attends pre-school. In 2001 which is the year prior to the reform that will be studied in this paper, 43.3 percent of all one-year-old children and 79.3 percent of all two-year-old children in Sweden attended pre-school (Swedish National Agency for Education, 2002). Another important part of family policies in Sweden is the parental leave insurance system. Up until January 2002, parental leave benefit was given for 450 days per child and one month was reserved for each parent. For parents of children born from January 1 2002 and onward, parental leave benefit was extended to 480 days per child and a second month was reserved for each parent. The latter part of this extension of the parental leave is often referred to as the second "daddy-month reform".[3] [4]

The number of calendar days that are used for parental leave is different from the number of days available with parental leave benefit. The leave can be extended by extracting the benefit for only shares of the days or not using any benefit on some days. Therefore, the number of calendar days that an individual has been on parental leave can be different from the total number of days with parental leave benefit. The focus of this paper is whether access to childcare for the older sibling(s) affects the division of time spent at home with the second born child. The measure of parental leave outtake of interest is therefore the one that resembles time spent at home as closely as possible. Parents who extend time at home by using shares of the day could potentially be masked if shares of days were used to calculate the net total parental leave outtake. On the other hand, since the parental leave periods can be split in to several smaller blocks of extracting benefit,

[3] The first daddy-month reform that reserved days for the father was implemented in 1995.

[4] The second daddy-month reform occurred at the same time as the reform studied in this paper but was implemented similarly across all municipalities in Sweden. Given the assumption that the daddy month reform affected fathers in different municipalities in the same way, the time fixed effects will net out the impact of the daddy month reform from the estimate of the effect of access to childcare and the simultaneity of the two reforms will not matter (see section 4 for further discussion).

the length of the total period that the parent spent at home is not clear from the register data. In this paper the number of days, regardless of the share, with parental leave benefit will be used to calculate the parental leave outtake. Although it may underestimate total time spent at home with the child, this measurement will serve as a good proxy for time spent on parental leave.

When the parental leave benefit was introduced in 1974 men used 0.5 percent of all days. Since then men's share has increased to around 23 percent in 2010 (Duvander and Johansson, 2012). During the infant's first years, mothers' outtake dominates. The fathers use around 9 percent of the total parental leave during a child's first year, and have used around 17 percent when the child turns two. There are large differences in fathers' parental leave outtake and around 25 percent of the fathers have not used any leave at all during the child's first two years. Around 12 percent of families in Sweden have a gender neutral parental leave outtake, where both parents use between 40-60 percent of the total number of days (Dahl, 2014). Moreover, both mothers and fathers use less leave with the second born child compared to the first born. This is most likely due to changes in economic circumstances when a family grows and that younger siblings usually starts pre-school at a lower age (Dahl, 2014).

3.1 The childcare reform

Since 1995, Swedish municipalities are obligated to offer a spot in pre-school to children whose parents are either working or studying. The decision whether or not to offer a spot in pre-school to children of unemployed parents or parents on parental leave was however until 2002 decided locally in each municipality. In the end of the 1990's only one in four municipalities allowed children of parents on parental leave to remain in pre-school. As part of the many steps taken by the government to make childcare a part of the educational system, several new policies were implemented under a Swedish childcare reform called *Maxtaxa och allmän förskola m m* in order to make public childcare available to all children. The reform was introduced between 2001 and 2003 and consisted of four parts. The first part, implemented in July 2001, made it mandatory for municipalities to offer childcare to children of unemployed parents. The second part, introduced in January

2002, introduced a cap on childcare prices. The final part of the reform was implemented in January 2003 and introduced universal free childcare to all four- and five-year-old children. The reform analyzed in this study is the third part of the reform which, as of January 1 2002, gave children of parents who were on parental leave with a younger sibling the right to a pre-school spot for at least 15 hours a week for the older kid. Since this part of the reform was implemented simultaneously to a drop in childcare prices resulting from the second part of the "Maxtaxa"-reform the effects of increased availability of childcare for the older sibling can be confounded by the reduction in childcare prices. Not only were parents on parental leave with an older sibling able to keep their child in pre-school after the reform, but it also became cheaper after January 1 2002. However, since childcare prices were reduced in all municipalities at the same point in time, the effect of the reduction in childcare prices can be controlled for by including time fixed effects in the estimations if we assume that the level of the price reduction was uncorrelated with the availability of childcare prior to the reform. To address this I also present estimates of the effect of the reform where I control for childcare prices before and after the reform in a robustness analysis (see section 6.3).

Access to childcare for children of parents on parental leave does not necessarily imply that more children attended daycare since pre-school is not mandatory; it only gave parents the possibility to keep the older child in pre-school.[5] However, the Swedish National Agency for Education (NAE) concludes that the reform led to more frequent participation in pre-school of children with parents on parental leave. In 1999 26 percent of all 1-5 year olds with parents on parental leave attended pre-school, whereas in 2002 the share was 47 percent. NAE also concludes that the share of 1-5 year olds with a parent on parental leave who were at home with the parent decreased from 70 percent to 48 percent between the years 1999 and 2002. (Swedish National Agency for Education, 2002)

In the spring of 2001, NAE conducted surveys among all Swedish municipalities to document the availability of childcare. Among several questions, they asked whether parents who already had a child in pre-school could keep their spot if the parents went on

[5] Recall that since childcare is heavily subsidized in Sweden compared to many other countries, keeping an older sibling in childcare during parental leave is less of a financial strain for the family.

parental leave. By grouping the municipalities according to the answer to this question I construct a treatment group of municipalities; those that did not offer childcare prior to the reform, and a control group; those that already before the reform offered childcare to children of parents on parental leave. In some municipalities before the reform the older sibling could remain in pre-school, but only for a limited number of months. If the number of months was restricted to three months or less I group the municipality as belonging to the treatment group, and as control group otherwise. The amount of hours per week that the child is allowed to remain in pre-school also differs across municipalities both before and after the reform. Most common after the reform is that the child can stay for at most 15 hours per week, but in some municipalities the child can stay for between 20 and 30 hours per week. The grouping in treatment and control only considers whether the child could keep its spot at all. Eight municipalities are dropped as they did not answer the survey. Table *Table 1* lists the number of municipalities in each category. Figure 2 in the Appendix shows a map over Sweden and how treatment and control regions are located.

Table 1: Municipality groups

Treatment group	204
(Childcare was not available before reform)	
Control Group	77
(Childcare was available before the reform)	
No answer	8

Source: Swedish National Agency for Education (NAE).

4 Empirical strategy

There are several methodological challenges in assessing the effects of access to pre-school on the division of parental leave. First and foremost, there could be a selection problem. If parents that are more concerned with a gender neutral parental leave outtake request for the older sibling to remain in pre-school to a higher extent than other parents, any differences found would potentially be the result of selection of certain types of par-

ents into pre-school. This implies that the direction of causality between childcare and gender neutral parental leave cannot be distinguished. Another problem is that there is no available individual data on pre-school attendance. Ideally, one would like to estimate the effect of pre-school attendance of the older sibling on the division of parental leave for the younger sibling.

I utilize the pre-school reform in January 2002 to address these methodological challenges. In some municipalities before the reform, there was no possibility to select into pre-school as children of parents on parental leave were not able to keep their spot. My identification strategy exploits the fact that the reform, although implemented at the same point in time throughout the country, had different implications for different municipalities since some offered childcare already prior to the reform. This heterogeneity in the implementation of the reform will be used in a difference-in-differences setting. I use the location of where the family lives and the timing of the birth of the second child as determinant of whether the older sibling had access to childcare or not. Because I have no individual level data on which children attends pre-school, I instead estimate a reduced form effect. In order to draw causal conclusions from the difference-in-differences estimation, we must assume that treatment is exogenous against other trends in the municipalities. The composition of individuals is assumed to remain unchanged before and after the reform. The identification strategy relies on the assumption that trends in the outcome - conditional on observable pre-determined covariates - should be the same for all regions absent of treatment. This assumption is tested in a placebo analysis which investigates whether trends in the outcome were the same in treatment- and control municipalities before the implementation of the reform (Angrist and Krueger, 1999).

The way that my treatment and control groups are constructed will imply that municipalities in the control group give access to childcare all the time whereas municipalities in the treatment group will supply treatment (i.e. childcare) after the reform date in January 2002. Parents before and after the reform in municipalities where children could keep their spot in pre-school will be compared to parents before and after the reform in municipalities where they could not. My difference-in-differences estimation equation is given

by:

$$y_{ist} = \alpha + \lambda_s + \lambda_t + \delta(T_s * d_t) + \mathbf{X}_{ist}\beta' + \varepsilon_{ist} \quad (1)$$

where y_{ist} is the outcome (the division of parental leave) for individual i in municipality s in year t. λ_s is a set of municipality fixed effect included to capture time-invariant differences in parental leave outtake between municipalities. λ_t is a set of year dummy variables controlling for time shocks that commonly influence parental leave outtake in Swedish municipalities. One example of such a shock is the introduction of the second daddy-month reform which reserved an additional month of the parental leave benefit to each parent. However, since the reform was implemented simultaneously throughout the country and given the assumption that this shock affected fathers in different municipalities similarly, the effect of the daddy-month reform will be controlled for by the year-fixed effects. There may however be differences in how fathers reacted to the second daddy-month reform across municipalities that are correlated with the implementation of the childcare reform. If this is true I cannot separate the effect of the second daddy-month reform from the effect of access to childcare. The estimates of the effect of access to childcare in the analysis in this paper would then have to be interpreted as an interaction effect of the two reforms. This would imply that any effects of the reform found in this study could have been different had it not been for the simultaneous implementation of the second daddy-month reform. T_s is an indicator for whether the municipality in which the individual lives changed its access to childcare as a result of the reform or not and d_t is a dummy for post-reform years. δ is the variable of interest and captures the effect of the treatment. Treatment is defined as living in a municipality that did not offer childcare before the reform and having a second child post reform date (i.e. an interaction of a dummy for whether the municipality was affected by the reform or not and a dummy for post-treatment period or not).

Additionally, X_{ist} is a vector of controls for predetermined individual characteristics of the parents and of the children which vary within the municipality. Different characteristics of the family can affect the division of parental leave (see Swedish Social Insurance Agency, 2013 and Dahl, 2014). I will therefore include controls for family characteristics

such as age of the parents, age of the older sibling, parental educational level, and whether the parents are married or not. A control for parental leave take-up for the first born child is also included (see section 5.2 for further discussion). I have also included a control for annual municipal unemployment to capture changing economic circumstances within the municipality over time. Furthermore, monthly fixed effects for the timing of the birth of the younger child are included since there may be seasonal effects in the parental leave outtake. Throughout all estimations, the standard errors will be clustered at the municipal level to address the potential within-municipality correlation in estimated standard errors.

Even if the reform can only impact the leave with the second born child, information on the leave with the first born child is available. This gives the opportunity to look at changes between children for the same father and hence net out unobserved individual father characteristics. That is, unobserved differences in fathers' tendency to take parental leave can be controlled for. Note that this does not contribute to the identification of the treatment effect but may contribute to the precision. In the analyses, controls for parental leave with the first born child will be included to capture unobservable family characteristics.

5 Data and parental leave measurements

5.1 Data

The data used in this study resides from several data registers. Using the multi-generational register, family members are identified. The register covers all individuals born in Sweden and links individuals to their biological mother and father. The register also contains information on year and month of birth. In this way, older siblings with the same biological mother and/or father can be identified. Based on this information, a sample is created consisting of parents who had their second child between January 1998 and March 2005[6], and where an older sibling was in pre-school age (1-5 years old) at the time of the birth of the infant. Observations that cannot be linked to an older sibling, observations where

[6] I unfortunately only have access data on the personal identifier for children born up onto April 1st 2005 in the multi-generational register, which is required in order to be able to match the parental leave data with each child. To compensate for any seasonal effects that may result from including children born only in the first quarter of 2005 I will include monthly fixed effects in the estimations.

the biological parents differ or where birth order of children differ between parents, and twins are excluded from the analysis[7].

The data on the families is matched with the population register (called Louise) which contains annual individual level data on background variables such as educational attainment and annual labor income as well as demographic variables such as age and municipality of residence. Most of the parental characteristics will be measured using values of the variable in the year of birth of the second born child; this includes parental education, whether they are married or not, age, and country of birth. Income is measured the year prior to the birth of the second born child since most mothers use the first part of the leave and therefore have reduced income the same year as the birth of the child.

Data on parental leave take-up resides from the National Social Insurance Agency and includes information on the number of calendar days that parental leave benefit was lifted for each child and parent. Since the interest of the paper is the division of parental leave during the first period of the infant's life, I only consider parental leave outtake during the infant's first two years. This is firstly because parental leave usually refers to the time that parents stay at home with a child before it starts pre-school (which usually happens at the age of 1-2 years), and secondly because leave that is lifted when the child is older than two is usually used to extend holidays and vacations and therefore has little implications for the gender neutrality of the care of the child (Dahl, 2014). Total parental leave for each parent is measured by adding the number of calendar days that they lifted the benefit respectively during a two year period after the birth of the child. As mentioned earlier, parental leave can be extended by lifting the benefit for only parts of day but I will only consider the number of calendar days that any benefit was registered. The three sources of information can be linked on an individual level, since all Swedish residents have a unique identity number that defines them in all contacts with the authorities.

In the main analysis families where both parents are born outside of Sweden are ex-

[7] According to the multigenerational register there are 286 326 second born children born between January 1998 and march 2005. Approximately 44 000 are not the father's second born child and are therefore dropped. An additional 12 000 observations are dropped since they cannot be matched with their older sibling. Finally, 20 000 observations are dropped because the older sibling is more than five years old at the time of the birth of the infant.

cluded since these families are less likely to have a gender equal division (Swedish Social Insurance Agency, 2013). Because very little is known about the driving forces behind the division of paid parental leave between mothers and fathers, this paper will focus on a more homogeneous sample of parents as a starting point to investigate any potential effects of the reform. Results of estimations where families with immigrant background are included can be found in Appendix.

Descriptive statistics of the families included in the analyses are found in Table 2. Means and standard deviations (the latter in parenthesis) are reported for treatment and control municipalities, before and after the implementation of the reform. The final column shows the difference-in-differences on the characteristics of the families. All covariates except for age of older sibling and maternal education are balanced between treatment and control. The significant difference, although small, found in the age of the older sibling and on maternal education shows the importance of controlling for these covariates in the regressions. Separate analyses depending on age difference of the siblings and on maternal education will also be performed in a sub-group analysis.

Table 2: Descriptive statistics of parental and child characteristics in treatment and control groups before and after reform

	Treatment		Control		All
	(1)	(2)	(3)	(4)	(5)
	Pre2001	Post2001	Pre2001	Post2001	DD
Mother's age	29.83	30.60	30.84	31.63	-0.008
	(4.004)	(4.050)	(4.143)	(4.107)	(0.043)
Father's age	32.03	32.70	32.87	33.58	-0.029
	(4.484)	(4.473)	(4.651)	(4.600)	(0.050)
Age of sibling	2.662	2.654	2.663	2.622	0.032***
	(0.865)	(0.895)	(0.870)	(0.876)	(0.012)
Mother w. high school educ. (%)	56.69	45.85	47.17	37.38	-0.011**
	(49.55)	(49.83)	(49.92)	(48.38)	(0.005)
Father w. high school educ. (%)	58.22	51.22	47.51	39.88	0.005
	(49.32)	(49.99)	(49.94)	(48.97)	(0.005)
Mother w. university educ. (%)	36.32	40.53	46.31	49.76	0.009*
	(48.09)	(49.10)	(49.86)	(50.00)	(0.005)
Father w. university educ. (%)	31.49	33.04	43.62	45.32	-0.000
	(46.45)	(47.04)	(49.59)	(49.78)	(0.005)
Married (%)	47.07	43.28	51.91	48.35	-0.002
	(49.91)	(49.55)	(49.96)	(49.97)	(0.005)
Father's income (thousands SEK)	235.5	256.0	261.7	285.0	-2.854
	(146.7)	(168.1)	(217.2)	(240.3)	(2.742)
Mother's income (thousands SEK)	106.2	120.8	118.1	134.2	-1.432
	(90.24)	(99.20)	(111.3)	(123.4)	(1.430)
Municipal unemp. (%)	4.237	3.622	4.238	3.822	-0.002
	(1.571)	(1.180)	(1.537)	(1.033)	(0.001)
Observations	42876	40005	34981	33517	151332

Note: Means of variables in the used data set. Standard errors in parenthesis. DD estimates are from running equation 1 without any controls for predetermined characteristics. * significant at 10%; ** at 5% ; *** at 1%.

5.2 Measuring the division of parental leave

The outcome of interest is the division of parental leave outtake for the second born child while the older sibling is in pre-school age. Division of parental leave can be measured in

several ways. One way to investigate whether the reform has an impact on the division of the leave is to focus on the father's parental leave outtake. Since women use the main part of the leave, parental leave policies aimed at increasing gender neutrality in the parental leave have focused on fathers' outtake. If the reform has a positive impact on fathers' parental leave, this most likely implies a more gender neutral outtake. Another way to investigate the division of parental leave is to look at whether the father's share of the total number of parental leave days is affected. This implies including the mother's parental leave in the outcome. As a first outcome I use the sum of father's parental leave days during the second child's first two years, $D_{F,2}$. In the analyses, fathers' parental leave with his first born child $D_{F,1}$ is included as a control variable to capture unobservable family characteristics. Figure 1 shows the distribution of the father's parental leave days with the first and second born child during the child's first two years. The figure shows that many fathers take no or very little parental leave, but also that there are some fathers who take a substantial leave.

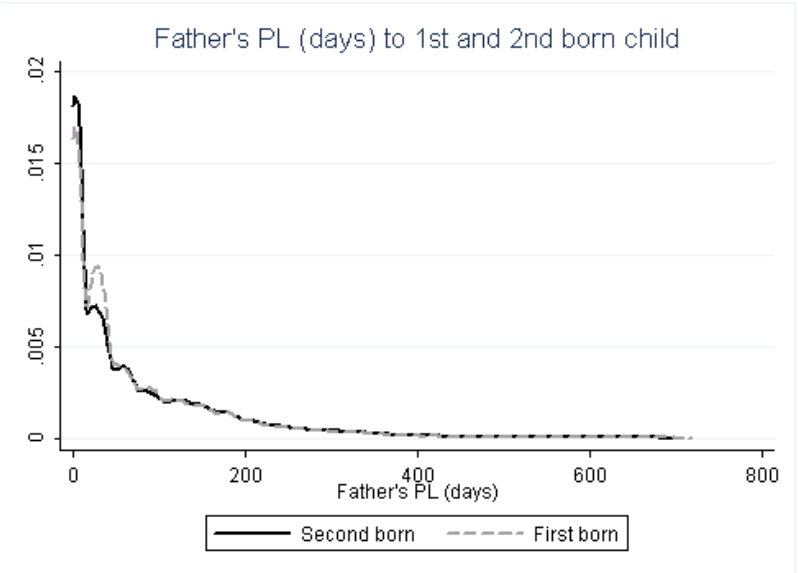

Figure 1: Fathers' parental leave days, first and second child

As a second outcome I use the fathers' share of the total parental leave days during the child's first two years of life, thus relating the father's leave to the mother's. The father's

share of the total parental leave days with the second child is calculated as:

$$FS_2 = \frac{D_{F,2}}{D_{M,2} + D_{F,2}} \tag{2}$$

where $D_{M,2}$ is the number of days that the mother used during the first two years after the birth of the second child. Information on the share of the leave with the first born child, FS_1, will be included as a control in the analysis to capture unobservable family characteristics.

Table 3 presents the summary statistics of the parental leave outtake for fathers and mothers with their second born and first born children, and the father's share of the total parental leave with the second born and first born child. The fathers' parental leave outtake is higher in control regions compared to treatment regions. Over time the fathers' share of the leave increase in both treatment and control regions. This is most likely a response to the daddy-month reform implemented January 1st 2002. This is also evident looking at pre- and post means for the number of days used by the father. This consequence of the daddy-month reform will be captured by the year-fixed effects. Graphs of the level of father's parental leave outtake in treatment and control group before and after the implementation of the reform can be found in Appendix, figures 3 and 4.

Table 3: Descriptive statistics of parental leave outtake, second and first born child

	Treatment		Control	
	(1)	(2)	(3)	(4)
	Pre2001	Post2001	Pre2001	Post2001
Father's PL, 2nd child ($D_{F,2}$)	51.78	84.09	58.25	92.61
	(80.72)	(96.74)	(84.74)	(98.02)
Father's share, 2nd child (FS_2)	0.100	0.154	0.115	0.174
	(0.153)	(0.171)	(0.167)	(0.179)
Father's PL, 1st child ($D_{F,1}$)	59.19	78.35	63.80	85.27
	(81.00)	(92.43)	(84.38)	(94.94)
Father's share, 1st child (FS_1)	0.114	0.146	0.126	0.162
	(0.149)	(0.167)	(0.163)	(0.178)
Mother's PL, 2nd child ($D_{M,2}$)	450.9	441.2	441.6	429.4
	(122.5)	(125.6)	(126.4)	(127.5)
Mother's PL, 1st child ($D_{M,1}$)	443.2	443.8	434.5	432.4
	(115.0)	(125.2)	(120.0)	(130.0)
Observations	42876	40005	34981	33517

5.3 Measuring parental health

Parental health will be measured as the number of days on sick leave absence during the first year after the child is born. Data on parental sick leave resides from National Social Insurance Agency and contains information on dates and the number of days on sick leave benefits for the Swedish population. If a person becomes sick while being on parental leave he/she has to report sick to the Social Insurance Agency in order for the other parent to be able to care for the child and receive benefit[8]. As opposed to when a person becomes sick while working, there is no period of sick pay when a person is on parental leave.[9] After a first unpaid day of sickness, sick leave benefit is paid straight away by the Social Insurance Agency. Hence, sickness absence during parental leave is

[8] If the child is below eight months of age, the other parent can use parental leave days to stay at home with the child if the main caretaker reports sick. Once the child has turned 8 months old, temporary parental benefit can be used.

[9] In Sweden, employers are obligated to pay sick pay to employees who cannot work due to illness for the first 14 days. As of the 15th sick day, the employee can instead receive sickness benefits from the Social Insurance Agency.

likely reported to the authorities at an early stage and also shorter sickness spells will be visible in the data. It should be noted however that sick leave absence during parental leave is only a proxy for parental health. Many sickness episodes are probably not reported and only illness that makes the caring parent unable to care for the infant will be captured. The father's and the mother's number of days on sick leave will be used as outcomes in separate analyses. Again, I will include the number of days on sick leave during the first year after the birth of the first born child as a control variable for the mothers and fathers respectively. Descriptive statistics of days on sick leave benefit during the second born child's first year of life can be found in Table 4. There are no apparent differences between treatment and control municipalities in the number of sick days for parents. The share of mothers that are ever sick is somewhat higher in treatment municipalities, and the share of mothers ever sick is generally three times higher than the share of fathers ever sick.

Table 4: Descriptive statistics of days on sick leave during second born child's first year of life

	Treatment		Control	
	(1)	(2)	(3)	(4)
	Pre2001	Post2001	Pre2001	Post2001
Sickdays Mother	3.459	4.255	3.187	3.712
	(17.43)	(20.73)	(17.16)	(19.54)
Sickdays Father	3.401	3.250	2.958	2.918
	(20.16)	(20.09)	(18.88)	(19.92)
Share of mohters ever sick	0.165	0.178	0.144	0.152
	(0.371)	(0.383)	(0.351)	(0.359)
Share of fathers ever sick	0.0641	0.0558	0.0566	0.0483
	(0.245)	(0.230)	(0.231)	(0.214)
Observations	42876	40005	34981	33517

6 Results

This section presents the regression results of the effect of childcare availability on the different parental outcomes. First, the results of the difference-in-difference analysis on the father's parental leave outtake are presented, followed by the results of the effect on the division of the leave between mothers and fathers. In section 6.3, a sensitivity analysis is conducted by estimating placebo regressions as well as investigating whether the reform impacts fertility decisions of families. In section 6.4, a summary of the results from a heterogeneity analysis is presented. Finally, section 6.5 presents the estimate of the difference-in-differences analysis on the effect of the reform on parental health.

6.1 Father's leave

Table 5 reports the results of the difference-in-differences models using the fathers' parental leave outtake as outcome. Controls for parental and child characteristics are included in all estimations: parental education, age of parents and of older sibling at the time of the birth of the second born child, birth month dummy variables for the second born child, and a control for municipal unemployment. The first two columns of Table 5 use the full sample. Both estimates are negative suggesting that access to childcare may decrease the father's parental leave take-up. None of the estimates are however statistically significant. When fathers' tendencies to take parental leave also are considered in the model, the estimate is closer to zero. The point estimate of paternal leave with the first child is positive suggesting that there is a positive correlation between the leave with the first and the second child.

Although the reform was implemented on January 1st 2002, I have limited information on the implementation process as I rely on survey data prior to the reform to create treatment and control groups. Since children are born throughout the year, I have families in the treatment group that are potentially both treated and untreated. If for example the younger child is born in October 2001 and the parents are on parental leave with this child for a year the parental leave spell overlaps both pre and post reform periods, but is categorized as only untreated in my data. Furthermore, it could be that childcare centers knowing that they shortly will be obligated to care for the older sibling, allows the child to

stay already before implementation of the reform. In an attempt to deal with this problem, I have re-estimated the model on a subset of the sample where I exclude families where the younger child is born between July and December 2001. Throughout, this sample will be referred to as the one without unclearly treated children. The estimates of the reform effects on father's parental leave outtake using this subsample are found in columns 3 and 4. Compared to Columns 1 and 2, the estimates of the effect of the reform are smaller but again not statistically significant.

The size of the point estimates of the effect of the reform are small. If it were to be interpreted, the estimate of -0.64 in Column 4 would suggest that access to childcare during parental leave reduces the father's parental leave outtake by a little more than a half day. Given the average of 68.8 days of paternal leave with the second born child in the sample, the estimate would correspond to a reduction in paternal leave days by a little less than 1 percent. The lower bound of the point estimate is -3.17 which would correspond to a reduction in paternal leave by 3.2 days or by 4.6 percent. Taken together, the results in Table 5 give no (clear) evidence of access to childcare during parental leave having an impact on the father's parental leave outtake.

Table 5: Difference-in-differences estimates of the effect of the reform on father's parental leave outtake

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	$D_{F,2}$	$D_{F,2}$	$D_{F,2}$
Treatment	-1.900	-1.067	-1.474	-0.636
	(1.332)	(1.147)	(1.495)	(1.289)
$D_{F,1}$		0.431***		0.430***
		(0.005)		(0.005)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	139971	136719	131470	128366

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the father's parental leave outtake with the younger child. The father's parental leave outtake is measured by the number of days on parental leave during the child's first two years of life, $D_{F,2}$. A control for the father's leave with the first born child is included in column 2 and 4, $D_{F,1}$. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

6.2 Division of the leave

The main research question posed in this paper is whether access to childcare during parental leave affects the division of the leave. Although the previous analysis shows no clear evidence of the reform having an impact on father's take-up, it may still have affected the division between the parents. I therefore turn to the second outcome looking at the division of the parental leave. Table 6 presents the estimates of the difference-in-differences estimations using the father's share of the total leave with the second born child (FS_2) as outcome variable. Again, I have estimated the model described in equation 1 with the full sample (column 1 and 2) as well as with the sample where children with unclear treatment are excluded (column 3 and 4).

The estimates in columns 1 and 3 are negative, suggesting that access to childcare during parental leave decreases the father's share of the total leave with the second born child. The estimates are however small and not statistically significant. In columns 2 and

4 I control for the father's share of the leave with the first born child. It reduces the size of the estimate of the effect of the reform. If it were to be interpreted, the estimate of -0.001 in the fourth column suggests that the father's share of the leave with the second born child is reduced by 0.1 percentage points. Given an average of father's share of around 13.3 percent this would correspond to a reduction of 0.75 percent which is not much, especially not if it were to be translated into days. Similarly to results in Table 5, the estimate of the control for the leave with the first child is positive and significant suggesting a positive correlation between fathers' share of the leave with the first child and the second.

In order to create the measure of the division of parental leave, I have incorporated mothers' parental leave in the outcome. If the mother's parental leave is affected by the reform, this will in turn affect the division of the leave without necessarily affecting the father's leave. It may therefore be informative to analyze effects on mothers' parental leave separately. Estimates of the difference-in-differences estimations using the mother's parental leave with the second born child as outcome are found in Appendix, Table 11. None of the estimates are statistically significant. There is no evidence of access to childcare during parental leave having affected mothers' parental leave either. Additionally, Table 12 in Appendix shows that there is no effect of access to childcare on the total number of days on parental leave with the second born child.

To sum up, access to childcare during parental leave for an older sibling seem to have had no impact on the division of the parental leave with the second born child. The difference of the division of parental leave with the second born child before and after the reform for families in treated municipalities is not different from the difference of the division of parental leave in families in the control municipalities, where childcare was available at all times.

Table 6: Difference-in-differences estimates of the effect of the reform on the division of parental leave

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	FS_2	FS_2	FS_2	FS_2
Treatment	-0.003	-0.002	-0.003	-0.001
	(0.002)	(0.002)	(0.003)	(0.002)
FS_1		0.420***		0.420***
		(0.005)		(0.005)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	139141	135361	130686	127086

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the division of parental leave with the younger child. The division is measured by father's share of the total number of days on parental leave with the second born child, FS_2. A control for the father's share of the leave with the first born child is included in column 2 and 4, FS_1. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

6.3 Robustness

As a way of testing the parallel trends assumption I perform a placebo test where I estimate my model again but this time rolling back the timing of the treatment and use only pre-reform data. The results of the placebo tests where fictitious reforms occur in 2000 or 2001 are presented in Table 7 and Table 8 respectively. Controls for parental and child characteristics are included in all estimations and the full sample is used in all estimations. The first two columns of Tables 7 and 8 use father's days with the second born child as outcome variable whereas the last two columns use the father's share with the second born child as outcome variable. The estimates of the effects of the fictitious reforms are not statistically significant in either of the estimations and they are also closer to zero compared to estimates in Tables 5 and 6. This suggests that there are no obvious problems with the parallel trends assumption.

As mentioned, access to childcare during parental leave was introduced at the same

point in time as a reduction in childcare prices occurred due to another part of the "Maxtaxa"-reform.[10] If the opportunity to keep an older sibling in childcare is uncorrelated with the level of the price change in the municipality, the simultaneity of the reforms will not be a problem. Given that the reduction in prices affected all municipalities, any effects of a price reduction will be netted away by the time fixed effects. There may however be a concern that the reduction in childcare prices is correlated with the opportunity to keep the children in childcare prior to the reform. Municipalities that allowed children of parents on parental leave to stay in childcare prior to the reform may also have been more generous in terms of charging for childcare. This would imply that the price reduction of childcare could be relatively higher in treated municipalities compared to control municipalities after the reform. The estimated effects of the reform would then potentially capture not only the effect access to childcare but also the effect of a price reduction. If this is the case I would be overestimating the effect of access to childcare as some of the effect may actually be attributed to a price reduction. (Conversely, the effect of access to childcare could be dampened if municipalities that allowed children of parents on parental leave to stay in childcare prior to the reform were less generous in terms of charging for childcare.) Furthermore, the change in prices may also have led to a change in the type of families that put their first child in childcare. Families who regarded childcare as too expensive prior to the reform and therefore cared for their child at home may have placed their child in pre-school when the prices were reduced. If those families that avoided the more expensive childcare have different preferences for division and length of parental leave in general, this may bias the estimates.

In order to check whether the estimates are sensitive to changes in childcare prices, I have estimated the effect of access to childcare controlling for the price level before and after the implementation of the reform. In the estimations I control for the price by using the prices for child care in each municipality in 1999 (pre-reform) and in 2003 (post-

[10] Recall that childcare prices are subsidized in Sweden. In 2001, prior to the reduction in childcare prices, the cost for childcare was around 10 percent of the net household income for an average family. After the reform, the cost of childcare for an average family was around 4 percent of the net income. (Lundin et al., 2008)

reform)[11]. The results of this robustness analysis are found in Table 9. The estimates are somewhat larger (more negative) in all columns, but remain statistically insignificant and of small size. The effect of access to childcare does not seem to be biased by changes in childcare prices.

Moreover, access to childcare during parental leave could potentially affect fertility decisions of parents. If the burden during parental leave is reduced, parents that value this relief highly may be more likely to have a second child. If this is true, the composition of families with two children after the reform may be different than it would have been, had it not been for the availability of childcare. This would violate the assumption that the composition of parents in treatment and control groups remains unchanged over time. In order to test whether the reform impacts fertility decisions I have estimated the difference-in-differences regression using the probability of having a second child within two years or within three years after the first child as outcome variables. The results of these estimations can be found in Table 22 in Appendix. There is no evidence of the reform affecting fertility decisions of the parents; neither of the estimates of the effect of access to childcare on the probability of having a second child within two or three years are statistically significant.

[11] Data on childcare prices are collected by NAE and are given by different types of households. I use prices for households that most closely resemble the families in the analysis, namely those consisting of one child in pre-school age with parents living together, one working full time and the other working part-time, and where both parents have around average income.

Table 7: Placebo estimates of the effect of the reform on father's parental leave outtake, fictitious reform in 2000

	(1)	(2)	(3)	(4)
	$D_{F,2}$	$D_{F,2}$	FS_2	FS_2
Treatment in 2000	-1.440	-1.024	-0.00326	-0.00249
	(1.168)	(1.139)	(0.00223)	(0.00220)
$D_{F,1}$		0.415***		
		(0.00720)		
FS_1				0.421***
				(0.00796)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	72568	70318	72190	69706

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the placebo difference-in-differences estimates. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table 8: Placebo estimates of the effect of the reform on father's parental leave outtake, fictitious reform in 2001

	(1)	(2)	(3)	(4)
	$D_{F,2}$	$D_{F,2}$	FS_2	FS_2
Treatment in 2001	0.992	0.240	0.00166	0.000870
	(1.342)	(1.249)	(0.00276)	(0.00281)
$D_{F,1}$		0.415***		
		(0.00720)		
FS_1				0.421***
				(0.00796)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	72568	70318	72190	69706

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the placebo difference-in-differences estimates. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table 9: Difference-in-differences estimates of the effect of the reform controlling for childcare prices

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-1.234	-0.003	-0.817	-0.002
	(1.123)	(0.002)	(1.259)	(0.002)
Childcare price	-0.003	-0.000**	-0.003*	-0.000**
	(0.002)	(0.000)	(0.002)	(0.000)
$D_{F,1}$	0.430***		0.430***	
	(0.005)		(0.005)	
FS_1		0.420***		0.420***
		(0.005)		(0.005)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	136574	135217	128234	126954

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the father's parental leave outtake with the younger child. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. Controls for the father's leave with the first born child is included in all estimations. Included in all estimations is also a control for the price level in childcare in each municipality before and after the reform. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

6.4 Sub-group analyses

Since there may be heterogeneity in the treatment effect I have analyzed different subsamples of the population. It has been suggested that certain parental characteristics are associated with differences in the tendency to divide the leave equally (Swedish Social Insurance Agency, 2013). Equal division between parents is more common where both the mother and father have high income and are highly educated (Dahl, 2014). The age of the older sibling could also matter: older siblings may have had more time to settle in in daycare the older they are, and it may thus be more burdensome to keep these children

at home. Furthermore, pre-school attendance is likely to be higher the older the sibling is. There may also be differences in the effect of the reform among municipalities in city regions compared to rural municipalities. Finally, there are differences in the amount of hours per week that the older siblings is allowed to stay in childcare. In most municipalities the older sibling may only stay for 15 hours per week whereas in other municipalities they may stay longer. The effect of the reform can therefore be more pronounced in regions where the sibling is allowed to stay for larger parts of the day. The results of the heterogeneity analysis are found in Appendix. All but one estimate are statistically not significant and should therefore be interpreted cautiously as they are imprecisely measured. Taking point estimates at face value may however provide some information on differences in impact between different types of families and regions.

The point estimates of the treatment effect on the division of the leave are close to zero in all estimations in Tables 13-19 in Appendix. Point estimates of the father's parental leave are positive for families where the mother or the father has university education (Tables 13 and 14) and where the mother or the father has an income above the median in the sample (Tables 15 and 16). Since equal division is more common among both high earners and highly educated parents, this is what might be expected. The estimates are however small and and not statistically significant. The point estimate of the father's parental leave is positive for families where the older sibling is older than 2.5 years of age at time of the birth of the younger sibling, and negative for families with a young older sibling (Table 17). In the latter group, some parents may still have parental leave days left with the first born child and pre-school attendance is likely to be lower, which would imply a weaker first stage (keeping child in childcare due to the reform) for this group. The estimates are however not statistically significant. The point estimate is positive (and larger) for families living in a rural region, and statistically significant for the division of the leave (Table 18). However, since the estimate is only weakly significant, it is difficult to draw conclusions from this result. Finally, the estimate of the father's parental leave is positive for municipalities where the children can stay for larger parts of the day and negative where they can only stay for 15 hours per week (Table 19).

6.5 Parental health

Reduced care burden during parental leave may have implications on other outcomes than the utilization of parental leave days. In the following section I show the results for whether access to childcare during parental leave has an effect on the utilization of sick leave insurance. In the sample, the average number of days on sick leave during the infant's first year of life is 3.7 days for mothers and 3.2 days for fathers. Around 16 percent of the mothers and 6 percent of the fathers in the sample use sick leave benefit some time during the child's first year of life. Results of the difference-in-differences estimation on the effect of access to childcare during parental leave on sickness absence of the mother and the father can be found in Table 10. All estimations include controls for parental and child characteristics as well as a control for the parent's number of days on sick leave during the first year of the first born child's life. This control is positive and significant in all estimations indicating a positive correlation between sickness during parental leave with the first child and the second. None of the estimates of the effect of the reform in Table 10 are statistically significant. Hence I find no evidence of an effect of access to childcare during parental leave on parental health.

Table 10: Difference-in-differences estimates of the effect of the reform on parental health

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	Sickdays Mother	Sickdays Father	Sickdays Mother	Sickdays Father
Treatment	0.170	-0.127	0.282	-0.132
	(0.245)	(0.189)	(0.239)	(0.185)
Mother Sickdays 1'st	0.206***		0.200***	
	(0.013)		(0.012)	
Father Sickdays 1'st		0.080***		0.081***
		(0.006)		(0.006)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	151332	151332	142499	142499

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the health of the mother and the father. Health is measured by the number of days on sick leave benefit during the younger sibling's first year of life. A control for the parent's number of days on sick leave with the first born child is included in all estimations. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

7 Conclusion

In this paper I have studied whether access to childcare for an older sibling during parental leave affects the father's parental leave outtake and the division of paid parental between mothers and fathers. The effects of a childcare reform in January 2002 that gave children of parents on parental leave with a younger sibling the right to a spot in childcare for an older sibling is evaluated using difference-in-differences. While the reform only affected the leave with the second born child, and as I have information on the parental leave with the first born child, I have investigated whether the reform affects the division of the parental leave controlling for unobserved family characteristics. By controlling for the parental leave outtake with the first born child unobservable family characteristics could be netted away. Focusing on fathers' parental leave, the reform does not seem to have

affected their outtake. The estimate is small, suggesting a reduction in parental leave days by a half day or a reduction by 1 percent, and not statistically significant. Similarly, when turning to whether the reform affected the division of the leave the estimates of the effect of the reform are small and not statistically significant.

Access to childcare was granted in treated municipalities at the same point in time as the introduction of the second daddy month reform. Given the assumption that fathers were affected similarly by the daddy month reform across municipalities, the difference-in-differences strategy will net out any effects of that reform. It could however be the case that there is an interaction effect between the two reforms. It should therefore be kept in mind when interpreting the results of the analysis that they may have looked different had it not been for the simultaneous implementation of the daddy month reform.

There may be many reasons for why families do not react more strongly to a decreased non-monetary cost of parental leave. Firstly, if the mother and the father value the non-monetary cost reduction equally the division between the parents would remain unchanged. Secondly, it could be that families do not care about this aspect. Other factors, such as gender norms and monetary incentives, may outweigh the impact of a decreased burden. The treatment may not be strong enough. Thirdly, it could be that parents do not realize that access to childcare will imply a decrease in the non-monetary cost of parental leave. Since the reform only comes into play with the second born child, families have no prior experience to compare with. Finally, it could be that access to childcare implies no reduction of the burden during parental leave. Most municipalities have restricted the number of hours that the older sibling can spend in childcare per day and if picking up and dropping off the child may interfere with the planning of the day, thus it need not imply a reduction in care burden.

This paper also analyze whether access to childcare during parental leave has an effect on mother's and father's number of days on sick leave benefit during the infant's first year of life. I find no evidence of the reform having an effect on sick leave absence during parental leave. Additional reasons for this, apart from the abovementioned reasons, may be that diseases during parental leave requiring the other parent to step in are of a severe type. If this is the case, a reduction in care burden during parts of the day will not matter

and access to childcare would therefore not impact the sick leave of either parent. It could also be that having one child in daycare increases the risk of infections which would counteract any positive effects of a reduction in the care burden.

Several measures have been taken by the Swedish Government to increase equal sharing of parental leave between mothers and fathers. Although Swedish fathers have increased their share of the parental leave during the last decades, mothers remain the primary caregiver during a child's first years. It is therefore of importance to investigate what could motivate families to increase equal sharing of paid parental leave. In this paper, I have studied whether decreased burden, or a reduction in non-monetary costs of parental leave, affects the division of paid parental leave. The results from the analyses give no evidence of access to childcare having an effect on the father's parental leave outtake or on the division of the parental leave between the mother and the father.

References

Albrecht, J., A. Björklund, and S. Vroman (2003). Is there a glass ceiling in sweden? *Journal of Labor Economics 21*(1), 145–177.

Albrecht, J., P. Skogman Thoursie, and S. Vroman (2014). Parental leave and the glass ceiling in sweden. *forthcoming in Research in Labor Economics*.

Anderson, P. M. and P. B. Levine (1999). Child care and mothers' employment decisions. Technical report, National Bureau of Economic Research.

Angelov, N., P. Johansson, and E. Lindahl (2013). *Gender differences in sickness absence and the gender division of family responsibilities*. IZA.

Angrist, J. D. and A. B. Krueger (1999). Empirical strategies in labor economics. *Handbook of labor economics 3*, 1277–1366.

Baker, M., J. Gruber, and K. Milligan (2005). Universal childcare, maternal labor supply, and family well-being. Technical report, National Bureau of Economic Research.

Björklund, A. (2006). Does family policy affect fertility? *Journal of Population Economics 19*(1), 3–24.

Dahl, S. (2014). *Män och jämställdhet SOU 2014:6*. Stockholm: Utbildningsdepartementet.

Duvander, A.-Z. and M. Johansson (2012). What are the effects of reforms promoting fathers' parental leave use? *Journal of European Social Policy 22*(3), 319–330.

Ekberg, J., R. Eriksson, and G. Friebel (2005). Parental leave–a policy evaluation of the swedish" daddy-month" reform. Technical report, Institute for the Study of Labor (IZA).

Ekberg, J., R. Eriksson, and G. Friebel (2013). Parental leave—a policy evaluation of the swedish "daddy-month" reform. *Journal of Public Economics 97*, 131–143.

Eriksson, R. (2005). Parental leave in sweden: The effects of the second daddy month. Technical report, Swedish Institute for Social Research.

Gupta, N. D. and N. Smith (2002). Children and career interruptions: The family gap in denmark. *Economica 69*(276), 609–629.

Gupta, N. D., N. Smith, and M. Verner (2008). The impact of nordic countries' family friendly policies on employment, wages, and children. *Review of Economics of the Household 6*(1), 65–89.

Karimi, A., E. Lindahl, and P. Skogman Thoursie (2012). Labour supply responses to paid parental leave. Technical report, Working Paper, IFAU-Institute for Evaluation of Labour Market and Education Policy.

Lalive, R., A. Schlosser, A. Steinhauer, and J. Zweimüller (2014). Parental leave and mothers' careers: The relative importance of job protection and cash benefits. *The Review of Economic Studies 81*(1), 219–265.

Lalive, R. and J. Zweimüller (2009). How does parental leave affect fertility and return to work? evidence from two natural experiments. *The Quarterly Journal of Economics 124*(3), 1363–1402.

Liu, Q. and O. Nordström Skans (2010). The duration of paid parental leave and children's scholastic performance. *The BE Journal of Economic Analysis & Policy 10*(1).

Lundberg, S. and R. A. Pollak (2007). The american family and family economics. Technical report, National Bureau of Economic Research.

Lundin, D., E. Mörk, and B. Öckert (2008). How far can reduced childcare prices push female labour supply? *Labour Economics 15*(4), 647–659.

Schönberg, U. and J. Ludsteck (2007). Maternity leave legislation, female labor supply, and the family wage gap. Technical report, IZA Discussion Papers.

Swedish National Agency for Education (2002). Barnomsorg, skola och vuxenutbildning i siffror, 2002 del 2: Barn, personal, elver och lärare,. *Rapport 294*.

Swedish Social Insurance Agency (2010). Jämställdhetsbonus. en effektutvärdering, socialförsäkringsrapport 2010:5. Technical report, Swedish Social Insurance Agency.

Swedish Social Insurance Agency (2013). De jämställda föräldrarna, socialförsäkringsrapport 2013:8. Technical report, Swedish Social Insurance Agency.

Swedish Social Insurance Agency (2014). Låg kunskap om jämställdhetsbonus, socialförsäkringsrapport 2014:1. Technical report, Swedish Social Insurance Agency.

Tamis-LeMonda, C. S. and N. E. Cabrera (2002). Handbook of father involvement: Multidisciplinary perspectives.

Vikman, U. (2010). Does providing childcare to unemployed affect unemployment duration? Technical report, Working paper//IFAU-Institute for Labour Market Policy Evaluation.

Waldfogel, J. (2002). Child care, women's employment, and child outcomes. *Journal of Population Economics 15*(3), 527–548.

Appendix

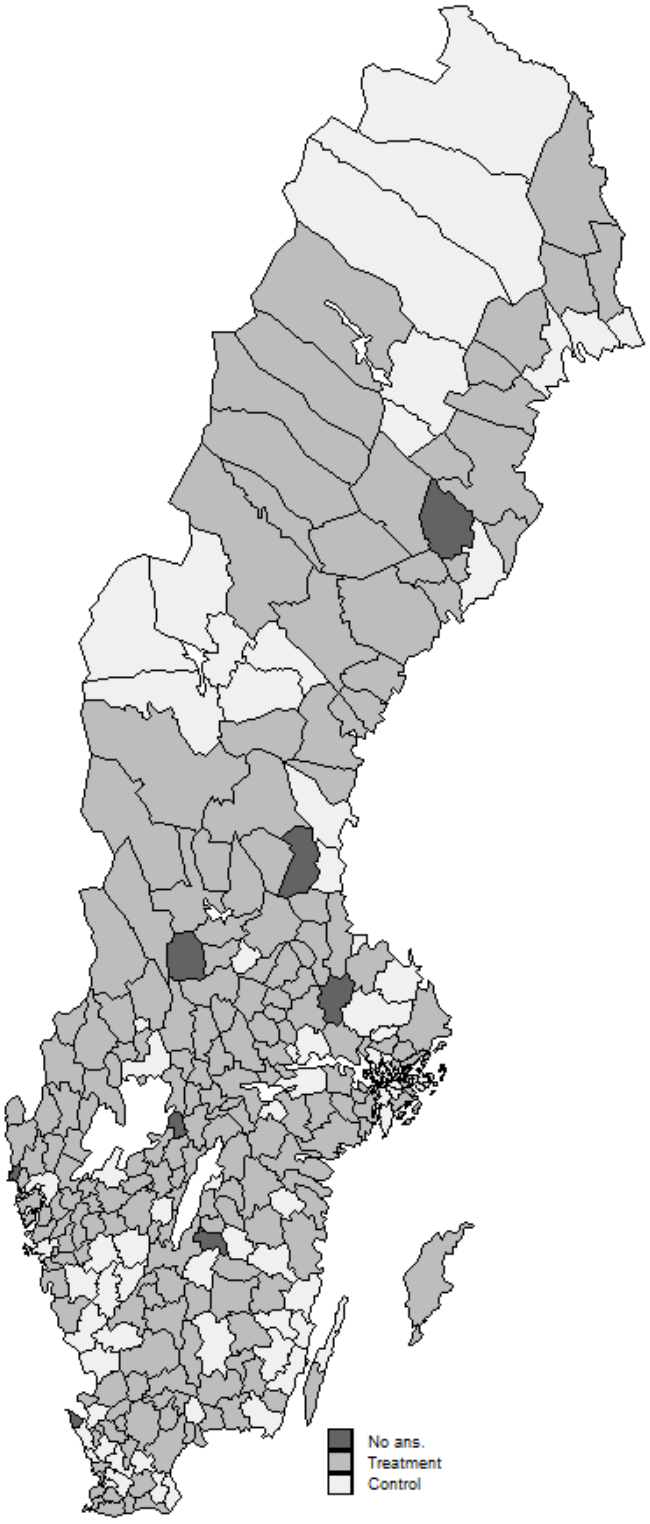

Figure A01: Treatment and control municipalities

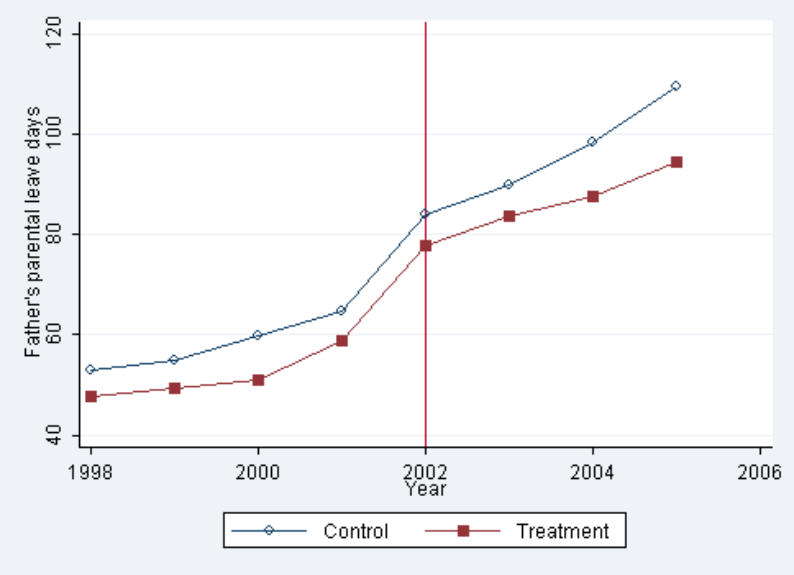

Figure A02: Fathers' parental leave days in treatment and control municipalities before and after the reform

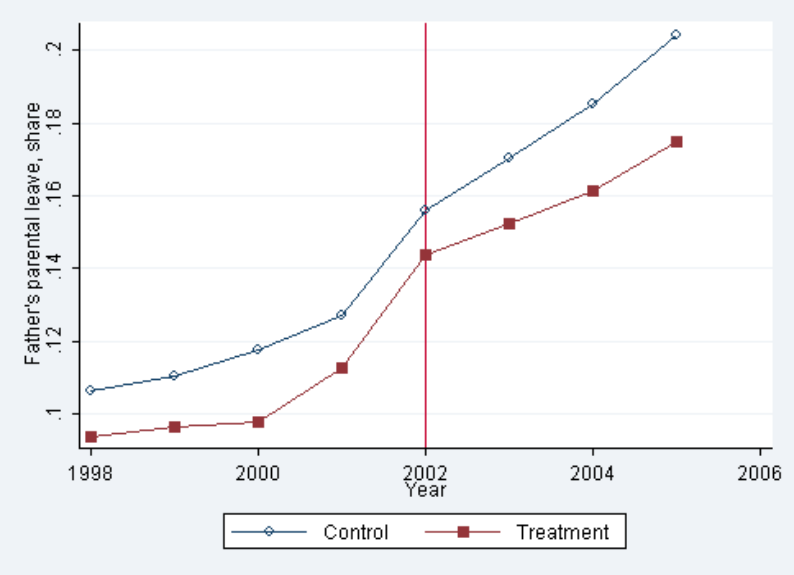

Figure A03: Fathers' share of parental leave days in treatment and control municipalities before and after the reform

Maternal leave

Table A01: Difference-in-differences estimates of the effect of the reform, mother's parental leave

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	$D_{M,2}$	$D_{M,2}$	$D_{M,2}$	$D_{M,2}$
Treatment	1.646	0.731	1.560	0.651
	(1.633)	(1.463)	(1.777)	(1.576)
$D_{M,2}$		0.440***		0.440***
		(0.003)		(0.003)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	150575	150180	141532	141152

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the mother's parental leave outtake with the younger child. The mother's parental leave outtake is measured by the number of days on parental leave during the child's first two years of life, $D_{M,2}$. A control for the father's leave with the first born child is included in column 2 and 4, $D_{M,1}$. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

Total leave

Table A02: Difference-in-differences estimates of the effect of the reform, total parental leave

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	Total Days 2'nd	Total Days 2'nd	Total Days 2'nd	Total Days 2'nd
Treatment	-0.423	-0.070	-0.304	0.028
	(1.744)	(1.662)	(1.773)	(1.675)
Total Days 1'st		0.386***		0.387***
		(0.005)		(0.004)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	143814	136102	135100	127770

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the total parental leave outtake of mother and father with the younger child. The total parental leave outtake is measured by adding the number of days on parental leave during the child's first two years of life of the mother and father, $D_{F,2} + D_{M,2}$. A control for the total leave with the first born child is included in column 2 and 4, $D_{F,1} + D_{M,1}$. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

Sub-group analyses

Table A03: Difference-in-differences estimates of the effect of the reform, splitting the sample according to mother's educational level

	At most highschool		University	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-0.041	0.001	1.669	0.001
	(1.427)	(0.003)	(1.355)	(0.003)
$D_{F,1}$	0.432***		0.424***	
	(0.007)		(0.006)	
FS_1		0.433***		0.402***
		(0.008)		(0.007)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	67262	66704	55518	54895

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to mothers' educational level. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A04: Difference-in-differences estimates of the effect of the reform, splitting the sample according to father's educational level

	At most highschool		University	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-0.081	0.001	1.889	0.001
	(1.281)	(0.002)	(1.611)	(0.003)
$D_{F,1}$	0.422***		0.436***	
	(0.006)		(0.007)	
FS_1		0.419***		0.414***
		(0.007)		(0.008)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	74081	73546	48668	48023

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to fathers' educational level. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A05: Difference-in-differences estimates of the effect of the reform, splitting the sample according to father's income level

	Below median		Above Median	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	0.508	0.003	-0.490	-0.001
	(1.742)	(0.003)	(1.510)	(0.003)
$D_{F,1}$	0.414***		0.453***	
	(0.007)		(0.007)	
FS_1		0.401***		0.440***
		(0.007)		(0.008)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	51589	50995	60267	59813

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to fathers' income level in the sample. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A06: Difference-in-differences estimates of the effect of the reform, splitting the sample according to mother's income level

	Below median		Above median	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	0.459	0.004	0.077	-0.001
	(1.529)	(0.003)	(1.474)	(0.003)
$D_{F,1}$	0.477***		0.397***	
	(0.007)		(0.007)	
FS_1		0.492***		0.361***
		(0.008)		(0.009)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	50528	49769	61386	61104

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to mothers' income level in the sample. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A07: Difference-in-differences estimates of the effect of the reform, splitting the sample according to age difference between siblings

	Young Sibling		Older Sibling	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-2.181	-0.004	0.948	0.002
	(1.672)	(0.003)	(1.642)	(0.003)
$D_{F,1}$	0.475***		0.384***	
	(0.006)		(0.007)	
FS_1		0.484***		0.360***
		(0.006)		(0.007)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	63737	63177	64629	63909

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to the age difference of siblings. Older siblings are at least 2.5 years older and young sibling less than 2.5 years older. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A08: Difference-in-differences estimates of the effect of the reform, splitting the sample according to type of municipality

	City Region		Not City Region	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-0.582	-0.002	2.883	0.006*
	(1.367)	(0.003)	(1.842)	(0.003)
$D_{F,1}$	0.431***		0.427***	
	(0.006)		(0.008)	
FS_1		0.420***		0.419***
		(0.006)		(0.009)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	82850	81955	45516	45131

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to the type of municipality that the family lives in. Municipalities are categorized into different types by the Swedish Association of Local Authorities and Regions (SKL). The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Table A09: Difference-in-differences estimates of the effect of the reform, splitting the sample according to whether the child could stay for 15 or 30 hours per week

	Stay short		Stay long	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	FS_2	$D_{F,2}$	FS_2
Treatment	-0.428	-0.00179	1.038	0.00515
	(1.559)	(0.00287)	(1.814)	(0.00366)
$D_{F,2}$	0.429***		0.434***	
	(0.00512)		(0.0124)	
FS_1		0.417***		0.428***
		(0.00531)		(0.00924)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	94692	93845	30450	30046

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates splitting the sample according to whether the older sibling could stay for more than 15 hours per week or not. The father's parental leave outtake is measured using two outcomes, $D_{F,2}$, and FS_2. A control for the father's take-up and his share of the leave with the first born child is included in column 2 and 4, $D_{F,1}$, and FS_1 respectively. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment.

Estimations including immigrated parents

Table A010: Difference-in-differences estimates of the effect of the reform on father's outtake, including immigrated parents

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	$D_{F,2}$	$D_{F,2}$	$D_{F,2}$	$D_{F,2}$
Treatment	-1.455	-0.992	-1.008	-0.541
	(1.178)	(1.011)	(1.282)	(1.106)
$D_{F,1}$		0.423***		0.423***
		(0.004)		(0.005)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	151996	147406	142691	138337

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the father's parental leave outtake with the younger child. The father's parental leave outtake is measured by the number of days on parental leave during the child's first two years of life, $D_{F,2}$. A control for the father's leave with the first born child is included in column 2 and 4, $D_{F,1}$. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

Table A011: Difference-in-differences estimates of the effect of the reform on division, including immigrated parents

	Full Sample		Excl. unclear treat.	
	(1)	(2)	(3)	(4)
	FS_2	FS_2	FS_2	FS_2
Treatment	-0.003	-0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.003)	(0.002)
FS_1		0.410***		0.411***
		(0.005)		(0.005)
Controls	Yes	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	150740	145030	141506	136103

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on the division of parental leave with the younger child. The division is measured by father's share of the total number of days on parental leave with the second born child, FS_2. A control for the father's share of the leave with the first born child is included in column 2 and 4, FS_1. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the second born child, are included: mother's and father's education, the age of the mother and father, whether they are married or not, age of older sibling, birth month fixed effects for the second born child, and a control for municipal unemployment. In columns 3 and 4, children born just prior to the implementation of the reform are excluded.

Fertility

This section presents the regression results of the effect of childcare availability on the probability of having a second child within two years or within three years after the birth of the first child. These analyses use a sample of first born children born between 1998 and 1999 and between 2002 and 2003. These first born children and their parents are matched with a younger sibling, if they have one. The outcome variables are dummy variables taking the value 1 of the first born child has a sibling born within two years or within three years, and 0 otherwise. In the main analyses of this paper, treatment status of the families depends on the timing of the birth of the second child. Since we can no longer use the timing of the birth of the second child, the analyses presented here assume that the parental leave with younger siblings born within two or three years after the first born children born between 1998 and 1999 will take place before the implementation of the reform. Parental leave with younger sibling of first born children born between 2002 and 2003 will however take place after the implementation of the reform. We can therefore compare these families before and after the implementation of the reform in treatment and control municipalities to investigate whether the reform affects fertility decisions of the families. Since parental leave spells of younger sibling of first born children born between 2000 and 2001 may overlap the reform date, these observations are excluded in the analysis. Table 22 presents the difference-in-differences estimates of the effect of the reform. Standard errors, clustered at the municipal level, are given in parenthesis. None of the estimates of the effect of the reform are statistically significant, suggesting that the reform has no effect on fertility decisions in this sample.

Table A012: Difference-in-differences estimates of the effect of the reform on timing of second child

	98-99 vs. 02-03		98 vs. 02
	(1)	(2)	(3)
	Within 3 yrs	Within 2 yrs	Within 3 yrs
Treatment	-0.003	0.003	
	(0.007)	(0.004)	
Treatment			-0.008
			(0.010)
Controls	Yes	Yes	Yes
Municipal Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	121611	121611	60335

Note: Standard errors in parenthesis, clustered at municipality level. * significant at 10%; ** at 5% ; *** at 1%. This table presents the results of the difference-in-differences estimates of the effect of access to childcare for the older sibling during parental leave on fertility decisions of the family. Fertility is measured by a dummy variable taking the value 1 if the family has a second child within two years after the birth of the first child, and 0 otherwise $Within2yrs$, or a dummy variable taking the value one if the family has a second child within three years, and 0 otherwise $Within3yrs$. The model includes municipality fixed effects and year fixed effects. The following controls for parental and child characteristics, measured at the time of birth of the first born child, are included: mother's and father's education, the age of the mother and father, and whether they are married or not.

Publication series published by IFAU – latest issues

Rapporter/Reports

2015:1 Albrecht James, Peter Skogman Thoursie and Susan Vroman ”Glastaket och föräldraförsäkringen i Sverige”

2015:2 Persson Petra ” Socialförsäkringar och äktenskapsbeslut”

2015:3 Frostenson Magnus ”Organisatoriska åtgärder på skolnivå till följd av lärarlegitimationsreformen”

2015:4 Grönqvist Erik and Erik Lindqvist ”Kan man lära sig ledarskap? Befälsutbildning under värnplikten och utfall på arbetsmarknaden”

2015:5 Böhlmark Anders, Helena Holmlund and Mikael Lindahl ”Skolsegregation och skolval”

2015:6 Håkanson Christina, Erik Lindqvist and Jonas Vlachos ”Sortering av arbetskraftens förmågor i Sverige 1986–2008”

2015:7 Wahlström Ninni and Daniel Sundberg ” En teoribaserad utvärdering av läroplanen Lgr 11”

2015:8 Björvang Carl and Katarina Galic´ ”Kommunernas styrning av skolan – skolplaner under 20 år”

2015:9 Nybom Martin and Jan Stuhler ”Att skatta intergenerationella inkomstsamband: en jämförelse av de vanligaste måtten”

2015:10 Eriksson Stefan and Karolina Stadin ”Hur påverkar förändringar i produktefterfrågan, arbetsutbud och lönekostnader antalet nyanställningar?”

2015:11 Grönqvist Hans, Caroline Hall, Jonas Vlachos and Olof Åslund ”Utbildning och brottslighet – vad hände när man förlängde yrkesutbildningarna på gymnasiet?”

2015:12 Lind Patrik and Alexander Westerberg ”Yrkeshögskolan – vilka söker, vem tar examen och hur går det sedan?

2015:13 Mörk Eva, Anna Sjögren and Helena Svaleryd ”Hellre rik och frisk – om familjebakgrund och barns hälsa”

2015:14 Eliason Marcus and Martin Nilsson ”Inlåsningseffekter och differentierade ersättningsnivåer i sjukförsäkringen”

2015:15 Boye Katarina ”Mer vab, lägre lön? Uttag av tillfällig föräldrapenning för vård av barn och lön bland svenska föräldrar”

2015:16 Öhman Mattias ”Smarta och sociala lever längre: sambanden mellan intelligens, social förmåga och mortalitet”

2015:17 Mellander Erik and Joakim Svärdh ”Tre lärdomar från en effektutvärdering av lärarstödsprogrammet NTA”

Working papers

2015:1 Avdic Daniel “A matter of life and death? Hospital distance and quality of care: evidence from emergency hospital closures and myocardial infarctions”

2015:2 Eliason Marcus “Alcohol-related morbidity and mortality following involuntary job loss”

2015:3 Pingel Ronnie and Ingeborg Waernbaum “Correlation and efficiency of propensity score-based estimators for average causal effects”

2015:4 Albrecht James, Peter Skogman Thoursie and Susan Vroman “Parental leave and the glass ceiling in Sweden”

2015:5 Vikström Johan “Evaluation of sequences of treatments with application to active labor market policies”

2015:6 Persson Petra “Social insurance and the marriage market”

2015:7 Grönqvist Erik and Erik Lindqvist "The making of a manager: evidence from military officer training"

2015:8 Böhlmark Anders, Helena Holmlund and Mikael Lindahl "School choice and segregation: evidence from Sweden"

2015:9 Håkanson Christina, Erik Lindqvist and Jonas Vlachos "Firms and skills: the evolution of worker sorting"

2015:10 van den Berg Gerard J., Antoine Bozio and Mónica Costa Dias "Policy discontinuity and duration outcomes"

2015:11 Wahlström Ninni and Daniel Sundberg "Theory-based evaluation of the curriculum Lgr 11"

2015:12 Frölich Markus and Martin Huber "Direct and indirect treatment effects: causal chains and mediation analysis with instrumental variables"

2015:13 Nybom Martin and Jan Stuhler "Biases in standard measures of intergenerational income dependence"

2015:14 Eriksson Stefan and Karolina Stadin "What are the determinants of hiring? The role of demand and supply factors"

2015:15 Åslund Olof, Hans Grönqvist, Caroline Hall and Jonas Vlachos "Education and criminal behaviour: insights from an expansion of upper secondary school"

2015:16 van den Berg Gerard J. and Bas van der Klaauw "Structural empirical evaluation of job search monitoring"

2015:17 Nilsson Martin "Economic incentives and long-term sickness absence: the indirect effect of replacement rates on absence behavior"

2015:18 Boye Katarina "Care more, earn less? The association between care leave for sick children and wage among Swedish parents"

2015:19 Assadi Anahita and Martin Lundin "Tenure and street level bureaucrats: how assessment tools are used at the frontline of the public sector"

2015:20 Stadin Karolina "Firms' employment dynamics and the state of the labor market"

2015:21 Öhman Mattias "Be smart, live long: the relationship between cognitive and non-cognitive abilities and mortality"

2015:22 Hägglund Pathric, Per Johansson and Lisa Laun "Rehabilitation of mental illness and chronic pain – the impact on sick leave and health"

2015:23 Mellander Erik and Joakim Svärdh "Inquiry-based learning put to test: long-term effects of the Swedish science and technology for children program"

2015:24 Norén Anna "Childcare and the division of parental leave"

Dissertation series

2014:1 Avdic Daniel "Microeconometric analyses of individual behaviour in public welfare systems"

2014:2 Karimi Arizo "Impacts of policies, peers and parenthood on labor market outcomes"

2014:3 Eliasson Tove "Empirical essays on wage setting and immigrant labor market opportunities"

2014:4 Nilsson Martin "Essays on health shocks and social insurance"

2014:5 Pingel Ronnie "Some aspects of propensity score-based estimators for causal inference"

2014:6 Karbownik Krzysztof "Essays in education and family economics"