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Modeling Family Leave Policies

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Abstract

This study presents a model that helps to solve the predicament facing policymakers by improving on the existing tools to calculate the effects of changes in the current policies. We present a model that allows its user to analyze the dynamic behavioral effects of changes in the family leave policies. We also show a number of policy-experiments that demonstrate the effects of changing parental leave policies using our model. In the policy-experiments we vary the length and level of different family leave policies to illustrate how the usage of parental leaves respond in the model to these kinds of changes. When the model is used in actual policy making, one can more easily conduct these kinds of policy-experiments as well as study the sensitivity of the results to the elasticity parameters and other parameters in the model. This report also presents an extensive literature review on the causal effects of family leave policies on the usage of policies. The baseline elasticity parameters of the model are based on this prior literature. The main conclusion drawn from this literature review is that parents are fairly sensitive to increases in benefits related to home care, such as paid parental leave or subsidies to home care, i.e., the participation elasticity in this case is relatively high. However, the responses are more mixed when day care fees are lowered.

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Tiivistelmä

Tässä hankkeessa on tehty malli, jonka avulla voidaan aiempaa helpommin arvioida perhevapaiden piirteiden muuttamisen vaikutusta perhevapaiden käyttöön. Näitä piirteitä ovat esimerkiksi vapaiden kesto tai niiden taso. Aiemmin politiikan valmistelijoiden käytössä on ollut vain staattisia malleja, jotka eivät ota huomioon käyttäytymisvaikutuksia. Koska politiikan valmistelijat voivat itse käyttää mallia, sen myötä politiikan valmistelu on helpompaa ja sen perusteena olevien arvioiden laatu ja käytettävyys lisääntyy huomattavasti.

Malli toimii Matlab-ohjelmistolla ja sen kehittäminen on vaatinut matemaattisen mallintamisen osaamista yhdistettynä syvälliseen ymmärrykseen perhevapaiden instituutionaalisista piirteistä ja siitä, miten aiemmissa tutkimuksissa on havaittu näiden vaikuttavan perhevapaiden käyttöön. Kelan etuuksista on laskettu lapsen iän mukaan miten paljon äidit ja isät käyttävät eri etuuksia. Lisäksi mikrosimulointimalli SISU:lla on laskettu eri etuuksien käyttöön liittyvät työn vastaanottamisen kannustimet.

Malli tuottaa perusuran erikseen kummallekin vanhemmalle, joka kuvaa lapsen iän mukaan kuukausissa, kuinka moni vanhempi käyttää kulloisessakin skenaariossa eri perhevapaita.

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Detta projekt har skapat en modell som underlättar bedömningen av effekter av ändringar som görs till familjeledigheternas detaljer på användningen av familjeledigheter. Sådana detaljer är exempelvis familjeledighetens längd eller grad. Politiska lagberedare har tidigare endast haft statiska modeller tillhanda som inte tar hänsyn till beteendeeffekter. Genom att låta politiska lagberedare själva använda modellen blir utarbetandet av politik lättare, och kvalitén och användbarheten hos bedömningar som lagberedningen är baserad på höjs avsevärt.

Modellen används med Matlab-programvaran vars utveckling har förutsatt kunnande av matematisk modellering kombinerad med djup förståelse för familjeledigheternas institutionella detaljer samt för vad tidigare forskning har upptäckt om hurdan påverkan dessa detaljer har för användningen av familjeledigheter. Utifrån stöd från FPA och barnets ålder har det beräknats till vilken grad mödrar och fäder utnyttjar olika förmåner. Ytterligare har med mikrosimuleringsmodell SISU beräknats incitamenten till godkännande av arbete med koppling till utnyttjande av olika förmåner.

Modellen producerar för vardera föräldern en separat baskarriär som framställer barnets ålder i månader och visar hur många av föräldrarna som använder familjeledighet i respektive scenarier.

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Contents

1 Introduction

There is a passionate ongoing debate on family leave policies in many developed countries, particularly in Finland. The wider discussion touches upon many important societal themes, such as gender equality, employment of mothers, and the best way to care for and educate children. Family leave policies and publicly provided child care are also directly expensive for the public sector. Family leave policies differ from the subsidizing of day care because these policies are potentially indirectly costly through behavioral effects, which inhibit parents from providing labor as well as the dynamic and indirect effects that are caused in the labor markets. Regarding benefits, parental leave is a major public program that affects all those who have children. Paid parental leave is viewed as a major strength of the welfare state and enjoys broad support within society. Policymakers are under pressure to balance the potential costs and benefits of these programs as well as to design the details of the policies in such a way that the broader goals of gender equality and child wellbeing are attained.

However, the tools needed to perform calculations of the impacts of proposed changes in family leave policies are currently lacking. Present models mostly include static microsimulations, which fail to capture the very margins that policy changes try to achieve, such as changes in the usage of parental leave among fathers or mothers' participation in employment (and consequently children in daycare). At best, current behavioral effects are calculated in a very crude manner, taking behavioral parameters estimated from some other context and multiplying them with the average change in the incentives thus providing a rough estimate of the number of people employed.

This study presents a model that helps to solve the predicament faced by policymakers by improving on the existing tools for calculating the effects of changes in the current policies. We present a model that allows its users to analyze the dynamic behavioral effects of changes in family leave policies. We also show a number of policy-experiments that analyze the impacts of changing parental leave policies using our model. In the policy-experiments, we vary the length and level of different family leave policies to illustrate how, using the model, how the usage of parental leaves responds to these kinds of changes. When the model is used in actual policy making, one can

derive more of these kinds of policy-experiments as well as study the sensitivity of results to the model's elasticity and other parameters. This report also presents an extensive literature review on the causal effects of family leave policies on the usage of policies. The baseline elasticity parameters of the model are based on this prior literature. The main conclusion drawn from this literature review is that parents are fairly sensitive to increases in benefits related to home care, such as paid parental leave or home care subsidies, i.e., the participation elasticity in this case is relatively high. However, the responses are more mixed when day care fees are lowered.

The main purpose of this report is to describe and apply the simulation model to a set of policy changes, after which we can observe how the simulation model captures the behavioral responses of parents to changes in the policies. Utilizing the model, the policymakers themselves can see how different policy changes could affect, for example, the share of fathers taking parental leave or what fraction of mothers would return to work sooner and stop collecting home care allowance earlier according to the age of their child in months. While the model still relies on a set of assumptions, it nonetheless allows for a much more transparent and precise ex-ante evaluation of policy alternatives. Moreover, we provide the ministries and Social Insurance Institution the code (done in Matlab) and an easy to use user-interface , so that in future they will have a tool that they can use themselves and that will enable them to modify some assumptions made in the baseline model. This also improves the transparency of the research tools in policymaking.

The essential elements in the model follow earlier literature that describes the method in which modeling and simulating participation responses to taxes are conducted (Saez 2002, Kleven and Kreiner, 2006 and Immervoll et al. 2007). They include a behavioral rule that determines how an individual would respond to changes in the policy. The model follows standard economic models and assumes that individuals enjoy consuming more but dislike the work effort needed to earn income that enables the additional consumption. The model pays special attention to participation in work choice, where a decision is made by comparing utility derived from staying at home or participating in work. While staying at home, parents derive utility from taking care of their child. If they choose to return to work, they need to pay a fixed cost for returning to work, which can be prompted by work-related expenses such as the need for child care. The timing of returning to work differs across individuals, in part because they have different fixed costs of returning to work. Moreover, parents in the model only have fixed points in time when they can return to work, and these fixed points also differ across individuals. All in all, this structure generates smooth participation profiles, which correspond to the current participation profiles after the model is calibrated to the current situation. Family leave policies, and changes therein, affect disposable income when not participating in work. Thus, changing the euro amount of leaves affects the usage of said leaves by affecting one's incentives to do so.

Another element of the model takes the child-age profiles from current leave usage and calibrates the baseline model to the empirical situation. We use aggregate calculations from the Social Insurance Institution on the fraction of fathers and mothers using the leave policies according to the length of the leave periods. We have also calculated, using the SISU-microsimulation model[1], the participation tax rates and disposable incomes associated with the current system as well as how changing current policies would affect these. The calibrated profiles allow us to see how many people are using policies by considering the length of their leave(s). This information helps in modeling how many people would be affected when lengthening or shortening the amount of possible maximum leave duration from the current situation.

The model has parameters governing how responsive individuals are to the changes in incentives that the user can easily change. We make a baseline scenario, on which the model operates unless the parameters are changed. For mothers, these are taken from empirical studies, such as Kosonen (2014), who estimate that the participation elasticity of mothers on home care allowance is on average 0.8. For fathers, we needed to make more assumptions due to the lack of applicable empirical studies. In the baseline model we use a participation elasticity of 0.2, which is a consensus estimate for the general responsiveness to taxes (Saez et al. 2012). Also, in the 2015 situation, 28% of eligible fathers used the maximum amount of leave entitled to them. It is thus plausible that at least in the short term, not all fathers would respond to an expansion in the leave entitled to fathers, but rather that response would be limited to those using almost the maximum amount of leave currently.

Some caveats follow: A trade-off between realistic looking participation profiles and the number of assumptions is needed. The model uses some assumptions and calibrations to the data, but precise behavioral responses are still based on assumptions. Especially the fathers' model rests on assumptions that cannot be backed with empirical causal estimates on the effect of actual policies similarly than the assumptions in the mothers' model. This makes assessing the impacts of family leave policies on fathers particularly difficult. Moreover, changes in parental leave policies might alter preferences in the longer term in a manner that cannot be captured by empirical quasi-experimental studies or models relying on economic incentives, e.g., by affecting social norms.

One contribution to wider research on policy that this project makes is that it takes fertility decisions into account. These results show that many mothers, who are on parental leave from the previous child, have another child within the 36-month leave period and thus exit the pool of those using home care allowance and begin another parental leave spell. We take this behavior into account and focus on the length of

[1] Available at https://www.stat.fi/tup/mikrosimulointi/index.html.

home care allowance periods affected by the generosity of proposed policies and parents' desire to return to work

This article proceeds by discussing earlier literature in Section 2. Section 3 gives a brief summary of the current family leave policies in Finland. Section 4 presents the basic structure of the model and Section 5 shows the baseline simulations and how the model is calibrated to empirical data. Section 6 presents a number of policy-experiments on Finland's current family leave policies and demonstrates how our model, which predicts the behavior of parents, would change under these scenarios. Section 7 then concludes the study.

2 Literature

The central aspect of family leave policies we model in this study is rooted in the impact of the generosity of paid leaves and the length of either paid leave or work-protected unpaid leave. To provide empirically founded insights on the size of the relevant elasticities, i.e., how sensitive individual decisions are to these policy parameters, we rely on previous literature on the subject. The central focus in the selected literature is on decisions regarding the length of parental leave, or conversely, on the choice to participate in work, and to some extent, fertility decisions. Of interest, but not something the model takes a stance on, is also the impact of these decisions on the wellbeing of children, the main subject of these policies. This subsection reviews the literature on mothers and children and the next subsection reviews the much less extensive literature regarding fathers.

Perhaps the most studied part of these questions in the literature is the impact incentives for working have on mothers' decisions to return to work. Participation incentives are affected by family leave policies, since a more generous family leave benefit decreases incentives to go back to work. The international literature contains many diverging results, perhaps due to different contexts and child care institutions (see e.g. Johnsen and Løken (2015) for a survey on studies from Nordic countries and Olivetti and Petrongolo (2017) for a different survey on child-related policies).

Therefore, we start the review by reviewing studies that are rooted in the Finnish context. Kosonen (2014) and Kosonen and Huttunen (2018, in Finnish) study the impact of child home care allowance (HCA) policies on the employment of mothers whose youngest child is at least 10 months, but under three years, old. The national policy provides subsidies to parents of children that stay at home and take care of their eligible children with separate subsidies that are in place for public and private day care. Both studies utilize municipal supplements for HCA as an identification strategy providing credible causal estimates due to exogenous variation in HCA related benefits over time and across regions. Kosonen (2014) estimates the participation elasticity as 0.8, which takes into account the impact of HCA on mothers' participation tax rate. Further, this is the baseline participation elasticity we will utilize in this study due to the estimates being from the same country and taking place in the equivalent institutional setting that we model here as well as due to the study's credible causal identification strategy. Kosonen and Huttunen (2018) also find that HCA-induced home care has a negative impact on children measured in the child health care clinic tests taking place when children are five or four years old.

Räsänen et al. (2019) also analyze the impact of home care allowance with the help of municipal supplements in Finland. The average effect is similar to that found in

Kosonen (2014), but they focus more on heterogeneity across subgroups of families. The HCA seems to have an effect in most subgroups, however, it seems the negative effect is even stronger among mothers who were unemployed when the child was born.

There are other studies that utilize the variation incentivizing mothers to stay at home such as the Carneiro et al. (2015) study, which examines the increase in paid maternity leave and extension of job security period in Norway on maternal labor supply and the long-term outcomes of children. The authors use a regression discontinuity design (RDD as the date of birth was the criterion used to decide who would be affected by new policy applied from certain birth cohorts onwards. The immediate effect of the policy was that mothers stayed longer at home taking care of their children after the policy changes. Long term results for children display an increase in college attendance and earnings as well as a decrease in high school dropout rates. Thus, for maternal labor supply, this study arrives at similar conclusion as Kosonen (2014) in that incentivizing home care leads to longer home care periods, although this study utilizes variation affecting babies of a few months old and variation in 1970s in Norway.

Dahl et al (2016) study the later extensions of paid maternity leave that left the length of job protection unchanged in a more systematic fashion than Carneiro et al. (2015), who focused on only a single earlier reform (studying the long-term outcomes for children). This study utilizes an RDD setting with seven parental leave reforms in Norway. The study found relatively strong effects that lead to increases in the number of paid months, which led to roughly similar increases in the length of home care episodes for mothers, and consequently, created a negative effect on the labor supply of mothers. Instead, they found no effect on family income, most likely due to the nearly 100% replacement rate of the paid parental leave.

Similarly, Gathmann and Sass (2018) study the impact of subsidies on home care (or informal day care) in East Germany. They find that subsidizing home care leads to a reduction in daycare attendance for children and a decline in maternal labor supply. The latter effect is not as strong as what Kosonen (2014) finds, perhaps because the subsidy was also being used to finance informal daycare, not only home care. Schone (2004) and Naz (2004) study Norway’s Cash-For-Care (CFC) policy. As with the policy studied by Gathmann and Sass (2018), the Norwegian CFC was created for all non-public childcare. The incentives for parents not to supply labor and not to place their child in formal child care are stronger in the Finnish HCA than with these aforementioned types of policies. In line with the strength of incentives, Schone (2004) and Naz (2004) find a negative maternal labor supply effect created by CFC policy, but smaller than what Kosonen (2014) finds.

Participation to work incentives are formed by comparing disposable income when participating in work and when not participating. Home care policies affect the share when not participating and day care fees affect the share when participating. Variation in both, subsidies or fees, could affect participation decisions, although in different directions. One difference between family leave policies and day care fees is that the former affects children between the ages of at most three years of age while the latter affect children who are at most six years of age, with emphasis on the latter. A number of papers have also studied the impact of day care fees on participation decisions in the Nordic and other countries. In this case, the results are somewhat mixed. For example, Lundin, Mörk, and Öckert (2008) in a case study of Sweden, Simonsen (2010) of Denmark, and Havnes and Mogstad (2011) of Norway, find small or negligible effects on maternal labor supply when public day care fees were lowered or public day care was expanded, therefore effectively making child care cheaper. In all these instances, one likely explanation is that maternal labor supply was already at a high level, thus it might have been difficult to increase it further. The difference between these reforms and the extensions of paid maternity leave discussed above is that these reforms affected the labor supply decisions of the parents of older – one to five years of age, children than any parental leave reforms.

Contrary to other Nordic studies, Andresen and Havnes (2019) find a positive impact from the extension off public child care coverage. Norway increased the availability of child care for toddlers in 2004 and they demonstrate that this increase in availability had a positive impact on the labor supply of both cohabitating and married mothers. Estimates show that the policy increases the probability of mothers being employed by 32%. However, the increase in tax revenue is negligible. Finally, they find no labor supply response for fathers.

Studies utilizing American settings do find that lower child care fees improve maternal labor supply. For example, Baker et al (2008) studied the introduction of universal daycare in Quebec, Canada, which effectively made child care more affordable for parents. Their results show that there was an increase in the use of daycare and in maternal labor supply. One difference between the Canadian setting and that in the Nordic countries, is that maternal labor supply in Canada was at a much lower level. Moreover, the study found evidence of the negative effects on child's health; stress and anxiety that arises from participating in day care, which could under one hypothesis, be attributed to the poor child day care quality in Quebec at the time. Also, Gelbach (2002) finds strong increases in maternal labor supply when public schooling is extended to five-year old-children in the US.

Essentially, there are three ways for governments to support families financially. One of which is to support home care. As discussed above, the selected literature has found that support for home care has a strong negative effect on employment. Families

can also be directly supported through child support. The upside of the direct benefit is that the employment effects only come through the income effect; that is, the reduction in labor supply stemming from an overall increase in income and these impacts are therefore potentially much weaker. Empirically, child benefits have been found to have a minor negative effect on employment in Spain (Gonzales, 2013) and Canada (Schirrle, 2015). However, the benefits are not well-targeted if intended to support only low-income families and are thus expensive programs if the benefit level is high. Some kind of middle-ground would be to operate a means-tested child support program, where the means-testing would be significantly lower than is currently the case with the home-care related subsidies (to which parents are effectively ineligible for when they participate in work, which renders the means testing implicitly at 100%). The third way to support families is the Earned Income Tax Credit policy as employed in the US. The tax credit is mostly targeted at low-income families but only at those in employment. The program provides a tax credit payment that at first increases according to income, reducing marginal tax rates for low incomes, while it increases them for higher incomes in which event the policy is phased out. While the program benefits families financially, it is also found to encourage employment, especially among mothers (Meyer and Rosenbaum, 2001; Eissa and Hoynes, 2006; Meyer, 2010). Noteworthy, however, the positive employment effect has been contested by Kleven (2019) and, moreover, this policy does not help to alleviate poverty among families where parents are unemployed or outside of the labor force.

Ultimately, the financial wellbeing of families is a function of the totality of the social security programs in addition to earnings. In Norway, Johnsen and Reiso (2019) study the decrease of the maximum benefit duration for single mothers. The result was that for each NOK reduction in benefits, 0.65 was replaced by other benefits like rehabilitation, sick leave, and unemployment insurance.

In general, having children reduces mothers' earnings over the short and the long term as has been shown by e.g. Kleven et al. (2019). Sieppi and Pehkonen (2019) estimated that in Finland, the child penalty with respect to gross earnings for mothers, is 25% five years after childbearing. Angelov and Lindahl (2016) also show that parenthood increases the gender pay gap in Sweden. Lundborg et al (2017) demonstrate a similar result in Denmark. These phenomena are explained by women working less when children are young and then getting paid less when children are older.

The parental leave and benefit system have also been observed to have an additional effect on fertility. For mothers, the extension of parental leave has been shown to increase the probability of having a second child in Austria (Lalive and Zweimüller, 2009). In Germany, Raute (2019) demonstrates that a policy reform that increased the maternity leave benefit for high earners increased their fertility. For fathers, Farré and

González (2019) studied the impact of the extension of paternity leave by two weeks on fertility in Spain. Their results suggest that a paternity leave extension had a negative effect on fertility by reducing the probability of couples having another child. All in all, these effects are mixed and much weaker than the immediate effects family leave policies have on labor supply, especially of mothers.

2.1 Fathers

While there is rather extensive literature on a mother's labor supply and other behavioral responses to parental benefits, less is known regarding the impact on fathers. However, there are still some studies that take into account the extension of paternity leave in Sweden and Norway. Ekberg et al. (2013) studied the Swedish parental leave reform that reserved one month of the parental leave period for fathers. The reform increased the share of fathers that took one month of leave from 9% to 47%. Due to the structure of the reform, mothers' leave was similarly shortened. Cools et al. (2015) studied a similar reform in Norway, which reserved four weeks of the parental leave exclusively for fathers. They found a similar increase in fathers' take-up of parental leave. Though Rege and Solli (2013) determine that parental leave reform in Norway had a negative impact on fathers' long-term earnings.

In Canada, Quebec has introduced a fathers' quota of five weeks in the parental leave. The reform had a major effect on fathers' take-up, which increased from 25% to 75% (Patnaik, 2019). A similar reform plan in Germany introduced two months of paternity leave, which also displayed a strong effect on take-up (Tamm, 2019). However, these studies do not compute participation or labor supply elasticities with respect to the respective parental leave benefits.

3 Institutions

In this section, we summarize the core parental leave programs in Finland. Finnish parents have the right to stay on leave for three years with job protection. Parental allowances are split into three categories: maternity leave, parental leave, and paternity leave. Mothers have the right to 105 working days of maternity leave[2]. Of those 105 days, 30 to 50 working days can be used before the child is born. Parental leave corresponds to 158 days of leave that can be split by the parents as they see fit. Finally, fathers can take up to 54 days of paternity leave, 18 of which can be spent simultaneously with the mother.

Mothers are eligible for a maternity allowance, which is based on the earnings of the previous 12 full months, excluding the final month and preceding the start of the right to the benefit. In some circumstances, the reference period falls from 12 to 3 months. For the first 56 days, the replacement rate for the maternity allowance is 90% for lower earnings. At annual earnings above 59,444 euros (in 2020), the marginal replacement rate falls to 0.325 with no ceiling. After the 56th day, the maternity allowance, parental leave, and paternity leave all follow the same benefit rule. The replacement rate is 0.7 for lower earnings. The marginal replacement rate falls to 0.4 for per annum earnings above 38,637 euros and 0.25 for annual earnings above 59,444 euros. Many employees receive full salary for a short period, the length of which is determined in collective labor agreements. This length varies by sector.

After the maternity and parental leave periods, parents are entitled to receive a home care allowance (HCA) that lasts until the child reaches three years of age. The main difference between the maternal/parental leave regime to the home care allowance scheme is that the payment of the parental leave system is based on the parents' income, while the home care allowance pays a fixed sum of 341.69 euros per month for one child under 3 years of age and is supplemented for additional children. There is also additional supplement for low income families and extra supplements for older siblings in home care. The average HCA received by families is well over 500 euros per month. Furthermore, some municipalities provide a supplement for the HCA that is independent of household characteristics. The average supplement is over 150 euros per month and may also contain extra benefits based on the number of siblings.

[2] The number of working days of leave include Saturdays.

4 Model

This section describes the theoretical model used to simulate different parental leave policies. First there is a general description of the model and later a more detailed and technical depiction of the mother's and father's model.

The objective of the model is to study the labor participation decision of mothers and fathers and how their respective choices depend on family leave policies. If the model captures this relationship accurately, it can be used to simulate how changes in the current policies would affect the participation decisions of those surveyed. These changes can be observed in the generosity of the income related parental benefit in the amount transferred via the home care allowance. The model is also designed to simulate how labor participation decisions would change in the face of changes in the maximum duration of the benefits or the parental leave period.

The model takes into account the incentives parents face to stay at home and take care of their child, and the incentives to return to work while the child is in daycare (which incurs a daycare fee). If the parent works, he/she enjoys the benefits of the increase in income that translates into higher consumption. However, working reduces the time devoted to leisure. Hence, the parent chooses, according to their own wage, the number of hours devoted to work. This increase in consumption and decrease in leisure is standard in economic theory and is applied to all sorts of situations. However, to study participation decisions to work, and the timing of these decisions, the standard model needs to be augmented by the fixed costs associated with the participation decision. Because these costs are participation-related, they create a situation where some parents choose to stay strictly at home while others participate with non-marginal earnings. Moreover, these fixed costs are heterogenous across parents leading to the empirically observed situation in which only a fraction of parents at a given time decide to participate in work, namely those whose fixed cost was low enough. Fixed costs could arise, for example, from direct and indirect child day care costs or utility and financial costs arising from commuting to work and daycare. We also stimulate fixed costs through a child-need item, which essentially means that some parents would prefer to stay at home with their small child.

The costs of participating in the labor market that are related to childcare can be time dependent. When a child is a newborn, parents face a high cost for leaving the child in the care of others. However, as time passes, the child becomes more independent and parents may face a smaller cost for using daycare services. These considerations are translated into the model with a participation cost that has both a fixed and a time dependent share. Therefore, a parent may choose to stay at home when the child is

13 months old and then choose to return to work when the offspring is 15 months old even if the salary and benefits associated with this decision remain unchanged.

It is worth noting that we develop a separate model that describes the behavior of mothers and another that describes the behavior of fathers. The two models are consistent with each other and are constructed under the same set of assumptions. However, each model assumes that agent behavior in the model is independent of each other. That is, each parent chooses the optimal leave without taking into account the choices of the other parent. In the case of fathers, their leave choices are calibrated to the average observed behavior. However, this calibration does not change in the face of new policies.

4.1 Mothers

The theoretical model is based on the optimal taxation models of Saez (2002), Kleven and Kreiner (2006), and Immervoll et al. (2007); and also incorporates the discrete choices framework analyzed by Kosonen and Matikka (2019). The main goal of the theoretical work is to create a model that is able to simulate how parents would behave when facing changes in parental leave policies. These changes can be observed in the length of leave or the generosity of the associated benefits.

In the first period, all mothers are at home and have a child of age 0 (in months). Every month the mother chooses if she should return to work, remain on maternity leave, or have another child. The fertility choice of having another offspring and when to have it, is exogenous and assumed to be independent of policies.

Mothers maximize their utility by choosing whether to work or not, the level of consumption, c, and how much to work ℓ^*. The decision to participate in the labor market presents a utility cost for mothers. This participation cost has two parts. First, participation decision has an idiosyncratic cost, $\kappa \sim N(\mu_\kappa, \sigma_\kappa)$ as seen in Kleven and Kreiner (2006). The idea of this participation cost is that each family has its own idiosyncrasies that affect the utility of working. Factors that may affect the size of the participation cost include but are not limited to commuting time, the stress of having a job and social norms. At the same time, the working mother faces a time-varying participation cost that is associated with the age, a, of the child. Younger children need more attention and parent are reluctant to leave small infants at daycare. However, as the child grows older, the participation cost decreases as the child becomes more independent.

We assume a quasi-linear utility function of the following form

$$U(c,\ell) = c - \frac{\varphi}{1+\frac{1}{e}}\,\ell^{1+\frac{1}{e}} - (n_a + \kappa)(\ell > 0)$$

where, e, is the labor elasticity parameter and φ a scaling parameter. When working the mother receives a wage, w and has to pay a daycare cost, q. When on maternity leave the mother receives a benefit, b_a, that depends on the age of the child. The benefit b_a is computed by estimating the participation tax rate (PTR). The PTR describes how benefits (including the parental leave system) and taxes change the financial incentives to return to work. If the PTR is very high the parent will have less incentives to return to work. The parent would have no financial incentive to work if the PTR were to be above one. On the other hand, if the PTR is close to zero the parent would have high incentives to return to work. Given the above description, the problem of the mother with a child of age a can be formalized as

$$\max\ c\ \ -\frac{\varphi}{1+\frac{1}{e}}\,\ell^{1+\frac{1}{e}} - (n_a + \kappa)(\ell > 0)$$

$$st$$

$$c\ =\ (w\ell\ -\ q)(\ell\ >\ 0) +\ b_a(\ell = 0)$$

Assuming participation, the optimal amount of time spent working is defined as

$$\ell^*\ =\ \left(\frac{w}{\varphi}\right)^e$$

Even though by law mothers are allowed to return to work at any time, practical matters may nonetheless affect their decision. Employers may negotiate the best return date according to the industry characteristics of their own field. For example, schools would like its teachers to return to work at the beginning of a semester, shops would like their salesclerks to return to work before, and not after, the Christmas season. Workplaces also hire fixed term replacements for mothers on maternity leave. At the same time, families typically prefer to place their child in a daycare that is closest to their home or according to some other personal preference. The availability of places at daycare centers at a given time may also affect the time mothers can return to work.

This feature is modeled by adding discrete choices to the model as in Kosonen and Matikka (2019). If there was no discreteness in the model, the mother would optimally choose the date a ∈ N to return to work where a represents the age of the child in moths. However, the choice set of mothers is A ⊂ N. The choice set A is defined by drawing n random draws from a probability distribution P.

Given the choice set A the mother compares the value of staying at home taking care of the child and the value of working and leaving the child in daycare. Given the above described assumptions, the value of staying at home is:

$$H(a,\kappa) = b_a$$

the value of working is

$$W(a,\kappa) = w\ell^* - q - \frac{\varphi}{1+\frac{1}{e}}\ell^{*\,1+\frac{1}{e}} - n_a - \kappa$$

Therefore, the mother chooses the best date to return to work by minimizing the loss function which is the absolute value of the difference between the value of working and staying at home. That is, the problem of the mother becomes

$$a^* = \min_{a\in A} |w\,\ell^* - q - b_a - \varphi\ell^{*1+\frac{1}{e}} - n_a - \kappa|$$

The mothers also can have another child. This is modelled as an exogenous decision that is not affected by the public policy. The fertility decision is modelled by two random variables. The first binary draw determines if the mother will have another child or not. The second random draw decides the date when the next child will be born. The month when the next child is born is defined as $m^* \sim N(\mu,\sigma)$. We calibrate μ to match the observed empirical distribution of subsequent fertility. If $m^* \leq a^*$ the mother has another child before returning to work. And if $a_* < m_*$ the mother returns to work and has another child later.

4.2 Fathers

This section describes the model used to analyze fathers' behavior. The model is similar to the mothers' model. That is, fathers optimally choose the length of their paternity leave given their idiosyncratic and time dependent participation costs. The utility function of working and staying at home are identical to the ones described in the mother's model, while the discrete choice framework is also present in the same way in both models. Therefore, fathers choose the length of their leave from a limited set of options.

However, there is one noticeable difference between paternity and maternity leave. The mother's leave starts one month before the child is born and ends when the mother decides to return to work or to have another child. The father's leave,

on the other hand, is split into at least two parts. The first period of the paternity leave can happen when the child is born and can last at maximum three weeks, and can be used simultaneously with the mother. The remainder of a father's leave happens later when the mother returns to work or at an even later date. This model is used to simulate the total leave taken by fathers. The decision on the starting date of the leave is not taken into account. For tractability, we assume that the second part of the fathers leave start when the child is one year old.

Therefore, the full set of discrete leave choices faced by the father is $\Omega = (No\ leave, 3\ weeks, 1\ month, 2\ months)$. Notice that in the first two values of Ω the child is newly born, while the last two leave the option that the child's age is equal or greater to the length of the mother's maternity leave.

Given the set of choices the father minimizes the loss function in order to choose the optimal leave time.

$$a^* = \max_{a \in A \subseteq \Omega} |w\,\ell^* - q - b_a - \phi \ell^{*1+\frac{1}{e}} - n_a - \kappa|$$

All the parameters of the above equation are the same from the mother's case except for the participation cost parameters. The idiosyncratic part has a different mean and variance, and the time dependent part reads $n_a = \alpha^{c+a}$ where c is a parameter that reflects how the father perceives the change over time in the participation cost.

4.3 SISU

To calculate the participation tax rates that give us the parental leave benefit values, we utilize the microsimulation model SISU which is maintained by Statistics Finland. The SISU-model is a static microsimulation model developed to evaluate the effects of legislated or potential policy reforms on personal and household disposable income as well as public finances. SISU includes most legislation that affects personal income and social transfers. The simulation model utilizes register data on 800 000 individuals and forms a representative sample of Finnish population. We use register data from 2016 and legislation from 2019.

We calculate participation tax rates for all women who were receiving home care allowance in 2016. As described is section 3.1, the participation tax rate (PTR) describes the financial incentives to return to work and effectively can be defined as the change in the net tax rate when transiting from the home care allowance to working. That is, the formula for participation tax rate is:

$$PTR = \frac{T(W) - T(0)}{w} = \frac{w - c(w) - 0 - c(0)}{w} = 1 - \frac{c(w) - c(0)}{w},$$

where $T(W)$ and $T(0)$ denote the net tax rate when working and while at home, respectively, w denotes the wage rate and $c(w)$ and $c(0)$ denote disposable income while working and while on home care allowance, respectively. To calculate the participation tax rate in SISU, we simulate the disposable income while working ($c(w)$) and while staying at home with the child ($c(0)$).

Disposable income while at home is simulated on all mothers who had children under the age of 3 and received at least 9 months of home care allowance in 2016. This is the baseline simulation. For this same sample of mothers, the participation wage rate is never observed for those not participating, and we instead need to rely on the predicted wage rate that is our estimate of their wages when they do participate in work. The predicted wage rate is estimated for all mothers who have children under three years of age by using a log wage regression model with data from a comparison group, which is made up of employed mothers who have kids between ages 4 and 7. We restrict our regression to those mothers whose monthly wages are above 600 euros to gain a wage prediction for the whole wage distribution. In the regression model the monthly wage is explained with age, education level, area of residence, civil status, and the previous year's employment days. With these observable characteristics and estimated coefficients, we make a prediction of the wage level on the sample of mothers in the baseline simulation.

In the last step, we evaluate disposable income with the predicted wage level for mothers in the baseline sample. This is done by running the SISU model with the predicted wage level and without access to home-care allowance benefits. The SISU-model is also used for evaluating the participation tax rate when the home care allowance is increased or reduced from the baseline (current) level. We simulate the disposable income for the stay-at-home mothers in settings when the home care allowance is 800 or 400 euros, or totally abolished. In addition to the participation tax rates, Table 1 below shows the corresponding mean values of predicted yearly wage and the disposable income when at home collecting a home-care allowance or if working. The participation tax rates by income groups are further shown in appendix 7.2.

Table 1. Participation tax rates

	Mean predicted wage, w	Disposable income when working, $c(w)$	Disposable income on HCA, $c(0)$	Participation tax rate, PTR
Baseline level	24 809 €	22 607 €	14 100 €	0.724
800 level	24 809 €	22 607 €	16 100 €	0.804
400 level	24 809 €	22 607 €	13 600 €	0.703
0 level	24 809 €	22 607 €	11 100 €	0.605

Note 1: To calculate PTR, one needs to subtract day care fees (€ 1652) from the disposable income ($c(w)$).

Note 2: Home care allowance levels: Baseline level, allowance of € 341.27 + supplement € 182.64; 800 level, allowance of € 617.35 +supplement € 182.64; 400 level, allowance of € 300 + supplement € 100; 0 level, allowance and supplement € 0.

We did not use SISU to simulate the participation tax rate for the first 9 months of paid parental leave for mothers. In the model we used a rough estimate for PTR of 0.9 for this part, which corresponds to the replacement rate of 0.7 that these benefits have with low incomes added to the need to pay day care fees when participating and other interactions with benefits.

4.4 Data

We use data from the Social Insurance Institution (SII) to describe the current usage of different parental leave policies and to which the model is calibrated. These data are aggregated to the number of parents using each policy per child's age in months but is based on microdata on the fraction of parents using parental leave policies provided by SII.

We form the sample by starting with all children born in 2015 and then following them over a three-year period. We observe whether each parent is on some of the different parental leaves by the age of the child in moths. We also observe possible other children during the follow-up period by the age of the child in months born in 2015. For our analysis, SII aggregated these data to relevant groups, e.g., on average for all, by gender, and by income groups.

5 Calibration

This section describes the calibration of the model and the fit of the baseline models for fathers and mothers to the empirical data.

5.1 The baseline model

The baseline model is based on the current Finnish parental leave system (see Section 3), and its periodicity is a month. That is, mothers and fathers choose the number of months that they are going to stay on leave. It is assumed that the mother takes off 30 working days before the child is born. Therefore, the maternal leave duration with replacement rate after birth is 9 months[3].

5.2 Calibration

The objective of the calibration is to find parameters that better fit the predictions of the baseline model to the data. The fitting criteria used was the minimization of the square errors of the model. That is, we square the difference between the prediction of the model and the data. Four parameters were calibrated. The mean and variance of the idiosyncratic participation cost, the α parameter that governs how the time dependent participation cost decreases over time, and the labor elasticity parameter e. The age dependent benefit level b_a was estimated using the SISU model. The participation tax rate of the maternity/parental allowance period was set to be 0.9. The replacement rate of the average mother in the sample is 70% of her pre-birth income. To compute the PTR of that sample we need to take into account daycare cost, other costs associated with working, and other benefits like, for example, the housing allowance. The PTR of the home care allowance period is 0.724. After the end of the three years leave period, the PTR, according to SISU, drops to 0.518. For mothers the baseline draws for kappa are drawn from normal distribution with mu=0.0526 and sigma=0.2927. For fathers the baseline mu=0.002 and sigma=0.3316. The probability distribution for fixed returning points to work are drawn from a distribution for mothers that has uniform probability for the first 10 months, and declining probability after that until 36 months, where there is

[3] A working month is equal to 25 working days. Hence the mother is entitled to 233 days of leave after birth. This correspond to 9.3 months.

a jump in probability of returning to work. For fathers the probability is uniform for each full month of leave.

Another important aspect of the model is the monthly probability of having the choice to return to work. This probability distribution is responsible for creating the discrete responses of the Kosonen and Matikka (2019) framework. If the probability was one in all periods, there would be no discreteness in the model. For mothers, the probability of returning to work is set to be high during the first 9 months of leave. This reflects the fact that small leaves can be planned in advance. Afterwards, there is a continuous decline in the probability of returning to work. Finally, in the last month of job protection, there is a spike in this probability. For fathers, the probability is constant. However, the second month, in the model, is split in two parts and, consequently, the probability of choosing those dates is decreased.

Figure 1 shows the fit of the mothers' baseline model to the data. The model is able to predict a profile of return to work and fertility that is quite close to the data and follows a similar pattern. Fewer than 5% of the mothers return to work before the 10^{th} month of leave. There is a spike in the return to work before the home care allowance period starts and replacement rates change. Afterwards, there is a smooth increase in the number of mothers that return to work or have another child. By the 36^{th} month, there is another small spike in the number of mothers returning to work, this reflects the fact that this is the last month of job protection and the last month that the mother can receive the home care allowance.

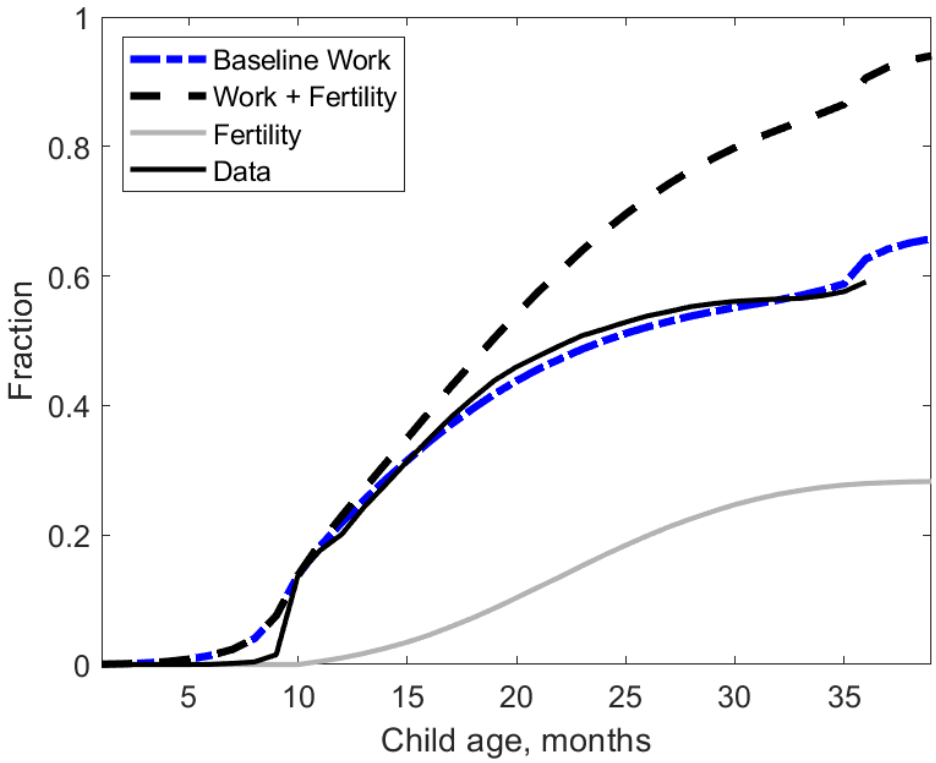

Figure 1: Data and mothers baseline model

According to data from The Social Insurance Institution presented in Figure 2, 26% of fathers do not take any paternity leave. This seemingly high share of fathers that do not take a single day of leave can be to some extent related to fathers who are not married or cohabiting with the mother. 33% of fathers only take the first three weeks of paternity leave, mostly together with the mother when the child is born. It is worth noting that mothers take their leave before the father, and therefore, if the mother has another child before returning to work, the father would be unable to have any leave other than those 18 days when the child is born. Another possible explanation for this spike at 3 weeks is that there is a non-negligible number of fathers who would prefer to stay more than 3 weeks at home simultaneously with the mother and take no leave afterwards.

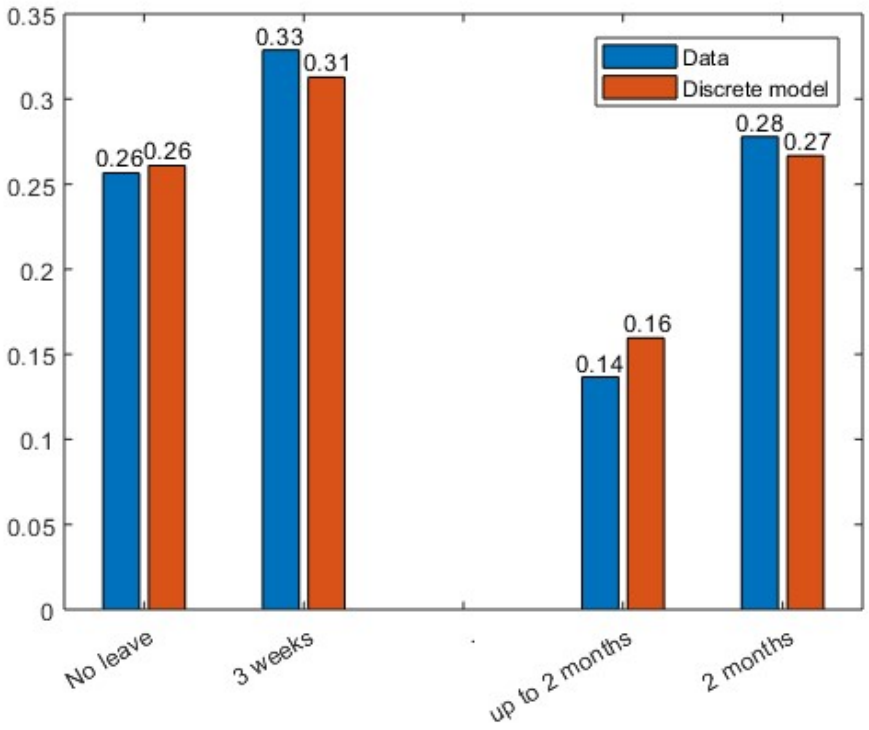

Figure 2: Data and fathers baseline model

28% of fathers take all the leave they are entitled to. That is, they take 56 days of leave in a total of two months. The remaining 14% take more than 3 weeks and less than two months of leave. The bunching at the maximum leave could be rationalized by the fact that a significant proportion of fathers who use all their allocated leave would like to use even more leave. Therefore, most of the changes in leave behavior is expected to come from those fathers who take the full leave.

The calibration of the fathers' model was done by choosing a set of parameters that would best fit the four data points described above. The four calibrated parameters were, the mean and variance of the idiosyncratic participation cost and the α and c parameters that determine how much the participation cost decreases over time. Figure 2 presents the fit of the fathers' model. In general, the model does not deviate more than two percentage points from the values seen in the data.

6 Policy Experiments

This section describes a series of policy experiments based on the mothers' and fathers' models. The results are relevant for small changes with no shifts in preferences. The larger the policy experiments, the less accurate the model predictions are.

There is one important caveat when analyzing the simulations of fathers' behavior in the face of different parental leave policies. The data available is constrained to the current maximum amount of paternity leave of two months. Furthermore, the literature on the effects paternity leave on the labor market is still incipient. Therefore, the prediction of the model becomes less precise as we simulate policies that are further away from the current institutional set up.

6.1.1 Suggested Government reform

In the spring of 2020, the Finnish Government suggested a change to the current parental leave system. The proposal provides 164 working days of leave for each parent. Furthermore, one parent can take 69 working days of leave from the other parent's quota. Mothers would also be entitled to have one month of leave prior to the child's birth.

According to the proposal, a mother could, in principle, remain on leave for 233 working days, or 9.3 months, as in the current system. However, in this scenario, fathers would be entitled to 95 days, or 3.8 months, of leave, which is roughly two months more than in the current system.

Since more than 95% of mothers take at least 9 months of leave in accordance with the current system, it would be unlikely that this behavior would change dramatically in the short-run. Thus, we assume that the mother is entitled to 9 months of leave and the father has to a maximum of 4 months.

The mother's behavior would look similar to that witnessed in the current system. Most of the changes would come, however, from the amount of paternity leave taken by fathers. Figure 3 presents the result of the policy simulation where fathers are entitled to have 4 months of paternity leave. The first 3 weeks of the leave would be spent with the mother and the rest after the mother's leave is over. There is very little change in the usage of the shorter leave periods. However, those fathers piling at 2 months in the current system become distributed throughout the larger choice set between 2 months

and 4 months. This reflects the fact that many fathers would like to use a longer paternity leave, while other fathers are at the optimum in the current system.

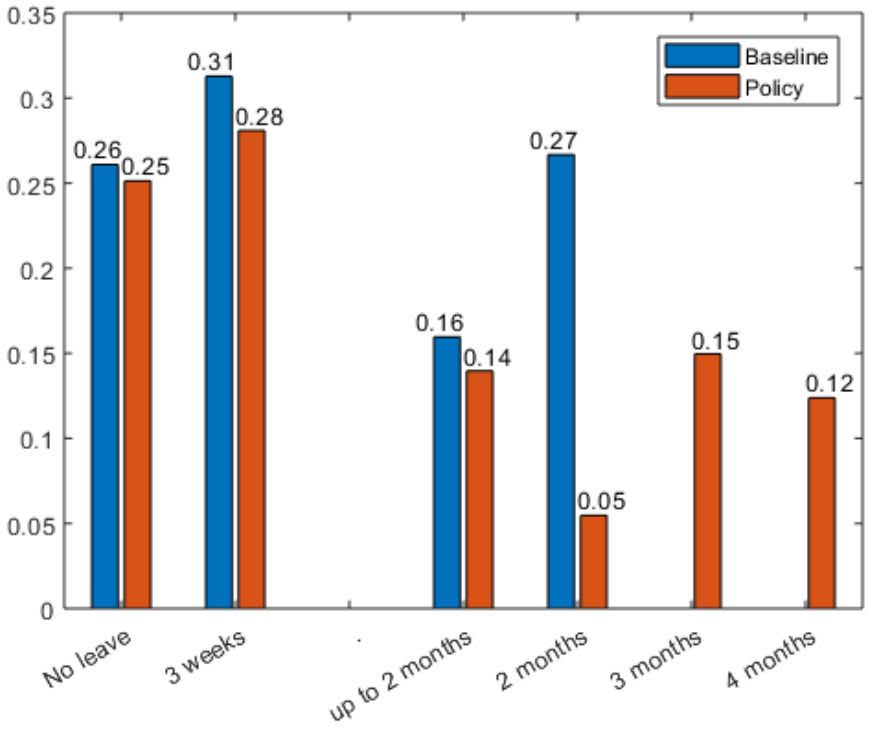

Figure 3: Policy experiment: 4 months of paternity leave

6.1.2 Changes in Home care allowance

This section studies the effects of the elimination of the home care allowance. In this scenar-io, mothers would be entitled to 9 months of maternity/parental leave and three years of job protection. However, contrary to the current system, there would be no home care allowance payments.

Figure 4 shows the results of this simulation. There is almost no change on the mother's behavior on the first period of the leave. However, the sharp reduction in benefits seen after the 9th month creates a jump in the number of mothers returning to work. In each month the participation rate is about 10% higher in the scenario without the HCA when compared to the baseline.

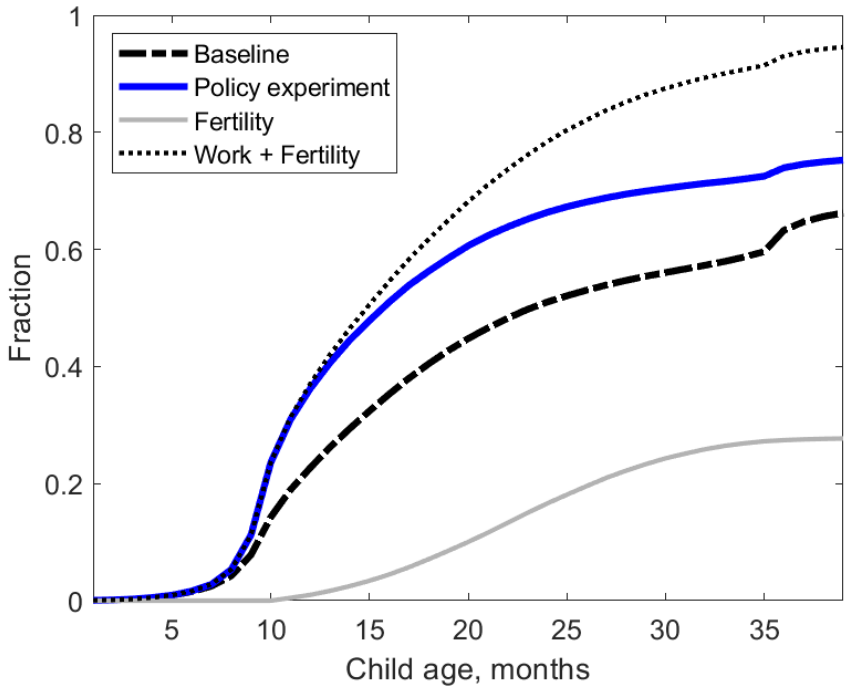

Figure 4: Policy experiment: no HCA

Changes in the values of the HCA have significant impacts on the date when mothers return to work. The policy simulation of the subsequent sections will show that changes in the number of months have only local effects on the profile of mothers returning to work.

6.1.3 Different parameter values

The baseline calibration for mothers has a participation elasticity (η) of 0.8 as in Kosonen (2014). Figure 5 shows how the participation profile would change if the model had a participation of 0.4 and 1.2. When the elasticity is reduced, fewer mothers, in relation to the baseline, return to work when their HCA expires. The opposite is true when the participation elasticity is increased. However, with any of these elasticities this policy would have a quite profound effect on the participation to work behavior of mothers in the model.

Since there is a low amount of evidence on the father's behavior in the empirical literature, we show in this section how the father's behavior would change for different elasticity values. This robustness check has the objective to see how sensitive the results are to different specifications. If the results of the model drastically changed with small changes in the parameters, then we would need to use precisely estimated elasticities.

For this exercise to be valid, the model needs to be recalibrated for each elasticity value. The recalibration is made so that the baseline model matches the data. Two different elasticities are considered. In one case where the elasticity is equal to half of the one in the baseline of 0.2 and a second in which the elasticity is increased by 50% to 0.3. The baseline is consistent with the estimated elasticity of taxable income in the broad literature (see Saez et al. 2012). In both cases, the recalibrated model fits the data well. However, the decrease in labor elasticity by 50% and an increase of 50% have a negligible effect on the model's policy simulation, which is shown in Figures A1 and A2 (in the Appendix). The differences from the baseline calibration are smaller than 0.5pp for all leave lengths.

We also experimented in the model with increasing or decreasing the benefit level for fathers. Figures A3 and A4 in the Appendix show that these changes do have an effect on how many fathers would take the maximum amount of leave. The baseline model has participation tax rate of 0.9 and in the reduction of benefits the PTR declines to 0.85. In the increased benefit case the PTR is 0.95.

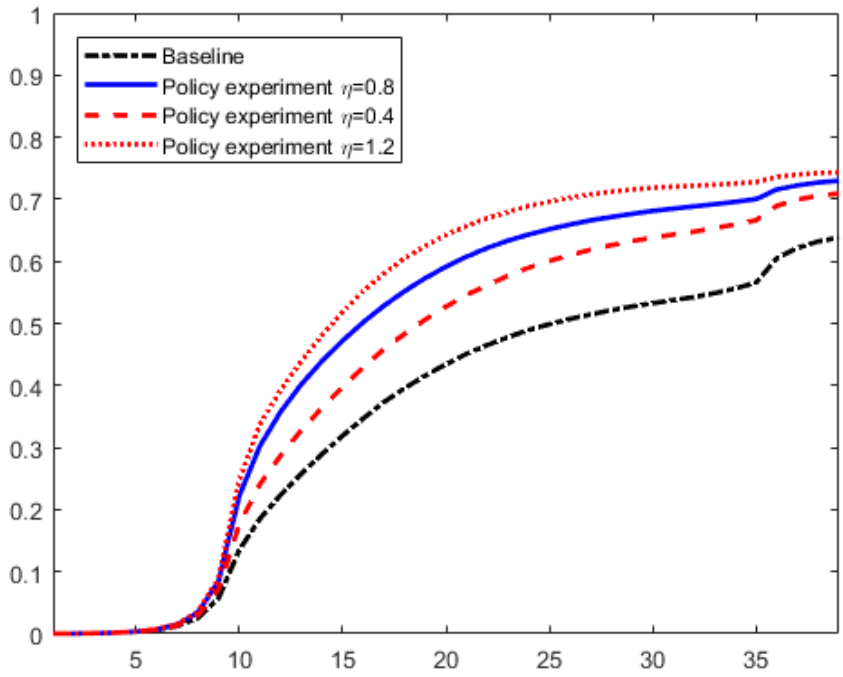

Figure 5: Policy experiment with different participation elasticities for mothers

6.2 Fathers with 3 months of paternity leave

This section studies what would happen if paternity leave was the same length as maternity leave. For this purpose, we increased the maximum leave duration to three months. Figure 6 presents the results of this policy experiment in comparison with the baseline model. The model predicts a small decline in the number of fathers that take less than the full leave. However, most of the movement occurs with those that previously took the whole leave. Before the policy change, 27% of fathers would take two months of paternity leave. The introduction of the extension makes this share drop to 7% and the 21% of the father's bunch at the new maximum limit of three months.

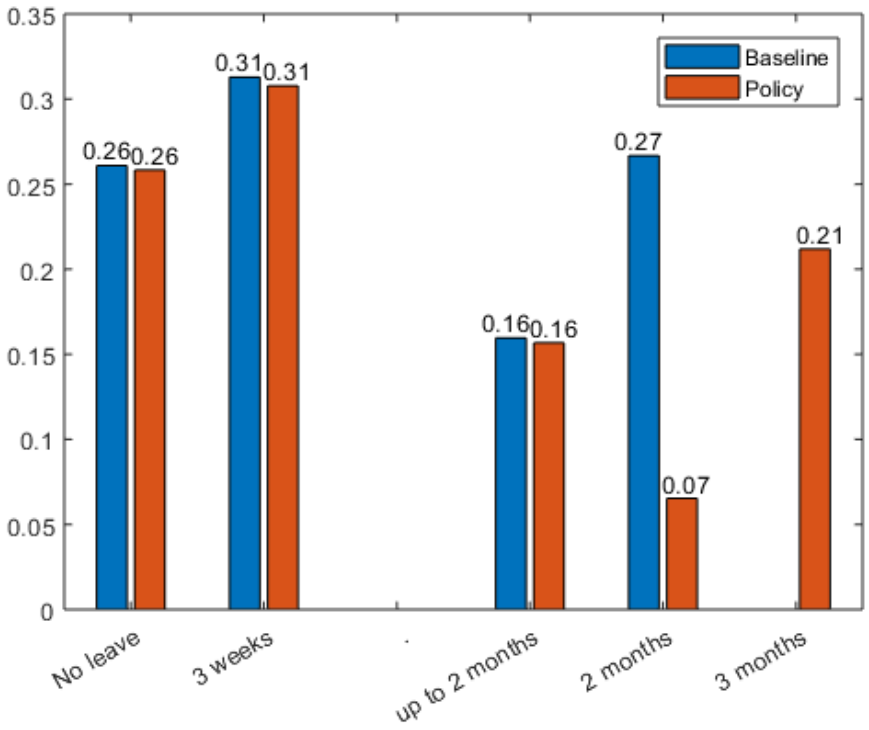

Figure 6: Policy experiment: 3 months of paternity leave.

6.3 Policy 3: 6+6+6 model

The policy studied in this section is the 6+6+6 model. That is, parental leave would be divided into six months of maternity leave, six months of paternity leave and six months share leave.

Figure 7 predicts how mothers would react if their income related benefits would be extended by three months. Now, a mother would be entitled to twelve months of leave with high replacement rates, making the model effectively 12+6, where the mothers take the full shared leave. The simulation shows that most of the mothers that would have returned to work between months nine and twelve delay their return to the labor market. The average delay is three months. The baseline and policy simulations are almost identical after the fifteenth month. This indicates that the effects of the policy are localized around months nine to fifteen.

Figure 8 presents a prediction of what would happen if the maximum amount of paternity leave were extended to six months. The policy would cause a reduction in the number of fathers that take less than two months of leave. As seen in the previous policy analysis, the bunching of fathers on the second month would be significantly reduced and fathers would spread out their preferred leave length between three and six months. Almost 28% of fathers would use their paternity leave duration above the current maximum of two months.

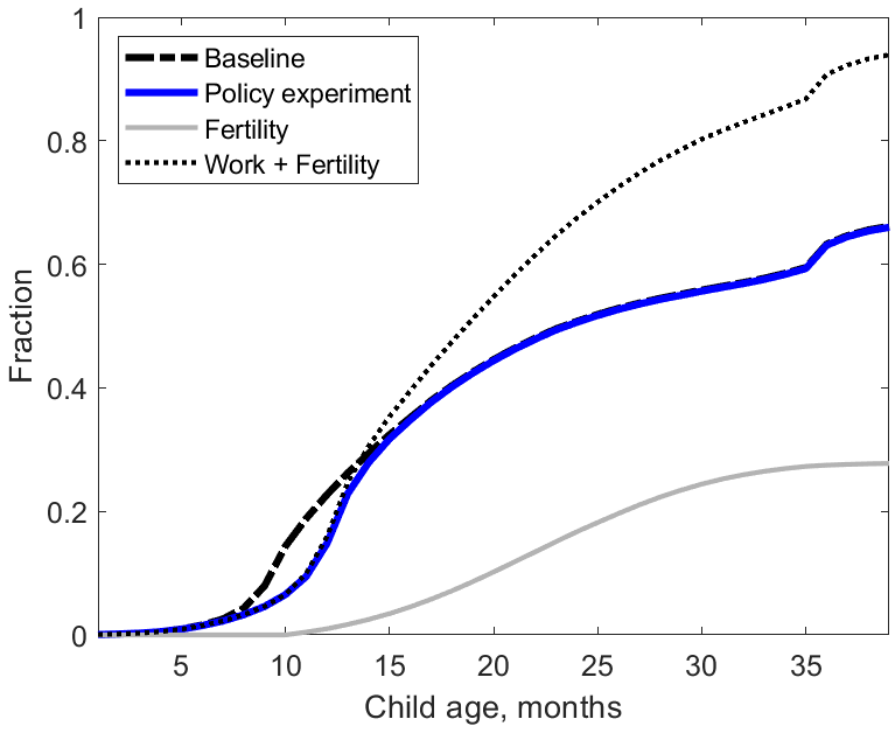

Figure 7: Policy experiment - 6+6+6 model for mothers

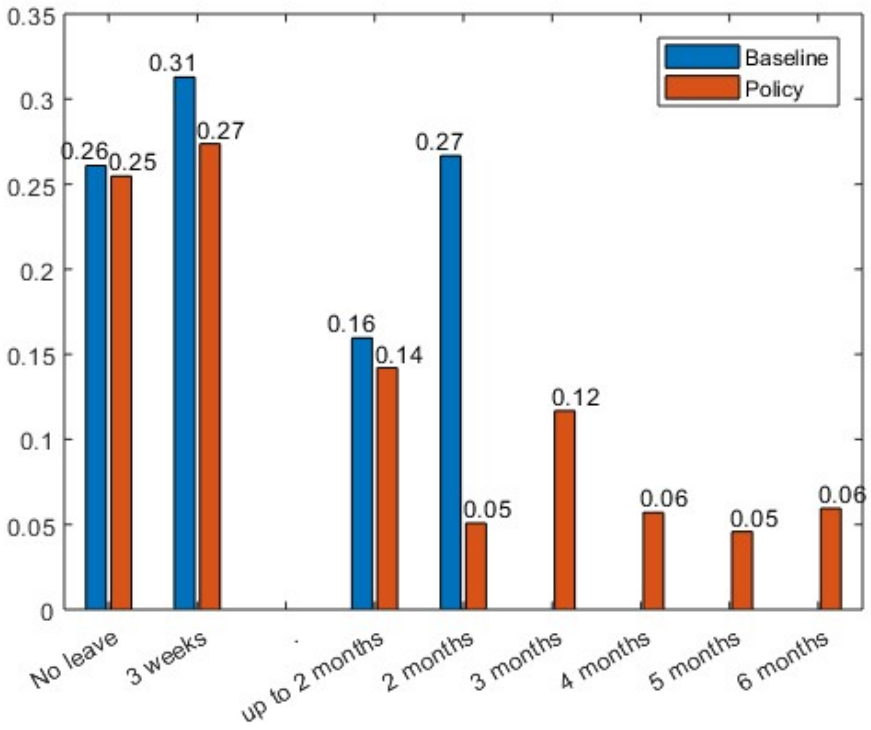

Figure 8: Policy experiment - 6+6+6 model for fathers

6.3.1 6+6+6 policy without HCA

This section examines a version of the 6+6+6 policy simulation without a home care allowance. The duration of the job protection period is kept unchanged at three years. From Figure 9 it is possible to see that effects of eliminating the HCA are far greater than the changes in maternity leave duration. After the end of the 12th month, all the parental related benefits for mothers are ceased and around 40% of the mothers return to work that same month. On average, after the first year, the participation rate of the mothers is about 10% higher when compared to the baseline.

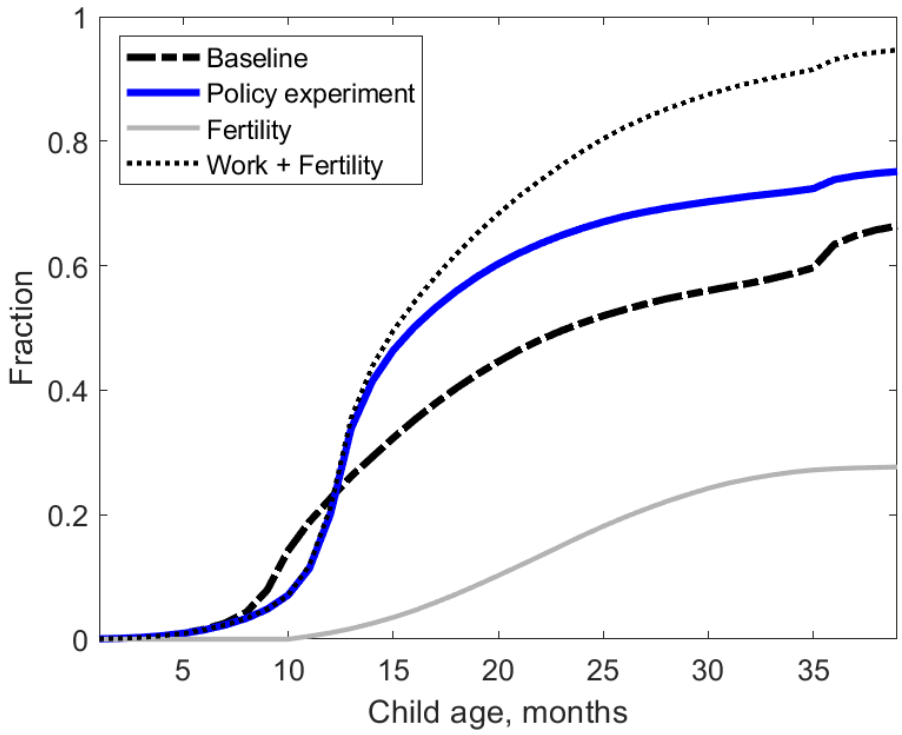

Figure 9: 6+6+6 model without HCA

6.4 Policy 4: 8+7 model

This policy simulation proposes the elimination of the six months of parental leave, in which parents can choose how many months each stays at home, and also proposes a new sharing rule between mothers and fathers. In this new setup, mothers would have the right to eight months of maternity leave, including one month before birth, while the father would have the right to have seven months of paternity leave. Therefore, each parent would have seven months of leave after the birth of their child.

Figure 10 presents the result of the simulation of the behavioral response of mothers to a maternity leave of seven months. The effects of the new policy are localized around the months near the policy change. Some of the mothers that would have returned to work on the ninth and tenth months after the birth of their child would return to work earlier. The baseline and policy pattern of returning to work are almost indistinguishable after the twelfth month of birth.

Figure 11 shows the simulated result of extending the maximum length of paternity leave to seven months. The results are consistent with the results of the previous simulations. Some fathers that took a leave shorter than two months now decide to take a longer one. The fathers that were previously bunching at the maximum leave of two month now are now spread out from months three to seven. Since the longer the fathers' leave is, the higher the career cost, more fathers prefer to take a leave of three months instead of a longer leave. We can also observe some bunching at the seventh month as some more fathers would like to have a yet longer leave.

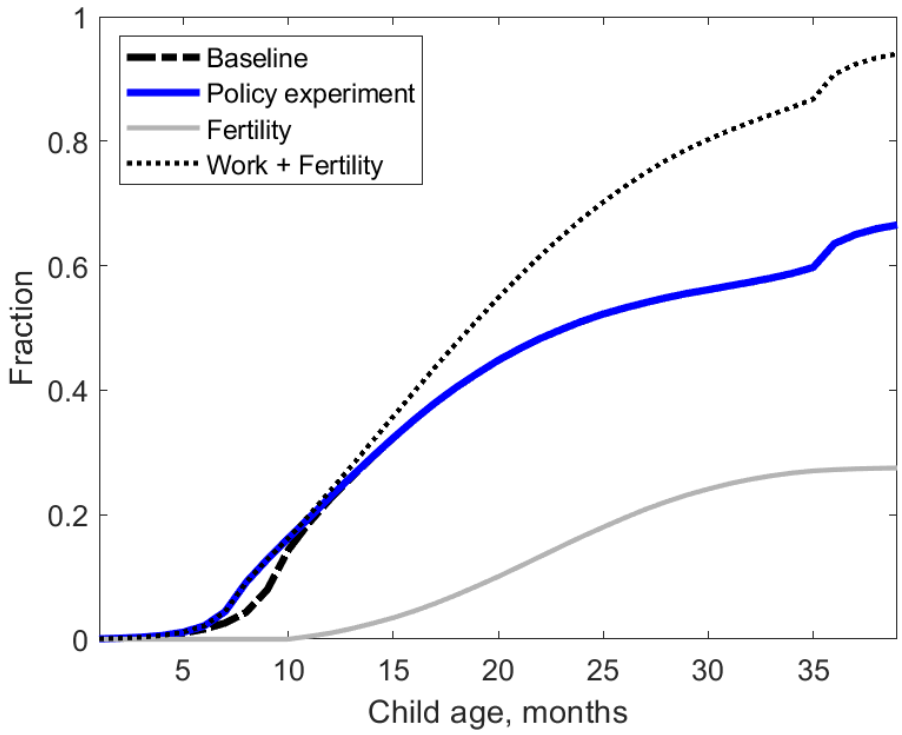

Figure 10: Maternity leave of seven months

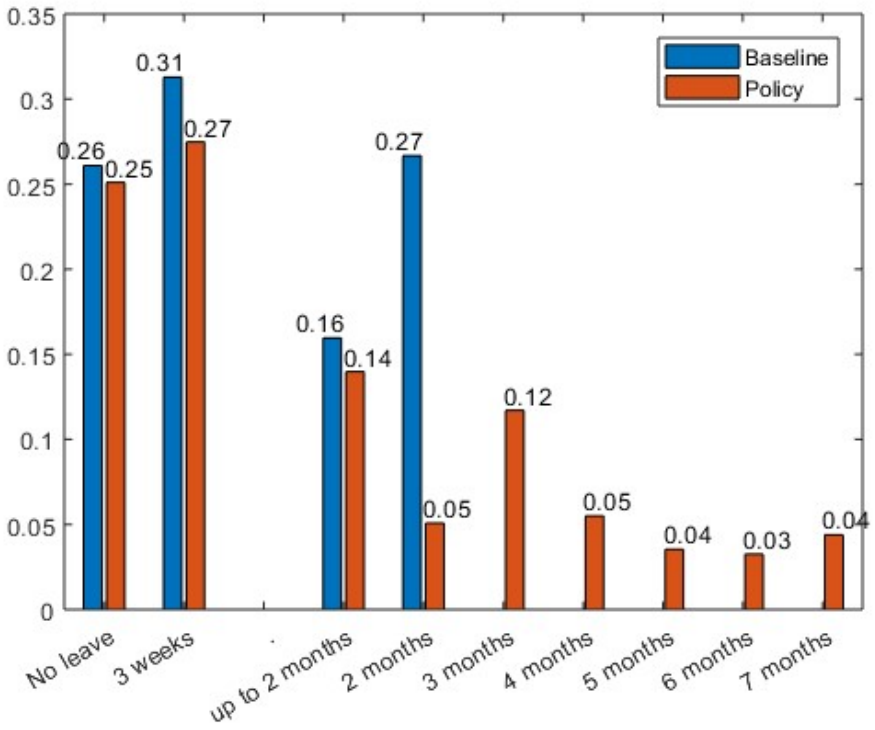

Figure 11: Paternity leave of seven months

6.5 Policy 5

The policy simulation studied below proposes splitting the home care allowance system into two parts. In the first part, from the first 10 to 24 months after birth, the home care allowance is increased to 800 euros from the current average amount of 520 euros. In the second part, from 25 to 36 months, the benefit is halved to 400 euros. According to the SISU model, a benefit of 800 euros corresponds to a PTR of 0.803. However, when the HCA is reduced to 400 euros in the third year of leave, the PTR is only reduced to 0.704.

Figure 12 shows the result of the simulated policy. The increase in benefits decrease the incentives to return to the labor market. For this reason, Mothers return to work at a slower pace when compared with the baseline. The participation profile becomes steeper when the HCA is halved since the incentives to work increased. However, by the end of the three-year leave period, the total number of mothers that have returned to work is almost the same as in the baseline model. The appendix contains a policy simulation where mothers can choose between two HCA schedules. One scheme has

a more generous payment, but during a shorter period. The other option has a less generous allowance but lasts for a longer period.

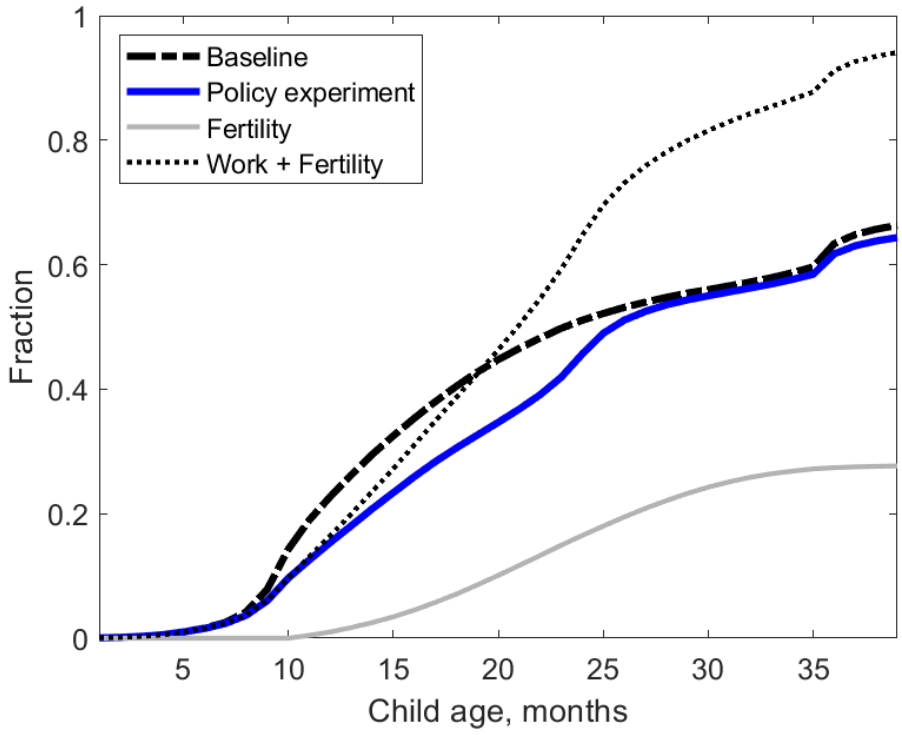

Figure 12: Policy experiment: two benefit levels

7 Final Remarks

This report had the objective of simulating the labor participation behavior of mothers and fathers when faced with changes in parental leave policies. The changes studied could be in terms of the generosity or length of the benefits. For that purpose, a model based on Kosonen and Matikka (2019) and Saez (2002) was used. That is, a model in which agents decide whether to work or not based on their participation costs as well as on the availability of the optimal choice being chosen.

Since mothers and fathers can receive benefits other than those related to child support, we computed the participation tax rate for the home care allowance, which was estimated using the SISU microsimulation model.

Five different policies were simulated. The first simulation attempts to understand the effects of the current government's planned reform. The main impact of this reform would be to increase the leave of fathers. According to the simulation, 27% of fathers would take more leave than the current maximum of 2 months. We also demonstrate that eliminating the HCA would be more effective in increasing the labor force participation of mothers. In general, our simulations show that changes in the HCA have a greater impact on the labor force participation of mothers when compared to changes in the duration of the maternal/parental leave system.

The second reform studied, increased the maximum leave of a father to three months. In this simulation, 21% of fathers would take the third month of leave. The third reform studied was the 6+6+6 model in which 29% of fathers would take, in this scenario, more than 2 months of leave. The effects of the new policy on mother's behavior were localized. In practice, this reform would delay by three months the return to work of mothers who usually return to work at the end of the parental leave benefit. The fourth study uses the model to analyze the case in which seven months of post-birth leave is offered to each parent. The effects are similar to the 6+6+6 model. However, now, there is a localized increase in labor force participation for those mothers who would otherwise take nine months of leave. The last policy simulated would increase the HCA for the first year and reduce the allowance in the last year of leave. The simulation showed that mothers would stay on leave longer. However, the overall labor force participation of mothers, after the third year, was almost unchanged.

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9 Appendix

9.1 Additional Figures

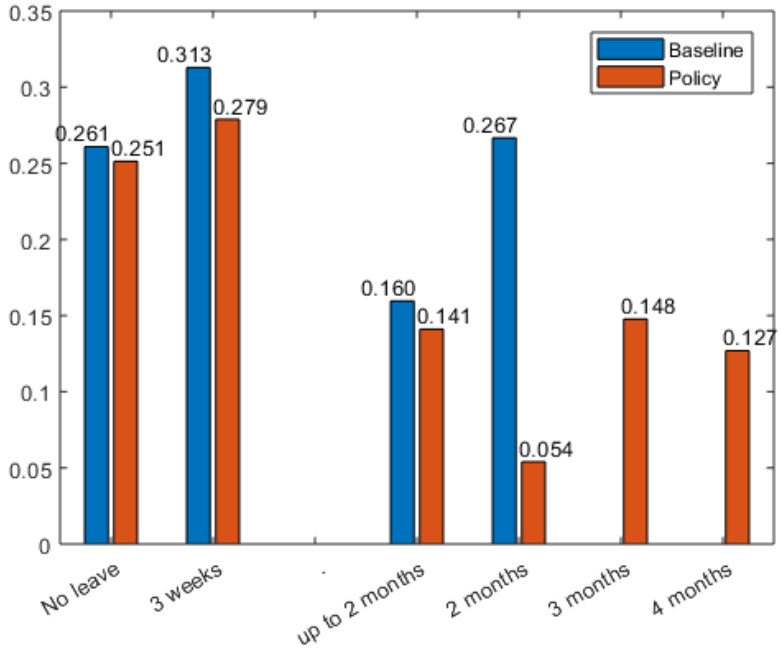

Figure A1 – Sensitivity analysis. Increased elasticity for fathers

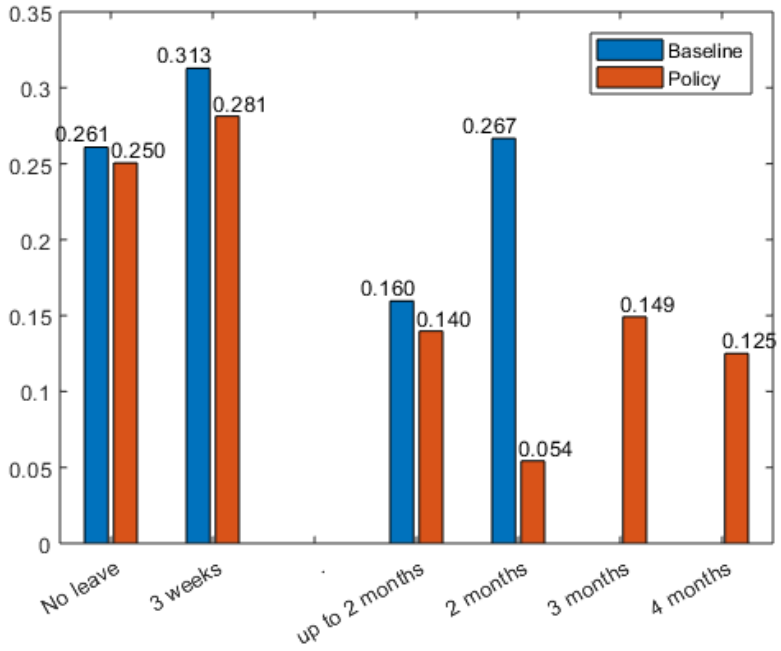

Figure A2 - Sensitivity analysis. Reduced elasticity for fathers

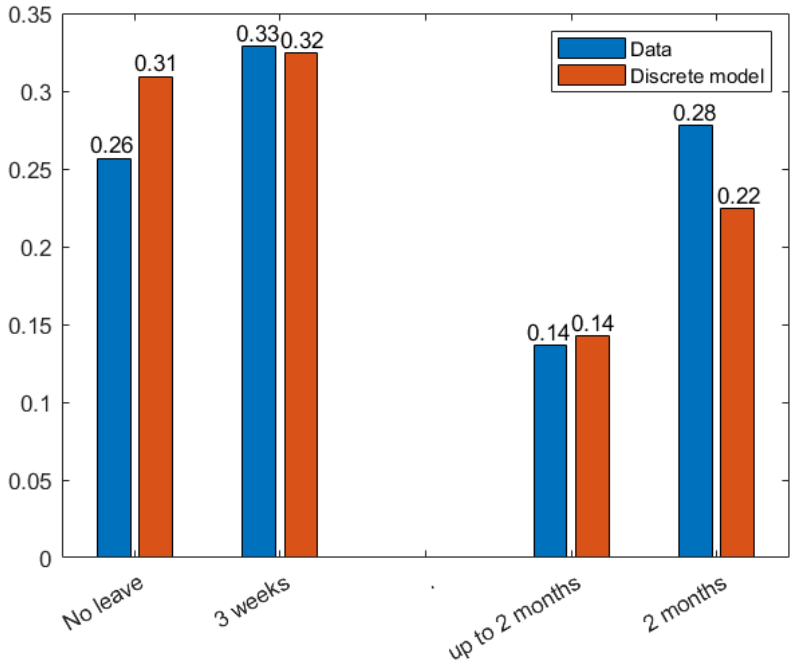

Figure A3 - Policy experiment. Reduced benefit level for fathers

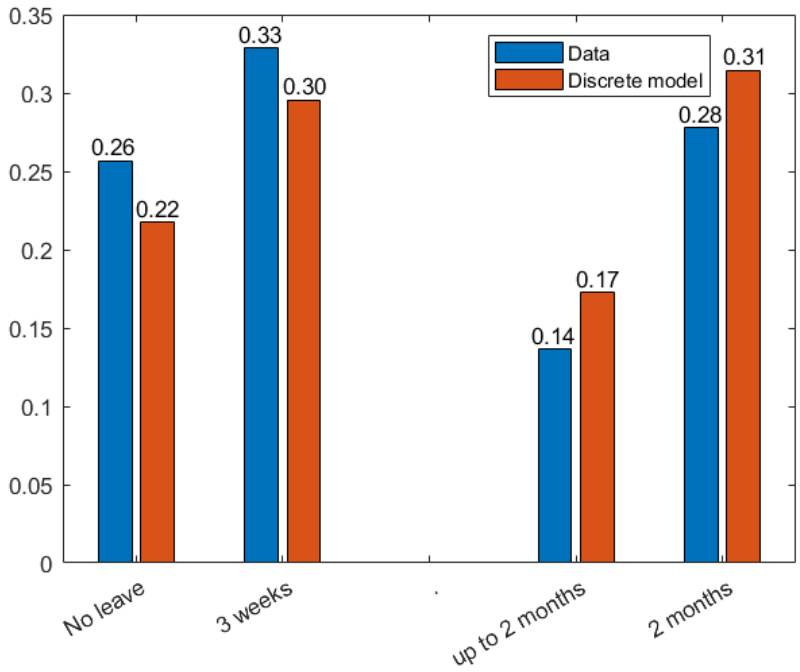

Figure A4 - Policy experiment. Increased benefit level for fathers

9.2 Policy Experiment: Two system model

This section describes the result of a simulation where the mother can choose between two different HCA schedules. The first option provides the mother an 800 euros home care al-lowance until the child is two years old. The second option has an HCA of 400 euros until the child turns three. Even though the benefit in one scheme is the double the aid offered by the other, this is not reflected in the participation tax rate. When the home care allowance de-creases, parents can apply for other benefits and, as a consequence, the PTR is not halved. For the baseline case, the SISU gives a PTR of 0.724. When the HCA is increased to 800 euros the PTR increases to 0.804. However, when the HCA is 400 euros the PTR decreases to 0.703. The job protection period is the same for both options and is equal to three years, as is the case in the current legislation.

Each simulated agent can choose between Policy 1 (high payment and short duration) and Policy 2 (low payment and long duration). It is worth noting that Policy 1 is strictly better than policy 2 for all those who intend to stay on leave less than 24 months.

Therefore, only par-ents planning on spending more than 24 months on leave would choose Policy 2, and in the simulation not many parents choose to do so.

Figure 15 presents the simulation results of the proposed policy. All mothers that return to work or have another child before the 24th month select the first option. Since benefits are higher, mothers return to work more slowly until the end of the 24th month. Afterwards, the mothers that chose to stay on leave longer than two years, return to work. According to the simulation, less than 10% of mother would choose the option with low payment and long duration.

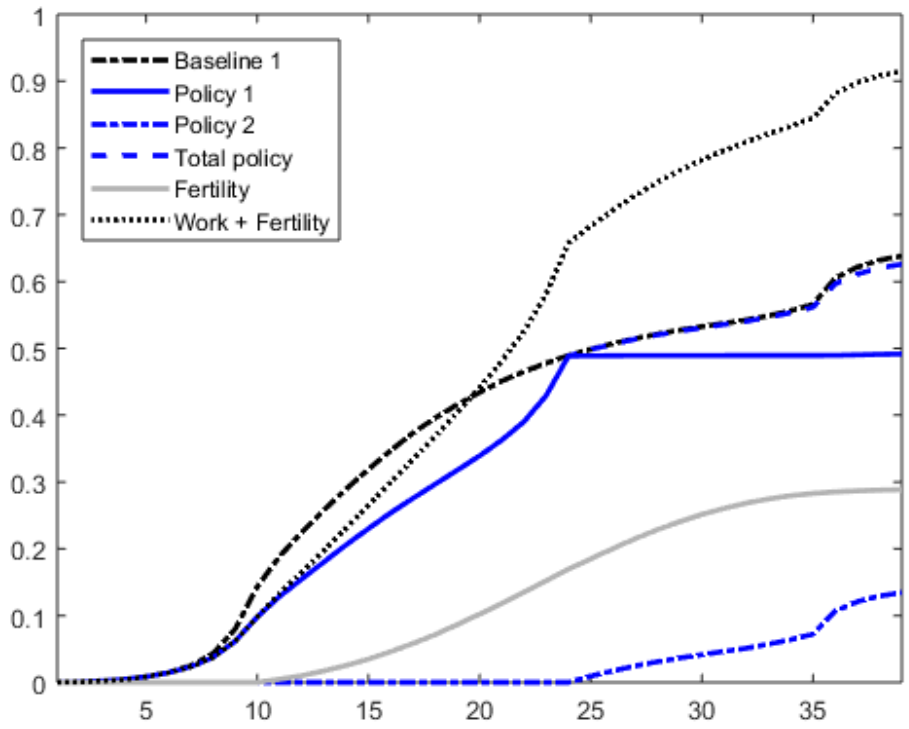

Figure A5 Policy experiment: choice model

9.3 Participation tax rate

Table A1. Participation tax rates by income groups

	Income level				
	Aggregate	1	2	3	4
Mean predicted wage	€ 24 809	€ 17 615	€ 22 525	€ 30 108	€ 40 070
Mean disposable income, baseline	€ 14 100	€ 12 312	€ 14 130	€ 14 921	€ 17 312
Mean disposable income, predicted	€ 22 607	€ 18 002	€ 21 522	€ 25 457	€ 32 200
Benefit level	PTR				
€ 520 (Baseline)	0.724	0.773	0.731	0.690	0.655
€ 800	0.804	0.865	0.816	0.756	0.706
€ 400	0.703	0.744	0.709	0.674	0.645
€ 0	0.605	0.624	0.604	0.595	0.586
After the HCA period	0.518				

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