Stockholm School of Economics
Course 5350: Master's Thesis in Economics

Nature, nurture, norms: Parental leave outcomes in a social context

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Submitted: May 15th 2013
Presented: May 23rd 2013

Abstract

In spite of policy changes that favour equal distributions, it continues to be a universal fact that women take the lion's share of parental leave. In the context of social aspirations of gender equality in the household as well as the workplace, the slow rate of growth in fathers' parental leave poses a serious obstacle. Alongside conventional explanations for household specialization, there is increasing evidence that social norms play a determining role in parental leave decisions. However, theoretical models of parental leave are practically non-existent despite its importance for gender distributions of paid and unpaid work. Here, a theoretical model is introduced in which the parental leave is an outcome not only of wage, but of preferences and social norms as well. We find that even a simple model is effective in explaining empirical trends through the modicum of social sensitivity to peer group actions.

JEL Classification: D01, D13, J22, Z13,
Keywords: Parental leave, social norms, Nash equilibria

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Acknowledgements

All my thanks are owed to Professor Jörgen Weibull for patient and careful supervision throughout the thesis project.

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1 Introduction

Equality of men and women in the household and the market is a common socio-economic goal, and the frequent subject of multidisciplinary research and political debate. However, while many governments in Europe and North America maintain gender equality as a policy target, significant differences persist in the household where women take a larger share of responsibility for housework and child-care, and in the market where men on average receive higher wages and work longer hours (Burda et al., 2012). Although there are many factors contributing to the gender gap in wages, one of the most significant is that despite a priori conditions, traditional gender specialization becomes accentuated in conjunction with parenthood, when women take on more household responsibility with lower future earnings as a result (Angelov et al., 2013); common explanations for the lower income of mothers are that they, due to intra-household specialization, suffer from weak labour market attachment, human capital depreciation, and limitations on the effort that can be applied to market work relative to fathers (Becker, 1985). Recent research indicates that the distribution of parental leave between the mother and father may have a significant impact on the future gender structures of paid and unpaid work in the household (Duvander et al., 2005), in other words the degree of specialization. For this reason, understanding how the decision of parental leave is taken is important for research on the gender gap in wages and labour supply. Moreover, understanding parents' motivations in this decision will assist in constructing appropriate policies for promoting equality in the home and workplace. Finally, for a sizable portion of the population, the duration of parental leave is one of the key decisions taken in their personal and professional lives, and inquiry into its mechanism is relevant in its own right.

Although the literature relating to parental leave motivation is well-developed in sociology where it is attributed to the presence of gender norms, it is still nascent in economics. In an attempt to model parental leave, it is therefore necessary to rely on tangential strands of literature. First, there is the empirical literature that describes parental leave policy effects, and finds covariates of parental leave: qualitative and quantitative data strongly imply that social norms have an impact on the distribution beyond that of relative wages and preferences. Second, there is the well-developed literature on household decisions which describes, using a variety of approaches, many issues related to parental leave, such as division of labour, fertility, provision of household public goods and female labour supply. However, very little of this literature deals explicitly with the role of social norms; for this reason the third body of research which is relevant illustrates the impact of social norms on a wide range of financial and non-financial decisions, such as the use of insurance or the prevalence of obesity. Drawing on this literature, it is possible to devise an appropriate mechanism to describe how social norms may affect households in this particular instance.

This thesis complements the existing literature on household decisions with a model that explains the persistent skew of parental leave between men and

women in terms of gendered social norms[1], as well as personal and economic factors. It provides a first step in the direction of theoretically explaining parental leave decisions in a way that is compatible with social and economic realities. It finds that as long as mothers compare their parental leave with that of other mothers, and as long as there are average differences in the behaviour of mothers and fathers, even gender-neutral households will exhibit gender differences in the parental leave taken. In other words, as long the gendered roles of motherhood and fatherhood (as distinct from parenthood) persist, we are likely to observe gendered leave-taking behaviour.

This paper proceeds in the following way: Section 2 introduces the empirical trends which the model should seek to explain. Section 3 explores the current body of theoretical literature which may be used to construct a model. In particular, it concludes that for the purpose of this analysis, a unitary model is appropriate for this analysis and that social norms may be incorporated using a Nash-equilibrium formulation. Section 4 presents the model, while Section 5 analyses its implications first as stylized outcomes, and second in relation to empirical observations. Section 6 concludes with a comment on potential extensions of the model.

2 Evidence from the empirical literature

Although the question of social norms and parental leave has a general application, the empirical basis for its modeling is limited largely to European welfare states. There is one dominant reason for this: extensive parental leave systems are geographically and historically unusual. Since empirical interest derives in part from existing policy review, the bulk of research has been conducted based on registry data, micro-census and survey results, as well as interviews and time journals, in contexts where parental leave is well-established or a prioritized policy issue: Scandinavia, Germany and the UK. In particular, there is a Scandinavian dominance in the literature, which here is contextualized by bringing in recent research from Germany. Apart from the relative scarcity of data, empirical analysis of parental leave is complicated by the fact that policies and attitudes are changing at a faster pace than the empirical literature can keep up with (Reich et al., 2012a; Moss & Wall, 2007). For example, there is very little published work (although working papers abound) concerning the effects of the 2007 family policy overhaul in Germany, whereby one of the systems most supportive of gendered divisions of labour became one which legally and practically promotes a dual-earner household. Nonetheless, the empirical literature is rich enough for us to elucidate key features that a model should incorporate or explain.

[1]"Gendered social norms" refers to a set of social norms that are gender-specific. In this case, although parenthood is not a gendered state, motherhood and fatherhood are gendered roles, which may be subject to gender specific norms.

2.1 Slow change and persistence

The available empirics show two key features with regard to home work in general and to parental leave in particular. The first is that the distribution of parental leave between men and women is gradually becoming more equal. Although this trend is the most pronounced in Scandinavian countries, where egalitarian family policies have the longest tradition, other countries too have seen paternal child care double over the past 20 years (Bonke & Esping-Andersen, 2009). Sweden, which has a gender neutral dual-earner parental leave system with earnings-related cash benefits, has seen the group of parents taking equally distributed leave (where an equal distribution is defined as a one where one parent takes at most 60% of the leave)[2] grow substantially: in 2001, 4.9% of children had parents that shared leave equally in the first two years of the child's life; in 2009, this figure was 12%.

However, the second feature which empirical research highlights is the persistence of the skewed distribution. Bluntly, this is illustrated by the Swedish 2012 report on parental cash benefit days: men only took 23.7% of the total leave; in Southern Europe, this share is generally much lower (Hook, 2006). Of note is the fact that the group of men taking no cash-benefit days at all in Sweden has remained largely constant at around 10% since the mid-nineties, even growing slightly. The slow pace of change in household behaviour by men in particular has been called an "incomplete revolution", in reference to the successful revolution of women in the labour market (Bonke & Esping-Andersen, 2009).

2.2 Determinants of parental leave: empirical indications

Parental leave research has long maintained the centrality of opportunity costs in terms of foregone income as the central determinant of the skewed distribution between mothers and fathers: women, by virtue of having lower wages on average, would necessarily take the longer leave in order to minimize the opportunity costs to the household. Indeed, survey reports from Sweden indicate that parents who value their financial situation highly take shorter leave (Riksförsäkrings Verket, 2004). However, the empirical research from Germany and Scandinavia also reveal that higher earners take longer leave, implying that the immediate opportunity costs from parental leave may not necessarily be at the heart of the decision.

Another cost from parental leave is the risk that a parent, by signaling their dedication to the family through taking a long absence, will be overlooked in the workplace; in other words there may be a career cost beyond the human capital depreciation in conjunction with leave. There is evidence suggesting that fathers are more aware of career costs than mothers: German fathers take higher leave if they have permanent work contract rather than being self-employed or on a temporary contract (Beckmann, 2001; Institut für Demoskopie Allensbach, 2005; Kassner & Rüling, 2005; Rost, 2002). They also, like Swedish fathers, take

[2]This is a common measure of equality in the Swedish literature.

higher leave if employed in the public sector in comparison to the private sector, where job security is lower. Björnberg (2002) illustrates that women face more positive attitudes in the workplace relating to taking parental leave. Possibly for this reason, fathers to a higher extent than mothers claim to take their work place into consideration when deciding on parental leave, often trying to coordinate with the team or the employer. Additionally, fathers' leave increases more from having a boss who holds favorable attitudes towards parental leave than mothers' leave does.

Another concern that appears in the empirical literature is that for personal well-being and for the well-being of the child. Given the prevalence of birth control and divorce, it is reasonable to assume that the conception of a child entails that both the mother and the father experience some enjoyment from child care (Juster, 1985; Sayer et al., 2004a). Moreover, there are common assumptions that the child is entitled to a relationship with both of its parents, and in fact medical research supports the view that children benefit from having a father who takes parental leave (Ruhm, 2000). On the other hand, there is no empirical research to our knowledge that points to how far parents enjoy the time with their children, although this is very likely a determinant of parental leave duration.

Empirical research has frequently either implicitly or explicitly explained the distribution of parental leave by the existence of gender specific social norms relating to motherhood and fatherhood (for Sweden: Björnberg & Kolling, 2003; Inspektionen för Socialförsäkringen, 2012; for Germany: Burda et al., 2012). Through qualitative research, such as surveys and interviews (e.g. Almqvist et al., 2010; Alsarve & Boye, 2011) social norms have been found to vary with industry, geography, religious heritage, family background and education. For example, Burda et al. (2012) posit that social norms depend in part on a country's religion. It is likely that social norms clusters are responsible for much of the variation in parental leave. For example, of fathers in Sweden, those born in Sweden take more leave than those born abroad (Inspektionen för Socialförsäkringen, 2012); of fathers in Germany, those who are of German nationality take higher leave than those who aren't. Similarly, for both Germany and Sweden, urban parents take more leave than those in less populous and more homogenous areas (Almqvist et al., 2010). This can be attributed to the fact that in urban areas, there may be multiple competing norms. Furthermore, evidence from almost all countries suggest that parental leave of men and women increases with education, and that especially uptake among fathers increases with his own and with the mothers education (Almqvist et al., 2010; Riksförsäkrings Verket, 2004).

Moreover, in interviews, Swedish parents have indicated that they think actively about the choices they make, and that they also observe and think about those that their friends and family make. However, it appears that mothers devote more time thinking about the implications of their parental leave choices. On the one hand, some express anxiety over falling into a traditional gender division (Alsarve & Boye, 2011). On the other, women say that they also face pressures to be more career oriented (Almqvist et al., 2010). A further com-

plicating factor is that many women express some attachment to the parental care model that they grew up with themselves. There is clearly scope for tension: although women may want to pursue equal parental leave, their actual preferences for child-care may interfere with such goals. Moreover, it is still the case that being away from the child is more strongly associated with being a bad mother for a woman than being a bad father for a man (Almqvist et al., 2010). Hence women are subject to conflicting social pressures. However, it also seems that the role of the father has become a more important part of modern masculinity: hence there is an increasing pressure on fathers to practice active fathering in order to maintain a masculine identity (Romano & Bruzzese, 2007).

3 Literature Analysis

Over the past two hundred years, household decisions and the question of how these are made has spawned a diverse literature aimed at explaining labour supply, fertility, the wage gap, marriage markets and provision of household goods, along with many other phenomena. Although the literature that discusses the impact of parental leave policies on fertility and labour markets is well-developed (Averett & Whittington 2001; Ruhm, 1998), that which explicitly describes the decision to take parental leave is limited in general, and to our knowledge, non-existent in the context of social norms. Determining the type of model that is appropriate for modeling the empirical facts of Section 2 therefore requires a brief investigation into the current literature on household decisions, and to that on social norms.

3.1 The household decision – unitary and non-unitary models

The "unitary approach" is the starting point of modern household decision-theory and is characterized by the treatment of the household as a single decision-making agent, which maximizes a single utility function given a single budget constraint over pooled resources (Seiz, 1995; Chiappori, 1992). The approach rests on the idea that either a mother and father in a household have identical preferences, that the household decision is made entirely by its altruist head, or that the wife and husband have reached, by consensus, some household welfare function (Becker, 1965, 1974, 1981; Samuelson, 1956). A simple application of Becker's (1965) theory effectively rationalizes the gendered parental leave distribution where women take the bulk of the parental leave as the solution to a labour supply decision based on comparative advantage: if women have a comparative advantage in household production relative to market work compared to men - be it for essentialist, relative wage and/or learning-by-doing reasons -, then specialization is optimal and necessarily gives rise to a skewed distribution of parental leave. Although unitary models have been criticized on theoretical and empirical grounds for violating the basic principle that individuals make decisions to maximize their own utility (Chiappori, 1992), they still serve as the

work-house for much of household economics when it is feasible to assume that the interests of the parents are aligned. For example, Engström, Kolm and Liang (2009) assume a unitary model in their paper on parental leave. They interestingly posit that present-biased preferences in the absence of commitment devices creates a time-inconsistent outcome from the family's and society's perspective, and that this is irrational and inter-temporally suboptimal, a key difference from the models which maintain that the household decision is rational. The authors suggest that the cause of this higher instantaneous utility may be financial or social factors, status quo preferences or addiction, but purposefully leave the explanation for this mechanism outside of the model, inviting the type of model which we introduce in Section 4.

Starting in the 1980s the unitary approach was challenged by an influx of game-theoretical bargaining into the modeling of household decisions. Manser and Brown (1980) and McElroy and Horney (1981) saw the household as consisting of two individuals, who may care about the welfare of each other, but who reach Nash-equilibrium decisions through cooperative bargaining. In this literature, the bargaining process is characterized by the existence of threat points either within the household (non-cooperation within the marriage) or outside the household (divorce), which are the source of each party's bargaining power. Although these models have a distinct appeal, especially given the career costs of children and the very real threat of divorce in European cultures, there is little evidence of bargaining in the decision of housework in general (Bianchi et al., 2000; Alvarez & Miles, 2003; Bittman et al., 2003; Evertsson & Nermo, 2004) and parental leave in particular (Almqvist et al., 2010; Alsarve & Boye, 2011), and especially not that the bargaining is conditional on threat points. This is likely because efficacy of birth control means that bargaining has preceded the conception of the child, and moreover that for those choosing to have a child, child care is usually not considered a negative experience. One can assume that at the time a couple makes decisions about parental leave, they are both focusing on the longevity of the relationship and the welfare of the child; for this reason, we reject the bargaining approach to modeling.

The most recent prominent contribution to the household literature is the "collective model" of labour supply (Chiappori, 1992) which attempts to maintain rational behaviour of the individual even within a pair. The only assumption made is that a decision has to be Pareto optimal, as a result the collective model may nest both unitary and cooperative bargaining solutions and is consistent with a larger range of economic observations. The assumption of a Pareto optimal distribution arises from the idea that the mother and father know each other's preferences from repeated interactions, and care enough for each other that they will exploit any chances to Pareto-improve the distribution. However, the collective model does not lend itself to an interesting discussion of social norms. Since its focus is so predominantly on the mechanism of the group's "collective choice", it cannot be extended in an easily interpreted way to take into account the behaviour of other households. Since the goal of the model is to clearly illustrate the effects of gendered social norms, we reject the collective model as well.

This means that we will develop a unitary model for the parental leave decision. This does not rule out that non-cooperative situations relating to child birth exist: for example, if the child is desired by one parent but not the other, it is possible that the parent with greatest reservations makes the birth of the child conditional on not having to take any household responsibility for it. Nor does it imply that the significant work on collective labour decisions by for example Chiappori (1992) has no relevance to the parental leave decision: it is quite likely that Pareto-optimizing altruistic parents could well describe reality. However, choosing a simpler definition of household utility will allow for a clearer role of social norms.

3.2 Social norms

Although economists have focused on wages as the determinant of household specialization, sociologists have tended to stress that the parental leave distribution is determined by gender ideological preferences, which constitute social norms (Blair & Lichter 1991). Gender ideologies such as what constitutes motherhood and fatherhood vary across class as well as across societies, and in particular attitudes towards parental leave are likely to be associated with attitudes to labour market participation more generally (Blossfeld & Drobnic, 2001). To similar effect, Ishii-Kuntz and Coltrane (1992) posit that preferences for active fatherhood and a dual earner system is more prevalent among highly educated fathers, an idea which is strongly supported in data. Moreover, Fernandez et al. (2004) have found that there is an inter-generational transmission of behaviour which reflects inherited social norms – in their case that sons of working mothers tend to marry working women.

Most models of social norms include an expression of utility (disutility) from complying with (deviating from) a given social norm, which is frequently defined as the average behaviour among a peer group: hence utility will depend on how close to the social norm an individual's behaviour is. Using this simple mechanism many economic phenomena can be explained. One model of a household decision that is impacted by social norms is developed by Oh (2011) who investigates the effects of gender asymmetric norms on fertility. Oh suggests that men to a larger extent have traditional separate spheres norms, while women to a larger extent have shared care norms[3]. Since individuals' internalized norms may not be observable, Oh assumes that spouses are randomly matched. Fertility will be the highest when both spouses have separate spheres norms, followed by both having "shared care" norms and lowest when they have differing norms. Oh's key idea is that the intensity of the social norm (the payoff from conformism) is what impacts the outcome, in this case fertility.

Other examples which come close to the decision of parental leave are Lindbeck et al. (1999) who describe how unemployment benefits and social norms

[3]Separate spheres is a term widely used in the historical and sociological literature of gender relations where men's given arena is public sphere, and women's given sphere is the home. Separate spheres ideologies imply that women should take all or most of the parental leave. Joint care on the other hand refers to both parents caring for the child.

interact to form labour supply decisions. Surprisingly however, the approach which is most easily transferable to the decision of parental leave is that employed in Reich and Weibull's model of obesity (2012). To model equilibrium Body Mass Index (BMI), the authors posit that individuals have two components of utility: a sub-utility from consumption and a sub-utility from fitness. The individual's BMI is given by an exogenous individual metabolism function which transforms consumption into fitness, while the individual's ideal BMI is the maximand of the sub-utility of fitness given the behaviour of others in the population. In their parametric specification, consumption utility displays constant elasticity of substitution, and the sub-utility of fitness is a bell-shaped function of the individual's BMI given everyone else's BMI, which includes fitness sensitivity and a quadratic loss from deviating from ideal. They illustrate that endogenous peer effects can be modeled by imagining the individuals as engaged in a simultaneous-mover game, where each individual chooses the consumption and fitness strategy that maximizes utility given the behaviour of all other players: the Nash-equilibrium outcome is thereby able to explain the development of obesity in the Western world. Although the parametric specification that we use in our model of parental leave is very different, the general framework is drawn from Reich and Weibull: households (instead of individuals) have sub-utilities of consumption and parental leave, and where the sub-utility from leave, as indicated by survey data (Almqvist, 2010), depends on the behaviour of peers. Solving for the Nash equilibrium will therefore allows for a parametric description of parental leave decision.

4 Model

Consider a large group of households $h \in H = \{1, 2, ..., n\}$ consisting of a mother and father, for whom social norms relating to gender may play a role. As discussed above, these clusters of households may be located in the same geographic area, have similar socio-economic profiles, or share a common culture or religion; the determining factor is that the group constitutes household's social reference point. We denote each individual $i = h, k$, where $k = 1, 2$ represents being a mother or father. We model the decision problem faced by each household h in the following way:

$$\max_{t_{(h,1)}, t_{(h,2)} \leq 1} U_h \left(y_h, t_{(h,1)}, t_{(h,2)}, x_{-h} \right)$$

$$x_{-h} = \left(t_{(j,1)}, t_{(j,2)} \right)_{j \neq h}$$

where the maximand is the household's total utility when the household's total consumption is y_h, one parent, for example the mother, takes takes parental leave $t_{(h,1)}$, the other parent takes parental leave $t_{(h,2)}$, and x_{-h} is a vector that represents all other households' decisions in a single time period, which we interpret as the time during which the child needs the most care. The duration

of a time unit may be context dependent to H - in some cases it may feasibly represent a much longer or shorter time. For example it may be related to the age at which a child is able to start day-care or kindergarden, or the period for which it is possible to get cash-benefits for parental leave.

$t_{(h,k)}$ is interpreted as the share of full time work during a unit of time, and for analytical convenience we permit negative parental leave. This implies that there is no employment or other constraints on how much an individual may work. For example, if our time period is the child's first two years, and $t_{(h,1)} = 1, t_{(h,2)} = 0.5$, it means that one parent stays home with the child for two years, while the other stays at home for one year. An implication of this time-endowment formulation is that both parents may stay home with their child at the same time.

Let us assume in the unitary tradition that the each household collectively chooses the mother's and father's parental leave so as to maximize the household's expected total utility. This means that there is no strategic interaction between the parents: rather the household through some mechanism that is not described here employs a joint-utility maximizing rule. We imagine that these decisions take place simultaneously in all households, and that the decision is taken with correct expectations of other parents' leave: in other words, we solve for Nash equilibrium among the households H.

We assume each household's utility to be separable in household income, y_h, and parental leaves:

$$U\left(t_{(h,1)}, t_{(h,2)}, x_{-h}\right) = u\left(y_h\right) + v_{(h,1)}\left(t_{(h,1)}, \hat{t}_{(h,1)}, t_{(h,2)}\right) + v_{(h,2)}\left(t_{(h,2)}, \hat{t}_{(h,2)}, t_{(h,1)}\right)$$

for some sub-utility functions u, v_1 and v_2 and parental leave ideals, $\hat{t}_{(h,1)}$ for one parent and $\hat{t}_{(h,2)}$ for the other. We assume that each parent's ideal parental leave $\hat{t}_{(h,k)}$ may depend on what others in the parent's peer group do, and specifically that it is a linear combination of an the individual parent's intrinsic ideal $\tau_{(h,k)}$ and the average parental leave taken by the other members of that parent's peer group:

$$\hat{t}_{(h,k)} = \lambda_{(h,k)}\bar{t}_{(k,-h)} + \left(1 - \lambda_{(h,k)}\right)\tau_{(h,k)} \text{ for } k = 1, 2 \tag{1}$$

where

$$\bar{t}_{(-h,k)} = \frac{1}{n-1}\sum_{j \neq h} t_{(j,k)} \tag{2}$$

is interpreted as the *social norm* facing parent k in household h, and where $\tau_{(h,k)} \in (0, 1]$ is interpreted as the amount of leave that a parent would would consider ideal in the absence of social pressure.

As discussed in Section 2, we assume that if parents decide to have a child, they will derive some pleasure from spending time with it, and hence the intrinsic norm is by assumption always positive. The parameter $\lambda_{(h,k)}$ represents parent k's social sensitivity, and we assume $0 \leq \lambda_{(h,k)} < 1$; in other words the parent may have zero sensitivity to the social norm, but will always place at least some value on the intrinsic ideal. The formulation of the ideal (1) implies that

social norms affect the individual only through the behaviour of others in its peer group, and not through the intrinsic ideal. In reality, the intrinsic ideal $\tau_{(h,k)}$ may also reflect internalized social norms, but we make the simplifying assumption that intrinsic ideals are exogenously determined. Note that we define parent k's peer group as all other parents k in the set of households H[4]: this implies that mothers (fathers) only reference the behaviour of other mothers (fathers). While it is of course possible that mothers are influenced by the the leave-decisions of fathers and vice versa, the assumption of gender-delineated peer groups is made in the interest of explaining the differences in parental leave between mothers and fathers as the possible result of gendered social norms: in this case gender-specific roles of motherhood and fatherhood, as distinct from parenthood arise from an identification with a gendered peer group.

Treating the consumer good as numeraire, and assuming that the household's only income comes from labour, household income is given by:

$$\begin{aligned} y_h &= w_{(h,1)}\left(1-t_{(h,1)}\right)+w_{(h,2)}\left(1-t_{(h,2)}\right)+b_1 w_{(h,1)}t_{(h,1)}+b_2 w_{(h,2)}t_{(h,2)} && (3)\\ &= w_{(h,1)}+w_{(h,2)}-\left(1-b_1\right)w_{(h,1)}t_{(h,1)}-\left(1-b_2\right)w_{(h,2)}t_{(h,2)} && (4) \end{aligned}$$

where $w_{(h,k)}$ is the real after-tax wage of each parent, $b_k \in [0,1]$ is the benefit rate defined as a share of wage to a parent $k = 1, 2$, paid out when they are on parental leave, and the sum $w_{(h,1)} + w_{(h,2)}$ is the household's (disposable) labour endowment (expressed in the numeraire consumption good). Benefit rates are assumed to be equal for all households but may differ between fathers and mothers. We make the simplifying assumption that benefits may be taken for the entire duration of parental leave period: this assumption may not be that unrealistic, since in many cases individuals use less than the maximum entitlement of benefits (Försäkringskassan, 2012). The budget constraint can easily be altered to reflect a lump sum benefit transfer without significant implications for the role of social norms.

In order to obtain operational expressions for equilibrium parental leave, we assume that the household utility is linear in the parents' pooled income y_h, that each parent k experiences linear utility for the time the co-parent spends with the child $t_{(h,-k)}$, and and that each parent experiences a quadratic disutility from deviating from his or her ideal leave $\hat{t}_{(h,1)}$, with intensity $\delta_{(h,k)}$:

$$\begin{aligned} U\left(t_{(h,1)}, t_{(h,2)}, x_{-h}\right) &= y_h - \frac{\delta_{(h,1)}}{2}\left(t_{(h,1)}-\hat{t}_{(h,1)}\right)^2 && (5)\\ &\quad -\frac{\delta_{(h,2)}}{2}\left(t_{(h,2)}-\hat{t}_{(h,2)}\right)^2+\gamma_{(h,1)}t_{(h,2)}+\gamma_{(h,2)}t_{(h,1)} \end{aligned}$$

with

$$\begin{aligned} \delta_{(h,k)} &> 0\\ \gamma_{(h,k)} &\geq 0 \end{aligned}$$

[4]Note that it would also be possible to assign different peer groups to the mother and father: this would have little impact on the analysis, provided there are systematic differences in the two peer groups.

This specification captures some key elements from the empirical literature. First, as discussed in Section 2, household income y_h is an important determinant. Second, parents hold an ideal leave $\hat{t}_{(h,k)}$, which is the amount of parental leave they would take in the absence of household considerations, such as the welfare of the family. The quadratic formulation of the deviation from $\hat{t}_{(h,k)}$ implies that the further away behaviour is from the ideal, the higher the disutility, and moreover that the effect is the same whether behaviour is above or below the ideal. $\delta_{(h,k)}$ represents the fact that parents may be more or less averse to deviating from their ideal leave for the household's sake. For example, it may be that one parent thinks that his or her career is of overwhelming priority, in which case he or she may be very unwilling to take longer leave. We can interpret $\delta_{(h,k)}$ as intensity with which the parent experiences the ideal. Finally, γ_h indicates that mothers and fathers care about each others parental leave, which reflects the paradigm that it is better for the child to have access to both parents, and that both parents feel concern for the welfare of the child.

We then have $U_h\left(t_{(h,1)}, t_{(h,2)}, x_{-h}\right)$, for any given x_{-h}, as a strictly concave function of the households decision vector, $\left(t_{(h,1)} \leq 1, t_{(h,2)} \leq 1\right)$, with partial derivatives for $k = 1, 2$:

$$\frac{\partial U_h}{\partial t_{(h,k)}} = -\left(1 - b_k\right) w_{(h,k)} - \delta_{(h,k)}\left(t_{(h,k)} - \hat{t}_{(h,k)}\right) + \gamma_{(h,-k)}$$

Solving for $t_{(h,k)}$ when the derivative is zero gives:

$$t_{(h,k)} = \hat{t}_{(h,k)} - \frac{(1-b_k)w_{(h,k)} - \gamma_{(h,-k)}}{\delta_{(h,k)}} \tag{6}$$

From equation (6) we observe that a parent takes non-negative leave when:

$$\left(1 - b_k\right) w_{(h,k)} - \gamma_{(h,-k)} \leq \delta_{(h,k)} \hat{t}_{(h,k)}$$

Since the left hand term represents the forgone consumption adjusted for the utility derived by parent $-k$ from $t_{(h,k)}$, it is interpreted as the opportunity cost of parent k's parental leave. This condition therefore implies that a parent will take non-negative parental leave if the opportunity cost is less than or equal to the ideal parental leave, scaled by the intensity of that ideal. However, when the opportunity cost of foregone consumption is higher than the utility derived from parental leave, the parent will take negative leave.

Remark 1:

We interpret negative parental leave as overtime work. Recall equation (5). If parent k works overtime, it causes disutility to the household as parent $-k$ will experience disutility from the other parent working overtime, probably as a result of having to bear more responsibility in the home in the absence of co-parental support. However, $t_{(h,k)}$ also enters into the budget constraint (3), where the term $b_1 w_{(h,1)} t_{(h,1)}$ needs interpretation in the case of negative parental leave. Specifically, when parental leave is negative, the benefit portion of the budget constraint enters as a cost instead, meaning that with overtime work, the consumption possibilities of the household will grow by factor $(1 - b_k)\, w_{(h,k)}$ instead of growing simply by factor $w_{(h,k)}$. Although the most literal interpretation of this is that wages from over-time work are taxed at the the benefit rate (which is implausible), we can instead posit that a large part of marginal income from overtime work has to be spent on for example extra-familial child care, or domestic help, which are needed to make the household function in k's absence. For this reason, the consumption frontier expands much more modestly when a parent works overtime with a new born child at home. Hence, the general implications of over-time work may be realistically captured by the model by a stagnation of the family's welfare. Note, however, that this penalty for overtime work consequently leads to an underestimation by the model of the number of individuals working overtime.

Turning again to (6) we see that $t_{(h,k)}$ is decreasing in $w_{(h,k)}$, and increasing in $\hat{t}_{(h,k)}$, b_k and $\gamma_{(h,-k)}$. This is intuitive: the higher the wage, the higher the opportunity cost, which is mitigated by higher levels of benefits; likewise, the greater the parents ideal leave, or the greater the value the co-parent ascribes to $t_{(h,k)}$, the more leave we would expect k to take.

Let us examine equation (6) from the perspective of ideal leave $\hat{t}_{(h,k)}$. If the opportunity cost of $t_{(h,k)}$ is positive, $0 < (1 - b_k)\, w_{(h,k)} - \gamma_{(h,-k)}$, then the parent will take less than ideal leave, $t_{(h,k)} < \hat{t}_{(h,k)}$. This means that if the parent is taking less than his or her ideal leave, higher b_k or $\gamma_{(h,-k)}$, or lower $w_{(h,k)}$, corresponds to the parent being closer to the ideal; if the parent is taking more than his or her ideal leave, the opposite is true**.** However, looking to the effect of the parent's norm-intensity, $\delta_{(h,k)}$, $t_{(h,k)}$ is only increasing in $\delta_{(h,k)}$ if parent k is taking less than ideal leave $t_{(h,k)} < \hat{t}_{(h,k)}$. If on the other hand parent k is taking more than ideal leave, then $t_{(h,k)}$ is decreasing in $\delta_{(h,k)}$. This means that a higher norm intensity $\delta_{(h,k)}$ always implies the parent being closer to its ideal leave $\hat{t}_{(h,k)}$.

Remark 2:

Consider again the opportunity cost of $t_{(h,k)}$, $(1-b_k)\,w_{(h,k)} - \gamma_{(h,-k)}$. *The opportunity cost will be positive unless it is the case that* $\gamma_{(h,-k)}$ *is strongly positive, or that* b_k *is very high and/or* $w_{(h,k)}$ *very low. Henceforth, unless otherwise specified, we assume that opportunity costs in this formulation and all analogous formulations are positive.*

In Nash equilibrium we obtain:

$$t^*_{(h,k)} = \hat{t}_{(h,k)} - \frac{(1-b_k)w_{(h,k)} - \gamma_{(h,-k)}}{\delta_{(h,k)}} \tag{7}$$

Recall that a Nash equilibrium is defined as the optimal decision of the household given the decision of all other households. Given equations (1) and (2), if $\lambda_k > 0$, then $\hat{t}_{(h,k)}$ depends on x_{-h}, meaning that k's ideal is sensitive to the parental leave taken by members of its peer group. A full expression of the Nash equilibrium therefore requires solving for the ideal $\hat{t}_{(h,k)}$.

In order to simplify the calculations, we henceforth assume the number n of households is so large that we, for each parent $i = (h,k)$, can approximate $\bar{t}_{(-h,k)}$ by $\bar{t}_k$, the average leave among all parents k in the peer group of the parent in question.

Let mothers (fathers) differ from each other across all dimensions, apart from the fact that they delineate their peer group along gendered lines when it comes to parental leave. Substitution of (1) into (7) gives:

$$t^*_{(h,k)} = \lambda_{(h,k)}\bar{t}_k + \left(1-\lambda_{(h,k)}\right)\tau_{(h,k)} - \frac{(1-b_k)w_{(h,k)} - \gamma_{(h,-k)}}{\delta_{(h,k)}} \tag{8}$$

In order to find $\bar{t}_k$ we average over households j and obtain:

$$\bar{t}_k = \bar{\lambda}_k\bar{t}_k + \left(1-\bar{\lambda}_k\right)\bar{\tau}_k - \frac{\left[(1-b_k)\,\bar{w}_k - \bar{\gamma}_{-k}\right]}{\bar{\delta}_k}$$

where $\bar{\lambda}_k, \bar{\tau}_k$, $\bar{\delta}_k$, $\bar{w}_k$, and $\bar{\gamma}_{-k}$, represent the average values in the peer group. We solve for $\bar{t}_k$:

$$\bar{t}_k = \bar{\tau}_k - \frac{\left[(1-b_k)\,\bar{w}_k - \bar{\gamma}_{-k}\right]}{\left(1-\bar{\lambda}_k\right)\bar{\delta}_k} \tag{9}$$

We see that (9) is analogous to (6). The elements of the average opportunity cost affect $\bar{t}_k$ in the same way that the elements of the individual opportunity cost affected $t_{(h,k)}$. $\bar{\delta}_k$ is scaled by $\left(1-\bar{\lambda}_k\right)$ which, recall from (1), is the average social-insensitivity, and $(1-\bar{\lambda}_k)$ behaves in same as $\bar{\delta}_k$: increasing it brings the closer to average intrinsic ideal, while decreasing it brings it further away. This makes intuitive sense: we interpret $(1-\bar{\lambda}_k)$ as how robust a parent's intrinsic ideal $\tau_{(h,k)}$, is to pressures from the peer group, while we can interpret $\delta_{(h,k)}$ as how robust a parents socially adjusted ideal $\hat{t}_{(h,k)}$ is to other household considerations.

By substituting (9) into (8) we obtain the Nash-equilibrium parental leave:

Proposition 1:

If the number n of households is large, then there exists a unique Nash-equilibrium in terms of parental leave given by:

$$\begin{aligned} t^*_{(h,k)} &= \lambda_{(h,k)}\bar{\tau}_k + \left(1-\lambda_{(h,k)}\right)\tau_{(h,k)} \\ &\quad - \frac{\lambda_{(h,k)}\left(\left(1-b_k\right)\bar{w}_k - \bar{\gamma}_{-k}\right)}{\left(1-\bar{\lambda}_k\right)\bar{\delta}_k} - \frac{\left(\left(1-b_k\right)w_{(h,k)} - \gamma_{(h,-k)}\right)}{\delta_{(h,k)}} \end{aligned} \quad (10)$$

Proposition 1 gives the following comparative statics:

- Higher values of $\tau_{(h,k)}, \bar{\tau}_k$, $\gamma_{(h,-k)}$, $\bar{\gamma}_k$, and b_k correspond to longer $t^*_{(h,k)}$.
- A higher value of $\delta_{(h,k)}$ corresponds to longer $t^*_{(h,k)}$ if $0 < (1-b_k)\,w_{(h,k)} - \gamma_{(h,-k)}$. Recalling Remark 2, this always holds by assumption.
- A higher value of $\bar{\delta}_k$ corresponds to longer $t^*_{(h,k)}$ if $0 < (1-b_k)\,\bar{w}_k - \bar{\gamma}_{-k}$. Recalling Remark 2, this always holds by assumption.
- A lower value of $\bar{\lambda}_k$ corresponds to longer $t^*_{(h,k)}$ if $0 < (1-b_k)\,\bar{w}_k - \bar{\gamma}_{-k}$. Recalling Remark 2, this always holds by assumption.
- A higher value of $\lambda_{(h,k)}$ corresponds to longer $t^*_{(h,k)}$ if $\tau_{(h,k)} < \bar{\tau}_k - \frac{\left[(1-b_k)\bar{w}_k - \bar{\gamma}\right]}{\left(1-\bar{\lambda}_k\right)\bar{\delta}_k}$. From (9) we see that this is equivalent to when $\tau_{(h,k)} < \bar{t}_k$: if intrinsic ideal is lower than the average parental leave of the peer group, a higher social sensitivity corresponds to longer parental leave.

Moreover, parent k takes non-negative leave when

$$\begin{aligned} \lambda_{(h,k)}\bar{\tau}_k + \left(1-\lambda_{(h,k)}\right)\tau_{(h,k)} \quad &\geq \quad \frac{\lambda_{(h,k)}}{\left(1-\bar{\lambda}_k\right)}\frac{\left(\left(1-b_k\right)\bar{w}_k - \bar{\gamma}_{-k}\right)}{\bar{\delta}_k} \\ &\quad + \frac{\left(1-b_k\right)w_{(h,k)} - \gamma_{(h,-k)}}{\delta_{(h,k)}} \end{aligned}$$

and equilibrium leave falls short parent k's intrinsic ideal, $t^*_{(h,k)} < \tau_{(h,k)}$ when

$$\bar{\tau}_k - \tau_{(h,k)} < \left[\frac{\left(1-b_k\right)w_{(h,k)} - \gamma_{(h,-k)}}{\lambda_{(h,k)}\delta_{(h,k)}}\right] + \left[\frac{\left(1-b_k\right)\bar{w}_k - \bar{\gamma}_{-k}}{\left(1-\bar{\lambda}_k\right)\bar{\delta}_k}\right]$$

implying that the longer the parent's intrinsic ideal is relative to that of the peer group, the more likely it is that, in equilibrium, the parent's leave will fall short of intrinsic ideal. A lower $\delta_{(h,k)}$, $\bar{\delta}_k$, *and* $\lambda_{(h,k)}$, higher $\bar{\lambda}_k$ or higher opportunity costs will also make it this more likely.

5 Discussion

5.1 Stylized implications

Proposition 1, by allowing for a high level of heterogeneity, is a rich yet simple description of equilibrium leave that has significant implications for the interpretation of gendered distributions. In this section, we will look through some of these implications for intra-household and inter-household scenarios based on simplified cases.

5.1.1 Perfectly matched parents

Consider first the case of a household wherein the mother and father are identical, except for their peer groups: $\lambda_{(h,1)} = \lambda_{(h,2)} = \lambda_h$ and similarly for τ, δ , b, w, γ. We can interpret this as a a highly homogamous couple (Bonke & Esping-Andersen, 2009); in fact they are perfectly matched. Let $k = 1$ denote mother, and $k = 2$ denote the father. Then, provided that $\lambda_h \neq 0$, Proposition 1 implies that $t^*_{(h,2)} < t^*_{(h,1)}$, in other words the household will display a traditionally gendered distribution of parental leave, as long as $\bar{t}_1 > \bar{t}_2$. Recalling equation (9), this will be the case if any one of the following is true: $\bar{\tau}_1 > \bar{\tau}_2$ $\bar{w}_1 < \bar{w}_2$, $\bar{\gamma}_2 > \bar{\gamma}_1$, $\bar{\delta}_1 > \bar{\delta}_2$, $\bar{\lambda}_1 < \bar{\lambda}_2$. There is empirical evidence suggesting that indeed $\bar{\tau}_1 > \bar{\tau}_2$, $\bar{w}_1 < \bar{w}_2$, $\bar{\delta}_1 > \bar{\delta}_2$, $\bar{\gamma}_2 > \bar{\gamma}_1$. In other words, women on average have higher intrinsic ideals of parental leave, lower wages, experience deviations from ideal more acutely, and value the father staying home less than he values her staying home (Almqvist et al., 2010).

5.1.2 Separate spheres outcome

Proposition 1 allows us to explain how separate spheres ideologies persist, namely how a traditional gender distribution would arise from realistic assumptions of the parameter values. As before, let $k = 1$ denote mother, and $k = 2$ denote the father. Empirical literature suggests that traditional gender distributions are more pronounced in more homogenous environments (Almqvist, 2010). Let us therefore suppose that there is a high degree of homogeneity in the peer group, arising from low mobility. In particular, posit that although wages may differ between mothers (fathers), $\tau_{(h,k)} = \tau_k$, $\delta_{(h,k)} = \delta_k$, and $\lambda_{(h,k)} = \lambda_k$ and $\gamma_{(h,k)} = \gamma_k$ for all ($k = 1$,2). Traditionally, we would assume the following:

- $\bar{w}_1 < \bar{w}_2$: mothers on average have lower wages than fathers, possibly from statistical discrimination or from less human capital investment
- $b_k = 0$: there is no earnings related paid parental leave.
- $\gamma_k = 0$: there is no paradigm that the child is entitled to time with both of its parents.
- $\delta_2 > \delta_1$: the household welfare decreases more with father's deviation from his ideal, perhaps because the father has greater influence in the household.

- $\tau_1 > \tau_2$: the mother has an intrinsically higher ideal leave than the father
- $\lambda_1 = \lambda_2 = \lambda$: mothers and fathers are equally socially sensitive.

Then our expression for equilibrium leave (10) will simplify to:

$$t^*_{(h,k)} = \tau_k - \frac{(\lambda \bar{w_k} + (1-\lambda)\, w_k)}{(1-\lambda)\, \delta_k}$$

$$t^*_{(h,1)} - t^*_{(h,2)} = \tau_1 - \tau_2 - \frac{(\lambda \bar{w_1} + (1-\lambda)\, w_1)}{(1-\lambda)\, \delta_1} + \frac{(\lambda \bar{w_2} + (1-\lambda)\, w_2)}{(1-\lambda)\, \delta_2}$$

There will be separate spheres when:

$$0 < \tau_1 - \tau_2 - \frac{(\lambda \bar{w_1} + (1-\lambda)\, w_1)}{(1-\lambda)\, \delta_1} + \frac{(\lambda \bar{w_2} + (1-\lambda)\, w_2)}{(1-\lambda)\, \delta_2}$$

$$\frac{1}{(1-\lambda)\, \delta_1 \delta_2} \left[\delta_2 \left(\lambda \bar{w_1} + (1-\lambda)\, w_1\right) - \delta_1 \left(\lambda \bar{w_2} + (1-\lambda)\, w_2\right)\right] < \tau_1 - \tau_2$$

By assumption the right hand side is positive. Unless δ_2 is very much higher than δ_1, the left hand side will be negative, meaning that separate spheres will tend to hold.

5.1.3 Extreme levels of social sensitivity

Consider the case where a parent is entirely socially insensitive: $\lambda_{(h,k)} = 0$.

$$t^*_{(h,k)} = \tau_{(h,k)} - \frac{\left((1-b_k)\, w_{(h,k)} - \gamma_{(h,-k)}\right)}{\delta_{(h,k)}}$$

Recall that we assumed $0 \leq \lambda_{(h,k)} < 1$, guaranteeing a well-behaved solution. Let us postulate that although $0 \leq \lambda_k < 1$, $\lambda_{(h,k)}$ in fact is equal to 1. This would mean that i has no concern at all for his or her own intrinsic ideal. In that case, the solution would become:

$$t^*_{(h,k)} = \bar{\tau}_k - \frac{\left((1-b_k)\, \bar{w}_k - \bar{\gamma}_{-k}\right)}{\left(1-\bar{\lambda}_k\right) \bar{\delta}_k} - \frac{\left((1-b_k)\, w_{(h,k)} - \gamma_{(h,-k)}\right)}{\delta_{(h,k)}}$$

Even with completely socially determined ideals, there is spread in behaviour, given by individual characteristics and wage.

5.2 Model predictions and empirical observations

In this section, we see how well the model matches up with empirical data. Of particular importance is observing the effects of policy changes. When changes are uniform and instantaneous, one may assume that the policy operates through income channels. However, when behaviour is resistant to policy, or has uneven results, it may point to conflicting effects of social norms.

5.2.1 Policy

Craig and Mullan (2011) showed that differences between Australia, France, Italy and Denmark in the division of child care between mothers and fathers in couples were largely in line with expected effects of the corresponding policy package of the country, suggesting that policy either is endogenous to the populations ideals, in that people vote for the party most likely to benefit them (Lindbeck et al., 1999), or that policy has a real potential to influence average behaviour.

The model has interesting policy implications. Recall (9): to achieve an average change in parental leave of one gender group, policy can operate through benefits, wages, and preferences. The model predicts that increasing benefit rates increases duration of parental leave. This is corroborated by empirical research: Brandth and Kvande (2001) find this to be the case for Norwegian households.

More significantly, given the prevailing lower average wage levels of women, benefit rates would be the most effective in equalizing the parental leave distribution if they were differentiated so that fathers received a higher earnings-related benefit than women. This implies trying to create equality through the unequal treatment of men and women, and it is probably for this reason that we do not observe benefit differentiation of this type.

The second implication is that increasing the average wages of women (or closing the gap to those of men) would also effectively smooth the distribution of parental leave. Thus parental leave outcomes would effectively be achieved outside of the traditional purview of family policy (namely by for example trying to influence what type of professions women (men) enter into).

Finally, there is the possibility of influencing preferences, namely trying to shift the intrinsic ideal, the weight attached to the co-parent's parenting time, the social sensitivity or the norm intensity for women or men, so that parental leave becomes more equal. This is in fact something that has been happening: public campaigns tend to focus on the positive effects for the child of having both parents present, and have been successful in some areas of Sweden in increasing the amount of leave fathers take. This plausibly operates through increasing the intrinsic ideal of the father, or increasing the weight the mother associates with the fathers leave.

5.2.2 "Daddy months"

One policy which has gained popularity over the past decade is that of a reserved "Daddy month". In a system where parental leave is allocated to the household as a unit and can be freely distributed between parents as they choose, it constitutes a constraint that at least one period - two months in Sweden, Norway, and Germany, and three months in Iceland - cannot be waived by one parent in favor of the other. These have sometimes been referred to as take-it-or leave-it months, since if they are not used they are voided - and the total amount of time available to the household for parental leave falls. Although the policy reserves time for both parents, it is usually only considered a binding constraint for the father, since mothers usually already take above the reserved month amount of leave. For this reason, research on this policy evaluates the effects primarily on parental leave taken by men.

The policy has had similar but not identical impacts in different countries. We look to Sweden, which has been the focus of the literature on "Daddy months" internationally. In Sweden, the introduction of the first reserved month had a dramatic impact on fathers' leave: the share of fathers taking zero days decreased from 54% to 18%, while the share taking around a month increased from 9% to 47%. Total days taken by fathers increased by 15, while mothers decreased by 20 which had a significant redistribution effect, given that the total amount of parental leave days was unchanged by the policy. The second reserved month, introduced in 2002, was by contrast associated with smaller changes: although the group taking approximately two months of leave increased substantially, the leave taken by mothers also increased (Eriksson, 2005).

The effects of the first "Daddy month" relative to the second may operate through two channels. Imagine that before its introduction, fathers in equilibrium were taking less than their ideal amount of leave. The policy reduced the amount of time available for the mother to use; for this reason, we can assume that as the $\bar{\gamma}$ of mothers increased and, unable to stay home as long with the child themselves, they place an even higher value on the fathers parental leave, in order to maintain the same level of welfare for the child. With the increase of $\bar{\gamma}_{-k}$, fathers will take higher amount of leave. This puts them closer to their ideal leave. The second "Daddy month" on the other hand was accompanied by an increase in the total amount of leave a family could take. As a result, the increase in maternal pressure for the father to increase leave would grow by less than it did in conjunction with the first month, since it was simultaneously possible for the mother to take more leave. Moreover, the second month had its largest impact on fathers of middle income, and fathers that were born in Sweden. This implies that these fathers had higher intrinsic ideals that they were still undershooting. Those who did not expand leave as a result of the second month may have been more robust in their intrinsic ideal, hence not wanting to go above it, provided they were satisfied.

5.2.3 Wages

The second empirical observation that is interesting to relate to the model is the impact of wages, which is the factor that has been the most closely analyzed both theoretically and empirically.

Recall that the blunt prediction of the model is that higher individual wages induce less leave, which is in line with the New Household theories of household specialization and common-place predictions of opportunity costs. Moreover, recall from comparative statics that all else equal, the parent with the lower wage in a household will take longer parental leave, and that households with lower income will take longer leave. Contrary to this, empirical data from various sources show a more complex picture. There is indeed evidence suggesting that relative wages in the household influences the relative parental leave taken: Duvander and Johannson (2012) use registry data to confirm that in Sweden, for both the mother and the father, leave is positively correlated with the wage of the other parent, while in the same vein, Angelov et al. (2013) find a strong positive correlation between the pre-child income gap and the extent of household responsibility taken on by the mother.

However, at this point the effects become less straight forward. Angelov et al. (2013) do not find the relationship between pre-child earnings and household responsibility to be symmetric for fathers: they do not increase their leave in response to mother's income as much as mothers do, which calls into question theories of household specialization. Moreover, using Danish data, Bonke and Esping-Andersen (2009) find that women's wages do not significantly affect child care, which contradicts the prediction of the model. Finally, Duvander and Johannson (2012) find that wages impact the individual's leave in opposite ways: although mothers' wages correlate negatively with parental leave, fathers' wages correlate positively with parental leave. Note that this means that data from Denmark and Sweden are directly contradictory when it comes to the impact of female wages.

How can these empirics be reconciled with the model? In the case of the first statement, the model is agnostic: since it does not solve parent k's leave explicitly in terms of $w_{(h,-k)}$, several perturbations of the comparative statics can generate this result. With regards to the second statement, one possible explanation is that wages increase as a result of work responsibility and stress. In tandem with stress from work increasing, it is possible that the value placed on the mother being home with her child increases from the side of the father $\gamma_{(h,-k)}$, mitigating the results of the wage increase. It may then be that in Sweden, this parallel development does not take place.

The third fact that father's leave increases with wage while women's decreases can be explained by the model, under contextual assumptions. Assume that higher wages imply greater responsibility at work. Posit that individuals with more work responsibility also display a more independent personality, higher age, or a better bargaining position as productive worker (in other words qualities which may be decreasing in social sensitivity): it is then plausible that higher wages also correlate with lower social sensitivity. Recall the implications

of 10: if $\tau_{(h,k)} > \bar{t}_k$, then $t^*_{(h,k)}$ is decreasing in $\lambda_{(h,k)}$. If we posit that individuals with high wages in Sweden have egalitarian intrinsic ideals, the low average level of fathers' leave and high average level of mothers' leave would imply that this condition holds for men but not for women. As a result, higher wages lead to higher parental leave for men, but lower leave for mothers. This implies that there is endogeneity in the model: namely that $\tau_{(h,k)}$ may vary systematically with wages; however, the way in which it varies may be context dependent and for this reason the model is still powerful in describing parental leave decisions.

However, survey evidence from the US finds that financial pressure is a reason for many households taking less leave than parents want or none at all (Cantor et al. 1995; Cantor et al., 2001; Waldfogel, 2001), which also contradicts the model. This reflects one limitation of the model, namely that because utility is linear in income, the possibility for heterogenous income effects is absent from the model. If utility were non-linear utility in income, for example $ln\,(y_h)$ then as income goes to zero, utility approaches infinity, increasing the relative price of parental leave. Moreover, a non-linear utility curve would also generate interdependencies between the parents' wages, which would enrich the model's predictive capabilities. This would come at a cost however: such a solution requires the simultaneous solution of both parents' parental leave, and generates terms of such algebraic complexity that it would defeat the objective of the model which is to describe this problem in readily understandable terms.

5.2.4 Education

Another aspect which is interesting to investigate is the role of education in determining parental leave. This has been the topic of both economic and sociological research, and it is generally assumed that egalitarian views are held to a greater extent among well-educated men and women (Blossfeld & Drobnic 2001) and that fathers' parental leave or child care increases with education, (e.g. Sayer et al., 2004a; Sayer et al., 2004b; Kassner & Rüling, 2005), the exception seemingly being Norway (Haas & Hwang, 2008; Sayer et al., 2004b). The evidence for women is mixed: for example, Bonke and Esping-Andersen (2009) find no effects from mother's education, while Sayer et al. (2004) and Guryan et al. (2008) find strong effects. There are two further interesting observations in the empirical literature: less educated couples invest less time in their parenting than well-educated couples, and less educated couples display a more gendered division of labour than well-educated couples, leading to a speculation that there is currently a polarization going among parents (Bianchi et al., 2000, 2006; Bittman et al., 2003).

Bonke and Esping-Andersen (2009) suggest that this may in part be because lower education individuals are not as competitive on the relationship market: as a result they may not be able to find matches to the same extent as well-educated, more competitive individuals. Hence, homogamy will tend to be stronger in well-educated peer groups than in lower educated groups. As we saw in the stylized case of the perfectly matched couple, even small differences in the parental leave of the peer group will create gendered divisions: therefore,

one may guess that in couples that are less well matched, given that female average wages are almost universally lower than men's, there will be a larger predisposition towards traditional gender specialization.

Although better matching might increase the predisposition towards an egalitarian distribution of parental leave, it is unlikely that this is the only reason for the large effect that education has on men's parental leave. Bonke and Esping-Andersen (2009) posit that among the well-educated, children are given higher priority, in spite of opportunity costs. In terms of our model, this means that better educated households have systematically higher τ_k and $\gamma_{(h,-k)}$, and that these are high enough to offset the higher levels of $w_{(h,k)}$ which one expects from better education.

6 Conclusion

As parental leave policies across Europe converge on a dual-earner model, the quantitative research interest in parental leave behaviour is burgeoning. However, without a realistic and accessible theoretical underpinning, such research may not be of much help in actually understanding what matters to families and to individuals as they make their parental leave decision. As a result, it may difficult to predict the effect of family policies, as illustrated by the differences in the effects of the first and second "Daddy month" in Sweden. Here we have seen that a simple model that includes social norms generated by gendered peer groups can go a long way to understanding the data. Although it permits a large extent of heterogeneity across the population, it can also be simplified substantially leading to easy interpretation.

The model can be extended in many ways. The first significant extension is to make consumption non-linear: this would allow for a better description of how parental leave varies with wages, as well as a simple description of interdependency in the leave decisions of both parents. As discussed above, with the exception of simultaneously solving a system consisting of two first order conditions rather than one, such models would follow the exact same procedure as above, and generate more realistic but more complex terms. The second interesting extension would be making the model dynamic, in order to make the endogeneity of the model explicit. This would allow for an analysis of how parental leave decisions would change over time.

Finally, this thesis has indicated the value in interdisciplinary approach to household decisions: incorporating not only sociological approaches, but a model used to describe a public health problem has allowed for a richer analysis than the previous literature on the household.

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