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Abstract

We consider a bargaining model in which husband and wife decide on the allocation of time and disposable income. Since her bargaining power would go down otherwise more strongly, the wife agrees to have a child only if the husband also leaves the labor market for a while. The daddy months subsidy enables the couple to overcome a hold-up problem and thereby improves efficiency. However, the same ruling harms cooperative couples and may also reduce welfare in an endogenous taxation framework.

JEL-Code: D130, H210, J130, J180, J220.

Keywords: fertility, bargaining, family policy, labor supply.

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1 Introduction

Daddy months have been introduced in recent years as instruments of family policy in Scandinavia and Germany. Subsidies are paid to young parents as a replacement income for temporarily withdrawing from the labor market. The full subsidy is paid only if both spouses leave their job. Empirical studies indicate that daddy month rulings have increased the use of fathers' parental leave (Geisler and Kreyenfeld, 2012), while a permanent impact on time input of the father in the household seems doubtful (Ekberg et al. 2013). Taking daddy months will often be associated with a lasting decrease of the income of the father (Rege and Solli, 2013), which may counteract the phenomenon that parental leave mandates contribute substantially to the gender wage differential (Ruhm, 1998).

Our paper addresses the question if a daddy months provision can be justified on an allocative basis. At first sight, such a clause does not look efficient as it often requires the family to reduce its income compared to paying the full subsidy without this daddy months clause. We argue that a daddy months rule may enhance welfare if it enables the couple to overcome a hold-up problem. After giving birth to a child, the income prospects of the mother are substantially deteriorated. This also reduces her power in intrafamily bargaining. Her losses would be less severe or even nonexistent if the husband also withdraws from the labor market for a while. However, the husband cannot commit to such a behavior and will often find it optimal to continue working once the child is born. Foreseeing this consequence, the wife may not agree to have a child. As a daddy months rule makes it somewhat more attractive for the husband to keep his promise, welfare of both spouses may rise compared to the alternative outcome of a childless family.

This line of reasoning is associated with several drawbacks. Compared to a legal framework without the daddy months clause, it harms couples preferring continued work of the husband. As this ruling reduces the income prospects under traditional behavior, it can reduce fertility and welfare of such couples. Moreover, even if couples are induced to have children due to the daddy months rule as described, this may go along with a welfare loss in a general equlibrium perspective. As all child-related benefits have to be financed by taxation, a daddy months paradox can arise. While fertility and welfare of households increase at given taxes through implementing the daddy months clause, the individuals may be better off staying childless without the need to pay taxes for financing the subsidy.

The paper closest to ours in spirit is Kemnitz and Thum (2014), investigating changes in the balance of power of spouses, inducing inefficiently low fertility. They consider child allowances, maternal care benefits and formal child care subsidies as alternative instruments to overcome the inefficency. The endogeneity of the balance of power is analyzed in several versions in the literature. In the collective approach, the household typically maximizes a weighted sum of individuals' utilities. Bourguignon and Chappiori (1994) then specify that the weights will depend on wage rates, hence potential income. In contrast, Basu (2006) uses a version in which these bargaining weights depend on actual income, thus also on labor supply, such that a fixed point is to be found. Both approaches share the property that individuals will overinvest in human capital to improve their bargaining position (Iyigun and Walsh, 2007). The outside option, which is remaining single (or be divorced), is the basis of reservation utility, which constrains the determination of weights in the joint welfare function (Iyigun and Walsh, 2007). As in the noncooperative family framework of Konrad and Lommerud (1995), our argument suggests that a welfare gain can achieved through reallocating family benefits from one spouse to the other.

Should taking daddy months have a lasting positive impact on the mothers' labor supply, the public finance and political economy arguments from the literature on publicly subsidized or publicly provided child care (Bergstrom and Blomquist, 1996, Apps and Rees, 2004, Blomquist et al., 2010, Borck and Wrohlich, 2011) apply. Voters are willing to support higher child-related benefits if these will be offset by future tax payments of mothers or if distortions can be reduced in an efficiency-enhancing fashion. Moreover, voters can also benefit from additional children since they are usually carrying a positive fiscal externality as prospective contributers in a public pension scheme (Cigno 1993, Sinn 2001).

The remainder of the paper is organized as follows. Section 2 introduces the model. Section 3 discusses bargaining in the family, the parental leave decision of the husband and the fertility chioce. After discussion of some welfare and policy implications in Section 4, Section 5 concludes.

2 The model

Consider two individuals, husband (m) and wife (f), choosing whether or not to have a child. Though the model is framed in terms of marriage, it should be stressed that the lines of reasoning brought forward also apply to non-married couples. When having a child, the husband decides on withdrawing from the labor market for some time. Finally, there is bargaining on the allocation of consumption goods in either of the three possible states: without a child (o), with a child when the husband continues working (c), or with the child when the husband takes some daddy months leave (d). Wages of husband and wife, w^m and w^f reflect experience upgrading. They are interpreted in a long-term perspective. Considering a break due to parental leave having lasting consequences, we impose $w_o^m = w_c^m > w_d^m$ and $w_o^f > w_d^f \geq w_c^f$. Family income y will be highest without the child and lowest when the husband takes daddy months, $y_o > y_c > y_d$. Utility levels of the male and female partner in a setting without special daddy months subsidies in the final equilibrium would be $u_c^m > u_d^m > u_o^m$ and $u_d^f > u_o^f > u_c^f$, respectively. Thus, both spouses prefer the daddy months outcome to not having a child, but the husband would even prefer to continue working.

The political options of family policy are of two different types: In the standard scenario, the full benefit b is not contingent on a daddy months rule. The benefit will be paid out to the mother. The father may nevertheless take parental leave, but will not receive any part of the benefit then. Alternatively, under a daddy months rule, the father receives the benefit b^m upon withdrawing from work temporarily, while the benefit b^f will be paid to the mother anyway. As the aggregate benefit is unchanged by switching to the other type of family policy, we consider only $b^f + b^m = b$. Hence, the benefits paid to mother and father are

$$\beta^f = \begin{cases} b \text{ if no daddy months rule (dmr) is implemented,} \\ b^f = b - b^m < b \text{ with daddy months rule in place} \end{cases}$$

and

$$\beta^m = \begin{cases} b^m \text{ with dmr in place and daddy months taken,} \\ 0 \text{ else.} \end{cases}$$

For simplicity, the benefits are financed by lump-sum taxes for men, T^m, and for women, T^f. While there is some macroeconomic budget constraint determining the level of these taxes, they will not be affected by decision-making within the family under consideration.

The utility function sums up monetary and nonmonetary benefits. For simplicity, utility is transferable and measured in monetary equivalents. Immaterial benefits from having a child are x^m for the husband and x^f for the wife in monetary units. These values are assumed to be smaller (halfed) if bargaining ends in failure, thus affecting the threat point. Furthermore, taking the daddy months is associated with a payoff z to the father, which captures the value of leisure, the value of staying with the child and possibly also some moral pleasure component of keeping a promise to his wife.

The bargaining outcome is predicted by maximizing family welfare

$$N = (u^m)^\lambda (u^f)^{(1-\lambda)}, \tag{1}$$

where $\lambda \in (0,1)$ indicates the bargaining power of the husband. We assume that the bargaining coefficient of the husband rises with his relative net income, that is $\lambda = f([w^m - T^m + \beta^m] / [w^f - T^f + \beta^f]; \overline{u}^f; \overline{u}^m)$, with $f_1 > 0$. The function f determining the bargaining weight λ has to ensure that each partner achieves at least the conflict outcome, denoted by $\overline{u}^m$ and

$\overline{u}^f$, respectively. Moreover, the bargaining weight of the husband increases with his own reservation utility and decreases with the reservation utility of the wife, $f_2 < 0 < f_3$. The conflict outcome is interpreted as the allocation upon a divorce, which may depend on wage prospects, government benefits and the existence of a child. In case of conflict, the financial or nonfinancial marriage surplus is lost, which amounts to γ^f for the female and γ^m for the male spouse.

Bargaining can take place in three different scenarios, without a child, with a child and continued working, and with a child and daddy months taken. It entails a decision on θ, the transfer the husband pays to his wife. Threat point levels are such that marriage surpluses and the immaterial daddy months benefit z are lost, and psychic child surpluses are halfed. Wages, taxes and family benefits remain unaffected. Further, the legal transfer in case of divorce is set to zero. Hence, threat point utilities are

$$\overline{u}_o^m = w_o^m - T^m, \tag{2}$$

$$\overline{u}_o^f = w_o^f - T^f, \tag{3}$$

$$\overline{u}_c^m = w_c^m - T^m + \frac{x^m}{2}, \tag{4}$$

$$\overline{u}_c^f = w_c^f - T^f + \frac{x^f}{2} + \beta^f, \tag{5}$$

$$\overline{u}_d^m = w_d^m - T^m + \frac{x^m}{2} + \beta^m, \tag{6}$$

$$\overline{u}_d^f = w_d^f - T^f + \frac{x^f}{2} + \beta^f. \tag{7}$$

Excess surplus levels relative to the allocation without a child are given by

$$\Omega_c - \Omega_o = x^m + x^f - \left(w_o^m + w_o^f - \left[w_c^m + w_c^f + \beta^f\right]\right), \tag{8}$$

$$\Omega_d - \Omega_o = x^m + x^f + z - \left(w_o^m + w_o^f - \left[w_d^m + w_d^f + b\right]\right), \tag{9}$$

in cases of continued work and with daddy months, respectively. We assume that $w_c^m + w_c^f + \beta^f > w_d^m + w_d^f + b$ for any relevant vector of wages and policy variables. Further, having a child and taking daddy months does also yield a higher aggregate payoff for the household than remaining childless. Therefore, $\Omega_c > \Omega_d > \Omega_o$, that is, having a child is associated with a surplus, and continued work maximizes the sum of payoffs, even if total child allowances would be the same, $\beta^f = b$. Thus, cooperative couples will never choose daddy months. The bargaining weight of the husband will be highest with a child and continued working and lowest when no child is around, $\lambda_o < \lambda_d < \lambda_c$. As the distribution of benefits also affects the bargaining weights, we have $\lambda_d^d > \lambda_d$ and $\lambda_c^d > \lambda_c$, where the superscript d indicates that a daddy months rule is in place, allocating part of the transfer to the father contingent on taking his leave from the workplace.

The sequence of events is as follows. First, the government announces the parameters of family policy, that is, the level of transfers and taxes. Second, knowing all policy parameters, husband and wife simultaneously choose whether or not to have a child. If they do not agree to have a child, the couple remains childless, and they bargain about the distribution of consumption. Should they agree to have a child, a birth will be realized. In that event, the husband chooses whether to continue working or to take daddy months. Finally, in either case, there will be bargaining about the distribution of consumption between husband and wife.

3 Time allocation, bargaining and fertility

3.1 Bargaining

When bargaining, husband and wife maximize (1) with respect to the transfer θ. The utilities if bargaining is successful consist of monetary and immaterial payoffs. Using utility levels upon divorce as the threat point reference scenario, the outcome is characterized in Lemma 1.

Lemma 1 *The transfer from husband to wife satisfies*

$$\theta = (1 - \lambda)\, \widehat{u}^m - \lambda \widehat{u}^f, \tag{10}$$

where variables with a hat denote utilities before the transfer, that is, $\widehat{u}^m = u^m + \theta$ *and* $\widehat{u}^f = u^f - \theta$.

Proof. The first-order condition is

$$\frac{\partial N}{\partial \theta} = \left[\frac{\lambda \frac{\partial u^m}{\partial \theta}}{u^m(\theta)} + \frac{(1-\lambda)\frac{\partial u^f}{\partial \theta}}{u^f(\theta)} \right] N = 0. \tag{11}$$

Noting that $\frac{\partial u^f}{\partial \theta} = 1 = -\frac{\partial u^f}{\partial \theta}$, this is equivalent to

$$(1-\lambda)\, u^m(\theta) = \lambda u^f(\theta). \tag{12}$$

Rearranging then yields

$$u^f(\theta) = (1-\lambda)\left[u^m(\theta) + u^f(\theta)\right] = (1-\lambda)\,\Omega, \tag{13}$$

$$u^m(\theta) = \lambda\left[u^m(\theta) + u^f(\theta)\right] = \lambda\Omega. \tag{14}$$

Thus, the transfer will be chosen such that the share λ of the aggregate surplus $\Omega \equiv \widehat{u}^m + \widehat{u}^f = u^m(\theta) + u^f(\theta)$ will be acquired by the husband, while the share $(1-\lambda)$ falls to the wife. Since $\theta = \widehat{u}^m - u^m(\theta) = u^f(\theta) - \widehat{u}^f$, rearranging yields the explicit expression of the claim. □

We assume that weight changes in bargaining upon income variations never fully compensate the impacts of the variation in the income differential on the resulting transfer. Thus, θ_c rises if a daddy months rule is implemented, reducing income and bargaining weight of the wife since her claim on family allowances decreases - though the change in the bargaining weight counteracts this effect. And θ_d rises if a daddy months rule is implemented, shifting family allowance payments from wife to husband, with a change in bargaining weights in the same direction. If x is a pure reallocation from wife to husband, which may occur through reassignment of parental benefits, the transfer changes according to

$$
\begin{aligned}
\frac{\partial\theta}{\partial x} &= (1-\lambda)\frac{\partial\widehat{u}^m}{\partial x} - \lambda\frac{\partial\widehat{u}^f}{\partial x} - \left[\widehat{u}^m + \widehat{u}^f\right]\frac{\partial\lambda}{\partial x} \qquad (15)\\
&= 1 - \left[\widehat{u}^m + \widehat{u}^f\right]\frac{\partial\lambda}{\partial x}\\
&= 1 - \Omega\left[f_1\frac{\partial\left[\left(w^m - T^m + \beta^m\right)/\left(w^f - T^f + \beta^f\right)\right]}{\partial x} + f_2\frac{\partial\widehat{u}^f}{\partial x} + f_3\frac{\partial\widehat{u}^m}{\partial x}\right]\\
&= 1 - \Omega\left[f_1\frac{\partial\left[\left(w^m - T^m + \beta^m\right)/\left(w^f - T^f + \beta^f\right)\right]}{\partial x} - f_2 + f_3\right] > 0.
\end{aligned}
$$

since $\frac{\partial\widehat{u}^m}{\partial x} = -\frac{\partial\widehat{u}^f}{\partial x} = 1$ holds with pure reallocation and induced changes in bargaining weights never offset the initial redistribution. Therefore, a reallocation of family benefits from wife to husband will lead to a higher transfer from husband to wife, though at a smaller rate. Finally, the impacts of changes in threat utility levels are captured by

$$
\frac{\partial\theta}{\partial\overline{u}^m} = -f_3\left[\widehat{u}^m + \widehat{u}^f\right] < 0, \qquad (16)
$$

$$
\frac{\partial\theta}{\partial\overline{u}^f} = -f_2\left[\widehat{u}^m + \widehat{u}^f\right] > 0. \qquad (17)
$$

Thus, if some variation affects only a divorced individual, say by a differentiated treatment of the tax-transfer system according to marital status, this will have an impact on the transfer from husband to wife according to the implied change in bargaining power.

3.2 Whether or not to take father's leave

The decision to take daddy months is affected by the family policy of the government. If the full child benefit is collected by the mother, the father continues working if, and only if, the difference between the wage differential and the intrafamily transfer differential exceeds the nonmonetary daddy months payoff, that is,

$$
\left(w_c^m - w_d^m\right) - \left(\theta_c^0 - \theta_d^0\right) > z, \qquad (18)
$$

where the superscript 0 refers to the nonexistence of a daddy months subsidy. If such a subsidy is in place, it will affect the bargaining outcome. The daddy months subsidy will then be taken up if, and only if,

$$(w_c^m - w_d^m) - \left(\theta_c^d - \theta_d^d\right) \leq z + b^m, \tag{19}$$

where it is assumed that the daddy holiday is taken in case of indifference. The superscript d indicates the presence of a daddy months rule. For simplicity, we will omit the superscript whereever this does not lead to confusion. If both conditions (18) and (19) are met, the father will take the holiday only with the daddy months subsidy, but not otherwise. Proposition 1 then shows that the daddy months rule can induce fathers to take parental leave.

Proposition 1 *Implementing a daddy months rule enlarges the set of wages under which the husband prefers to take daddy months to continued work.*

Proof. A father prefers taking daddy months to continued work if and only if

$$w_c^m - (w_d^m + z + b^m) - [\theta_c - \theta_d] \leq 0, \tag{20}$$

which is equivalent to

$$\theta_c + b^m - \theta_d \geq w_c^m - (w_d^m + z) \tag{21}$$

Notice that the RHS of (21) is independent of the daddy months rule. On the other hand $b^m > 0$ is paid only if a daddy months rule is implemented, and both θ_c and θ_d are increasing with a daddy months rule in place. However, the assumptions guarantee that the increase in θ_d does never exceed b^m. Thus, implementing the daddy months rule unambiguously increases the LHS of (21), increasing the set of wages (w_c^m, w_d^m) under which (21) holds. □

While the transfer under claiming daddy months increases when the father receives part of the family allowance, the reallocated income will only be partially redistributed to the mother due to the higher bargaining weight of the father. At the same time, the increase in the bargaining weight of the husband will not be sufficient to reduce θ_c upon the introduction of the daddy months rule. Why will the introduction of the benefit b^m induce the husband to choose daddy months? The impact of the benefit reallocation would be completely offset by the change in intrafamily transfers if no change in bargaining weights occur. The husband will be bettter off only if his bargaining weight λ_d increases.

The welfare impact of the daddy months rule on the husband is not trivial. Utility upon continued work is going to fall since part of the transfer to the family is cut, where the husband participates in the loss through a higher level of θ_c, recalling the assumption that the impact of income changes is never reversed by a higher bargaining weight of the husband. Thus, if the father chooses to continue working anyway, the daddy months rule harms such a family. Conversely, utility of the husband increases if daddy months are chosen anyway. This is true because the reallocated family alllowance will be compensated only partially through a higher transfer from husband to wife. For those fathers who switch to take daddy months because of the introduction of the ruling, it is not obvious at the outset whether or not the regime change has a beneficial or harmful impact in terms of resulting utility.

For understanding potential conflicts of interests in the family, it is important to know under which circumstances the wife prefers that daddy months are taken. Her preference ordering will depend on whether or not a daddy months rule is is place. At any given ruling, the wife prefers that daddy months are taken iff

$$w_d^f + \theta_d - \left(w_c^f + \theta_c\right) \geq 0, \tag{22}$$

that is, iff the sum of her net wage and the intrafamily transfer does not decrease. This can be rearranged to arrive at

$$w_d^f - w_c^f \geq \theta_c - \theta_d, \tag{23}$$

or, after inserting the bargaining formula,

$$\begin{aligned} w_d^f - w_c^f &\geq (1-\lambda_c)\Omega_c - (1-\lambda_d)\Omega_d \\ &= \Omega_c - \Omega_d + \lambda_d\Omega_d - \lambda_c\Omega_c \\ &= \left[w_c^m + w_c^f + \beta^f\right] - \left[z + w_d^m + w_d^f + b\right] \\ &\quad -\lambda_c\left[\Omega_c - \Omega_d\right] - (\lambda_c - \lambda_d)\,\Omega_d \\ &= (1-\lambda_c)\left[\Omega_c - \Omega_d\right] - (\lambda_c - \lambda_d)\,\Omega_d. \end{aligned} \tag{24}$$

Thus, the bargaining weights and their changes clearly matter for the comparison. Notice that the weight of the husband satisfies $\lambda_c > \lambda_d$. The criterion always holds if the compensating transfer is sufficiently small, that is, if λ is high enough. The daddy months rule works as follows. It introduces the father's benefit $b^m > 0$, it reduces Ω_c by b^m, and it does not change Ω_d. As a consequence, both bargaining weights λ_c and λ_d rise. Thus, the transfer in case of continued work θ_c will necessarily fall, while the change of the bargaining weight also has a negative impact on θ_d. Unless the fall in the bargaining weight $1 - \lambda_d$ is too strong, an already existing preference for daddy months in the absence of a daddy months rule may be strengthened if that is implemented.

We now need to show under which circumstances a disagreement occurs, such that in the absence of a daddy months rule the husband prefers continued work while the wife prefers that daddy months are taken.

3.3 Fertility

Given the specification of the model and the bargaining process, utility of wife and husband when remaining childless are given by u_0^f and u_0^m, respectively, where the transfer θ_0 reflects the division of the marriage surplus $\gamma^f + \gamma^m$. Having a child requires that expected utility levels of both husband and wife increase.

The husband agrees to have a child iff

$$\max\left\{w_c^m - \theta_c, w_d^m + z + \beta^m - \theta_d\right\} + x^m \geq w_o^m - \theta_o. \tag{25}$$

The wife's choice is contingent on the expected future behavior of her husband. She agrees to have a child

(i) given that the husband's contingent optimum is to continue working iff

$$w_c^f + x^f + \beta^f + \theta_c \geq w_o^f + \theta_o, \tag{26}$$

(ii) given that the husband's contingent optimum consists in taking daddy months iff

$$w_d^f + x^f + \beta^f + \theta_d \geq w_o^f + \theta_o. \tag{27}$$

Should the wife prefer that daddy months are taken to continued work, there are wage parameter sets under which she is willing to have a child only if a daddy months rule is implemented. Due to our assumptions, $\lambda_c > \lambda_o$ in combination with $\Omega_c > \Omega_o$ ensures that the husband is always in favor of having a child. Thus:

Proposition 2 *The wife agrees to have a child only if the husband prefers to take daddy months iff* $\left(w_o^f - w_d^f\right) + (\theta_o - \theta_d) < x^f + \beta^f < \left(w_o^f - w_c^f\right) + (\theta_o - \theta_c)$ *.*

Proof. Expecting that the husband's contingent optimum is to continue working, the wife disagrees to have a child iff

$$w_c^f + \theta_c < w_o^f + \theta_o - x^f - \beta^f, \tag{28}$$

which is equivalent to

$$w_o^f - w_c^f + \theta_o - \theta_c > x^f + \beta^f. \tag{29}$$

Expecting that the husband's contingent optimum is to take daddy months, the wife prefers to have a child iff

$$w_d^f + \theta_d \geq w_o^f + \theta_o - x^f - \beta^f, \tag{30}$$

which is equivalent to

$$w_o^f - w_d^f + \theta_o - \theta_d \leq x^f + \beta^f. \tag{31}$$

Neglecting equalities, the claim follows directly from comparing (29) and (31). □

Notice that the relevant inequalities can exhibit either sign. The situation described in the proposition arises when the sum of the benefit β^f and the immaterial utility from having a child x^f exceeds the sum of wage and transfer losses under taking daddy months, but at the same time fall shorts of the sum of wage and transfer losses with continued work. The interesting consideration is under which circumstances the wife prefers daddy months taken to continued work. Recalling that the right-hand sides of (29) and (31) are identical, this will hold iff

$$w_d^f - w_c^f > \theta_c - \theta_d, \tag{32}$$

that is, if the female wage differential is not compensated by the transfer differential. While the assumptions generally ensure $w_d^f - w_c^f \geq 0$ and $\theta_c - \theta_d > 0$, the levels and changes of the bargaining weights prove to be decisive. With low male bargaining weights λ_c and λ_d, inequality (32) is generally violated because aggregate surplus is highest with continued work. Conversely, a sufficiently strong wage increase $w_d^f - w_c^f > 0$ in combination with high male bargaining weights λ_c and λ_d guarantee that (32) holds. Finally, a smaller bargaining weight differential $\lambda_c - \lambda_d$ makes (32) more likely to hold.

4 Impact on welfare

The impact of introducing a daddy months rule on the relative attractiveness of daddy months is as follows. The aggregate surplus Ω_c is reduced, and the male bargaining power coefficient λ_c rises due to the cut in the maternal benefit β^f. At the same time, Ω_d is unchanged, while λ_d increases. Both terms on the RHS of (32) decline.

Proposition 3 *Implementing a daddy months rule can increase fertility and welfare of husband and wife.*

Proof. Suppose all couples are identical. Moreover, let conditions (29) and (31) hold such that the wife agrees to have a child only if a daddy months rule is in place. Finally, let wages and bargaining weights be structured that the husband will take daddy months rather than continue working only if a daddy months rule is implemented. Hence, we have $u_o^m < u_d^m < u_c^m$ without and $u_o^m < u_c^m < u_d^m$ with the daddy months rule and $u_c^f < u_o^f < u_d^f$ in either case. In that event, the daddy months rule changes the equilibrium from a no-child scenario to giving birth with taking daddy months. Comparing these equilibria immediately reveals that utility levels of both husband and wife increase. □

Proposition 3 is our key result. The introduction of a daddy months clause induces the husband to take daddy months upon becoming father. Foreseeing this consequence, the wife can agree to have a child. Through this mechanism, the family overcomes a hold-up problem. An unconditional reallocation of the subsidy from husband to wife would not achieve the goal because it simply weakens the distributional position of the wife in any allocation with having a child. Her disadvantage from introducing the daddy months clause in bargaining when the daddy months are taken is more than offset by being able to avoid the continued work regime in which her bargaining power is particularly low.

It should be noted that a daddy months clause may decrease welfare of cooperative couples. Such couples can simply choose the option with the highest aggregate payoff and use side payments so as to achieve a Pareto improvement on any reference allocation. If having a child with continued work of the husband promises the highest aggregate payoff, such a couple is harmed by moving to daddy months.

Proposition 4 *Introducing a daddy months rule can reduce fertility and welfare of husband and wife.*

Proof. Suppose all couples are identical. Moreover, let these couples prefer to have a child with continued work to not having a child. Let having a child combined with daddy months always be the least preferred option of both husband and wife irrespective of a daddy months rule. Hence, we have $u_d^m < u_o^m < u_c^m$ and $u_d^f < u_o^f < u_c^f$. Finally, let wages and bargaining weights be structured such that at least one of the partners no longer agrees to having child with a daddy months rule in place, for example $u_o^f > u_c^f > u_d^f$. In that event, the daddy months rule changes the equilibrium from continued work scenario with a child to the no-child regime. Comparing these equlibria reveals that utility levels of both husband and wife decrease. □

The scenario that daddy months reduce fertility can easily arise due to the induced change of preferences of the wife, where lower resources of the family in case of continued work are accompanied by a deterioration of her bargaining power. It should also be noted that a daddy months paradox may occur in a general equilibrium perspective. Though at given tax payments both husband and wife fare better under the daddy months rule, this may no longer hold when the tax payments are endogenous.

Proposition 5 *While implementing a daddy months rule can increase fertility and welfare of husband and wife at given tax rates, it may reduce welfare under endogenous taxation.*

Proof. Suppose all couples are identical. Consider again the specifications of Proposition 3 where conditions (29) and (31) hold such that the wife agrees to have a child only if a daddy months rule is in place. Again, let wages and bargaining weights be structured that the husband will take daddy months rather than continue working only if a daddy months rule is implemented. Thus, the daddy months rule changes the equilibrium from a no-child scenario to giving birth with taking daddy months. However, the joint payoff advantage of the couple may fall short of the tax payments. Hence, we may have $0 < \Omega_d - \Omega_o < b$, or $x^m + x^f + z - \left(w_o^m + w_o^f - \left[w_d^m + w_d^f\right]\right) < b$. In that event, an allocation of lump-sum taxes to husband and wife exists, such that the couple fares worse under the daddy months rule than in a no-child equilibrium without having to finance child benefits. □

Of course, the daddy months paradox proposition has to be taken with caution. If in such a homogenous household setting people have rational expectations, they will never support a family policy based on daddy months. However, deviating from such a see-through assumption to some extent seems plausible, as voters may mainly perceive their advantage from having a daddy months rule at given tax payments.

5 An example

It seems useful to illustrate the results by means of a numerical example. In particular, it may be doubted whether the scenario of the wife's preferences and equilibrium outcomes envisaged in Propositions 2 and 3 can arise under reasonable parameters.

Let the wage of a childless male partner be $w_o^m = w_c^m = 12$, where taking daddy months is associated with a reduction of the wage of the husband to $w_d^m = 11$. Let the wage of a childless wife be $w_o^f = 10$, which is reduced upon motherhood with continued work of the husband to $w_c^f = 8$ and with daddy months taken to $w_d^f = 8.5$ - say due to earlier return to work. Furthermore, let taxes be $T^m = 2$; $T^f = 1$. Moreover, the benefit schedule is $b = 1$ without the daddy months rule, while $b^f = 0.6$ and $b^m = 0.4$ if a daddy months rule is in place. Immaterial benefits of children and taking daddy months are given by $x^m = x^f = 1$ and $z = 0.5$. Thus, excess aggregate surplus levels over the no-child situation are $\Omega_c - \Omega_o = 2 + 1 - 2 = 1$ under continued work without dmr, $\Omega_c^d - \Omega_o = 2 + 0.6 - 2 = 0.6$ under continued work with dmr in place, and $\Omega_d - \Omega_o = \Omega_d^d - \Omega_o = 2 + 0.5 + 1 - 2.5 = 1$ with daddy months rule and daddy months taken regardless of the implementation of the daddy months rule. Total surplus levels are $\Omega_o = 22$, $\Omega_c = 23, \Omega_c^d = 22.6$, and $\Omega_d = \Omega_d^d = 23$.

Under these circumstances, threat point utilities are $\overline{u}_o^m = 10$, $\overline{u}_o^f = 9$, $\overline{u}_c^m = \overline{u}_c^{md} = 10.5, \overline{u}_c^f = 8.5, \overline{u}_c^{fd} = 8.1, \overline{u}_d^m = 9.5, \overline{u}_d^{md} = 9.9, \overline{u}_d^{fd} = 8.6$, $\overline{u}_d^f = 9$. Let marriage surplus levels be given by $\gamma^m = 2$ and $\gamma^f = 1$.

A typical scenario may look as follows. Without a child, let the husband's share be $\lambda_o = .5$, derived from a net income ratio $y_o^m / y_o^f = 10/9$ and threat point utilities $\overline{u}_o^m = 10$, $\overline{u}_o^f = 9$. The resulting transfer is $\theta_o = 1$, associated with utility levels $u_o^m = u_o^f = 11$.

Without the daddy months rule and continued work after birth, let the husband's share be $\lambda_c = 12.1/23$, derived from a net income ratio $y_c^m / y_c^f = 10/8 = 5/4$ and threat point utilities $\overline{u}_c^m = 10.5$, $\overline{u}_c^f = 8.5$. The resulting transfer is $\theta_c = 0.9$, associated with utilities $u_c^m = 12.1, u_c^f = 10.9$.

When taking daddy months without the dmr, the husband's share is $\lambda_d = 11.4/23$, derived from a net income ratio $y_d^m / y_d^f = 9/8.5 = 18/17$ and threat point utilities $\overline{u}_d^m = 9.5$, $\overline{u}_d^f = 9$. The resulting transfer is $\theta_d = 1.1$, associated with utility levels $u_d^m = 11.4, u_d^f = 11.6$. Since the husband would prefer continued work upon becoming father, the couple stays childless in equilibrium.

With a daddy months rule in place, and continued work after birth, let the husband's share be $\lambda_c^d = 11.94/22.6$, derived from a net income ratio $y_c^{md} / y_c^{fd} = 10/7.6$ and threat point utilities $\overline{u}_c^{md} = 10.5$, $\overline{u}_c^{fd} = 8.1$. The resulting transfer is $\theta_c^d = 1.06$, associated with utilities $u_c^{md} = 11.94, u_c^{fd} = 10.66$.

Finally, with dmr in place and daddy months taken, the husband's share is $\lambda_d^d = 11.95/23$, derived from a net income ratio $y_d^{md} / y_d^{fd} = 9.4/8.1 = 94/81$ and threat point utilities $\overline{u}_d^{md} = 9.9$, $\overline{u}_d^{fd} = 8.6$. The resulting transfer is $\theta_d^d = 0.45$, associated with utility levels $u_d^{md} = 11.95, u_d^{fd} = 11.05$. Consequently, the daddy months rule induces an equilibrium with positive fertility and daddy months taken.

The example features the properties $\lambda_d < \lambda_o < \lambda_c$ and $\lambda_o < \lambda_d^d < \lambda_c^d$, that is, the share of the husband is always highest under continued work regardless of the daddy months rule. At the same time, his power increases at given behavior when a daddy months rule is implemented, $\lambda_c^d > \lambda_c$ and $\lambda_d^d > \lambda_d$. Since in this example the maximum surplus of the scenarios with the child just offsets the family benefits, a slight adaptation, say by reducing immaterial benfits of having a child by 0.01, may already give rise to the daddy months paradox described in Proposition 5.

6 Conclusions

We have shown that implementing a daddy months rule can be justified as an efficiency enhancing device. It may help potential fathers to credibly commit to keep the balance of power within the family after birth. As a hold-up problem is likely to exist, this may be overcome by setting incentives for withdrawing from the labor market for some time, reducing the deficit in earnings of the wife relative to the husband.

We have neglected behavioral, sociological and political economy explanations for daddy months rules. For example, it may be the case that the government is trying to change the pattern of child care and labor supply in the family. This may arise as a voting outcome if it is supported by a majority of young voters being directly affected by the reform while the old generation having brought up families under a traditional social norm remains neutral in the vote. Moreover, political support can further increase if long-term labor supply effects have a lasting positive impact on government revenue.

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