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## INTRAFAMILY DISTRIBUTION AND TAXATION

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**U**NDER WHAT CIRCUMSTANCES MIGHT A CHANGE in the personal income tax schedule adversely affect spouses? This paper provides a discussion of the bargaining approach to household decisionmaking and then summarizes the results of Gugl (2004c), in which I analyze the impacts of personal income tax reform on the welfare of both spouses.

The question of whether joint or individual taxation is the best way to tax couples has received much attention in the literature. Apps and Rees (1999a, b) and Piggott and Whalley (1996) look at this problem from an efficiency point of view, but Apps and Rees (1999b) also address inter-household distribution. Wrede (2003) is concerned with the welfare of spouses within the same family and finds both spouses prefer income splitting to individual taxation, but women who contemplate marriage and are not yet married might benefit from individual taxation in their future marriage. Gugl (2004a, b, c) shows that even within marriage spouses might prefer different forms of family taxation.

Pollak (2004) discusses how bargaining models of the family might address the issue of family taxation. He emphasizes the importance of household production and the possibility of renegotiation within marriage. Gugl (2004a, b, c) can be seen as a formal investigation into the issues Pollak (2004) has raised in his prolegomenon.

Gugl (2004c) is more comprehensive in terms of different specifications of timing of household decisionmaking and threatpoints than Gugl (2004a, b), but focuses on a simpler model than that work in terms of the specifications of spouses' utility functions and household production. The justification is tractability and the argument that the timing of household decisions and specifications of threatpoints matter even if the model is the same in every other aspect.

I find the timing of decisions is crucial: if spouses bargain over lifetime utility, they will always agree on the tax schedule for married people. If, on the other hand, spouses renegotiate the marriage contract at the beginning of the second period

("period-by-period bargaining"), spouses may disagree on the most preferred tax schedule regardless of whether they use a threatpoint determined by divorce or non-cooperative marriage.

The paper first discusses the family bargaining approach to household decisionmaking, then introduces the building blocks of the model presented in Gugl (2004c), and then summarizes the results of Gugl (2004c) and concludes.

### THE FAMILY BARGAINING APPROACH

Manser and Brown (1980) and McElroy and Horney (1981) were the first to apply cooperative bargaining theory to the family. Family bargaining models acknowledge the individual as the elementary unit of decisionmaking and take account of the fact that observed behavior of a multi-person household must have emerged from some decisionmaking process within the family.<sup>1</sup> In family bargaining models, we need to specify each family member's utility function and the utility each family member could get if bargaining breaks down. We can think of this as a minimum claim of each family member to family resources: Nobody should be worse off by cooperating with the others than by non-cooperating. Next, we identify allocations given the family's resource and technological constraints that would leave all family members at least as well off as in the case of non-cooperation. That is, we identify the gains from cooperation. Some of these points will be Pareto efficient (they are on the utility possibility frontier), and a bargaining solution will pick one among these points. A bargaining solution, therefore, depends on each family member's utility in non-cooperation ("threatpoint"). (Different threatpoint specifications are discussed below in more detail.) Note that in the models of cooperative bargaining, non-cooperation will never be the outcome because the bargaining solution makes sure that all members find it in their best interest to cooperate.

Family bargaining models typically assume that spouses have equal bargaining weights: This means that if we switch spouses' utility functions and threatpoints, person 1 ends up with person 2's utility and person 2 ends up with person 1's utility

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using the same bargaining solution as before. If everything else stays the same and the threatpoint shifts in favor of one family member, then this person will be better off and another family member will be worse off under the same bargaining rule. A person's threatpoint, therefore, determines his or her bargaining power within the household.

While the earlier family bargaining models were essentially static models, recently developed family bargaining models (e.g., Wells-Maher, 1996; Ligon, 2000; Pavoni, 2000; Aura, 2001; Basu, 2001; Lich-Tyler, 2001) incorporate more than one period. Although family members repeatedly interact with each other, they do so in a changing environment. Typically, their decisions on how much time they want to spend in home production and employment in one period impact not only the family budget constraint (and, therefore, the utility possibility frontier) in the next period but also their bargaining power in the next period. Thus, family members fear that a person whose threatpoint increases over time might take advantage of his or her increased bargaining power by demanding a higher share of family resources than previously negotiated. As renegotiation becomes possible, family members' decisions will no longer lead to intertemporal efficiency. Period-by-period bargaining will not lead to non-cooperation either. Family members will find it in their best interest to cooperate to some extent and thereby generate allocations in which each family member will be better off than in non-cooperation, but full cooperation of a family member in one period might hurt the member in the next. Both versions of family bargaining models have in common that family members will never find themselves in their threatpoint. Gugl (2004c) discusses how full or partial cooperation in a marriage that lasts for two periods may occur depending on when spouses bargain with each other.

#### Threatpoints

Manser and Brown (1980) and McElroy and Horney (1981) focus on the utility of both spouses when divorced as the threatpoint in family bargaining. In contrast, Lundberg and Pollak (1993) argue that if people are already married and then face a bargaining problem, due to high costs associated with divorce or gains from the consumption of family public goods, spouses' threatpoint should be determined by the utility that a so-called non-cooperative marriage yields for each spouse.

Lundberg and Pollak (1993) suggest that in a non-cooperative marriage spouses might retreat to a division of labor sanctioned by gender roles, calling this approach "separate spheres bargaining." This would lead to inefficient amounts of the household public good and, therefore, gains of cooperation in marriage exist, but may also generate utility for both spouses well above their utility in divorce. As an alternative to "separate spheres bargaining," one might think of a situation in which both spouses contribute privately to the household public good and the amount of the household public good is determined by a Nash equilibrium (see, e.g., Woolley, 1988; Konrad and Lommerud, 2000). Gugl (2004c) extends Gugl (2004b) to allow for such a threatpoint as an alternative to the divorce threatpoint.

#### THE TWO-PERIOD MODEL

We focus on a model in which two people, one with a lower initial wage rate, denoted "wife," and another with a higher wage rate, denoted "husband," bargain over their utility in marriage. There are two periods, in each of which spouses generate family income and a household public good. The household public good in each period is produced with the time inputs of both spouses. Spouses can either earn income through employment or work in household production.<sup>2</sup> For simplicity, we assume that the time of one spouse is a perfect substitute for the time of the other spouse in household production.

I assume that both spouses have the same utility function over private consumption financed by a spouse's share of family income and the household public good<sup>3</sup> because I want to understand how a difference in wage rates might impact the preference for a certain family tax schedule rather than a difference in tastes. The price of the private consumption good is equalized to 1 for both spouses.

Since this paper focuses on tax reform, we next turn the discussion of the assumptions to wage rates and the way we model tax reform. Two other crucial features of the model are the timing of household bargaining and the specification of threatpoints. The form of the utility function for both spouses plays a crucial role in the tractability of results in this model and is also discussed below.

#### Net Wage Rates and Tax Rates

Although education determines to a large extent a person's wage rate, continuous human capital

investment through training on the job is very important in increasing one's wage rate over time. The model captures this aspect of wage rate increase by assuming that the wage rate in the second period increases linearly in the hours spent in employment in the first period. It is also assumed that the wife always earns a lower net wage rate than the husband, no matter how much she works in the first period to increase her second-period wage rate.

This implies that with individual taxation the wife would be taxed at a lower marginal tax rate than the husband, if the husband works no less than she does. For joint taxation, this means that the wife as the secondary earner is facing a tax rate on her first dollar earned that the husband faces on his last dollar earned.

Because the focus is on one household only, I abstract from tax revenue neutral tax reform. As Apps and Rees (1999b) point out, there are many different households where spouses earn different wage rates to different degrees. Only if we capture this heterogeneity of households, tax revenue neutral tax reform becomes meaningful. Since no real household is likely to be equal to the average household, tax reform will not be tax revenue neutral for any specific household and households may, therefore, gain or lose with tax reform depending on their relative position to the average household.

#### Quasilinear Utility or Transferable Utility

Gugl (2004c) makes the following assumptions: (1) Spouses' preferences in each period are quasilinear in the private consumption good. Thus, demand for the household public good doesn't have an income effect, and whenever the opportunity cost of household production goes up, less of the household public good is produced. (2) Spouses' intertemporal utility is given by the sum of the utilities in both periods, and saving or borrowing is not possible.

While limiting with respect to preferences, the assumptions of linear (or quasilinear) and identical utility functions for both spouses, and that both spouses face the same prices, yield a linear utility possibility frontier with slope equal to one, which has the advantage that the most often used bargaining solutions, the Nash Bargaining solution and the Kalai-Smorodinsky solution, coincide. They both have a nice interpretation in this case: they split gains from cooperation equally between spouses. This implies that the spouse with the higher threat-

point ends up with a higher utility in marriage than the spouse with the lower threatpoint.

#### Timing of Decisions

Gugl (2004c) focuses on two different timeframes for the decisions of the spouses: In the first case, termed "bargaining over life-time utility," spouses can make binding agreements at the beginning of marriage about their labor supply in marriage. Once labor supply in both periods is chosen, intertemporal gains from marriage are divided equally.

In the second case, termed "period-by-period bargaining," spouses cannot make a binding agreement at the beginning of marriage. Both spouses know that once labor supply is chosen in each period, they will split gains from cooperation equally in each period.

#### Threatpoints

If spouses bargain over lifetime utility, they use their lifetime utility of being single as a threatpoint. Spouses ask themselves: How well off would I be had I not married at all?

We assume that the household public good is not available if single and both spouses will, therefore, maximize their intertemporal utility if they remain single by working full-time in both periods. The threatpoint is determined by one's own first and second period wage and the tax schedule for singles, while the labor supply during marriage has no impact on the threatpoint of either spouse.

If spouses bargain each period, two alternative threatpoints come to mind. First, spouses can consider how well off they would be if they do not get married in the first period and if they get divorced in the second period. The threatpoint in the first period is given by the net wage when single and does not depend on labor supply during marriage. In the second period, the threatpoint depends on first period labor supply during marriage because this in turn determines the second period wage rate. In each period, the threatpoint also depends on the tax schedule of singles.

Alternatively, rather than getting divorced in the second period, spouses can live in a non-cooperative marriage where they still benefit from the consumption of the household public good, but they will privately contribute to the household public good and finance their private consumption with their own net wages (e.g., Woolley, 1988; Konrad and Lummerud, 2000.) This means the utility of

each spouse in a non-cooperative marriage in the second period depends on the labor supply during marriage in the first period through its impact on the second period wage rate.

The tax schedule that spouses face during marriage also has an impact on each spouse's threatpoint when determined by non-cooperative marriage. The appropriate amount of taxes, however, that each spouse should pay in non-cooperative marriage is not obvious when the government uses joint taxation for spouses. Pollak (2004) argues that the utilities in non-cooperative marriage should not depend on the joint taxation schedule for couples and instead spouses would use an alternative tax schedule (i.e., filing separately as a couple). I assume that spouses file jointly in non-cooperative marriage because the couple can always decrease its tax liability by filing jointly under the current U. S. system. Even if the couple disagrees about other issues in marriage, it seems plausible that they would agree on minimizing the amount of taxes they have to pay. While to be on the utility possibility frontier it is clear that the spouse with the lower wage rate will be the secondary earner, in non-cooperative marriage spouses do not benefit from the other spouse's earnings and so each of them might claim to be the primary earner. Inspired by the idea of sanctioned gender roles advocated in the separate spheres bargaining model by Lundberg and Pollak (1993), one might argue that the husband may still be considered the primary earner of the family, and so would get a first mover advantage in choosing his labor supply first and get the benefit of lower marginal tax rates. If the husband moves first, he would always choose to work full time, knowing that the wife as the second mover will contribute a positive amount of time to the household public good.<sup>4</sup>

## RESULTS

Due to the assumption that spousal time inputs are perfect substitutes in household production, the husband always finds it in his best interest to work full-time, while the wife divides her time in both periods between employment and household production regardless of whether spouses bargain over lifetime utility or engage in period-by-period bargaining. Note that compared to the bargaining problem over lifetime utility, the first-period labor supply in period-by-period bargaining now also depends on the determinants of the second-period

threatpoint. This introduces an additional positive effect of first period labor supply on the wife's second-period utility and decreases the amount of time the wife is willing to spend in household production. Compared to intertemporal efficiency, less household public good is produced.

### Tax Schedule for Singles Changes

In bargaining over lifetime utility, the tax schedule of singles only plays a role in the threatpoint, but not in determining the gains from cooperation. If one person's tax rate goes up while the other one's goes down (an increase or decrease in the progressivity of the tax schedule), the spouse whose threatpoint goes up benefits and the spouse whose threatpoint goes down loses.

In period-by-period bargaining, tax rates for singles will have a different impact on the gains from marriage depending on whether the second-period threatpoint depends on them or not. If the second-period threatpoint depends on the tax rates of singles (in case of the divorce threatpoint), a decrease in the tax rate for the wife when divorced will give her a higher marginal benefit from increasing her first-period labor supply, and the level of household public good will decrease. This decreases the utility of the husband because he will consume less of the household public good, and at the same time his bargaining power in the second period decreases compared to the wife's, leaving him with a smaller relative share of family income. A change in the tax schedule for the husband when divorced will not change the amount of household public good or family income (he is always at a corner solution), but will impact intrafamily distribution (see Gugl, 2004b).

If threatpoints are determined by non-cooperative marriage in the second period, a change in the tax rate for singles only changes intrafamily distribution through the change in the first period threatpoint, but will not change the gains from marriage as a whole.

### Tax Rates for Couples

A change in the tax rate for couples will always have an impact on the amount of the household public good and of family income because the prices that the household faces change with a change in the marginal tax rates of couples.

In the case of bargaining over lifetime utility, this is the only change, since the first-period labor supply of spouses does not depend on their threatpoint

in the second period. Whenever the utility possibility frontier shifts parallelly outward or inward due to a change in the tax rate for couples, both people gain or lose with tax reform.

In period-by-period bargaining, a change of tax rates, because it induces the wife to change her labor supply as her opportunity cost of time changes, also has an impact on her second-period threatpoint, even if the threatpoint is taken to be divorce. Gugl (2004b) shows that the wife's utility may increase when her marginal tax rate decreases and the husband's marginal tax rate increases while the husband's utility may decrease.

If non-cooperative marriage is the threatpoint, the wife has an additional incentive to increase her first-period labor supply because her second-period threatpoint depends on the marginal tax rate during marriage. Again, as with the divorce threatpoint in the second period, the wife's intertemporal utility may increase and the husband's decrease if the marginal tax rate for the wife decreases and the husband's marginal tax rate increases.

### CONCLUSION

Gugl (2004c) analyzes in a simple two-period model of household production and human capital accumulation whether spouses can be adversely affected by tax reform. The point that this paper makes is that we need to pay attention to the timing of decisions in the household when evaluating tax reform. Even in this very simple framework, a change from bargaining over lifetime utility to period-by-period bargaining will change the assessment of tax reform.

### Notes

<sup>1</sup> This is in marked contrast to the unitary model of the household that assumes a household utility function.

<sup>2</sup> Household production (as noted by, e.g., Becker, 1981; Apps and Rees, 1999a and b; Piggott and Whalley, 1996) is a distinct feature of multi-person households and a source of considerable economic gains from marriage through specialization. Family bargaining models have not always considered household production and have focused more on the consumption of household public goods that were purchased in the market. Recently, household production has been incorporated in family bargaining models (see, e.g., Lundberg, 2002; Wrede, 2003).

<sup>3</sup> I abstract from leisure in this model. Introducing leisure as a choice variable further complicates the

analysis, especially if leisure is a private good for each spouse because then spouses face different prices for leisure. In the bargaining literature, authors often choose between focusing on household production or leisure, but not both (see, e.g., Lundberg, 2002; Wrede, 2003; Rainer, 2002; Konrad and Lommerud, 2000; Pavoni, 2002).

<sup>4</sup> This equilibrium requires that the parameters of the model are such that the first order condition for the wife is binding. Because spousal time inputs are perfect substitutes in household production, the husband will not find it in his best interest to contribute to the household public good given the amount of time the wife spends in household production.

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