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Household bargaining and the design of couples' income taxation

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Abstract

The paper studies the design of couples' income taxation when consumption and labor supply decisions within the couple are made in a cooperative way according to some bargaining scheme. Specifically, the couple maximizes a weighted sum of the spouses' utilities. In the first part of the paper, the spouses' bargaining weights (specific to each couple) are exogenously given. In the second part, these bargaining weights are endogenous, and depend on the spouses' respective contributions to total family income. The information structure is the traditional one in Mirrleesian nonlinear income tax models. However, while the household's total consumption is publicly observable, the consumption levels of the individual spouses are *not* observable. The social welfare function is utilitarian. We show that the expression for a spouses' marginal income tax rate includes a "Pigouvian" (paternalistic) and an incentive term. With exogenous weights the Pigouvian term favors a marginal subsidy (tax) for the high-weight (low-weight) spouse, whose labor supply otherwise tends to be too low (high). In some cases both terms have the same sign and imply a positive marginal tax for the low-weight spouse and a negative one for the high-weight spouse.

Keywords: Couples' income taxation, household bargaining, optimal income taxation, household labor supply.

JEL classification: H21, H31, D10

1 Introduction

Family taxation rules continue to differ significantly across countries, and their design remains a widely debated issue. While there appears to be a trend towards more “individualized” tax systems in some countries, like France, the systems remain to a substantial part family-based.

Accounting for the family dimension when studying optimal income taxation thus appears to be highly important. Following the seminal papers by Boskin (1975) and Boskin and Sheshinski (1983) the analysis of optimal family income taxation has traditionally been restricted to the framework of only linear instruments.¹ Nonlinear taxation has been studied by some authors like Schroyen (2003), Brett (2007), Kleven *et al.* (2009) and Cremer *et al.* (2012). One of the major issues underlying all these studies is the appropriate choice of the tax unit. Specifically, it has been examined under which conditions, “extreme” solutions like pure *joint taxation* (the tax function depends only on the sum of family income), or *individual taxation* (the tax paid by the family is the addition of two tax functions each depending only upon one spouse’s income) arise. While the results are often quite complex (due to the multi-dimensional nature of the problem) it appears fair to say that the extreme solutions arise only under very restrictive conditions. In most realistic settings, one can expect the solution to be in between these extreme cases and one obtains a general tax function with the two spouses’ incomes as separate arguments. Marginal income tax rates typically differ between spouses and one spouse’s marginal tax *does* depend on the other spouse’s income.²

The more challenging task is to characterize this general tax schedule and to study the factors which affect the spouses’ relative marginal tax rates. Cremer *et al.* (2012), for instance, take a step in that direction and show that depending on the pattern of

¹Examples are papers by Apps and Rees (1988; 1999) or more recently Kleven (2004), Alesina, Ichino and Karabarbounis (2011), and Bastani (2013).

²More formally, the second order cross derivative of the tax function is not zero.

mating, the celebrated result according to which the spouse with the more elastic labor supply faces the lower marginal tax rate may or may not hold.

While each of these studies has its specific features they are all based on a so called “unitary” view of the couple. In reality, however, household decision making is more likely to result from some more or less complex (and more or less cooperative) bargaining process between spouses. This is often referred to as the collective approach to couples’ decision making.³ Integrating this feature into the tax design is not just an intellectual challenge but also has very practical policy implications. For instance, an argument often used in favor of individual taxation schemes is that joint taxation discourages female labor force participation (as they imply a high marginal tax rate for the secondary earner). Such an argument is clearly at odds with the unitary view of the couple. Underlying this claim is the idea that the induced impact on female labor supply (though compatible with a unitary couple’s utility maximization) is in some way not “desirable”.

This paper takes a step in the direction of integrating a more complex approach to household decision making into the tax design problem. We consider an economy consisting of n types of couples which are characterized by the wage of the male and the female spouse. The mating pattern is such that wages of the female and the male spouses are positively (though not perfectly) correlated. Both spouses have identical preferences over (their individual) consumption and labor supply. Consumption and labor supply decisions within the couple are made in a cooperative way according to some bargaining scheme. Specifically, the couple maximizes a weighted sum of the spouses’ utilities. In the first part of the paper, the spouses bargaining weights (specific to each couple) are exogenously given.⁴ In the second part, these bargaining weights are endogenous and depend on the spouses’ respective contributions to total family income.⁵

³See Chiappori (1988).

⁴This is similar to the objective function used by Immervoll *et al.* (2011) in what they call the collective approach. However, in their setting labor market participation is only decided at the extensive margin (a binary decision between participation and non-participation).

⁵Empirical evidence is, for example, provided by Lise and Seitz (2011).

The information structure is the traditional one in Mirrleesian nonlinear income tax models. Individuals' wages and labor supplies are not publicly observable, but before tax income of each spouse is observable. Consequently, the tax schedule can depend on the income levels of the two spouses which are treated as separate arguments. This includes individual taxation (separable tax function) and joint tax function (only the total household income matters) as special cases. While the household's total consumption is publicly observable,⁶ the consumption levels of the individual spouses are *not* observable. The household's problem is modeled as a two stage optimization process. In the first stage the couple chooses the spouses' levels of labor supply (gross incomes). In the second stage the allocation of net income (gross income minus tax payments) to the consumption of the two spouses is determined. All decisions are made to maximize a weighted sum of spouses' utilities. The same (couple specific weights) are used in both stages.⁷

We determine the (incentive compatible) allocation that maximizes *utilitarian* welfare (the sum of *individual* utilities) under the information structure described above and study its implementation via a nonlinear tax function based on the income levels of a couples' spouses. Our utilitarian specification introduces a paternalistic dimension into the optimal tax problem whenever the female and male spouses have different weights in the couple's bargaining process. In other words, the social objective puts equal weights on *all* individuals. This is different from most of the existing literature where the couple is treated as a "black box" and where social welfare is defined over the utility functions of couples; see for instance Cremer *et al.* (2012).

In the first part of the paper we assume that the couple's bargaining weights are exogenous. The expressions for the optimal marginal tax rates of the spouses then include Pigouvian (paternalistic) terms in addition to the more traditional optimal tax

⁶It is simply equal to gross income minus the tax, both being observable.

⁷Two recent papers, Alesina, Ichino and Karabarbounis (2011), and Bastani (2013) deal with very similar issues, but restrict all instruments to be linear.

(incentive) terms. These Pigouvian terms tend to decrease the marginal tax of the spouse with the highest bargaining weight in the considered couple. If, say, the male spouse has a higher bargaining power the *laissez-faire* solution implies that the husband does not work enough (compared to the utilitarian optimum). This can be corrected through a marginal subsidy on male labor. We show that while the “no distortion at the top result” does not hold, marginal tax rates for the “top” couple (the one with the highest wages to which no incentive constraint is binding) have the same sign as the Pigouvian rates. Consequently, a higher bargaining weight for the male translates into a negative marginal tax rate for the male and a positive one for the female. This is of course at odds with the conventional results *à la* Boskin and Sheshinski (1983) which are based solely on labor supply elasticity.

For all the other (non “top”) couples optimal tax (incentive) terms reappear which may mitigate or even outweigh the Pigouvian terms. As usual, these incentive terms depend on the relative slope of the mimicking and the mimicked couple’s indifference curves in the space of male and female labor supplies. It is the distortion in this space which will reflect the couple’s relative marginal tax rates. In Cremer *et al.* (2012) results were mainly driven by relative (male and female) labor supply elasticities and the wage gap (ratio between wages). In the current paper elasticity differences are assumed away. Wage gaps continue to be relevant but the relative bargaining weights now also enter the picture. For instance, we show that when the bargaining weights of the low-wage spouse increase with wages, Pigouvian and incentive terms go in the same direction. Consequently, when the male spouse has the higher bargaining weight his marginal tax rate will be negative in all couples while all female spouses face a positive marginal tax rate.

In the second part of the paper bargaining weights are endogenous. They are now given by a spouse’s share in the total (gross) family income. The tax policy will then affect these weights through its effects on labor supplies. We first determine the utilitarian

optimum when wages are observable, a benchmark which is helpful for the interpretation of the subsequent results. We also derive the Pigouvian marginal tax rates through which this solution can be decentralized. Then, we again turn to the *second-best* (incentive compatible) allocation and study its implementation through a tax schedule based on spouses' incomes. Results now crucially depend on the spouses' relative wages. While our expressions are very general, we focus our interpretations on the empirically more relevant case where the male spouse has the higher wage, an outcome which occurs in practice even when spouses have similar innate abilities. Intuitively, one would expect that the endogeneity of weights mitigates the results obtained for exogenous weights. In particular, the Pigouvian subsidy on male labor supply that appeared in the expression under exogenous weights may now well be counterproductive because it would further increase the bargaining weight of the male spouse (which was already too large from a utilitarian perspective). However, we show that this conjecture is correct only as long that the male spouse has the higher total utility, a condition that may or may not be satisfied.

In any event, even when this conjecture is correct, it only applies for the Pigouvian terms. For all couples but the top one, the marginal tax rates depend once again on an incentive term. The *structure* of the incentive term resembles that under exogenous weights. In particular, their sign depend on the ratio of the marginal rates of substitution of the considered spouse in the mimicking and in the mimicked couple. We find sufficient conditions under which the indifference curve of the spouse in the mimicking couple is smaller than that of his mimicked counterpart. In that case the incentive term goes in the usual direction and tends to increase marginal tax rates.

Our paper is organized as follows. In Section 2 we first analyze a couple's optimization problem when bargaining weights are exogenously given. The government's optimization problem for this case is described in Section 3. Section 4 shows the couple's and government's optimization problem when weights are no longer exogenous but

are endogenous and depend on a spouse's income share in overall family income. Section 5 offers some concluding remarks while more technical material is relegated to the Appendix.

2 The couple

Consider a population with $i = 1, \dots, n$ couples. The proportion of couple i is π^i . Members of the couple are indexed by the subscript $j = f, m$. Each spouse in couple i supplies ℓ_j^i units of labor earning a wage rate w_j^i . Gross earnings are given by $y_j^i = w_j^i \ell_j^i$. The mating pattern is such that spouses' wages are positively correlated and couples are ordered such that $w_j^i < w_j^{i+1}$. In other words, a higher index refers to a couple in which *both* spouses have a higher wage. Consequently, there is a single level of w_f associated with each level of w_m . The difference in wages between spouses may differ across couples. The utility of a spouse j in a couple of type i is given by

$$U_j^i = u(c_j^i) - v(\ell_j^i),$$

where c_j^i is the consumption of a numeraire (private) good. Assume $u' > 0$ and $u'' < 0$ while labor disutility, v , satisfies $v' > 0$ and $v'' > 0$. Couples act cooperatively, that is, they maximize the weighted sum of spouses' utilities. The weights attached to the female and male member in couple i denoted by α_f^i and α_m^i sum up to two, $\alpha_f^i + \alpha_m^i = 2$. For the time being we assume that these weights, which reflect the bargaining power of each spouse, are *exogenously* given. In the second part of the paper we will suppose that weights are endogenous and depend on relative (gross) incomes. To ensure consistency between the two parts we assume that, when weights are exogenous, a single vector of weights is associated with every vector of wages.⁸

⁸This assumption is not crucial for the first part of the paper. The expressions would remain valid for a more general distribution of weights across couples. However, the determination of the pattern of binding incentive constraints would then be more delicate.

Let I^i denote the household's disposable (after tax) income. For any bundle (I^i, y_m^i, y_f^i) couple i solves

$$\max_{c_m^i, c_f^i} W^i = \sum_{j=f,m} \alpha_j^i \left[u(c_j^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] \quad (1)$$

$$\text{s.t.} \quad \sum_{j=f,m} c_j^i = I^i. \quad (2)$$

Maximization of the above problem leads to the following first order condition (FOC)

$$-\alpha_m^i u'(c_m^i) + \alpha_f^i u'(c_f^i) = 0. \quad (3)$$

This equation, along with the budget constraint (2) defines the male's and female's consumption levels as functions of their family income, $c_m^i(I^i)$ and $c_f^i(I^i)$ with

$$\frac{\partial c_m^i(I^i)}{\partial I^i} = \frac{\alpha_f^i u''(c_f^i)}{SOC} > 0, \quad (4)$$

$$\frac{\partial c_f^i(I^i)}{\partial I^i} = \frac{\alpha_m^i u''(c_m^i)}{SOC} > 0, \quad (5)$$

since the second order condition (SOC) is negative

$$SOC = \alpha_m^i u''(c_m^i) + \alpha_f^i u''(c_f^i) < 0.$$

To simplify notation let us define

$$\hat{u}_j^i(I^i) \equiv u(c_j^i(I^i)) \quad (6)$$

as the indirect subutility of disposable household income for household member j .

Three properties of the couple's optimal allocation of consumption will be useful for our analysis. First, given (I^i, y_m^i, y_f^i) , the optimal allocation of consumption depends only on overall income I^i and on the weights (α_f^i, α_m^i) but not on each spouse's labor supply and gross income (y_m^i, y_f^i) . This is due to the separability of utility. Second, note that

$$\sum_{j=f,m} \frac{\partial c_j^i(I^i)}{\partial I^i} = 1. \quad (7)$$

In words, when a couple's income increases by one dollar so does the sum of their consumption. Third, the welfare change of an income increase for couple i is given by

$$\frac{\partial W^i}{\partial I^i} = \sum_{j=f,m} \alpha_j^i u'(c_j^i(I^i)) \frac{\partial c_j^i(I^i)}{\partial I^i},$$

which using (3) and (7) yields

$$\frac{\partial W^i}{\partial I^i} = \alpha_m^i u'(c_m^i(I^i)) = \alpha_f^i u'(c_f^i(I^i)). \quad (8)$$

3 Government's optimization

Throughout the paper we take a paternalistic approach and consider the utilitarian optimum based on equal weights between husband and wife, $\alpha_f^i = \alpha_m^i \forall i$. The objective function of the government is thus given by

$$\mathcal{W} = \sum_{i=1}^n \pi^i \sum_{j=f,m} \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right]. \quad (9)$$

While the government observes each spouse's (before tax) income y_j^i (and the distribution of types), it does not observe productivities, labor supplies nor the spouses' individual consumption levels. Under the considered information structure the government's instrument consists of a possibly nonlinear income tax scheme $T^i \equiv T(y_f^i, y_m^i)$ which can be positive or negative. This specification includes joint taxation ($T^i \equiv T(y_f^i + y_m^i)$) or individual taxation ($T^i \equiv T(y_f^i) + T(y_m^i)$) as special cases. Observe that while the tax administration knows I^i (which is by definition equal to gross income minus tax payment) it cannot observe how this consumption budget is allocated between two spouses.

3.1 Couple's problem and public policy

To study the implementation of the optimal allocation and its implications for the spouses' respective tax treatments, we first have to revisit the problem of the couple when it faces an income tax schedule $T(y_f^i, y_m^i)$. Using the indirect utility function \hat{u}_j^i

defined by (6) which accounts for the way the couple allocates its disposable income between the spouses, this problem can be stated as follows

$$\max_{I^i, y_j^i} W^i = \sum_{j=f,m} \alpha_j^i \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] \quad (10)$$

$$\text{s.t.} \quad \sum_{j=f,m} y_j^i - T(y_m^i, y_f^i) - I^i \geq 0. \quad (11)$$

The FOCs of the above problem are given by

$$\sum_{g=f,m} \alpha_g^i \hat{u}_g^i(I^i) = \sigma, \quad (12)$$

$$\frac{\alpha_j^i}{w_j^i} v'\left(\frac{y_j^i}{w_j^i}\right) = \sigma \left(1 - \frac{\partial T^i}{\partial y_j^i}\right), \quad (13)$$

where σ denotes the Lagrangean multiplier associated with the couple's budget constraint (11). Making use of (8), equations (12) and (13) can be rewritten as

$$MRS_{I y_j}^i = \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i)} = 1 - T_{y_j}^i \quad \forall i, \quad (14)$$

$$MRS_{y_f y_m}^i = \frac{\alpha_m^i w_f^i v'(\ell_m^i)}{\alpha_f^i w_m^i v'(\ell_f^i)} = \frac{1 - T_{y_m}^i}{1 - T_{y_f}^i} \quad \forall i, \quad (15)$$

where $T_{y_j}^i = \partial T^i / \partial y_j^i$ denotes the marginal tax rate faced by spouse j in couple i . As usual in optimal tax models this characteristic of the tax function tells us in which direction a spouse's labor supply is distorted (for a given indifference curve). This distortion is considered in the consumption-labor supply, that is in (I, y) -space. Distortions between the spouses' respective labor supplies are assessed in (y_f, y_m) -space. When $MRS_{y_f y_m}^i = 1$, labor supplies are chosen in an efficient way, that is to minimize the couple's disutility of labor for a given total (before tax) income.⁹ Expression (15)

⁹Formally this means that (y_f^i, y_m^i) solves

$$\begin{aligned} \min_{y_f^i, y_m^i} \quad & \alpha_f^i v\left(\frac{y_f^i}{w_f^i}\right) + \alpha_m^i v\left(\frac{y_m^i}{w_m^i}\right) \\ \text{s.t.} \quad & y_f^i + y_m^i = I^i, \end{aligned}$$

shows that this distortion is determined by the ratio of 1 minus the marginal tax rates. Specifically, when $T_{y_m}^i > T_{y_f}^i$ we have $MRS_{y_f y_m}^i > 1$ and the tax system encourages the female's labor supply ℓ_f at the expense of the male's labor supply ℓ_m . Interestingly, identical marginal tax rates (even if different from zero) imply that the tradeoff between male and female labor supply is not distorted. This would be for instance the case under a joint income tax schedule, $T(y_f + y_m)$.

3.2 General solution

We now turn to the determination of the optimal incentive compatible allocation. With the considered information structure feasible allocations must satisfy the following incentive constraint

$$\sum_{j=f,m} \alpha_j^i \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] \geq \sum_{j=f,m} \alpha_j^i \left[\hat{u}_j^i(I^k) - v\left(\frac{y_j^k}{w_j^i}\right) \right] \quad \forall i \neq k. \quad (16)$$

That is any type- i couple must be prevented from mimicking any type- k couple. In addition, the resource constraint

$$\sum_{i=1}^n \pi^i \left(\sum_{j=f,m} y_j^i - I^i \right) \geq 0 \quad (17)$$

must hold.

The government maximizes (9) subject to the constraints (16) and (17). The Lagrangian $\mathcal{L}^1 \equiv \mathcal{L}(I^i, y_f^i, y_m^i)$ can be written as

$$\begin{aligned} \mathcal{L}^1 = & \sum_{i=1}^n \pi^i \sum_{j=f,m} \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] + \mu \sum_{i=1}^n \pi^i \left(\sum_{j=f,m} y_j^i - I^i \right) \\ & + \sum_{i=1}^n \sum_{k=1, k \neq i}^n \lambda_{ik} \left\{ \sum_{j=f,m} \alpha_j^i \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] - \sum_{j=f,m} \alpha_j^i \left[\hat{u}_j^i(I^k) - v\left(\frac{y_j^k}{w_j^i}\right) \right] \right\}, \end{aligned} \quad (18)$$

where the total family income I^i is given.

where $\mu > 0$ is the Lagrange multiplier of the resource constraint while $\lambda_{ik} \geq 0$ is the Lagrange multiplier associated with the self-selection constraint from type i to type k , equation (16). The first-order conditions with respect to I^i , y_j^i are given by

$$\begin{aligned} \frac{\partial \mathcal{L}^1}{\partial I^i} &= \pi^i \sum_{j=f,m} \hat{u}_j^i(I^i) \\ &+ \sum_{k=1, k \neq i}^n \lambda_{ik} \sum_{g=f,m} \alpha_g^i \hat{u}_g^i(I^i) - \sum_{k=1, k \neq i}^n \lambda_{ki} \sum_{g=f,m} \alpha_g^k \hat{u}_g^{k'}(I^i) - \mu \pi^i = 0, \end{aligned} \quad (19)$$

$$\frac{\partial \mathcal{L}^1}{\partial y_j^i} = -\pi^i \frac{1}{w_j^i} v'(\ell_j^i) - \sum_{k=1, k \neq i}^n \lambda_{ik} \alpha_j^i \frac{1}{w_j^i} v'(\ell_j^i) + \sum_{k=1, k \neq i}^n \lambda_{ki} \alpha_j^k \frac{1}{w_j^k} v'(\ell_j^{ki}) + \mu \pi^i = 0, \quad (20)$$

where $\hat{u}_j^k(I^i)$ and ℓ_j^{ki} denote utility and labor supply of spouse j in couple k when mimicking spouse j in couple i .

In the Appendix we show that by combining the two FOCs, the marginal rate of substitution between labor and consumption is given by

$$MRS_{Iy_j}^i = \frac{\frac{\pi^i}{\alpha_j^i} \sum_{g=f,m} \frac{u'(c_g^i)}{u'(c_j^i)} \frac{\partial c_g^i}{\partial I^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k}{\alpha_j^i} \frac{u'(c_j^{ki})}{u'(c_j^i)}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k}{\alpha_j^i} \frac{u'(c_j^{ki})}{u'(c_j^i)} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i}}. \quad (21)$$

where c_j^{ki} denotes consumption of couple k when mimicking couple i ; recall that c_g^i , c_j^i and c_j^{ki} are functions of I^i ; see Section 2.

3.3 Optimal tax policy

From the marginal rate of substitution given by equation (21) we can determine the marginal tax rate of the implementing tax function, which from equation (14), is given by $T_{y_j}^i = 1 - MRS_{Iy_j}^i$, so that

$$T_{y_j}^i = 1 - \frac{\frac{\pi^i}{\alpha_j^i} \sum_{g=f,m} \frac{u'(c_g^i)}{u'(c_j^i)} \frac{\partial c_g^i}{\partial I^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k}{\alpha_j^i} \frac{u'(c_j^{ki})}{u'(c_j^i)}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k}{\alpha_j^i} \frac{u'(c_j^{ki})}{u'(c_j^i)} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i}}. \quad (22)$$

As usual in optimal income tax models this expression shows how the marginal tax rate must be set to induce couples to choose the consumption bundle and labor supplies intended for them. This expression is very general and is valid whatever the pattern of binding incentive constraints (*i.e.*, which, if any, of the λ_{ik} 's and λ_{ki} 's are strictly positive). However, the λ_{ik} 's and λ_{ki} 's play a crucial role since the marginal tax rate faced by a specific type depends on the incentive constraints binding to this type and from this type. We will now successively study different configurations starting with the benchmark case where wages are observable. Then, we return to the Mirrleesian information structure with unobservable wages.

3.3.1 Benchmark: observable wages

Let us first study the case where wages are publicly observable implying that the self-selection constraints can be neglected so that $\lambda_{ik} = \lambda_{ki} = 0 \forall i, j$. Note that this does not, in general, yield the first-best utilitarian optimum¹⁰ because spouses' individual consumption levels remain unobservable. Expression (21) then yields the ‘‘Pigouvian’’ tax (subsidy)¹¹

$$T_{y_j}^i = T_{y_j}^{Pi} = 1 - \sum_{g=f,m} \frac{u'(c_g^i)}{u'(c_j^i)} \frac{\partial c_g^i}{\partial I^i}. \quad (23)$$

Using (7) and (8) the Pigouvian tax (subsidy) for the female and male in couple i can be expressed as follows

$$T_{y_f}^{Pi} = 1 - \frac{\alpha_f^i}{\alpha_m^i} \frac{\partial c_m^i}{\partial I^i} - \frac{\partial c_f^i}{\partial I^i} = \left(1 - \frac{\alpha_f^i}{\alpha_m^i}\right) \frac{\partial c_m^i}{\partial I^i}, \quad (24)$$

$$T_{y_m}^{Pi} = 1 - \frac{\alpha_m^i}{\alpha_f^i} \frac{\partial c_f^i}{\partial I^i} - \frac{\partial c_m^i}{\partial I^i} = \left(1 - \frac{\alpha_m^i}{\alpha_f^i}\right) \frac{\partial c_f^i}{\partial I^i}. \quad (25)$$

¹⁰Except when all spouses in all couples have equal weights. To see this, observe that with $\lambda_{ik} = \lambda_{ki} = 0 \forall i, j$, equation (20) implies $\alpha_m^i v' \left(\frac{y_m^i}{w_m^i} \right) / w_m^i = \alpha_f^i v' \left(\frac{y_f^i}{w_f^i} \right) / w_f^i$, while the first-best utilitarian solution requires $v' \left(\frac{y_m^i}{w_m^i} \right) / w_m^i = v' \left(\frac{y_f^i}{w_f^i} \right) / w_f^i$.

¹¹We use the term ‘‘Pigouvian’’ throughout the paper. The tax arises to correct for a difference in social and private welfare. Alternatively, it could be referred to as paternalistic.

Since $\partial c_j^i / \partial I^i \geq 0$ we have

$$T_{y_f}^{Pi} \underset{\geq 0}{\leq} 0 \quad \Leftrightarrow \quad \alpha_f^i \underset{\geq 0}{\geq} \alpha_m^i, \quad (26)$$

$$T_{y_m}^{Pi} \underset{\geq 0}{\leq} 0 \quad \Leftrightarrow \quad \alpha_f^i \underset{\geq 0}{\leq} \alpha_m^i. \quad (27)$$

In words, the spouse with the *lower* bargaining weight faces a marginal *tax* on labor supply while the spouse with the *higher* bargaining weight faces a marginal *subsidy* on labor supply. The intuition behind this result is as follows. The spouse with the lower bargaining weight receives a smaller share of the cake (the common income I^i) implying a lower consumption (and thus a higher marginal utility of consumption). In the *laissez-faire*, this negative income effect in turn increases this spouse's labor supply (above the optimal level that would arise for equal weights). The opposite holds for the spouse with the higher bargaining weight. Roughly speaking, the spouse with the low bargaining weight works too much while the one with the high bargaining weight does not work enough. The Pigouvian tax (subsidy) corrects for these non-optimal labor supply decisions. Observe that when the male spouse has a higher weight, his *marginal* tax rate will be negative (his labor supply is subsidized). This may be surprising at first since he has a lower weight in the welfare function than in the couple's utility. So we do not expect him to be subsidized. However, the subsidy applies only to the *marginal* tax rate; it will increase his labor supply and thus his contribution to the common household budget.

3.3.2 Second-best tax policy

We now return to the original second-best problem where wages are not publicly observable. Consider first a “top” couple, that is a couple whom nobody mimics. Formally, we consider a couple with index i so that $\lambda_{ki} = 0 \quad \forall k$, but where $\lambda_{ik} > 0$ for at least one k . Since couples are indexed according to increasing wage levels and the welfare function is utilitarian, we can expect this to be the couple with the highest wages. Using

the definition of the Pigouvian tax (23) and setting all $\lambda_{ki} = 0$, equation (21) can be rewritten as

$$T_{y_j}^i = 1 - \frac{\frac{\pi^i}{\alpha_j^i} \left(1 - T_{y_j}^{Pi}\right) + \sum_{k=1, k \neq i}^n \lambda_{ik}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik}} = \frac{\frac{\pi^i}{\alpha_j^i} T_{y_j}^{Pi}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik}}. \quad (28)$$

If in this couple the bargaining power is equally divided so that $T_{y_f}^{Pi} = T_{y_m}^{Pi} = 0$ both spouses face no distortion since then $T_{y_j}^i = 0$. If, however, the bargaining power is unequally distributed, we have $|T_{y_j}^i| < |T_{y_j}^{Pi}|$ implying a lower tax (subsidy) than the Pigouvian one. In other words, the “no distortion at the top” result no longer holds. A similar result is obtained by Cremer and Roeder (2013) when individuals are myopic. Myopia justifies a social objective different from the private one which gives rise to a Pigouvian *subsidy*. While the current setting is more complicated in that the Pigouvian tax can be positive or negative, the intuition behind the result remains essentially the same. A distortion is optimal even for the top couple because the consumption and labor supplies are weighted differently in the incentive constraint than in the social objective. This opens the door for relaxing incentive constraints by not restoring a first-best tradeoff for this couple.

Now consider a spouse who is not part of the “top” couple. For such a couple the optimal tax rate is

$$T_{y_j}^i = 1 - \frac{\frac{\pi^i}{\alpha_j^i} \left(1 - T_{y_j}^{Pi}\right) + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki})}{\alpha_j^i u'(c_j^i)}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki})}{\alpha_j^i u'(c_j^i)} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i}}. \quad (29)$$

This expression includes a Pigouvian term and “incentive” terms, that is terms which reflect the impact of the tax policy on the incentive constraints. To get a more precise understanding of the structure of these incentive terms and their interaction with the Pigouvian term, we can rearrange equation (29) to obtain the following condition

$$T_{y_j}^i \leq 0 \iff \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki})}{\alpha_j^i u'(c_j^i)} \left(\frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i} - 1 \right) \geq \frac{\pi^i}{\alpha_j^i} T_{y_j}^{Pi} \quad (30)$$

In words, the sign of the marginal tax rate depends on the relative magnitude of the Pigouvian term (the last term) and the incentive term (the first term in the second inequality of 30). In standard optimal taxation models the marginal rate of substitution of the mimicker (couple ki) is always smaller than that of the mimicked (couple i), as long as only downward incentive constraints are binding.¹² In our setting, things are more complicated because marginal rates of substitution depend on (unobservable) consumption levels which, in turn, depend on the spouses' weights.

To interpret condition (30), assume first that weights are the same across couples. In other words, all females have the same weight and so do all males. If these weights are equal to one, the Pigouvian term, $T_{y_j}^{Pi}$, is equal to zero and the sign of the marginal tax, $T_{y_j}^i$, depends only on the way it affects binding incentive constraints. We have $T_{y_j}^i > 0$ if binding incentive constraints are from high-wage to low-wage couples since with $\alpha_j^k = \alpha_j^i = 1$, we have

$$MRS_{Iy_j}^{ki} / MRS_{Iy_j}^i < 1 \quad \Leftrightarrow \quad w_j^k > w_j^i. \quad (31)$$

This is pretty much the standard result obtained in Mirrleesian models.

Now assume that weights differ between genders, but that the weight of a given gender is the same in all couples $\alpha_j^i = \alpha_j \forall j, i$. Then, we effectively have both Pigouvian and incentive terms. The incentive term (LHS) calls for positive taxation while the Pigouvian term (RHS) calls for a subsidization (taxation) of labor for the gender who has the higher (lower) bargaining power; see Section 3.3.1. Consequently, for the gender with the lower bargaining power both effects go in the same direction implying $T_{y_j}^i > T_{y_j}^{Pi} > 0$, while for the gender with the higher bargaining power, the two effects go in opposite direction implying $T_{y_j}^i \leq T_{y_j}^{Pi} < 0$.

If additionally weights differ across couples, we have $c_j^i(I^i) > c_j^k(I^i)$ iff $\alpha_j^i > \alpha_j^k$ so

¹²Which is typically the case with a utilitarian social welfare function.

that for a couple with $w_j^i = w_j \quad \forall i, j$, we have (by concavity of u)

$$MRS_{Iy_j}^{ki} > MRS_{Iy_j}^i \iff \alpha_j^k > \alpha_j^i. \quad (32)$$

Combining 32 with (31) implies that

$$MRS_{Iy_j}^{ki} < MRS_{Iy_j}^i \quad \text{if} \quad w_j^k > w_j^i \quad \text{and} \quad \alpha_j^k < \alpha_j^i. \quad (33)$$

In words, when spouse j has a lower bargaining weight in the high-wage couple, then the couples' indifference curves cross in the "usual way"; the low-wage spouse has a steeper indifference curve and the LHS in the second inequality of (30) is negative.

To understand the implication of these inequalities, consider a couple i for which only $\lambda_{ki} > 0$.¹³ Assume that downward incentive constraints are binding, so that $w_j^k > w_j^i$.

First, examine the spouse with a low weight $\alpha_j^i < 1$. Then, the Pigouvian tax is positive, and the incentive term also calls for a tax if $\alpha_j^i < \alpha_j^k$, that is if weights (of the low-weight spouse) increase with wage. If, however, weights of this spouse decrease with wage, $\alpha_j^k < \alpha_j^i$, the Pigouvian term and incentive term go in opposite directions and we are not able to sign the marginal tax rate.

Next analyze the high-weight spouse $\alpha_j^i > 1$. Now, we have a negative Pigouvian tax rate, while the incentive term calls for a tax if $\alpha_j^i < \alpha_j^k$ (increasing weights of the high-weight spouse). In this case, the effects go in opposite directions. But, when the bargaining weights decrease with wages, $\alpha_j^i > \alpha_j^k$, both terms are negative and this spouse faces a negative marginal tax rate.

Finally, observe that when the weight of the low-weight spouse increases with wages, we have of course that the weight of the high-weight spouse decreases. Consequently, in this case results are unambiguous for both spouses: a positive marginal tax for the low-weight spouse and a negative one for the high-weight spouse. This result is particularly interesting for the case where the male spouse has the higher bargaining power. It

¹³More precisely, we have $\lambda_{hi} = 0$ when $h \neq k$. This does not rule out $\lambda_{ih} > 0$ for some h .

$w_j^i < w_j^k$		Pigouvian term: $T_{y_j}^{Pi}$	incentive term	overall effect: $T_{y_j}^i$
$\alpha_j^i \leq 1$	(i) $\alpha_j^i \leq \alpha_j^k$	≥ 0	> 0	> 0
	(ii) $\alpha_j^i > \alpha_j^k$	≥ 0	< 0	≤ 0
$\alpha_j^i > 1$	(i) $\alpha_j^i \geq \alpha_j^k$	< 0	< 0	< 0
	(ii) $\alpha_j^i < \alpha_j^k$	< 0	> 0	≤ 0

Table 1: Marginal tax rates for the low- and high-weight spouse and for (i) increasing and (ii) decreasing bargaining weights.

completely reverses the result by Boskin and Sheshinski (1983) that the female spouse should typically face a lower marginal tax rate than her male partner. In our framework, the female spouse would not only have a higher marginal tax rate than the male spouse, but his rate would even be negative. Finally, when weights follow the opposite pattern (low weights decrease with wages) results are ambiguous for both spouses. Table 1 illustrates our results.

The main results of this section are summarized in the following proposition.

Proposition 1 *Assume that the spouses' bargaining weights are exogenous.*

(i) *When couples' types are observable, income will be subject to a Pigouvian tax or subsidy to correct the misallocation of consumption by couples. The member of the household that has the lower bargaining weight will face a marginal tax on labor income and the member with the higher weight will face a marginal subsidy on labor income. Specifically, we have that $T_{y_j}^{Pi} \geq 0$ iff $\alpha_j^i \leq 1 \forall i, j$. Consequently, when the male spouse has the higher bargaining weight his marginal tax rate will be negative while that of the female spouse will be positive.*

(ii) *When couples' types are not observable:*

(a) *A spouse's marginal tax rate is defined by expression (29), which shows that it depends on a paternalistic (Pigouvian) and on a redistributive (incentive related) term.*

The paternalistic term has the same sign as the Pigouvian tax described in item (i). The sign of the incentive term depends on the ratio of the marginal rate of substitution of the considered spouse in the mimicking and in the mimicked couple. This, in turn, depends on the distribution of weights and wages.

(b) We depart from the “no distortion at the top” result. The absolute value of the marginal tax or subsidy will be smaller than its Pigouvian counterpart. Formally, if $\alpha_j^i \leq 1$ we continue to have that $T_{y_j}^i \geq 0$ but with $|T_{y_j}^i| < |T_{y_j}^{Pi}|$.

(c) If the bargaining weight of the low-weight spouse is increasing in wages (which automatically implies that the bargaining weight of the high-weight spouse decreases in wages) the Pigouvian and incentive term go in the same direction implying $T_{y_j}^i > 0$ for the low-weight spouse and $T_{y_j}^i < 0$ for the high-weight spouse. Consequently, the Pigouvian results stated in item (i) are reinforced. Specifically, when the male spouse has the higher bargaining weight his marginal tax rate will be negative while that of the female spouse will be positive.

4 Endogenous bargaining weights

So far, we have assumed that spouses’ bargaining weights were exogenously given. We now turn to the case where the weights are endogenous and depend on the spouses’ respective incomes. More precisely, we assume that the bargaining power of a spouse increases with the share he/she contributes to *gross* family income I^i . Formally, we have $\alpha_j^i = \alpha(y_j^i / \sum_{g=f,m} y_g^i)$ with $\alpha_j^i(\cdot) > 0$. To simplify notation we define $\alpha_j(y^i) \equiv \alpha(y_j^i / \sum_{g=f,m} y_g^i)$, where y^i is the vector $y^i = (y_f^i, y_m^i)$. Observe that we do *not* assume $\alpha(0) = 0$.¹⁴

¹⁴However, since the functional form of α is increasing and the same for all spouses and additionally $\alpha_f + \alpha_m = 2$, we must have $\alpha(0) < 1$.

4.1 Couple's problem revisited

First, notice that endogenous weights do not affect the way a couple allocates its disposable income I^i for a given bundle (I^i, y_m^i, y_f^i) implying that the indirect utility function defined by (6) remains valid. However, a couple's labor supply decision in response to a (nonlinear) tax $T(y_f^i, y_m^i)$ is affected. The problem for couple i is now given by

$$\begin{aligned} \max_{I^i, y_f^i, y_m^i} \quad & W = \sum_{j=f,m} \alpha_j(y^i) \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] \\ \text{s.t.} \quad & \sum_{j=f,m} y_j^i - T(y_f^i, y_m^i) - I^i \geq 0. \end{aligned}$$

The FOCs with respect to I^i and y_j^i are

$$\sum_{g=f,m} \alpha_g(y^i) \hat{u}_g^{i'}(I^i) = \sigma, \quad (34)$$

$$\frac{\alpha_j(y^i)}{w_j^i} v' \left(\frac{y_j^i}{w_j^i} \right) - \sum_{g=f,m} \frac{\partial \alpha_g(y^i)}{\partial y_j^i} U_g^i = \sigma (1 - T_{y_j}^i). \quad (35)$$

Combining equations (34) and (35), using (8) and rearranging, yields the marginal rate of substitution between I^i and y_j^i for endogenous weights

$$MRS_{I y_j}^i = \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} - \frac{\sum_{g=f,m} (\partial \alpha_g(y^i) / \partial y_j^i) U_g^i}{\alpha_j(y^i) u'(c_j^i(I^i))} = 1 - T_{y_j}^i. \quad (36)$$

4.2 Government's problem

The government continues to maximize (9) subject to the resource and the incentive constraints. While the objective function is the same as before, we have to take into account the property that spouses' bargaining weights are endogenous. The incentive constraint is now given by

$$\sum_{j=f,m} \alpha_j(y^i) \left[\hat{u}_j^i(I^i) - v\left(\frac{y_j^i}{w_j^i}\right) \right] \geq \sum_{j=f,m} \alpha_j(y^k) \left[\hat{u}_j^i(I^k) - v\left(\frac{y_j^k}{w_j^i}\right) \right]. \quad (37)$$

It deviates from its counterpart with exogenous weights (equation 16), in that the weights on the LHS differ from those on the RHS. This is because when a couple mimicks another one, its bargaining weights will change. They are then determined by the mimicked couple's respective levels of spouses' incomes.

The Lagrangian associated with this problem is

$$\begin{aligned} \mathcal{L}^2 = & \sum_{i=1}^n \pi^i \sum_{j=f,m} \left[\hat{u}_j^i(I^i) - v \left(\frac{y_j^i}{w_j^i} \right) \right] + \mu \sum_{i=1}^n \pi^i \left(\sum_{j=f,m} y_j^i - I^i \right) \\ & + \sum_{i=1}^n \sum_{k=1, k \neq i}^n \lambda_{ik} \left\{ \sum_{j=f,m} \alpha_j(y^i) \left[\hat{u}_j^i(I^i) - v \left(\frac{y_j^i}{w_j^i} \right) \right] - \sum_{j=f,m} \alpha_j(y^k) \left[\hat{u}_j^i(I^k) - v \left(\frac{y_j^k}{w_j^i} \right) \right] \right\}. \end{aligned}$$

The FOCs with respect to I^i, y_j^i are given by

$$\begin{aligned} \frac{\partial \mathcal{L}^2}{\partial I^i} = & \pi^i \sum_{g=f,m} \hat{u}_g^{i'}(I^i) - \mu \pi^i \\ & + \sum_{k=1, k \neq i}^n \lambda_{ik} \sum_{g=f,m} \alpha_g(y^i) \hat{u}_g^{i'}(I^i) - \sum_{k=1, k \neq i}^n \lambda_{ki} \sum_{g=f,m} \alpha_g(y^i) \hat{u}_g^{i'}(I^k) = 0, \end{aligned} \quad (38)$$

$$\begin{aligned} \frac{\partial \mathcal{L}^2}{\partial y_j^i} = & - \pi^i \frac{1}{w_j^i} v'(\ell_j^i) + \mu \pi^i + \sum_{k=1, k \neq i}^n \lambda_{ik} \left[\sum_{g=f,m} \frac{\partial \alpha_g(y^i)}{\partial y_j^i} U_g^i - \alpha_j(y^i) \frac{1}{w_j^i} v'(\ell_j^i) \right] \\ & - \sum_{k=1, k \neq i}^n \lambda_{ki} \left[\sum_{g=f,m} \frac{\partial \alpha_g(y^i)}{\partial y_j^i} U_g^{ki} - \alpha_j(y^i) \frac{1}{w_j^k} v'(\ell_j^{ki}) \right] = 0. \end{aligned} \quad (39)$$

In the Appendix we show that by combining the two FOCs, the marginal rate of substitution between I^i and y_j^i for endogenous weights can be written as

$$\begin{aligned} MRS_{I y_j}^i = & \frac{\frac{\pi^i}{\alpha_j^i(y^i)} \left[\sum_{g=f,m} \frac{u'(c_g^i(I^i))}{u'(c_j^i(I^i))} \frac{\partial c_g^i}{\partial I^i} - \frac{\sum_{g=f,m} (\partial \alpha_g(y^i) / \partial y_j^i) U_g^i}{\alpha_j(y^i) u'(c_j^i(I^i))} \right]}{\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{MRS_{I y_j}^{ki}}{MRS_{I y_j}^i}} \\ & + \frac{\sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki}}{\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{MRS_{I y_j}^{ki}}{MRS_{I y_j}^i}}. \end{aligned} \quad (40)$$

Using equation (36) which implies $T_{y_j}^i = 1 - MRS_{Iy_j}^i$, we can use equation (40) to study the optimal tax policy and specifically examine the impact of the endogeneity of weights.

4.2.1 Benchmark: observable wages

Once again, let us first analyze the optimal tax policy when wages and thus labor supplies are publicly observable implying $\lambda_{ik} = \lambda_{ki} = 0 \quad \forall i, j$. Expression (40) then yields the Pigouvian tax (subsidy)

$$T_{y_j}^i = T_{y_j}^{Pi} = 1 - \left[\sum_{g=f,m} \frac{u'(c_g^i(I^i))}{u'(c_j^i(I^i))} \frac{\partial c_g^i}{\partial I^i} - \sum_{g=f,m} \frac{(\partial \alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i) u'(c_j^i(I^i))} \right]. \quad (41)$$

Since $\alpha_m(y^i) u'(c_m^i(I^i)) = \alpha_f(y^i) u'(c_f^i(I^i))$ and $\partial \alpha_f(y^i)/\partial y_j^i = -\partial \alpha_m(y^i)/\partial y_j^i$, we can write this Pigouvian tax (subsidy) for the female and male in couple i as follows

$$\begin{aligned} T_{y_f}^{Pi} &= 1 - \left[\frac{\alpha_f(y^i)}{\alpha_m(y^i)} \frac{\partial c_m^i}{\partial I^i} + \frac{\partial c_f^i}{\partial I^i} - \frac{\sum_{g=f,m} (\partial \alpha_g(y^i)/\partial y_f^i) U_g^i}{\alpha_f(y^i) u'(c_f^i(I^i))} \right] \\ &= \left(1 - \frac{\alpha_f(y^i)}{\alpha_m(y^i)} \right) \frac{\partial c_m^i}{\partial I^i} + \frac{\alpha'_f(y^i) U_f^i - U_m^i}{\alpha_f(y^i) u'(c_f^i(I^i))}, \end{aligned} \quad (42)$$

$$\begin{aligned} T_{y_m}^{Pi} &= 1 - \left[\frac{\partial c_m^i}{\partial I^i} + \frac{\alpha_m(y^i)}{\alpha_f(y^i)} \frac{\partial c_f^i}{\partial I^i} - \frac{\sum_{g=f,m} (\partial \alpha_g(y^i)/\partial y_m^i) U_g^i}{\alpha_m(y^i) u'(c_m^i(I^i))} \right] \\ &= \left(1 - \frac{\alpha_m(y^i)}{\alpha_f(y^i)} \right) \frac{\partial c_f^i}{\partial I^i} + \frac{\alpha'_m(y^i) U_m^i - U_f^i}{\alpha_m(y^i) u'(c_m^i(I^i))}. \end{aligned} \quad (43)$$

Equations (42) and (43) are the counterparts to expressions (25) and (27) under exogenous weights. The first term of each of these expression is unaffected by the endogeneity of the weights and its interpretation is in line with that presented in the previous section.¹⁵ To simplify the exposition, assume that the male spouse has the higher wage in all couples.¹⁶ Then the male spouse will also have the higher weight and the nega-

¹⁵For a level of exogenous weights corresponding to the weights implied by the second-best levels of y_j^i .

¹⁶This appears to be the empirically most relevant case. However the argument can easily be adapted if we remain agnostic about the gender of the high wage spouse.

tive first term calls for a marginal subsidy on his labor supply to bring it closer to the utilitarian optimum.¹⁷ The second term reflects the impact of y_m on the bargaining weights. Intuitively, one might expect this effect to be positive so as to mitigate the effect of the first term. This is because the Pigouvian subsidy that is optimal under exogenous weights (as long as the male has the higher weight) would further increase his weight by boosting his labor supply. Since his private weight is already larger than his weight in social welfare this does not appear to be desirable. However, expression (43) shows that this conjecture is correct only as long as $U_m^i - U_f^i > 0$. While this condition is intuitively appealing at first, it appears, under closer scrutiny, that it *may* not be satisfied. To see this, consider the case where spouses have equal weights. Since preferences are separable the utilitarian optimum then implies that the high wage male spouse has the *lower* utility. He will have the same consumption level as his spouse but work more. The same result will occur if weight differences are small compared to wage differences.

To sum up, at this level of generality the sign of the second term is ambiguous. While we would intuitively expect it to be positive (and this will certainly be true if weights are sufficiently different), we cannot rule out the possibility that the second term may actually further strengthen the case for a Pigouvian subsidy on the male spouse.

4.2.2 Second-best tax policy

Lets again turn our attention to the second-best problem where wages are not observable to the government. Consider a spouse in the “top” couple implying $\lambda_{ki} = 0 \quad \forall k$ but $\lambda_{ik} > 0$ for at least one k . For spouse j in such a couple, equation (40) can be rewritten

as

$$T_{y_j}^i = 1 - \frac{\frac{\pi^i}{\alpha_j(y^i)}(1 - T_{y_j}^{Pi}) + \sum_{k=1, k \neq i} \lambda_{ik}}{\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1, k \neq i} \lambda_{ik}} = \frac{\frac{\pi^i}{\alpha_j(y^i)} T_{y_j}^{Pi}}{\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1, k \neq i} \lambda_{ik}},$$

¹⁷These are second-best levels implying that a high weight of the male could lead to $y_m < y_f$. However, with endogenous weights this is *not* possible since then the male would have a lower weight which together with the higher wage level implies $y_m < y_f$, so that we obtain a contradiction.

where we made use of the definition for the Pigouvian tax; equation (41). If in this couple the bargaining power is equally divided so that $T_{y_f}^{P_i} = T_{y_m}^{P_i} = 0$ both spouses face no distortion since $T_{y_j}^i = 0$. If, however, the bargaining power is unequally distributed, we have again $|T_{y_j}^i| < |T_{y_j}^{P_i}|$ implying a lower tax (subsidy) than the Pigouvian one.

Now consider a spouse who is not part of the “top” couple. For such a couple the optimal tax rate is

$$T_{y_j}^i = 1 - \frac{\frac{\pi^i}{\alpha_j(y^i)} \left(1 - T_{y_j}^{P_i}\right) + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki}}{\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{MRS_{I y_j}^{ki}}{MRS_{I y_j}^i}}. \quad (44)$$

Again, this expression includes a Pigouvian term and “incentive” terms. To get a more precise understanding of the structure of these incentive terms and their interaction with the Pigouvian term, rearrange equation (44) to obtain the following condition

$$T_{y_j}^i \begin{matrix} \leq \\ \geq \end{matrix} 0 \iff \sum_{k=1, k \neq i}^n \lambda_{ki} \left(\frac{MRS_{I y_j}^{ki}}{MRS_{I y_j}^i} - 1 \right) \begin{matrix} \geq \\ \leq \end{matrix} \frac{\pi^i}{\alpha_j(y^i)} T_{y_j}^{P_i} \quad (45)$$

The left hand side of the second inequality represents the incentive term whereas the right hand side represents the Pigouvian term. This paternalistic term has the same sign and properties as the Pigouvian tax discussed in the previous subsection. The incentive term appears at first to be simpler than its counterpart in the exogenous weight case (equation (30)). However, the expression for the MRS , equation (36), is now much more complex. In particular, it depends on the relative differences between the utility of the male and the female spouse in the mimicking and the mimicked couple. This makes it difficult to study the sign of the incentive term.

To illustrate this assume that binding incentive constraints are from high-wage to low-wage couples. Using (36), we have

$$MRS_{I y_j}^{ki} / MRS_{I y_j}^i < 1 \quad \text{if} \quad w_j^k > w_j^i \quad \text{and} \quad U_m^i - U_f^i > U_m^{ki} - U_f^{ki}. \quad (46)$$

The second condition in expression (46) states that the difference in utility between spouses is larger in the mimicked than in the mimicking couple. Observe that this is a

sufficient but not a necessary condition for the ratio of marginal rates of substitution to be smaller than one. If the condition holds, the incentive term goes in the “usual” direction, that is tends to make the marginal tax rates negative and, depending on the case, may reinforce or mitigate (and possibly reverse) the Pigouvian term. Since consumption levels in the mimicked and mimicking couples are the same, we have

$$U_m^i - U_f^i > U_m^{ki} - U_f^{ki} \Leftrightarrow v\left(\frac{y_m^i}{w_m^k}\right) - v\left(\frac{y_f^i}{w_f^k}\right) > v\left(\frac{y_m^i}{w_m^i}\right) - v\left(\frac{y_f^i}{w_f^i}\right). \quad (47)$$

While this expression provides a more explicit condition, its precise interpretation remains non-trivial. All we can say is that it depends on the degree of convexity of v and on the respective wage gaps w_m/w_f within the two couples.

The main results of this section are summarized in the following proposition.

Proposition 2 *Assume that the spouses’ bargaining weights are endogenous so that the bargaining power of a spouse increases with the share he/she contributes to gross family income*

(i) *When couples’ types are observable, income will be subject to a Pigouvian tax or subsidy to correct the misallocation of consumption by couples. This Pigouvian tax is negative for the spouse with the higher wage (who will have the higher bargaining weight), as long as long as he has a higher total utility than his partner. The low wage spouse faces a positive marginal tax rate as long as she has the smaller total utility.*

(ii) *When couples’ types are not observable:*

(a) *A spouse’s marginal tax rate is defined by expression (44), which shows that it depends on a paternalistic (Pigouvian) and on a redistributive (incentive related) term. The paternalistic term has the same sign as the Pigouvian tax described in item (i). The sign of the incentive term depends on the ratio of the marginal rate of substitution of the considered spouse in the mimicking and in the mimicked couple.*

(b) *We depart from the “no distortion at the top” result. The absolute value of the marginal tax or subsidy will be smaller than its Pigouvian counterpart so that $|T_{y_j}^i| <$*

$|T_{y_j}^{Pi}|$.

(c) *When binding incentive constraints are from high-wage to low-wage couples, and when the difference in utility between spouses is larger in the mimicked than in the mimicked couple, then the incentive term goes in the “usual” direction and is negative.*

5 Concluding comments

This paper has studied the design of couples’ income taxation in a household bargaining setting. A couple’s consumption levels and labor supplies are chosen to maximize a weighted sum of spouses’ utilities. The weights represent the spouses’ respective bargaining powers. The main lesson that emerges from our paper is that the traditional Boskin and Sheshinski (1983) result calling for a lower marginal tax on the female spouse appears to be seriously challenged by the departure from a unitary couple model towards a bargaining setting. While the results are often ambiguous, it is clear that it takes rather rigorous conditions to obtain a lower marginal tax rate for the female spouse. As a matter of fact, we have presented examples of empirically “plausible” conditions under which the marginal tax rate of the male spouse is effectively *negative* while that of the female spouse is *positive*. The traditional results are typically driven by differences in labor supply elasticity which are neglected in our setting; spouses have the same individual preferences, including disutility of labor. Differences in labor supply elasticities can be expected to mitigate our results. However, since our results are rather spectacular, with spouses marginal tax rates differing in their sign, it is not clear that the elasticity effect could reverse them. At the very least this would require rather significant differences in the gender specific labor supply elasticities.

A Appendix

A.1 Derivation of $MRS_{Iy_j}^i$: exogenous weights

Dividing each term in equations (19) and (20) by $\alpha_j^i u'(c_j^i(I^i))$, using the couple's FOC for the optimal distribution of consumption (3) and rearranging, we have

$$\frac{\mu\pi^i}{\alpha_j^i u'(c_j^i(I^i))} = \pi^i \sum_{g=f,m} \frac{\hat{u}_g^{i'}(I^i)}{\alpha_j^i u'(c_j^i(I^i))} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))} \quad (\text{A.1})$$

$$\frac{\mu\pi^i}{\alpha_j^i u'(c_j^i(I^i))} = \frac{\pi^i}{\alpha_j^i} \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} + \sum_{k=1, k \neq i}^n \lambda_{ik} \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k}{\alpha_j^i} \frac{1}{w_j^k} \frac{v'(\ell_j^{ki})}{u'(c_j^i(I^i))}. \quad (\text{A.2})$$

With the definition of the marginal rate of substitution (equation 14)

$$MRS_{I^i y_j^i} = \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))}$$

we can rewrite equation (A.2) as

$$\frac{\mu\pi^i}{\alpha_j^i u'(c_j^i(I^i))} = MRS_{Iy_j}^i \left[\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i} \right]. \quad (\text{A.3})$$

Equalizing (A.1) and (A.3) and solving for $MRS_{I^i y_j^i}$ we get

$$MRS_{Iy_j}^i = \frac{\frac{\pi^i}{\alpha_j^i} \sum_{g=f,m} \frac{\hat{u}_g^{i'}(I^i)}{u'(c_j^i(I^i))} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i}}$$

which can be rewritten as

$$MRS_{Iy_j}^i = \frac{\frac{\pi^i}{\alpha_j^i} \sum_{g=f,m} \frac{u'(c_g^i(I^i))}{u'(c_j^i(I^i))} \frac{\partial c_g^i(I^i)}{\partial I^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))}}{\frac{\pi^i}{\alpha_j^i} + \sum_{k=1, k \neq i}^n \lambda_{ik} - \sum_{k=1, k \neq i}^n \lambda_{ki} \frac{\alpha_j^k u'(c_j^{ki}(I^i))}{\alpha_j^i u'(c_j^i(I^i))} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i}}$$

A.2 Derivation of MRS_{Iy}^i : endogenous weights

Dividing each term in equations (38) and (39) by $\alpha_j^i(y^i)u'(c_j^i(I^i))$, using the couple's FOC for the optimal distribution of consumption (3) and rearranging, we have

$$\frac{\mu\pi^i}{\alpha_j(y^i)u'(c_j^i(I^i))} = \frac{\pi^i}{\alpha_j(y^i)} \sum_{g=f,m} \frac{\hat{u}_g^i(I^i)}{u'(c_j^i(I^i))} + \sum_{k=1,k \neq i}^n \lambda_{ik} - \sum_{k=1,k \neq i}^n \lambda_{ki}, \quad (\text{A.4})$$

$$\begin{aligned} \frac{\mu\pi^i}{\alpha_j(y^i)u'(c_j^i(I^i))} &= \frac{\pi^i}{\alpha_j(y^i)} \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} \\ &+ \sum_{k=1,k \neq i}^n \lambda_{ik} \left[\frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} - \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i)u'(c_j^i(I^i))} \right] \\ &- \sum_{k=1,k \neq i}^n \lambda_{ki} \left[\frac{1}{w_j^k} \frac{v'(\ell_j^{ki})}{u'(c_j^k(I^i))} - \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^{ki}}{\alpha_j(y^i)u'(c_j^i(I^i))} \right]. \end{aligned} \quad (\text{A.5})$$

where we have used the fact that $u'(c_j^{ki}(I^i)) = u'(c_j^i(I^i))$ when weights are endogenous.

Now using the definition of the marginal rate of substitution, equation (14),

$$MRS_{Iy_j}^i = \frac{1}{w_j^i} \frac{v'(\ell_j^i)}{u'(c_j^i(I^i))} - \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i)u'(c_j^i(I^i))}$$

and adding and subtracting

$$\frac{\pi^i}{\alpha_j(y^i)} \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i)u'(c_j^i(I^i))}$$

in equation (A.5) we can rewrite this equation as

$$\begin{aligned} \frac{\mu\pi^i}{\alpha_j(y^i)u'(c_j^i(I^i))} &= \frac{\pi^i}{\alpha_j(y^i)} \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i)u'(c_j^i(I^i))} \\ &+ MRS_{Iy_j}^i \left[\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1,k \neq i}^n \lambda_{ik} - \sum_{k=1,k \neq i}^n \lambda_{ki} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i} \right] \end{aligned} \quad (\text{A.6})$$

Finally, equalizing (A.4) and (A.6) amounts to

$$\begin{aligned} &\frac{\pi^i}{\alpha_j(y^i)} \frac{\sum_{g=f,m} (\partial\alpha_g(y^i)/\partial y_j^i) U_g^i}{\alpha_j(y^i)u'(c_j^i(I^i))} + MRS_{Iy_j}^i \left[\frac{\pi^i}{\alpha_j(y^i)} + \sum_{k=1,k \neq i}^n \lambda_{ik} - \sum_{k=1,k \neq i}^n \lambda_{ki} \frac{MRS_{Iy_j}^{ki}}{MRS_{Iy_j}^i} \right] \\ &= \frac{\pi^i}{\alpha_j(y^i)} \sum_{g=f,m} \frac{\hat{u}_g^i(I^i)}{u'(c_j^i(I^i))} + \sum_{k=1,k \neq i}^n \lambda_{ik} - \sum_{k=1,k \neq i}^n \lambda_{ki}. \end{aligned}$$

Solving the above equation for $MRS_{Iy_j}^i$ yields equation (40) in the main text.

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