

The Income Splitting Method: Is it Good for Both Marriage Partners?

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Abstract. *This paper analyzes how deviating from individual taxation affects married couples. The focus is on time allocation, on investment in family-specific human capital and on distribution of income within the family. Two insights are discussed in detail. First, the distribution of tax-reduction gains due to the income splitting system depends on whether the family has been started or not. After marriage, joint taxation increases redistribution among family members. Second, although joint taxation reduces the tax burden of the family, it might harm the marriage partner that is more productive in household production provided that potential marriage partners foresee the effects of joint filing on the time allocation within the family.*

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1. INTRODUCTION

Even in industrialized countries the tax treatment of marriages is quite heterogeneous; see Messere (1998), Organization for Economic Cooperation and Development (1993), Pechman and Engelhardt (1990). While most countries rely on individual taxation, some countries such as Germany and the United States allow joint taxation. In contrast, France uses a quotient system which includes children. Support to couples by tax credits and tax allowances are given in several countries such as Canada, Australia, Italy, the United Kingdom, and Japan. In many countries one-earner couples get preferential treatment as compared to two-earner couples. The tax consequences of marriage are typically considerable; see, e.g., Rosen (1987). But the different systems lead to substantial differences in the amount of tax reductions; see, e.g., Pechman and Engelhardt (1990).

Since Gary Becker initiated the economic analysis of the family (see Becker, 1991), the various aspects of the family's economic situation have been

analyzed. Among others, there is a large strand of literature both theoretical and empirical that focuses on the taxation of married couples. First, equity and neutrality issues were discussed (see, e.g., Rosen, 1977). While individual taxation violates horizontal equity with respect to married couples with equal family income if the spouses' earnings are different, joint taxation does not achieve horizontal equity with respect to married couples and non-married couples. Second, the optimum-taxation approach has been applied to married couples (the seminal papers are Boskin and Sheshinski, 1983, and Apps and Rees, 1988; more recently Apps and Rees, 1999a, 1999b). For example, the inverse elasticity rule rejects joint taxation and recommends a lower tax rate for women since the women's income elasticity of labor supply is typically higher than that of the men. Third, the incidence of the marriage subsidy has been analyzed in detail. For example, Alm and Whittington (1997) discussed the impact of marriage taxes and subsidies on the decision to marry and, particularly, on the timing of marital decisions. Whittington and Alm (1997) considered the effect of income taxation on divorce.

The basic question raised in this paper is whether both men and women benefit from the tax reduction due to steps towards joint taxation. The aim of this paper is twofold. On the one hand, the impact of the tax approach towards married couples on before-marriage investment in human capital that can be used in household production will be considered. On the other hand, the distribution of the benefits caused by the tax reduction among family members will be considered.

Investment in education prior to the marriage has been analyzed before. For example, Konrad and Lommerud (2000) have shown that individuals over-invest in human capital that can be used in the labor market. One scenario is that individuals prepare themselves for a lot of work in the outside labor market if the marriage partners non-cooperatively decide on the allocation of time and, therefore, spend inefficiently little time in household production. Another scenario is that individuals want to increase their fallback utility level in order to strengthen their position in a Nash-bargaining process. People that over-invest in market-compatible skills underprovide family public goods such as well brought-up children, the well-being of elderly parents, etc.

In this paper the focus will be on investment in specific human capital that is useful in household production. Education can either be exclusively aimed at the outside labor market or it can also be oriented to household production and, particularly, to the bringing up of children. For instance, general education and teaching training partially impart knowledge on the bringing up of children. However, teachers, educators, and nurses typically earn less money than comparable professions. Furthermore, the percentage of women in these professions is extraordinarily high. That might have to do with the usefulness of profession-specific knowledge in bringing up children. For instance, in April 1998 in Germany, 9.8% of female workers worked in the health services, while just 1.2% of male workers did. Similarly, 5.8% (0.9%) of

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female (male) workers have a social profession, and 4.4% (2.6%) were teachers; 90% of the jobs in care of the body were filled by women (see Statistisches Bundesamt, 1999). In the European Union in 1995/96, the total proportion of female graduates was 53%, but in medical science the percentage of women was 69%, and in humanities, applied arts, and religion it was 71% (see Eurostat, 1998).

This paper will analyze the impact of the tax treatment of marriages on investment in human capital that also increases the productivity in household production. A main question is whether investment is encouraged or discouraged by joint filing and who benefits from joint taxation. Although human capital investment has been widely discussed, most authors neglected investment in family-specific human capital. One exception is Vagstad (2001). He stressed that incentives to acquire household production skills are asymmetric and that the more productive contributor to family public goods may be worse off than his/her spouse. However, Vagstad (2001) did not discuss tax issues.

The paper also considers the effect of joint taxation on specialization and on the distribution of income among family members during and after bringing up children. Of particular interest is whether both or only one spouse benefit from tax reductions and how intra-family transfers are adapted to a change in the tax treatment of marriage.

The paper is organized as follows. The discussion of the effects of joint filing on family behavior and income distribution within the family is divided into two parts. While the second section considers the family from marriage onwards, the third section focuses on investment decisions before marriage. A summarizing section brings the discussion to an end.

2. ABOLITION OF INDIVIDUAL TAXATION AND TRANSFERS BETWEEN SPOUSES

The paper considers a family consisting of two people, $i = f, m$, who make decisions. This section focuses on the wedding day and the time thereafter. The marriage lasts at most two periods. In the first period children are brought up; in the second period the marriage partners just live together. The family has to decide how much time each member devotes to raising children and how to distribute the income among the marriage partners. Utility is calculated in income terms. For simplicity, it is assumed that only married partners have children and that children are born in the first marriage period of their parents.

First, the second period is analyzed. The partners are married and have already decided on the allocation of time to raise children. The woman has devoted R_f hours to bringing up children, her husband R_m hours. The less time an individual had worked outside the household in the past, the less experienced he/she is and the less money he/she can earn now. Therefore, the

wage rate, w , is negatively correlated with the number of hours a person had devoted to the children. This fact is captured by a negatively sloped and concave wage rate function $w_i = w(R_i)$. Since children have been brought up already, both family members use their entire disposable time for working outside the household. The working hours of each individual are normalized to one. Hence, gross labor income of individual i is w_i .

Labor income is subject to a progressive income tax. The tax function, T , is continuous, twice differentiable, increasing, and convex as it is in Germany. Under an income splitting system, the tax due from individual i is $T_i = T(\alpha w_j + (1 - \alpha)w_i)$, $i, j = f, m, j \neq i, 0 \leq \alpha \leq \frac{1}{2}$. While income would be perfectly split if α were equal to one-half, income splitting would only be partial if $0 < \alpha < \frac{1}{2}$. With α being zero, individual taxation instead of joint taxation would be applied.

Since net family income can be distributed among the family members in any way, the available income (utility) of the two marriage partners can be written as

$$\begin{aligned} u_m^2 &= w(R_m) - T(\alpha w(R_f) + (1 - \alpha)w(R_m)) - Z^2 \\ u_f^2 &= w(R_f) - T(\alpha w(R_m) + (1 - \alpha)w(R_f)) + Z^2 \end{aligned} \quad (1)$$

where Z^2 denotes a transfer from the husband to his wife, which might be either positive or negative.¹ It should be stressed from the beginning that the assumption of transferable utility strengthens the results.

A divorce does not alter gross income but individuals are subject to individual taxation. Hence, the tax burden of person i is $\Theta_i = T(w_i)$. Some real costs such as lawyer's fees and some 'psychic' costs are connected with a divorce. The (positive) per capita costs are denoted by D . Whether or not the low-income individual is entitled to maintenance depends basically on the law. Here, two somewhat extreme scenarios of maintenance obligations are considered. Either no obligation to pay maintenance exists or the income net of taxes of the former family members are equalized by maintenance payments. Hence, in the case of a divorce, the achievable income (utility) of the former marriage partners are

$$\begin{aligned} \bar{u}_m^2 &= w(R_m) - T(w(R_m)) - M - D \\ \bar{u}_f^2 &= w(R_f) - T(w(R_f)) + M - D \end{aligned} \quad (2)$$

where M indicates the money transfer from the man to his former wife, which might be positive, negative or zero, depending on the law and on the allocation of time for raising children.

This paper assumes that the behavior of marriage partners in both periods can be described by Nash bargaining. Nash bargaining has two main

1. Here and in the following, the superscripts 1 or 2 indicate the period under consideration.

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advantages. First, it ensures efficiency; this feature will become important later on. Second, Nash bargaining makes a plausible prediction of the distribution of efficiency gains, which refers to the outside options, i.e. to the threat points. Either a non-cooperative equilibrium within a marriage (see, e.g., Lundberg and Pollak, 1993, and Konrad and Lommerud, 2000) or divorce (see Manser and Brown, 1980, and McElroy and Horney, 1981) is the threat point after the wedding day. Non-cooperative behavior is somewhat strange since there are so many opportunities to cooperate within a marriage. However, in this paper which only considers the distribution of income, there is no substantial difference between the two approaches. Pure non-cooperative behavior of marriage partners, which has been considered by, e.g., Lundberg and Pollak (1994) and Konrad and Lommerud (1995), is particularly implausible if the resultant equilibrium is inefficient. It should be possible for marriage partners to enter into binding agreements to overcome inefficiency.

Marriage partners stay together only if $\Theta_m + \Theta_f - (T_m + T_f) \geq -2D$, which is always fulfilled since the tax savings due to the income splitting system (the LHS) are non-negative.

Marriage partners that employ the Nash-bargaining approach choose in the second period the transfer Z^2 so as to maximize $(u_m^2 - \bar{u}_m^2)(u_f^2 - \bar{u}_f^2)$. The optimum transfer and the resultant utilities are

$$\begin{aligned} Z^2 &= \frac{\Theta_m - T_m - (\Theta_f - T_f)}{2} + M \\ \hat{u}_m^2 &= w_m - \frac{T_m + T_f}{2} + \frac{\Theta_f - \Theta_m}{2} - M \\ \hat{u}_f^2 &= w_f - \frac{T_m + T_f}{2} + \frac{\Theta_m - \Theta_f}{2} + M \end{aligned} \quad (3)$$

The higher the man's net income compared with that of his former wife after divorce and the lower the maintenance payment after divorce, the higher the income share of the husband and the lower, consequently, the share of the wife.² If the maintenance payment equalized income net of taxes, the transfer would be $Z^2 = (w_m - T_m - (w_f - T_f))/2$ and spouse i would get $\hat{u}_i^2 = (w_m + w_f - (T_m + T_f))/2$. Marriage partners' income shares are the same. Without a maintenance payment the difference in utility $\hat{u}_m^2 - \hat{u}_f^2 = w_m - \Theta_m - (w_f - \Theta_f)$ is independent of the tax system given the data of the first period.

Now, consider the first period. In order to make things as simple as possible, the wage rate w is exogenously given in the first period. The two potential marriage partners may marry or not. If both stay alone, net of taxes they each earn in every period $w - T(w)$. Lifetime utility would be $\bar{u} = (w - T(w))(1 + \delta)$, where δ is the common discount factor. If they get

2. Recall that the maintenance payment is negative if the woman supports her former husband.

married, they have children and they have to spend part of their time bringing them up. The working hours of individual i outside the household are $1 - R_i$. Spending time to raise children has some 'psychic' costs, taken into account by an increasing and convex cost function, $\phi_i = \phi(R_i)$. If a family member devotes only a few hours to the children, these costs are probably negative, but pleasure shrinks with the number of hours. Parents derive utility from well-educated children. This is also measured in income terms. There are no differences in utility with respect to children. The utility of raising children is simply a weighted sum of the numbers of hours devoted to the children. The weights are the (constant) marginal products in education. The marginal products of family members, β_m and β_f , are not necessarily the same. Productivity differentials are due to inborn differences and to different training. However, this section takes the productivity differentials as exogenously given. By either a positive or negative transfer from the man to the woman, Z^1 , resources can be redistributed among family members. Hence, utilities of married family members in period 1 are

$$\begin{aligned} u_m^1 &= (1 - R_m)w - T(\alpha(1 - R_f)w + (1 - \alpha)(1 - R_m)w) \\ &\quad - \phi(R_m) + \beta_m R_m + \beta_f R_f - Z^1 \\ u_f^1 &= (1 - R_f)w - T(\alpha(1 - R_m)w + (1 - \alpha)(1 - R_f)w) \\ &\quad - \phi(R_f) + \beta_m R_m + \beta_f R_f + Z^1 \end{aligned} \quad (4)$$

Lifetime utility of a spouse is $u_i = u_i^1 + \delta \hat{u}_i^2$.

Obviously, a necessary precondition for marriage is that total utility is higher than it would otherwise be. When marriage partners also play a Nash-bargaining game on the wedding day, they choose the transfer Z^1 so as to maximize $(u_m - \bar{u})(u_f - \bar{u})$. Since, by assumption, the fallbacks are the same, the transfer equalizes lifetime utilities, and thus

$$Z^1 = \frac{\delta(\hat{u}_m^2 - \hat{u}_f^2)}{2} + \frac{R_f w + T_f^1 + \phi_f - (R_m w + T_m^1 + \phi_m)}{2} \quad (5)$$

The higher, compared with his wife, the man's utility in period 2, the lower his 'psychic' costs of educating children; the lower the forgone labor income, the higher the transfer from the husband to his wife.

The marriage partners determine the allocation of time so as to maximize total lifetime utility:

$$\begin{aligned} u &= u_m^1 + u_f^1 + \delta(\hat{u}_m^2 + \hat{u}_f^2) \\ &= \sum_{i=m,f} [w(1 - R_i) - \phi_i + 2\beta_i R_i - T_i^1 + \delta(w_i - T_i^2)] \end{aligned} \quad (6)$$

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An increase in the time spent by individual i for raising children changes the tax savings due to the income splitting system in the second period according to

$$\frac{\partial(\Theta_m + \Theta_f - (T_m^2 + T_f^2))}{\partial R_i} = w'_i [\Theta'_i - (1 - \alpha)T_i^{2'} - \alpha T_j^{2'}] \quad i = m, f, j \neq i \quad (7)$$

This term is zero if family members are also subject to individual taxation, i.e. if α is zero. The term is certainly negative (positive) if individual i earns in period 2 more (less) money than the spouse. A stronger dispersion in the allocation of time leads to higher tax savings.

The first-order conditions for an interior solution of the family's utility maximization problem are:

$$\begin{aligned} \frac{\partial u}{\partial R_i} &= \delta w'_i [1 - \alpha T_j^{2'} - (1 - \alpha)T_i^{2'}] - w [1 - \alpha T_j^{1'} - (1 - \alpha)T_i^{1'}] - \phi'_i + 2\beta_i \\ &= 0 \quad i = m, f, j \neq i \end{aligned} \quad (8)$$

The marginal increase in utility through better education of the children should be equal to the marginal decrease in net income in present-value terms plus the marginal 'psychic' costs. These conditions determine functions $R_i(\alpha)$, $i = m, f$.

As a benchmark case, consider first individual taxation, i.e. that α is zero. Both marriage partners would spend the same amount of time with their children and earn the same amount of money in the second period if the man were as productive as the woman in bringing up children.³ Resources would not be transferred from the man to his wife in the first period. If the woman is more productive in raising children than the man, she devotes a bigger part of her time to the children than her husband. Hence, she earns less money in the first period. Furthermore, her labor income in the second period is smaller and her fallback therefore lower. The utility differential in the second period $\hat{u}_m^2 - \hat{u}_f^2$ is positive, and therefore the first-period transfer is relatively high.

The effects of joint taxation, i.e. of an increase in α , will now be analyzed. Total discounted utility changes according to

$$\frac{du}{d\alpha} = w(R_f - R_m)(T_m^{1'} - T_f^{1'}) + \delta(w_f - w_m)(T_f^{2'} - T_m^{2'}) \quad (9)$$

Consider a small productivity asymmetry in raising children. Even under individual taxation, the participation in the labor market of the person with the higher household-specific productivity is smaller and the second-period wage is lower. Because of the progressive tax system, this person faces a lower

3. Note that any differences in 'psychic' costs and labor-market productivity are assumed away.

marginal tax rate. If a step in the direction of joint taxation is put forward, both family members are better off (as can be seen from (9)). Owing to the nature of Nash bargaining, the marriage partners benefit equally.

Since the effects of time allocation are in general considerably complex, the focus is only on small deviations from individual taxation, i.e. a small increase in α starting from α being zero. Applying the implicit function theorem in (8), it can be obtained for α being zero that

$$\frac{dR_i}{d\alpha} = \frac{w \left(T_j^{1'} - T_i^{1'} + w T_i^{1''} (R_i - R_j) \right) + \delta w_i' \left(T_i^{2'} - T_j^{2'} + T_i^{2''} (w_i - w_j) \right)}{\phi_i'' + w^2 T_i^{1''} + (w_i^{2'} T_i^{2''} - w_i'' (1 - T_i^{2'})) \delta}$$

$$i = m, f, j \neq i \quad (10)$$

In reaction to the step towards joint taxation family members specialize more.⁴ As a consequence, transfers in the first and second periods are increased. The person that is more productive at home has to be compensated for less labor income.

It is also worthwhile to analyze how a change in the tax treatment of marriages affects long-standing families that have already brought up children. Along these lines, consider the introduction of a (partial) income-splitting system at the beginning of the second period. Provided that wages are different, both family members benefit equally. This is ensured by higher transfers from the high-income individual to his/her spouse. The transfer changes according to $dZ^2/d\alpha = (w_m - w_f) (T_m' + T_f')/2$.

Under the assumption on the utility function, the Nash-bargaining procedure ensures a uniform distribution of benefits, whether the tax reform takes place at the beginning or in the middle of the marriage. Not surprisingly, joint taxation requires more redistribution within the family since the primary net market incomes are more unequally distributed. To summarize:

Proposition 1. Both family members benefit equally from the introduction of a weighted income-splitting system. By means of higher transfers it can be ensured that the low-income individual also benefits. If the tax reform is announced at the beginning of the marriage, family members that are differently productive educators specialize even more than under individual taxation.

Note that marriage partners specialize less and benefit less from the weighted income splitting method if constraints on transfers are binding. If even under individual taxation marriage partners cannot realize the optimum transfer in

4. This can be concluded from (10) if the second-order conditions of the family's utility-maximization problem are taken into account.

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the first period due to liquidity constraints, a change in the tax approach towards married couples would not have any effect on the degree of specialization and the well-being of couples.

Married couples would clearly benefit from further steps towards joint taxation. Since joint taxation minimizes taxes, it also maximizes the utility of married couples as long as benefits of leisure are not explicitly taken into account; see, however, Apps and Rees (1988, 1999a, 1999b).

3. ABOLITION OF INDIVIDUAL TAXATION AND FAMILY-SPECIFIC HUMAN CAPITAL INVESTMENT

This section also considers a two-person family. However, it focuses on investment in family-specific human capital before marriage. It is assumed that potential marriage partners already know each other when they acquire household production skills. Investment before marriage, I_i , determines the productivity of individual i in raising children. For simplicity, investment in human capital does not affect the productivity in the outside labor market. Hence, the wage rate, w , is a constant. The outcome of raising children is again an additive function in the time variables R_m and R_f : $\sum_{i=m,f} \beta_i(I_i) R_i$, where $\beta_i(0) > 0$. But the marginal productivity in household production depends on investment and individuals possibly differ in productivity. Therefore, marginal productivity is $\beta_i = \beta_i(I_i) = b_i B(I_i)$, where $B = B(I_i)$ is an increasing and concave function of investment. A person is called more productive than person j if $b_i > b_j$. The costs of investment, whether real or 'psychic', are described by an increasing and convex function $\varphi_i = \varphi(I_i)$. These costs are borne by the investing individual. The total time per person available for working outside and inside the households is again constant and normalized to one. 'Psychic' costs of spending time with the children, ϕ_i , have the same properties as before. To simplify the analysis, the marriage consists of just one period. Furthermore, the tax system is the same as in the previous section.

Once investments are sunk, the two persons under consideration decide on marriage and on the time allocation with respect to raising children. Then, total family utility measured in income terms can be written as⁵

$$\tilde{u} = \sum_{\substack{i=m,f \\ j \neq i}} [(1 - R_i)w - T(\alpha(1 - R_j)w + (1 - \alpha)(1 - R_i)w) - \phi(R_i) + 2\beta_i(I_i)R_i] \quad (11)$$

Either one threatens to refuse marriage, so the fallback of each individual is $\bar{u} = w - T(w)$. The fallbacks of both are the same since, by assumption, family-specific human capital investment has no impact on the wage. Both

5. For simplicity discounting is neglected.

get married only if

$$\sum_{i=m,f} [\Theta_i - T_i] + \sum_{i=m,f} [2\beta_i(I_i)R_i - R_iw - \phi(R_i)] \geq 0 \quad (12)$$

In the following it is assumed that the sum of tax savings and net benefits from having children is positive.

In a Nash-bargaining game the two potential marriage partners decide on the allocation of time and the distribution of utility among them. Because of the linearity, the family distributes resources such that finally member i gets $\tilde{u}/2$.⁶ Given the levels of investment, the family maximizes $\tilde{u}$ by choosing the time allocation. The first-order conditions for an interior solution are:

$$\frac{\partial \tilde{u}}{\partial R_i} = 2\beta_i - w \left[1 - \alpha T'_j - (1 - \alpha) T'_i \right] - \phi'_i = 0 \quad i = m, f, j \neq i \quad (13)$$

The marginal increase in direct utility of brought-up children should be equal to the sum of marginal losses in net labor income and of the marginal 'psychic' costs. Household production time R_i and investment I_i are positively correlated. The higher the marginal productivity in household production, the more time is spent within the household. The two conditions (13) determine functions $R_i(\alpha, I_m, I_f)$, $i = m, f$. Note that under individual taxation the number of hours individual i works in the household is independent of the investment of his/her spouse.

Before marriage each individual decides independently on investment in family-specific human capital. If the individuals take the result of the Nash-bargaining procedure at the wedding day into account, individual i chooses investment so as to maximize $\hat{u}_i = \tilde{u}(\alpha, I_m, I_f)/2 - \varphi(I_i)$. At the Nash equilibrium at the investment stage, the following two first-order conditions are fulfilled:

$$\frac{\partial \hat{u}_i}{\partial I_i} = \frac{1}{2} \left[\frac{\partial \tilde{u}}{\partial R_m} \frac{\partial R_m}{\partial I_i} + \frac{\partial \tilde{u}}{\partial R_f} \frac{\partial R_f}{\partial I_i} \right] + \beta'_i R_i - \varphi'_i = 0 \quad i = m, f \quad (14)$$

Since the term in square brackets is zero, at the Nash equilibrium the marginal increase in children-training productivity should simply be equal to the marginal investment costs. It is assumed that a Nash equilibrium, at which the more productive individual invests more and spends more time with the children, exists. If more than one equilibrium exists, it is further assumed that the most efficient equilibrium is selected. Note that the individual with higher investment expenditures is ultimately less well off since the other person free-rides to a larger extent.

6. Here and in the following, the utility values are evaluated at the optimum time parameter values.

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The Nash equilibrium is inefficient since, at the Pareto optimum, $2\beta'_i R_i = \varphi'_i$ should be fulfilled. Non-altruistic individuals ignore the positive direct impact of their investment on the utility of their (potential) marriage partners. Starting at a Nash equilibrium, the marginal costs of investment and therefore investment itself should be higher. To summarize:

Proposition 2. At the Nash equilibrium, the two non-altruistic individuals would benefit from higher joint investment in family-specific human capital.

Bringing up children is simply a family-specific public good; see, e.g., Lundberg and Pollak (1994) and Konrad and Lommerud (2000). By investing in specific human capital, potential marriage partners voluntarily contribute to the public good. Underprovision due to the opportunity to free-ride is the well-known result. If the investment in family-specific human capital also lowered the wage rate, individuals would strategically reduce investment in order to improve their fallback position. This would aggravate inefficiency.

The conditions (14) determine functions $I_i(\alpha)$, $i = m, f$. Applying the implicit function theorem at $\alpha = 0$ leads to⁷

$$\frac{dI_i}{d\alpha} = \frac{w\beta'_i(T'_i - T'_j + wT''_i(R_j - R_i))}{2\beta'^2_i + (\beta''_i R_i - \varphi''_i)(\phi''_i + w^2 T''_i)} \quad i = m, f, j \neq i \quad (15)$$

A small deviation from individual taxation pushes individual i to invest more if this person has already spent more time with the children and therefore faces a lower marginal tax rate than the spouse. Hence, while the individual that is more productive in the household increases investment, his/her spouse reduces investment. The effect of (partial) joint taxation on total investment is ambiguous and depends on the functional form of costs, taxes, and productivity. Utility changes according to

$$\begin{aligned} \frac{d\hat{u}_i}{d\alpha} &= \frac{\partial \hat{u}_i}{\partial \alpha} + \frac{\partial \hat{u}_i}{\partial I_j} \frac{dI_j}{d\alpha} \\ &= \frac{w(R_m - R_f)(T'_f - T'_m)}{2} + \varphi'_j \frac{w\beta'_j(T'_j - T'_i + wT''_j(R_i - R_j))}{2\beta'^2_j + (\beta''_j R_j - \varphi''_j)(\phi''_j + w^2 T''_j)} \quad i, j = m, f, j \neq i \end{aligned} \quad (16)$$

The direct effect is clearly positive provided that there is some asymmetry in the family. Since the indirect effect is either positive or negative, the sign of the total effect is ambiguous. Either both or only one marriage partner benefit from the step towards joint taxation. There is the possibility that the tax reform harms one individual because his/her (potential) spouse reduces

7. Because of the second-order conditions, the denominator is negative.

investment heavily. Since it is the less productive person that invests less under income splitting, the individual that is more productive in household production might be the one to suffer. The following proposition states this result.

Proposition 3. The individual that is always less productive in household production benefits more than his/her spouse by a small step towards income splitting. The spouse might even be harmed by the change in the tax system.

Since well brought-up children are considered as a public good within the family and investment in household-production-specific human capital is a voluntary contribution to the public good, the results of this section reproduce, in principle, results that have already been discussed in the literature on private provision of public goods.⁸ In fact, Ihori (1996) investigated productivity differentials in contributing to public goods.⁹ He found out that contributors with high productivity do not necessarily achieve high utility levels. The analysis carried out by this paper confirms his result. However, the frameworks employed by Ihori and by this paper differ from each other. While Ihori considered direct contributions to a public good, this paper focuses on more indirect contributions. Both family members jointly decide on the public good quantity by determining the allocation of time. However, the marriage partners independently contribute to the public good by their decisions on their productivity.¹⁰

Finally, all the results were derived in a partial-tax-incidence framework since no government budget constraint has been set up. However, the introduction of a government budget constraint would clearly strengthen the result of the last proposition, particularly if there were only married couples. If the change in the splitting parameter α were offset by some change in the tax function, the probability increases that the more productive partner is harmed.

4. CONCLUDING REMARKS

This paper has analyzed the effects of a deviation from pure individual taxation on marriage partners. The focus was on time allocation, on investment in family-specific human capital and on distribution of income within the family.

The starting point was that the distribution of tax-reduction gains due to the income splitting method depends on whether the family has been started

8. A good introduction to this literature is Bergstrom *et al.* (1986).

9. Buchholz and Konrad (1995) considered productivity differentials and strategic transfers before the contributions have to be made.

10. The interaction between non-cooperative contributions and cooperative contributions determined by Nash bargaining has been discussed by Hoel (1991).

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or not. First, if joint filing is not introduced earlier than the wedding day, both family members benefit. By means of higher transfers it can be ensured that the low-income individual will also benefit. If the tax reform is announced at the beginning of the marriage, family members that are differently productive educators specialize even more than under individual taxation.

Second, if a partial income splitting system is introduced long before marriage, the individual that is always less productive in household production will benefit more than his/her spouse from a small step towards income splitting. The spouse might even be harmed by the change in the tax system.

Not only in Germany is the income splitting system currently being tested. Although the paper has not analytically discussed the complete transition from individual taxation to joint taxation, one is tempted to use the intuition presented in this paper to speculate about a non-marginal reform such as the abolition of joint filing. Already married partners will suffer from the increase in the tax burden. The same holds true for couples that consider marriage at the moment of the reform. These couples will allocate the time more evenly than under the income splitting system. Whether young people that actually organize their education and plan to marry later on benefit or suffer is not clear. Individuals that are more productive in household production and, particularly, in bringing up children might benefit in spite of the higher tax burden for families. Hence, particularly if the additional tax revenue is taken into account, a provocative conclusion of the paper is that young women are certainly the winners provided that women's productivity in bringing up children is higher. Old married couples and young men are the losers in a change from joint taxation to individual taxation.

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