Assortative Mating and Couple Taxation

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Abstract

An often neglected implication of couple taxation is its impact on marital sorting. A tractable model of such an impact is offered in this paper. It reveals that, as compared to joint taxation with income splitting, individual taxation makes higher-ability individuals more picky in the marriage market, which translates into a higher degree of economic homogamy in society. Furthermore, a shift from joint to individual taxation is predicted to reduce the average quality of marriages in the population.

Keywords: economic homogamy, assortative mating, couple taxation, tax unit, progressive income tax.

JEL-Classification: H21, H24.

1 Introduction

The majority of OECD countries taxes the income of couples on an *individual* basis: husband's income and wife's income are separately taxed according to some progressive tax schedule. This contrasts with countries such as Germany and France, where *joint taxation with splitting* is in place: the spouses' incomes are added together and taxed as if they had each earned one half of their total income. These countries experience recurrent debates about the pros and cons of a possible reform that would replace the existing form of joint taxation with individual taxation. The current short paper sheds some light on the consequences that such a reform would have for the pattern of couple formation, in particular the degree of economic homogamy resulting from marital sorting.

Economic homogamy, also referred to as positive assortative mating, refers to the relative closeness of the socio-economic backgrounds of spouses. It occurs whenever the observed probability that a wife from a certain skill group is married to a husband from the same skill group is larger than the probability implied by random matching. Economic homogamy is an empirically well-documented feature of married couples for all countries for which data are available. An increase in the degree of economic homogamy has been observed in various countries during the last decades and found to be a significant driver of the long-term rise of household income inequality (see e.g. Eika *et al.*, 2019; Frémeaux and Lefranc, 2020; Azzolini *et al.*, 2023). Furthermore, economic homogamy has been empirically found to enhance social stratification and to reduce intergenerational mobility (see e.g. Ermisch *et al.*, 2006; Guell *et al.*, 2015; Neidhöfer *et al.*, 2018; Collado *et al.*, 2023). This paper scrutinizes in a theoretical model the intuitive idea that how couples are taxed is likely to affect the pattern of marriage and thus the degree of economic homogamy in society.

How couples should be taxed is an intricate issue in the literature on optimal taxation.[1] In that literature, the pattern of marriage is typically assumed to be exogenously given. For instance, Kleven *et al.* (2009) assume that couples have uncorrelated earning abilities, so that there is no assortative mating. Simulation exercises that compare individual taxation to joint taxation with splitting, like Decoster and Haan (2014), usually suppose the pattern of marital sorting to be fixed at the observed one. As theoretically shown by Cremer *et al.* (2012), the type of correlation of wages within couples is a key ingredient in determining how couples should be taxed. Roughly speaking, a low correlation tends

[1] Apps and Rees (2009) provide a thoughtful discussion of the literature.

to make it more likely that individual taxation is socially desirable, whereas positive assortative mating tends to make unitary taxation more desirable. Frankel (2014) shows that the prevailing pattern of mating matters for optimal taxation in a simple quasi-linear model with two types.

Another strand of literature, the one on the economics of marriage, suggests instead that the pattern of mating should not be considered exogenous because income taxation does shape the incentive whether and whom to marry. In particular, Konrad and Lommerud (2010) show in a simple model that increasing the degree of redistribution achieved by income taxation tends to encourage marriage between high-skilled and low-skilled individuals. Moreover, this effect enhances social welfare because the utility gain for the low-skilled exceeds the utility loss for the high-skilled.

The setup investigated by Konrad and Lommerud (2010) is one where couples are taxed on an individual basis, labor supply is exogenous, and the tax schedule is linear. In the literature on optimal taxation, the only paper that takes the impact of taxation on the marriage market into account is the one by Gayle and Shephard (2019). In their model, spouses are egoistic and, when marrying, they commit to some relative bargaining power that will determine how they divide the surplus from marriage. The model of Gayle and Shephard (2019) is relatively complex and its authors simulate it using US data from 2006. Their simulations suggest that the tax system has a substantial impact on the pattern of marital sorting. Their simulated comparison between individual taxation and joint taxation with splitting has economic homogamy being uniformly higher under individual taxation (see their online appendix H.4).

The current paper adopts an applied-theory perspective, comparing the degree of assortative mating that arises in equilibrium under individual vs. joint taxation with splitting for a given but arbitrary progressive tax schedule and, like Konrad and Lommerud (2010) but differently from the optimal taxation literature, with exogenous labor supply. The proposed model is simple, exhibits crystal-clear equilibrium relationships, and produces sharp predictions. This type of applied analysis, despite being just a first pass, can usefully inform the tax-policy debate, as demonstrated e.g. by Fraser (1986), who pointed out the impossibility of having a tax system that is directly progressive, has couples with equal income paying equal taxes, and where no marriage tax or subsidy exists. In a related setting, Corneo (2013) showed that the choice of the tax unit has distinctive implications for the amount of consumption insurance implicitly offered by the tax system. Arguably, the impact of the tax system on economic homogamy is one of various ingredients that are likely to guide real-world legislators when deciding about how couples should be taxed.

My analysis employs and slightly generalizes the matching model proposed by Fernandez *et al.* (2005), which appears to be the most quoted article on the theory of marital sorting of the last five decades - that is, after Gary Becker's seminal articles on the theory of marriage. In that model, individuals differ according to their skill level, which is positively associated with their market income. The matching process is a two-stage, universal to segmented social-interaction process. In its first stage, everybody can meet everybody else, while in the second stage individuals only meet individuals that belong to the same skill group. Following Fernandez *et al.* (2005), as well as the bulk of the theory on optimal taxation, I assume a unitary model of couples in which the spouses partake in a common utility derived from consumption and the match-specific quality of their marriage (referred to as "love" by Fernandez *et al.*). To the setting of Fernandez *et al.* (2005), I add income taxation. There is a status quo in which couples are taxed according to joint taxation with splitting and there is a reform scenario that replaces it with individual taxation. I study how such a reform affects the equilibrium level of economic homogamy. Section 2 performs the analysis in the two-groups case considered by Fernandez *et al.* (2005); Section 3 addresses the case of more than two skill groups. In both cases I find that, as compared to joint taxation with income splitting, individual taxation makes higher-ability individuals more picky in the marriage market; the reform would therefore increase the degree of economic homogamy. Furthermore, a reform toward individual taxation is predicted to reduce the expected quality of marriage for individuals of all skill groups. In this sense, individual taxation is "love-dominated" by joint taxation with splitting.

2 Model

2.1 Assumptions

As in Fernandez *et al.* (2005), there are two identical continua of mass one to be matched with each other to form a continuum of mass one of married couples. For simplicity, I refer to those continua as men and women. Each individual is either unskilled (L) or skilled (H). A skilled individual earns an income y_H, while an unskilled individual earns income y_L, with $y_H > y_L \geq 0$. The proportion of skilled individuals in the population is denoted by λ. Without any loss of generality, I posit $\lambda \leq 1/2 \leq 1 - \lambda$, which captures the empirical regularity that median income is less than average income.

Individuals in a couple obtain utility from joint consumption and the match-specific quality of their marriage ("love"). A couple's utility function reads

$$U = u(c) + m, \tag{1}$$

where c is consumption, $u' > 0$, and m is the quality of their match. Consumption levels are denoted by c_{HH} for skilled couples, c_{LL} for unskilled couples, and c_{HL} for mixed ones, with $c_{HH} > c_{HL} > c_{LL} \geq 0$. These consumption levels will be determined by the tax system.

The formation of couples occurs in a two-rounds, general-to-segmented, interaction process. In its first round, all individuals randomly meet one of the opposite sex and draw a random match-specific quality. These quality draws are i.i.d. draws from a continuous cumulative distribution F with density function $f = F'$, defined on the positive orthant and with expected value $E(m) = \mu > 0$. In order to ensure an interior equilibrium, I posit $f(m) > 0$, $\forall m > 0$. If the match in the first round is accepted by both individuals, they form a married couple. Otherwise, the individuals enter a second round of social interaction that is skill-specific, i.e. individuals are matched only with individuals from the same skill group. Match qualities in this second round are again i.i.d. draws from the distribution F.

I follow Fernandez *et al.* (2005) also in assuming that $m = 0$ if an individual remains single; together with the assumption that m is non-negative, this ensures that in equilibrium all individuals form a couple. In the Appendix, I examine a more general setup in which the stand-alone match quality is positive and some individuals remain single in equilibrium. All results from the main text carry over to that setup. Furthermore, the following additional result is proved: shifting from joint to individual taxation increases the share of the population that never marries.

The government raises money by means of a progressive income tax and is subject to an exogenous revenue constraint. The directly progressive income tax schedule $T(y)$ satisfies the usual conditions $T(0) \leq 0$, $0 < T' < 1$ and $T'' > 0$. In the status quo, couples are taxed according to joint taxation with income splitting: the spouses' incomes are added together and taxed as if they had each earned one half of their total income. After the reform, individual taxation is adopted, which means that each spouse's income is separately taxed. The reform must raise at least as much tax revenue as in the status quo.

2.2 Couple Formation

Since the matching model is the same as in Fernandez *et al.* (2005), I will briefly summarize their analysis. Consider first two individuals of different skill that happen to meet in the first round and discover that their match quality is m. Reasoning by backward induction, the skilled individual's second-round option dominates the one of the unskilled individual - because the former is sure to find a partner with a higher income if they get into the second round. Hence, it is the skilled individual who actually determines whether they will marry. Marriage between differently skilled individuals will therefore occur if and only if

$$u(c_{HL}) + m \geq u(c_{HH}) + \mu. \tag{2}$$

This condition implies a threshold match quality,

$$\hat{m} = u(c_{HH}) - u(c_{HL}) + \mu, \tag{3}$$

that must necessarily be achieved in the first round if a mixed couple is to be formed. Clearly, $\hat{m} > \mu$.

Consider now the case of individuals who, in the first round, meet somebody from the same skill group. Since the income they expect to find in a partner in the second round is the same as in the first round, individuals will marry in the first round if and only if their match quality is larger than its expected value μ.

In equilibrium, the mating pattern in the population can be fully characterized by three items: the cumulative distribution function F, the proportion λ, and the threshold $\hat{m}$. Let's denote by β the share of mixed couples in the couple population. In the first round, the share of meetings between two individuals of different skill is given by $2\lambda(1-\lambda)$. The fraction of such meetings that end up in a marriage is given by $1 - F(\hat{m})$, the probability that the match quality exceeds $\hat{m}$. Thus, the share of mixed couples in the overall population of couples is given by

$$\beta = 2\lambda(1-\lambda)[1 - F(\hat{m})]. \tag{4}$$

Using gender symmetry, it is easy to verify that the share of skilled couples in equilibrium must be $\lambda - \beta/2$ and the share of unskilled couples is $1-\lambda-\beta/2$. Their sum, $1-\beta$, measures the extent of economic homogamy in the population, i.e. the share of couples in which the spouses have identical skill. Notice for later use that by (4) we have $\beta \in (0, 2\lambda(1-\lambda))$ in equilibrium.

The equilibrium pattern of marriage diverges from random matching, the more so, the larger is $F(\hat{m})$. As shown by Fernandez *et al.* (2005), $F(\hat{m})$ is the correlation coefficient between skill types of spouses. That coefficient and the share of mixed couples, β, are negatively related to each other through (4). The extent of economic homogamy in the population, $1 - \beta$, is thus a measure of positive assortative mating in the population.

2.3 Taxation and Homogamy

I now introduce taxation in the model. In the status quo, couples are subject to joint taxation with income splitting. The resulting pattern of couple formation exhibits some equilibrium share β of mixed couples and a corresponding degree of assortativeness. How does assortativeness change if joint taxation is replaced with with individual taxation?

Because the tax schedule $T(y)$ is directly progressive, joint taxation implies a splitting gain as compared to individual taxation. This means that the reform toward individual taxation creates some fiscal space. The additional tax revenue can be redistributed by means of some tax rebates σ_s, $s \in \{L, H\}$. I restrict the attention to tax rebates (σ_L, σ_H) that fulfill the following three requirements: (i) total net tax revenue is at least as large as in the status quo; (ii) $\sigma_s \geq 0, \forall s \in \{L, H\}$; (iii) no re-ranking occurs, i.e. $y_L - T(y_L) + \sigma_L < y_H - T(y_H) + \sigma_H$. The last requirement is not necessary for the results but helps shortening the proofs. Arguably, tax cuts that do not fulfill these requirements are unlikely to be part of a politically feasible reform in the real world.

Under the foregoing assumptions, the following result can be established:

Proposition 1. *Economic homogamy necessarily increases after switching to individual taxation.*

Proof. I use superscripts i and j for, respectively, individual taxation and joint taxation with splitting. In the status quo, total tax revenue is given by

$$R^j = (\lambda - \frac{\beta}{2})2T(y_H) + (1 - \lambda - \frac{\beta}{2})2T(y_L) + \beta 2T(\frac{y_H + y_L}{2}). \tag{5}$$

After the reform introducing individual taxation, the tax revenue, net of rebates, is independent of marital sorting and amounts to

$$R^i = 2\lambda[T(y_H) - \sigma_H] + 2(1 - \lambda)[T(y_L) - \sigma_L]. \tag{6}$$

Combining (5) and (6) yields the set of all tax rebates (σ_L, σ_H) that are consistent with the revenue requirement $R^i \geq R^j$:

$$2[\lambda\sigma_H + (1 - \lambda)\sigma_L)] \leq \beta V, \tag{7}$$

where $V \equiv T(y_H) + T(y_L) - 2T(\frac{y_H + y_L}{2})$ is the splitting gain under joint taxation. Since $T(.)$ is directly progressive, $V > 0$.

As shown by (4), economic homogamy is a strictly increasing function of the threshold quality $\hat{m}$. Let (σ_L^*, σ_H^*) denote the tax rebates that minimize the threshold quality $\hat{m}^i$ under individual taxation, as determined by (3). Formally, (σ_L^*, σ_H^*) is a solution to the following problem

$$min\ u(c_{HH}^i) - u(c_{HL}^i) + \mu$$

subject to

$$c^i_{HH} = 2[y_H - T(y_H) + \sigma_H]$$
$$c^i_{HL} = y_H + y_L - T(y_H) - T(y_L) + \sigma_H + \sigma_L$$
$$2[\lambda\sigma_H + (1-\lambda)\sigma_L)] \leq \beta V$$
$$\sigma_s \geq 0,\ \forall s \in \{L, H\}.$$

Denote by m^{*i} the value of the so minimized threshold. By (3), economic homogamy is necessarily higher under individual taxation if

$$m^{*i} > \hat{m}^j.$$

This condition can be written as,

$$u(c^{*i}_{HH}) - u(c^j_{HH}) > u(c^{*i}_{HL}) - u(c^j_{HL}),$$

with obvious notation. In order to show that this inequality is always satisfied, notice that its LHS is non-negative because $\sigma^*_H \geq 0$ and $u' > 0$. Its RHS is strictly negative if and only if

$$c^{*i}_{HL} < c^j_{HL},$$

which is equivalent to

$$\sigma^*_H + \sigma^*_L < V. \tag{8}$$

There are two cases to consider. First, suppose that $\sigma^*_H = \sigma^*_L = 0$, i.e. no tax rebates are granted. Then, (8) is immediately satisfied because $V > 0$. Second, suppose that at least one of the tax rebates is strictly positive. By (7), we have that $V \geq (2/\beta)[\lambda\sigma^*_H + (1-\lambda)\sigma^*_L)]$. Hence, a sufficient condition for inequality (8) to be met is

$$\sigma^*_H + \sigma^*_L < \frac{2}{\beta}[\lambda\sigma^*_H + (1-\lambda)\sigma^*_L)],$$

which can be rewritten as

$$(2\lambda - \beta)\sigma^*_H + [2(1-\lambda) - \beta]\sigma^*_L > 0.$$

This inequality is necessarily true because in equilibrium $\beta < 2\lambda(1-\lambda) < 2\lambda \leq 2(1-\lambda)$ and at least one among σ^*_H and σ^*_L is strictly positive. □

A shift to individual taxation is thus predicted to raise the degree of economic homogamy: as the splitting gain disappears, the high-skilled individuals in the marriage market become more picky and the resulting marital sorting exhibits a more assortative mating. Strikingly, this result holds for all possible tax rebates that may accompany the shift to individual taxation. Notice that the no re-ranking requirement was not invoked in the proof of Proposition 1, but is mechanically satisfied by the homogamy-minimizing rebates (σ_L^*, σ_H^*). To see it, recall that we showed $c_{HL}^{*i} < c_{HL}^j$. Since $c_{HL}^j < c_{HH}^j \leq c_{HH}^{*i}$, by transitivity we have $c_{HL}^{*i} < c_{HH}^{*i}$, which implies no re-ranking.

Building on Proposition 1, the following insight can be gained:

Proposition 2. *The average quality of marriage is lower for every skill group after switching to individual taxation.*

Proof. Consider first the group of unskilled individuals. By the law of large numbers, their average quality of marriage is their expected quality ex ante. In equilibrium, it is given by

$$E(m|L) = \lambda \left\{ F(\hat{m})\mu + [1 - F(\hat{m})] \frac{\int_{\hat{m}}^{\infty} xf(x)dx}{1 - F(\hat{m})} \right\} + (1-\lambda) \left\{ F(\mu)\mu + \int_{\mu}^{\infty} xf(x)dx \right\}. \quad (9)$$

This expression obtains from going through the process of couple formation. For example, its first term obtains because in the first round a meeting with a high-skilled individual occurs with probability λ and is rejected with probability $F(\hat{m})$; then, the second round is reached, and a union of average quality μ is expected. By the same token, the expected quality of marriage for a high skilled individual is given by

$$E(m|H) = \lambda \left\{ F(\mu)\mu + \int_{\mu}^{\infty} xf(x)dx \right\} + (1 - \lambda) \left\{ F(\hat{m})\mu + \int_{\hat{m}}^{\infty} xf(x)dx \right\}. \quad (10)$$

As shown by these formulas, the only channel through which taxation affects expected qualities of marriage is the threshold match quality $\hat{m}$, which depends on the tax system. As shown in the proof of Prop. 1, that threshold strictly increases if individual taxation is adopted. Therefore, the current proposition is proved if the expected qualities of marriage (8) and (9) are decreasing in the threshold match quality $\hat{m}$. We have,

$$\frac{\partial E(m|L)}{\partial \hat{m}} = \lambda \left[f(\hat{m})\mu - \hat{m}f(\hat{m}) \right] < 0,$$

$$\frac{\partial E(m|H)}{\partial \hat{m}} = (1 - \lambda)f(\hat{m})[\mu - \hat{m}] < 0,$$

because $\hat{m} > \mu$ in equilibrium. □

The intuition is straightforward. Under individual taxation, the high-skilled individuals become more picky and give up some high-quality first-round relationships with low-skilled individuals that would instead have led to marriage under joint taxation. The so dissolved first-round relationships are finally replaced by married relationships within one's own skill group; but these are only of average quality. Therefore, individual taxation lowers the social efficiency of love production and consumption as compared to joint taxation with splitting.

3 More Than Two Groups

In the foregoing two-groups model, an increase of homogamy in one skill group necessarily means that homogamy also increases in the other one. This Section extends the analysis to an arbitrary number of skill groups where this is no more the case. In a model with more than two groups, it is a priori possible that in the wake of a tax reform, homogamy increases within some groups, while decreasing in others. This eventuality raises two issues. First, comparing systems of couple taxation would require to select a weighting scheme to aggregate the various increases and decreases of homogamy across groups. Second, those changes would depend in equilibrium on the assumed environment, in particular on the distribution F of match qualities, about which little is empirically known. Both issues can be sidestepped if homogamy-dominance is employed as a criterion for comparison. This is the route that I will follow in this Section. It means comparing the two systems of couple taxation in terms of a higher degree of homogamy within *all* skill groups.

Suppose that there is a finite number $S \geq 3$ of skill groups, denoted by the index $s \in \{1, 2..., S\}$. They are ordered by increasing income, so that $y_{s+1} > y_s$ for all s. The mass of group s within each continuum is denoted by ω_s, with $\sum_{s=1}^{S} \omega_s = 1$. Similarly to Fernandez *et al.* (2005), the formation of couples occurs in a two-rounds, general-to-segmented, interaction process. In its first round, all individuals randomly meet one of the opposite sex and draw a random match-specific quality. If both individuals agree, they form a couple and marry. Otherwise, individuals enter a second round of social interaction that is skill-specific, i.e. individuals are matched only with individuals from the same skill group. In the status quo, joint taxation with income splitting is implemented. The equilibrium share of mixed couples with one spouse from group s and one from group z is denoted by β_{zs}. The same assumptions about the distribution of match quality F as above ensure that the equilibrium is interior, i.e. all β_{zs} are strictly positive.

I consider different scenarios that replace status-quo taxation with individual taxation, starting with a *straight* reform. A straight reform is one in which only the rule of couple taxation is changed; the increased tax revenue generated by individual taxation is not given back to taxpayers; it is used e.g. to finance some public goods that enter separately the utility function and thus generate no incentive effects on couple formation.

Proposition 3. *A straight reform toward individual taxation increases homogamy within each skill group.*

Proof. Equilibrium couple formation in the first round obeys the same logic as in the two-groups case. If two individuals from the same skill group meet, they marry if and only if their match quality is larger than μ. Otherwise, the individual from the higher-skill group is pivotal. For any $z > s$, marriage occurs if and only if the match quality is larger than a threshold

$$\hat{m}_{zs} = u(c_{zz}) - u(c_{zs}) + \mu. \tag{11}$$

Clearly, $\hat{m}_{zs} > \mu$. A sufficient condition for homogamy to increase in each group after the introduction of individual taxation is

$$\hat{m}^i_{zs} > \hat{m}^j_{zs},$$

for all z, s, with $z > s$. This is equivalent to

$$u(c^i_{zz}) - u(c^j_{zz}) > u(c^i_{zs}) - u(c^j_{zs}). \tag{12}$$

Under a straight reform there are no tax rebates, so that the LHS of (12) equals zero. Its RHS is strictly negative if and only if

$$c^i_{zs} < c^j_{zs},$$

which is equivalent to

$$0 < V_{zs},$$

where $V_{zs} \equiv T(y_z) + T(y_s) - 2T(\frac{y_z+y_s}{2})$ is the splitting gain at incomes y_z and y_s. Because of tax progressivity, $V_{zs} > 0$. □

I now turn to what I call a *realistic* reform: one in which the transition to individual taxation has to leave the overall net tax burden unchanged. In this scenario, the entire fiscal space created by individual taxation is used to finance tax rebates. I posit that budget neutrality is implemented by some convex combination of three common tax policies: a uniform reduction of marginal tax rates, a proportional reduction of income tax liabilities, and a reduced taxation of consumption. The resulting total tax rebate for a taxpayer with skill s is denoted by σ_s. By the same steps as in the proof of Proposition 1, budget neutrality implies the equivalent of (7), which now reads

$$2\sum_{s=1}^{S}\omega_s\sigma_s = \sum_{z>s}\sum_{s=1}^{S-1}\beta_{zs}V_{zs}. \tag{13}$$

Proposition 4. *Assume that $u(.)$ is logarithmic. Any realistic reform toward individual taxation increases homogamy within each skill group.*

Proof. As shown in the proof of Prop. 3, a sufficient condition for homogamy to increase in each group after switching to individual taxation is that (12) applies to all z, s, with $z > s$. Since $u(.)$ is logarithmic, condition (12) is equivalent to

$$\frac{c^i_{zz}}{c^j_{zz}} > \frac{c^i_{zs}}{c^j_{zs}}. \tag{14}$$

Inserting in (14) the respective consumption values yields,

$$\frac{y_z - T(y_z) + \sigma_z}{y_z - T(y_z)} > \frac{y_z + y_s - T(y_z) - T(y_s) + \sigma_z + \sigma_s}{y_z + y_s - 2T\left(\frac{y_z+y_s}{2}\right)}.$$

Rearranging terms and using the definition of splitting gain yields,

$$[y_z - T(y_z)][V_{zs} - \sigma_z - \sigma_s)] + \sigma_z[y_z + y_s - 2T(y_z + y_s/2)] > 0.$$

The LHS of this inequality can be expressed as the sum of two terms:

$$[y_z - T(y_z) + \sigma_z]V_{zs} + \{\sigma_z[y_s - T(y_s)] - \sigma_s[y_z - T(y_z)]\} > 0.$$

Its first term, $[y_z - T(y_z) + \sigma_z]V_{zs}$, is strictly positive. Hence, a sufficient condition for that inequality to be met is that the term in braces be non-negative, which is equivalent to:

$$\frac{\sigma_z}{\sigma_s} \geq \frac{y_z - T(y_z)}{y_s - T(y_s)}. \tag{15}$$

In what I have called a realistic reform, tax rebates are a convex combination of three instruments: a uniform reduction of marginal tax rates, yielding some rebate $\delta^m y$, with $\delta^m \geq 0$; a proportional reduction of income tax liabilities, yielding some rebate $\delta^a T(y)$, where $\delta^a \geq 0$ is the corresponding uniform reduction of average tax rates; a reduced taxation of consumption, yielding some rebate $\delta^c[y - T(y)]$, with $\delta^c \geq 0$. The total tax rebate received by a member of skill group s is thus given by:

$$\sigma_s = \delta^m y_s + \delta^a T(y_s) + \delta^c[y_s - T(y_s)].$$

The policy parameters δ^m, δ^a, δ^c have to ensure budget neutrality, i.e. they jointly satisfy (13).

Given such tax rebates, condition (15) - which is sufficient to prove the claim - reads,

$$\frac{\delta^m y_z + \delta^a T(y_z) + \delta^c[y_z - T(y_z)]}{\delta^m y_s + \delta^a T(y_s) + \delta^c[y_s - T(y_s)]} \geq \frac{y_z - T(y_z)}{y_s - T(y_s)}.$$

Rearranging terms and simplifying yields

$$(\delta^a + \delta^m)[y_s T(y_z) - y_z T(y_s)] \geq 0.$$

This inequality is satisfied if

$$\frac{T(y_z)}{y_z} \geq \frac{T(y_s)}{y_s},$$

which is true because $y_z > y_s$ and $T(y)$ is progressive. □

Notice that, as compared to Proposition 1, this result is less general as it assumes certain classes of tax rebates and preferences. This is due to the fact that homogamy-dominance is a more demanding criterion with more than two skill groups. However, the particular assumptions of Proposition 4 about tax rebates and preferences can be relaxed in various ways, as I am going to illustrate.

Let us begin with an extension that concerns the specific form of the tax rebates. The previous assumption of a realistic reform can be generalized so as to allow for all tax rebates that satisfy the revenue constraint $R^i \geq R^j$ and can formally be described by some arbitrary function of the taxpayer's income, $\sigma(y)$, satisfying $\sigma(y) \geq 0$ and $\sigma'(y) \geq 0$ for all $y \geq 0$. Let $\epsilon \equiv (d\sigma/dy)(y/\sigma)$ denote the income elasticity of the tax rebate function and let $\rho \equiv \{d[y - T(y)]/dy\}\{y/[y - T(y)]\}$ denote the residual elasticity of the tax schedule. As it is well-known, ρ is an inverse measure of tax progressivity and $\rho < 1$ for all progressive tax schedules. The following result can be established.

Proposition 5. *Assume that $\sigma(.)$ satisfies $\epsilon \geq \rho$ and that $u(.)$ is logarithmic. Any reform toward individual taxation increases homogamy within each skill group.*

Proof. The assumption $\epsilon \geq \rho$ implies

$$\frac{\sigma'(y)}{\sigma(y)} \geq \frac{1 - T'(y)}{y - T(y)},$$

or, equivalently,

$$\sigma'(y-T) - \sigma(1-T') \geq 0.$$

This inequality implies

$$\frac{d\left[\frac{\sigma(y)}{y-T(y)}\right]}{dy} \geq 0.$$

For any y_z and y_s with $y_z > y_s$, we must therefore have

$$\frac{\sigma(y_z)}{y_z - T(y_z)} \geq \frac{\sigma(y_s)}{y_s - T(y_s)}, \tag{16}$$

which implies (15), which is a sufficient condition for homogamy to increase if utility is logarithmic. □

The next result does away with the assumption about the income elasticity of the tax rebate and only maintains the requirement $\sigma' \geq 0$. Furthermore, instead of a logarithmic utility, it requires that the utility from consumption be linear. Linear utility is also assumed by Konrad and Lommerud (2010); it may be interpreted as a first-order approximation to some arbitrary non-linear utility function.

Proposition 6. *Assume that $u(.)$ is linear. Any reform toward individual taxation increases homogamy within each skill group.*

Proof. As shown in the proof of Prop. 3, inequality (12) for all z, s, with $z > s$, is a sufficient condition for homogamy to increase within each group after the introduction of individual taxation. Under linearity, (12) is equivalent to

$$c^i_{zz} - c^j_{zz} > c^i_{zs} - c^j_{zs}. \tag{17}$$

Inserting in (17) the respective consumption values and simplifying yields,

$$2\sigma(y_z) > \sigma(y_z) + \sigma(y_s) - V_{zs},$$

or

$$V_{zs} + \sigma(y_z) - \sigma(y_s) > 0,$$

which is true because $V_{zs} > 0$, $y_z > y_s$, and $\sigma'(y) \geq 0$. □

Notice that a special case covered by Proposition 6 is the one in which the tax rebates take the form of a demogrant - and thus $\sigma'(y) = 0$.

The final result extends Proposition 2 to the case of more than two skill groups.

Proposition 7. *All reforms toward individual taxation considered in Propositions 3 - 6 decrease the average quality of marriage for every skill group.*

Proof. The proof mirrors the one of Prop. 2 and is therefore only sketched. By the law of large numbers, average and expected quality of marriage coincide. For any group s, expected marriage quality in equilibrium is given by

$$E(m|s) = \sum_{r \neq s} \omega_r \left\{ F(\hat{m}_{sr})\mu + \int_{\hat{m}_{sr}}^{\infty} x f(x) dx \right\} + \omega_s \left\{ F(\mu)\mu + \int_{\mu}^{\infty} x f(x) dx \right\}. \tag{18}$$

All reforms toward individual taxation considered above imply a strict increase of all thresholds $\hat{m}_{sr}$. All partial derivatives of (18) with respect to the thresholds are negative, which shows that the expected quality of marriage falls after a reform, for every s. □

4 Conclusion

This short paper has developed a tractable model of the impact of couple taxation on assortative mating. A reform from joint taxation with income splitting to individual taxation is predicted to increase economic homogamy and reduce the average quality of marriage for all skill groups in the population. The intuition behind this result is easy to grasp. Under individual taxation, the high-skilled individuals in the marriage market become more picky because of the loss of the splitting gain. Therefore, they sever some initial high-quality relationships with low-skilled individuals that would have instead turned into marriages under joint taxation. The so dissolved relationships are finally replaced by in-group unions. Such marriages increase the consumption level of the high-skilled but their quality ("love") is just average. In this dimension, they are thus inferior to those dissolved relationships with low-skilled partners.

The model analyzed in this paper lends itself to multiple extensions. I have only considered the two most salient forms of couple taxation: joint taxation with splitting and individual taxation. There exist several hybrid forms of couple taxation that could be analyzed in a similar way. The model itself could be enriched by adding more dimensions to the matching process and allowing for endogenous and uncertain earnings. These and related questions are left for future research.

APPENDIX

This Appendix offers an extended version of the model of Sect. 2 in which some individuals remain single in equilibrium. As in that model, Eq. (1) keeps describing a couple's utility function. A single's utility function is given by

$$U_0 = v(c) + m_0,$$

where $m_0 \geq 0$ is the quality of the stand-alone match and the utility from consumption satisfies $v(c) = u(2c)$, $\forall c \geq 0$. In the special case $m_0 = 0$ the current framework is identical to the one in the main text. Therefore, I will focus on the case $m_0 > 0$. The assumption about $v(.)$ captures income pooling and generalizes the assumption made by Konrad and Lommerud (2010), who additionally posit that v and u are linear. As explained by them, less extreme assumptions than income pooling would not qualitatively affect the results.

Let us investigate couple formation in this extended model. Differently from the model in the main text, in the second round, some individuals prefer not to marry. Clearly, these are the individuals for whom $m < m_0$. Contingent on having reached the second round, the probability to marry is therefore given by $1 - F(m_0) \equiv p < 1$.

In the first round, potential spouses correctly take into account their outcomes in a possible second round. If two skilled individuals meet in the first round, their marriage occurs if and only if

$$u(c_{HH}) + m \geq p \left[u(c_{HH}) + \frac{\int_{m_0}^{\infty} x f(x) dx}{1 - F(m_0)} \right] + (1 - p)[v(c_H) + m_0].$$

Using $v(c) = u(2c)$ and simplifying terms, this condition boils down to $m \geq \bar{\mu}$, where $\bar{\mu} \equiv (1 - p)m_0 + \int_{m_0}^{\infty} x f(x) dx > \mu$. The same result obtains if two unskilled individuals meet.

Consider now two individuals of different skill. As in the model in the main text, the skilled individual's second-round option dominates the one of the unskilled individual. Hence, it is the skilled individual who actually determines whether they will marry. Using $v(c) = u(2c)$, marriage occurs if and only if

$$u(c_{HL}) + m \geq u(c_{HH}) + \bar{\mu}.$$

This condition implies a threshold match quality,

$$\hat{m} = u(c_{HH}) - u(c_{HL}) + \bar{\mu}, \tag{19}$$

that must necessarily be achieved in the first round if a mixed couple is to be formed.

Comparison of Eq. (19) with Eq. (3) in the main text immediately reveals that the analysis of marital sorting is qualitatively identical in the two cases. Hence, in equilibrium, the fraction of mixed couples under individual taxation must be smaller than the fraction of mixed couples under joint taxation with splitting, and economic homogamy increases after a reform. Similarly, all Propositions in Sect. 3 carry over to a generalized model with more than two skill groups in which some individuals remain single in equilibrium.

The extended model in this Appendix delivers a novel result about the effect of couple taxation on the share of the population that does not marry. Among all individuals who reach the second round, the share of those who remain single is given by $1 - p$, which is independent of how couples are taxed. However, the share of the population that reaches the second round is larger if individual taxation is adopted, because the threshold match quality for accepting a marriage with someone with a lower skill level in the first round is higher. Hence, in equilibrium, the fraction of singles in the population must be higher under individual taxation than under joint taxation with splitting.

References

Apps, P. and R. Rees (2009), Public Economics and the Household, Cambridge University Press, Cambridge.

Azzolini, L., Breen, R. and B. Nolan (2023), Demographic behaviour and earnings inequality across OECD countries, *Journal of Economic Inequality* 21, 441-461.

Collado, M. D., Ortuno-Ortín, I. and J. Stuhler (2023), Estimating intergenerational and assortative processes in extended family data, *Review of Economic Studies* 90, 1195-1227.

Corneo, G. (2013), A note on the taxation of couples under income uncertainty, *Finanzarchiv / Public Finance Analysis* 69, 129-134.

Cremer, H., Lozachmeur, J. and P. Pestieau (2012), Income taxation of couples and the tax unit choice, *Journal of Population Economics* 25, 763-778.

Decoster, A. and P. Haan (2014), Welfare effects of a shift to individual taxation in the German personal income tax, *Finanzarchiv / Public Finance Analysis* 70, 599-624.

Eika, L., Mogstad, M. and B. Zafar (2019), Educational assortative mating and household income inequality, *Journal of Political Economy* 127, 2795-2835.

Ermisch, J., Francesconi, M. and T. Siedler (2006), Intergenerational mobility and marital sorting, *Economic Journal* 116, 659-679.

Fernandez, R., Guner, N. and J. Knowles (2005), Love and money: A theoretical and empirical analysis of household sorting and inequality, *Quarterly Journal of Economics* 120, 273-344.

Frankel, A. (2014), Taxation of couples under assortative mating, *American Economic Journal: Economic Policy* 6, 155-177.

Fraser, J. (1986), The marriage tax, *Management Science* 32, 831-40.

Frémeaux, N. and A. Lefranc (2020), Assortative mating and earnings inequality in France, *Review of Income and Wealth* 66, 757-783.

Gayle, G.-L. and A. Shephard (2019), Optimal taxation, marriage, home production, and family labor supply, *Econometrica* 87, 291-326.

Guell, M., Rodriguez Mora J.V. and C.I. Telmer (2015), The informational content of surnames, the evolution of intergenerational mobility, and assortative mating, *Review of Economic Studies* 82, 693-735.

Kleven, H.J., Kreiner, C.T. and E. Saez (2009), The optimal income taxation of couples, *Econometrica* 77, 537-560.

Konrad, K.A. and K.E. Lommerud (2010), Love and taxes - and matching institutions, *Canadian Journal of Economics* 43, 919-939.

Neidhöfer, G., Serrano, J. and L. Gasparini (2018), Educational inequality and intergenerational mobility in Latin America: A new database, *Journal of Development Economics* 134, 329-349.