Gender norms, work hours, and corrective taxation

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Abstract

This paper deals with optimal income taxation based on a household model, where men and women allocate their time between market work and household production, and where households differ depending on which spouse has the comparative advantage in market work. The purpose is to analyze the tax policy implications of gender norms represented by a market work norm for men and household work norm for women. We show how the optimal (corrective) tax policy depends on the definition of social norms, the preferences for obeying these norms, and whether men or women have the comparative advantage in market work. Two extreme results are that (i) corrective taxation should not be used at all if the norms are based on the mean value of market work and household work, respectively, given that all households have the same preferences, and (ii) only the majority household type should be taxed at the margin if the norms are instead based on the modal value.

1. Introduction

Although women’s hours of market work and men’s contribution to household work have increased during the latest decades, women still do considerably more household work and less market work than men. According to the U.S. Bureau of Labor Statistics (2010), US wives do 80% more household work and spend one third less time in market work than their husbands. Also, women working full time in the labor market seem to do more household work than their male counterparts (Berardo, Shehan, and Gerald, 1987; Gershuny and Sullivan, 2003; Sullivan, 2000). Therefore, Becker’s (1981) description of an efficient household, where the allocation of time between household work and market work is based solely on comparative advantage, might not give the whole picture. Instead, a considerable amount of evidence suggests that gender norms, or gender ideology more generally, are also important determinants of how spouses allocate their time (e.g., Bianchi et al., 2000; Geist, 2005; Greenstein, 1996; Perrucci et al., 1978; Romme, 1990; Ross, 1987). Gender norms may lead to lower utility through the (perceived) costs of deviating from the behavior prescribed by the norms. They may also reduce welfare through their influence on household behavior; e.g., by making women with a comparative advantage in market work, relative to their husbands, specialize in household work. For these reasons, it is relevant to analyze the policy incentives associated with gender norms and their effects on household behavior.

The purpose of the present paper is to analyze how gender norms, measured as a market work norm for men and household work norm for women, affect the incentives underlying optimal income taxation of households. The literature on optimal income taxation of couples only includes a few earlier studies; none of them incorporating effects of social interaction. Instead, major issues in this literature are whether joint taxation of couples is optimal (Brett, 2007; Cremer et al., 2007; Schroyen, 2003), and how secondary earnings ought to be taxed (Kleven et al., 2009). Our paper differs from the aforementioned studies primarily by focusing on the tax policy implications of work-related gender norms. We consider a model with two household-types, which differ with respect to whether the man or the woman has the comparative advantage in market work, i.e., earns the higher before-tax wage rate. In each household, the man and woman allocate their respective time-endowment between market work, household production, and leisure, and the time spent in household production generates a household public good. The analysis will be carried out for a welfarist government, whose objective function accurately reflects the preferences of the households combined into a social welfare function. Therefore, the government attempts to internalize the externalities caused by the social norms.1

1 In the working paper version of the paper (Aronsson and Granlund, 2013), we also analyze the optimal tax policy of a paternalist (or non-welfarist) government that disregards the disutility perceived by each household if deviating from the social norms.
We model the gender norms as a market work norm for men and a household work norm for women, as we interpret the evidence reported for the United States by Ross (1987) and Bianchi et al. (2000) and those reported by Geist (2005) for ten developed countries as supporting the existence of such norms. These scholars base their assessments of gender norms on the extent to which respondents agree or disagree with statements like “It is much better for everyone if the man earns the main living and the woman takes care of the home and family” and “Preschool children are likely to suffer if their mother is employed.” 2 In short, the responses suggest that such gender norms may exist, according to which the man should be the main achiever outside the home, while the woman’s main responsibility is to take care of the home and family.

There is also evidence showing that gender related work norms have changed quite rapidly. For example, Brewster and Padavic (2000) find that the proportion of American respondents that agree with the statement “Preschool children are likely to suffer if their mother is employed” has dropped from 70 to 54% between 1977 and 1985 and find similar changes for other gender norm questions. Several sociological studies (e.g., Brewster and Padavic, 2000; Mason and Lu, 1988; Thornton et al., 1983) suggest that these changes can be driven by changes in the actual division between paid and unpaid work, in particular the large change in women’s time allocation. Based on this literature, we model the norms as a weighted average of the time women in different household-types spend in household work and a weighted average of the time men in different household-types spend in market work, respectively. This is a very general approach, as it only restricts the norms to be in the range of observed behavior. Two interesting special cases – with very different implications for tax policy – follow when the norms are based on mean value and modal value, respectively, for market work and household work.

It has also been recognized that the interdependencies among households in the gender division of work can be explained by gender identity, i.e., doing tasks that are normal for one’s gender will strengthen one’s gender identity (see Hook, 2006; Bianchi et al., 2000; Sani, 2014). For this reason, we model the norms as based on within-gender comparisons, even though an affirmative answer to the statement that “...the man earns the main living...” may also be consistent with across gender comparisons.

Our paper is also related to economics literature showing that social norms affect individual behavior. More specifically, both the obedience and disobedience of such norms are associated with costs to the individual; the former in terms of lost “intrinsic” utility (which reflects the objective that the consumer would maximize in the absence of observed behavior). Two interesting special cases – with very different implications for tax policy – follow when the norms are based on mean value and modal value, respectively, for market work and household work.

The economy consists of two household-types, denoted by subscripts 1 and 2, each of which comprises a male and female, denoted by subscripts m and f, respectively. The households differ with respect to the member’s earnings potential in the labor market as represented by the before-tax hourly wage rates: in households of type 1 the man earns \( w^m \) and the woman \( w^f \); in households of type 2 the opposite holds, i.e., the man earns \( w^f \) and the woman \( w^m \). The number of households of type \( j \) is denoted \( \eta_j \).

The utility function facing a household of type \( j \) is given by

\[
U_j = \alpha'(x_j) + \alpha^a(x_j) + \alpha^m(z_{jm}) + \alpha^f(z_{jf}) - \frac{1}{2} \beta_j [\psi_j - \bar{\tau}_m]^2
\]

for \( j = 1, 2 \),

where \( c \) denotes private consumption, \( x \) denotes a domestically produced household public good, and \( z \) denotes leisure. Leisure is, in turn, defined as a time endowment, \( \Gamma \), less the time spent in household work, \( d \), and in market work, \( \epsilon \), such that \( z_{jm} = \Gamma - \psi_j - \bar{\tau}_m \) and \( z_{jf} = \epsilon - \psi_j - d_{jf} \). The functions \( \alpha^a, \alpha^m, \alpha^f \), and \( \psi_j \) are all increasing in their respective argument, strictly concave, and all goods are normal. The additive utility function allows us to derive comparative statics for the hours of work spent in household production (which simplifies the interpretation of the results); it is not important for the structure of the tax formulas derived below. 7

9 See Blomquist (1993) for an early theoretical study of interdependent behavior in terms the labor supply, showing that endogenous social norms have important implications for the effects of taxes on work hours. In his study, the norm is measured as the average action (labor supply and consumption, respectively) in the population as a whole. See also Fischer and Huddart (2008) for a similar approach to norm formation; yet in another context. A conformity norm for leisure, common to men and women, is measured by the before-tax hourly wage rates: in households of type 1 the man earns \( w^m \) and the woman \( w^f \); in households of type 2 the opposite holds, i.e., the man earns \( w^f \) and the woman \( w^m \). The number of households of type \( j \) is denoted \( \eta_j \).

7 Other literature examines the implications of social norms for redistribution policy and social insurance; see, e.g., Lindbeck et al. (1999); 2003. In their studies, the cost to the individual of deviating from an employment norm decreases with the share of benefit recipients in society.

8 We have chosen to use a household utility function for simplicity, since it guarantees internal efficiency within the households. Identical solutions to the ones derived below can be obtained with individual utility functions and cooperative behavior among the household members, given that both spouses have the same bargaining power.
The fifth part of Eq. (1), \(-\frac{1}{2} \rho \ell [\epsilon_j - \ell]_m^2\), is a loss function, describing the utility loss of deviating from the norm for men's market work. We assume that \(\tau_m^w = \rho (1 + \beta_\ell) \epsilon_m\), where \(\beta_\ell \in [0, 1]\), i.e. the market work norm for men is given by a weighted average of the hours of market work supplied by men in the two household-types. Similarly, the final part of Eq. (1) describes the corresponding utility loss of deviating from the norm for women's household work. By analogy, we assume that \(\tau_m^w = \rho (1 + \beta_\ell) \epsilon_m\), where \(\beta_\ell \in [0, 1]\). Two special cases analyzed below are mean value norms where \(\beta_\ell = \beta_\ell = \beta\), and modal value norms such that \(\epsilon_j = \epsilon_{m}\) and \(\tau_j = \tau_m\). Note that the parameters \(\rho\) and \(\beta\) may vary with household-type, meaning that the model allows for heterogeneity among preferences for obeying the social norms (and, therefore, also in the behavioral response to these norms). This heterogeneity plays an important role below. Also, although the social norms are endogenous in the model, we assume that each household treats them as exogenous, meaning that the households behave atomistically.

The household production function, \(x_j = q(d_{jm}, d_{jf})\), is increasing in each argument and strictly concave. Since household work by men and women are close substitutes, we also assume that \(\partial x_j/\partial d_{jm} \partial d_{jf} < 0\). Following Schroyen (2003), we do not consider a scenario where close substitutes to \(x_j\) can be bought in the market. The reason is that at least part of what is typically thought of as household public goods, such as a pleasant and caring home environment, might be difficult to accomplish solely through hired help. Furthermore, since such activities are not likely to be left entirely to one of the spouses, we will not analyze corner solutions in the choices of household work in what follows. Neither do we analyze corner solutions in the choices of market work.

2.1. Household choices

Let \(w_m\) and \(w_f\) denote the before-tax hourly wage rates of the man and woman, respectively, in household-type \(j\) as mentioned above, for households of type 1. We have \(w_m = w^h\) and \(w_f = w^f\), whereas for households of type 2 the opposite applies so \(w_m = w^f\) and \(w_f = w^h\), where \(w^h > w^f\). Also, suppose that income taxes are paid according to a flexible nonlinear schedule, and let \(T\) denote the household's income tax payment. The household budget constraint can then be written as

\[
\sum_{\ell} w_{\ell m} \epsilon_{\ell m} + w_f \epsilon_f - T(w_m \epsilon_m, w_f \epsilon_f) - c_j = 0 \quad \text{for } j = 1, 2.
\]

The tax function implies that individuals' marginal taxes may depend also on their spouse's income, and the two spouses typically face different marginal income tax rates. In the presence of gender norms, men and women will typically differ in terms of gross earning. Therefore, the government may implement different marginal taxes for men and women just by allowing the marginal taxes for primary and secondary earners to depend on the gross earnings, without using different tax schedules for men and women.

Each household chooses \(c_j\), \(\epsilon_m\), \(\epsilon_f\), \(d_{jm}\) and \(d_{jf}\) to maximize its utility function in Eq. (1) subject to the budget constraint given by Eq. (2), as well as subject to the household production function and the following time constraints:

\[
\Gamma = z_j + d_j + \epsilon_j \quad \text{for } j = 1, 2 \quad \text{and } s = m, f.
\]

Let \(\omega_{j} = w_j [1 - T_j]\) denote the marginal wage rate facing spouse \(s\) in household-type \(j\), where \(T_j = \partial T(w_j \epsilon_j, w_f \epsilon_f)/\partial (w_j \epsilon_j)\) is the marginal income tax rate. Using the short notation \(u_j = \alpha'(\epsilon_j) + \alpha^B(\epsilon_{jm}) + \alpha^F(\epsilon_{jf})\), the first order conditions can be written

\[
\frac{\partial u_j}{\partial \epsilon_j} \omega_{jm} - \frac{\partial u_j}{\partial \epsilon_f} \omega_{jf} - \rho [\epsilon_j - \ell]_m = 0 \quad (4)
\]

\[
\frac{\partial u_j}{\partial \epsilon_j} \omega_{jm} = 0 \quad (5)
\]

\[
- \frac{\partial u_j}{\partial \epsilon_f} \omega_{jm} + \frac{\partial u_j}{\partial \epsilon_f} \partial x_j \omega_{jm} = 0 \quad (6)
\]

\[
- \frac{\partial u_j}{\partial \epsilon_j} \omega_{jf} + \frac{\partial u_j}{\partial \epsilon_f} \partial x_j \omega_{jf} = 0 \quad (7)
\]

Notice first that in the absence of gender norms, the allocation of labor within each household would be determined by the household members' comparative advantages, meaning that the relative marginal wage rate would equal the relative marginal productivity in household work such that

\[
\omega_{jm}/\omega_{jf} = \frac{\partial x_j}{\partial d_{jm}}/\frac{\partial x_j}{\partial d_{jf}}. \quad (8)
\]

We may think of Eq. (8) as representing a production efficient outcome, as it is analogous to optimality condition for time-allocation within the household derived in standard models without norms (c.f. Becker, 1981).

For the analysis to be carried out later, it is convenient to solve Eqs. (6) and (7) for \(d_{jm}\) and \(d_{jf}\) as functions of \(\epsilon_{jm}\), \(\epsilon_f\) and \(\tau_j\). Note that \(d_{jm}\) and \(d_{jf}\) are not functions of \(\epsilon_j\), since the utility function is additively separable, meaning that \(\epsilon_j\) does not appear in the first order conditions for \(d_{jm}\) and \(d_{jf}\). This gives the following conditional supply functions for the hours spent in household production:

\[
d_j = d_j(\epsilon_{jm}, \epsilon_f, \tau_j) \quad \text{for } j = 1, 2 \quad \text{and } s = m, f. \quad (9)
\]

The comparative statics of the conditional supply functions are

\[
\frac{\partial d_{jm}}{\partial \epsilon_{jm}} < 0, \quad \frac{\partial d_{jm}}{\partial \epsilon_f} > 0 \quad \text{and} \quad \frac{\partial d_{jm}}{\partial \tau_j} < 0 \quad (10)
\]

\[
\frac{\partial d_{jf}}{\partial \epsilon_{jm}} > 0, \quad \frac{\partial d_{jf}}{\partial \epsilon_f} < 0 \quad \text{and} \quad \frac{\partial d_{jf}}{\partial \tau_j} > 0. \quad (10)
\]

According to (10), an increase in the hours of market work by either household member reduces the time that this individual spends in household production, and increases the time the individual's spouse spends in household production, ceteris paribus. Furthermore, an increase in the household work norm for women implies that women spend more time and men less time in household production.

The production sector is competitive and consists of identical firms, which use high- and low-productivity labor as the only production factors. To avoid unnecessary complications, we also assume a linear technology such that the before-tax wage rates, \(w^h\) and \(w^f\), are fixed.

3. Optimal tax policy

We assume that the government attempts to maximize a social welfare function where all households are given the same weight. As we focus on corrective aspects of tax policy we also assume that household-types are observable such that the government can redistribute between them on a lump-sum basis. Therefore, the only reason for distorting the labor supply behavior is to correct for the effects of social norms.

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8 A possibly realistic extension would be to assume that the norms may vary between groups of households. However, since the model only distinguishes between two household-types, we refrain from such an extension here. This is an interesting issue for future research.
The objective of the government is a conventional Utilitarian social welfare function, which is given by

$$W = \sum_j n_j U_j$$  \hspace{1cm} (11)$$

where $U_j$ denotes the utility function of a household of type $j$, as given in Eq. (1), and (as mentioned above) $n_j$ denotes the number of households of type $j$. As such, the government recognizes the utility loss faced by each household if deviating from the social norms and will, therefore, try to internalize the externalities that the social norms give rise to.

Notice once again that $T(\cdot)$ is a nonlinear tax, through which the government is able to implement any desired combination of market work for both individuals and private consumption in each household-type. It is, therefore, convenient to write the public decision-problem as a direct decision-problem, i.e. as if the government directly decides upon the hours of market work for the man and woman, respectively, and the private consumption in each household-type. The marginal income tax rates that will implement the social optimum can then be derived by combining the first order conditions of the public decision-problem with those characterizing the households. Therefore, the government’s budget constraint will be written in terms of work hours and consumption as follows:

$$\sum_j n_j [W_{jm}\ell_{jm} + W_{jg}\ell_{jg} - c_j] = 0.$$  \hspace{1cm} (12)

Instead of substituting the response functions for $d_m$ and $d_f$ given in Eq. (9) into the objective function, we follow the equivalent approach of introducing the response functions as separate restrictions. This means that the government’s decision-problem can be expressed as choosing $c$ for each household type and choosing $\ell$ and $d$ for both individuals in each household. The Lagrangean can then be written as

$$L = W + \gamma \sum_j n_j [W_{jm}\ell_{jm} + W_{jg}\ell_{jg} - c_j]$$

$$+ \sum_j [\mu_{jm}(d_{jm} - d_{jm}(\ell_{jm}, \ell_{jg}, \bar{d}_j))]

+ \mu_{jg}(d_{jg} - d_{jg}(\ell_{jm}, \ell_{jg}, \bar{d}_j))).$$  \hspace{1cm} (13)

The first order conditions are given in Appendix A. We will now use these first order conditions to characterize the optimal tax policy.

Since the welfare effects of changes in the social norms play a key role in the analysis, we begin by briefly characterizing these welfare effects. By using that the Lagrangean is equal to the welfare function at the social optimum, i.e. $W = L$, we show in Appendix A that the welfare effect of an increase in $\bar{d}_f$ and $\bar{c}_m$, respectively, can be written as

$$\frac{\partial W}{\partial \bar{d}_f} = \frac{\sum_j n_j \kappa_j [d_{jg} - \bar{d}_f]}{1 - \frac{\partial d_{jg}}{\partial \bar{d}_f} \beta_d - \frac{\partial d_{jg}}{\partial \bar{d}_f} (1 - \beta_d)}$$  \hspace{1cm} (14)$$

$$\frac{\partial W}{\partial \bar{c}_m} = \sum_j n_j \rho_j \ell_{jm} - \bar{c}_m.$$  \hspace{1cm} (15)

Eq. (14) implies that the welfare effect of an increase in the household work norm depends on a weighted sum of differences between the actual time spent in household work by women and the behavior prescribed by the norm, ceteris paribus. Similarly, Eq. (15) means that the corresponding effect of an increase in the market work norm depends on a weighted sum of differences between the actual number of hours spent in market work by men and the number of work hours implied by the norm. The only difference between Eqs. (14) and (15) refers to the feedback effect in the denominator of Eq. (14), which arises due to that the conditional supply of household work by women in Eq. (9) depends directly on $\bar{d}_f$. Therefore, an increase in $\bar{d}_f$ will both affect welfare directly (through the term in the numerator) on the right hand side of Eq. (14) and indirectly via the conditional supply of hours that women spend in household work (through the term in the denominator). The intuition behind the feedback effect is that an increase in $\bar{d}_f$ leads to an increase in the hours of household work supplied by women (recall from (10) that $\partial d_{jg}/\partial \bar{d}_f > 0$ for $j = 1, 2$) which, in turn, contributes to increase $\bar{d}_f$ even further. By analogy to earlier research on feedback effects in models with externalities, we assume that the denominator of Eq. (14) is positive for any $\beta_d \in [0, 1]$, in which case the feedback effect only affects the magnitude (not the sign) of the welfare effect given in Eq. (14).

The optimal marginal income tax rates are characterized in Proposition 1.

**Proposition 1.** The optimal marginal income tax rates can be written as

$$T_{1f} = -\frac{\beta_d}{\gamma n_1 w_1} \frac{\partial W}{\partial d_{1f}} \frac{\partial d_{1f}}{\partial \bar{d}_f}$$  \hspace{1cm} (16)$$

$$T_{1m} = -\frac{\beta_d}{\gamma n_1 w_1} \frac{\partial W}{\partial d_{1m}} - \frac{\beta_1}{\gamma n_1 w_1} \frac{\partial W}{\partial \bar{c}_m}$$  \hspace{1cm} (17)$$

$$T_{2f} = \frac{(1 - \beta_d)}{\gamma n_2 w_1} \frac{\partial W}{\partial d_{2f}}$$  \hspace{1cm} (18)$$

$$T_{2m} = \frac{(1 - \beta_d)}{\gamma n_2 w_1} \frac{\partial W}{\partial d_{2m}} - \frac{(1 - \beta_1)}{\gamma n_2 w_1} \frac{\partial W}{\partial \bar{c}_m}$$  \hspace{1cm} (19)

**Proof:** See Appendix A.

Notice first that all marginal income tax rates depend directly on the norm for household work, whereas terms related to the norm for market work only affect the marginal income tax rates imposed on men. The reason is that the income tax is a perfect instrument for targeting the hours of market work (and, therefore, the norm for market work), while it is only an indirect (and imperfect) instrument for influencing the hours of household work. As long as $\beta_d \in (0, 1)$ the marginal income tax rates faced by women will have the same sign as $\partial W/\partial \bar{d}_f$. For instance, if an increase in $\bar{d}_f$ leads to higher welfare, ceteris paribus, there is an incentive for the government to increase the number of hours that women spend in household work (which leads to an increase in $\bar{d}_f$). In turn, this is accomplished by discouraging market work through higher marginal income taxation. The argument for lower marginal income taxation is analogous if $\partial W/\partial \bar{d}_f < 0$.

For men, the first term on the right hand side takes the opposite sign of $\partial W/\partial \bar{d}_f$, as long as $\beta_d \in (0, 1)$. The intuition is as follows: if $\partial W/\partial \bar{d}_f < 0$, there is an incentive for the government to discourage household work among women. This can be achieved by higher marginal taxation of their husband’s labor income, which encourages them to substitute market work for household work. The argument for lower marginal income taxation is analogous if $\partial W/\partial \bar{d}_f > 0$. According to empirical evidence presented in Sullivan (2000), the amount of time an individual spends in household work is more sensitive to changes in the individual’s own market work than to changes in the spouse’s market work: for this reason, therefore, the first term on the right hand side of Eq. (17) is likely to be smaller in absolute value than the right hand side of Eq. (16), and the first term on the right hand side of Eq. (19) is likely to be smaller in absolute value than the right hand side of Eq. (18).\(^{10}\) This size difference is reinforced in household-type 1 due to that the man earns the higher before-tax wage rate, and counteracted in household-type 2 where the woman earns the higher before-tax wage rate (which is seen from the denominator of the tax formulas).

\(^{10}\) Sullivan (2000, Table 5) finds that women who work part time instead of full time do 69 min more household work per day, while their husbands only do 13 min less household work per day, on average.
The second term on the right hand side in the tax formulas for men serves to correct for the externality that each man imposes on other households due to the social norm for market work. This marginal tax component is proportional to the negative of $\partial W/\partial T_m$. As such, if $\partial W/\partial T_m > 0$ ($< 0$), there is an incentive to encourage (discourage) market work among men through a lower (higher) marginal income tax rate, which contributes to internalize this externality.

Note also that the marginal income tax rates imposed on women take the same sign for both household-types, as long as both household-types contribute to the externality associated with the household work norm, i.e. if $\beta_2 \in (0, 1)$. For men, on the other hand, the marginal income tax rate may differ in sign between the two household-types if $\partial W/\partial T_m$ and $\partial W/\partial T_f$ differ in sign. The reason is that the relative weight attached to $\partial W/\partial T_m$ and $\partial W/\partial T_f$ can differ across the tax formulas for the men, even if $\beta_1$ and $\beta_2$ differ from each other, and/or because $\partial d_{lf}/\partial \ell_m$ differs from $\partial d_{lf}/\partial \ell_m$.

Two additional observations are worth further discussion. First, if the social norms were exogenous (instead of being dependent on household behavior) all marginal income tax rates would be equal to zero. In this case, there is no longer a problem of externalities and, as a consequence, no motive to use corrective taxation. Second, subsidized parental leave may under certain conditions be a useful supplemental instrument to income taxation. This is seen by observing that the optimal marginal tax rates depend on how responsive the hours of household production of women are to changes in the hours of market work, i.e., through the derivatives $\partial d_{lf}/\partial \ell_f$ and $\partial d_{lf}/\partial \ell_m$ for $j = 1, 2$. In reality, the magnitudes of these effects are likely to differ across households. Therefore, if an increase in the household work norm leads to lower welfare such that $\partial W/\partial T_f < 0$, the marginal income tax for men in households with a large value of $\partial d_{lf}/\partial \ell_m$ (e.g., fathers of small children) should be higher (or less negative) to encourage them to work less in the market work and spend more time in household production. One way to achieve an additional reduction in the hours of market work for men is to subsidize paternity leave. Similarly, if $\partial d_{lf}/\partial \ell_f$ is more negative for women with small children than for other women (which is arguably likely), and if we continue to assume that $\partial W/\partial T_f < 0$, there is an analogous argument against subsidizing maternity leave or for reducing the number of months of subsidized parental leave that mothers are allowed to utilize. This suggests to us that the role of subsidized parental leave under gender norms is an interesting issue for future research.

Below we consider two obvious special cases, where the social norms are based on mean and modal value, respectively. Consider first mean value norms, i.e. $\overline{d_f} = \sum_n n d_f / \sum_n n$ and $\overline{\ell_m} = \sum_n n \ell_m / \sum_n n$.

**Proposition 2.** With mean-value norms such that $\beta_1 = \beta_2 = n_1/(n_1 + n_2)$, and if the households have the same preferences in the sense that $\kappa_1 = \kappa_2$ and $\rho_1 = \rho_2$, then all marginal income tax rates are zero.

**Proof.** Use $\beta_2 = n_1/(n_1 + n_2)$ and $\kappa_1 = \kappa_2$ in Eq. (14), and use $\beta_1 = n_1/(n_1 + n_2)$ and $\rho_1 = \rho_2$ in Eq. (15). Rearrange to obtain $\partial W/\partial d_f = \partial W/\partial \ell_f = 0.0$. Substitution into Eqs. (16)-(19) gives $T_{f1} = T_{f2} = T_{m1} = T_{m2} = T_f = T_m = 0$. □

**Proposition 2** reflects a case where corrective taxation is not used. The intuition is that with mean value norms and identical preferences, the welfare gain to one of the household-types of an increase in the norm is exactly offset by the welfare loss for the other household-type. Therefore, with a Utilitarian social welfare function, the net effect will be zero.

Clearly, if we allow the preferences for norm-adjustments to differ across household-types, such that $\kappa_1 \neq \kappa_2$ and/or $\rho_1 \neq \rho_2$, **Proposition 2** will no longer apply. In that case, the mean value norms imply that Eqs. (14) and (15) reduce to read

$$\frac{\partial W}{\partial d_f} = 1 \overline{\Phi} (\kappa_1 - \kappa_2) n_1 n_2 (d_{lf} - d_{lf})$$  (20)

$$\frac{\partial W}{\partial \ell_m} = (\rho_1 - \rho_2) n_1 n_2 (\ell_{lm} - \ell_{lm})$$,  (21)

in which we have used the short notation

$$\overline{\Phi} = 1 - \frac{\partial d_{lf}}{\partial d_f} n_1 + n_2 - \frac{\partial d_{lf}}{\partial d_f} n_1 + n_2 > 0.$$  (22)

Eqs. (20) and (21) show that the qualitative welfare effects of increases in $d_{lf}$ and $\ell_{lm}$ depend on (i) which household-type experiences the largest utility loss by deviating from the social norms and (ii) differences in work hours across household-types (household work for women and market work for men). To analyze the optimal tax policy in this more general setting, note first that $d_{lf} > d_{lf}$ and $\ell_{lm} > \ell_{lm}$, since the norms will never fully offset the effects of comparative advantage. Then, if $k_1 < k_2$ and $\rho_1 < \rho_2$, we have $\partial W/\partial d_f < 0$ and $\partial W/\partial \ell_m < 0$. In this case, externality-correction calls for subsidization of women's market work at the margin, i.e. $T_{f1} = 0$ and $T_{f2} = 0$. The intuition is that more market work reduces the time spent in household work, which brings $\overline{d_f}$ down to a level more in accordance with the preferences of household-type 2 (which in this example experiences a larger utility loss that household-type 1 if deviating from the household work norm). Notice also that externality-correction in this case motivates positive marginal income tax rates for men. This is so for two reasons. First, by working fewer hours in the labor market, men will do more household work, which also contributes to reduce $\overline{d_f}$. Second, less market work among men decreases $\overline{\ell_m}$ to a more preferable level for household-type 2 (which experiences a larger utility loss than household-type 1 if deviating from the market work norm). On the other hand, if deviations from the social norms instead lead to higher utility losses for household-type 1 than for household-type 2, such that $k_1 > k_2$ and $\rho_1 > \rho_2$, tax policy implications opposite to those described above will follow.

Notice also that if one of the household-types cares more about deviations from one of the norms, while the other household-type cares more about deviations from the other norm, the marginal income tax rates for women are still signed. This is so because, irrespective of the relative sizes of $\rho_1$ and $\rho_2$, externality-correction calls for marginal subsidization of women's market work if $k_1 < k_2$ and marginal taxation of women's market work if $k_1 > k_2$. However, if $k_1 < k_2$ and $\rho_1 > \rho_2$, or if $k_1 > k_2$ and $\rho_1 < \rho_2$, the two norms have opposite qualitative effects on the marginal income tax rates implemented for men, and it remains an empirical question which effect dominates the other.

Let us continue with modal value norms, where $\overline{d_f} = \overline{d_f}$ and $\overline{\ell_m} = \ell_{lm}$ for $n_1 > n_2$.

**Proposition 3.** With modal value norms, the marginal income tax rates are zero for women and men of the minority household-type. If $n_1 > n_2$ ($n_1 < n_2$), the marginal income tax rate for women of the majority household-type is negative (positive), and the marginal income tax rate for men of the majority household-type is positive (negative).

**Proof.** If household-type 1 is the majority household-type, we have $n_1 > n_2$, meaning that $\beta_1 = \beta_1 = 1$ and $\overline{d_f} = d_{lf}$ and $\overline{\ell_m} = \ell_{lm}$.
Eqs. (14) and (15) will then simplify to read
\[ \frac{\partial W}{\partial d_f} = \frac{n_2 \kappa_1 [d_{2f} - d_{1f}]}{(1 - \frac{\partial W}{\partial m})} < 0 \]
(23)
\[ \frac{\partial W}{\partial \ell_m} = n_2 \rho_2 [\ell_{2m} - \ell_{1m}] < 0. \]
(24)
Substituting into Eqs. (16)–(19) gives \( T_{1f} < 0 \). \( T_{1m} > 0 \) and \( T_{2f} = T_{2m} = 0 \). Instead, if household-type 2 is the majority household-type, so \( n_1 < n_2 \), we have \( \beta_1 = \beta_2 = 0 \) and
\[ \frac{\partial W}{\partial d_f} = \frac{n_1 \kappa_1 [d_{1f} - d_{2f}]}{(1 - \frac{\partial W}{\partial m})} > 0 \]
(25)
\[ \frac{\partial W}{\partial \ell_m} = n_1 \rho_1 [\ell_{1m} - \ell_{2m}] > 0, \]
(26)
implying \( T_{2f} > 0 \), \( T_{2m} < 0 \) and \( T_{1f} = T_{1m} = 0 \). □

The intuition behind the first part of the proposition is that the minority household-type does not generate any externalities. As such, there is no reason for the government to distort the labor supply behavior of the minority household-type. The marginal income tax rates imposed on the majority household-type serve to reduce the differences between each norm and the corresponding number of work hours chosen by the minority household-type which, in this case, determines the welfare cost associated with the social norm. Therefore, it is the minority household-type’s values of \( \kappa \) and \( \rho \) that affect the marginal taxes (not the corresponding values characterizing the majority household-type), since the majority household-type per definition will not divert from \( d_f \) and \( \tau_m \), respectively.

4. Summary and discussion

The present paper analyzes corrective tax policy in an economy with gender-related work norms, which are defined as a market work norm for men and household work norm for women. Such a study is motivated by the observation that women still do considerably more housework and spend less time in the labor market than men, despite that gender equality has been on the political agenda for a long time. Our study is based on an economy populated by households, where men and women allocate their time between market work and household production, and where households are divided in two types depending on whether the man or woman has the comparative advantage in market work (i.e. earns the higher before-tax wage rate). The market work norm is defined as a weighted average of the hours of market work supplied by men in different household-types, while the household work norm is analogously defined as a weighted average of the hours of household work supplied by women in different household-types. As such, norms based on mean value and modal value constitute special cases in our framework. The policy instrument faced by the government is a nonlinear tax on the income from market work.

The take-away message from the paper is that income tax policy has a potentially very important corrective role in economies with gender-related work norms. Our characterization of marginal income tax rates implies that the optimal (corrective) tax policy depends on the (i) definition of social norms, (ii) the preferences for obeying these norms, and (iii) whether men or women have the comparative advantage in market work, and we also explain how these three mechanisms interact. Although real world tax systems typically reflect several different policy objectives (and not just externality-correction as we assume here), the results are practically useful by showing in what direction the marginal income tax rates should change, if governments want to internalize the social costs of gender norms. In addition, by characterizing the structure of marginal income taxation, the paper also shows what additional information policy makers need in order to be able to respond to gender-related work norms.

With mean value norms, tax policy is used to move the (endogenous) norms closer to the levels preferred by the household-type that experiences the largest utility loss if deviating from these norms. An immediate implication is that if the households have the same preferences, the corrective motive for taxation vanishes, since the welfare gain for one of the household-types of an increase in the value of the norm is exactly offset by a welfare loss for the other household-type. On the other hand, if households where the women have comparative advantage in market work care most about the social norms, women should face negative, and men positive, marginal taxes. The opposite tax policy implications will follow if households where the men have comparative advantage in market work care most about the norms. With norms based on modal value, on the other hand, there is no corrective motive for the government to tax the minority household-type, since such households do not generate any externalities. The marginal tax policy imposed on men and women of the majority household-type are designed to reduce the difference between the value of each norm (which, in this case, is determined by the behavior of the majority household-type) and the corresponding number of work hours chosen by the households of the minority type (which are those suffering from the norm).

Future work may take several different directions. First, as we mentioned above, subsidized parental leave may be a useful supplemental instrument worth further examination. Second, social norms are likely to evolve gradually over time instead of adjusting momentarily to policy, as we have assumed here. This suggests that a dynamic model might provide a richer framework for studying the policy implications of social norms; possibly in combination with numerical calculations to assess how the optimal corrective policies may change over time. Third, households may also invest resources to reduce their perceived cost of deviating from social norms, i.e. by altering their perception of these norms. As such, the welfare cost to households of deviating from such norms is likely to be reduced; yet at a cost, which may suggest a somewhat different role for public policy. We hope to address these issues in future research.

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Appendix A

The first order conditions for the government are written as
\[ \frac{\partial L}{\partial c_j} = n_j \frac{\partial u_j}{\partial c_j} - \gamma n_j = 0 \quad \text{for } j = 1, 2 \]  
(21)
\[ \frac{\partial L}{\partial \ell_{1f}} = -n_1 \frac{\partial u_1}{\partial \ell_{1f}} + \gamma n_1 w' - \mu_{1f} \frac{\partial d_{1f}}{\partial \ell_{1f}} = 0 \]  
(22)
\[ \frac{\partial L}{\partial \ell_{2f}} = -n_2 \frac{\partial u_2}{\partial \ell_{2f}} + \gamma n_2 w' - \mu_{2f} \frac{\partial d_{2f}}{\partial \ell_{2f}} = 0 \]  
(23)
\[ \frac{\partial L}{\partial \ell_{1m}} = -n_1 \beta_1 [\ell_{1m} - \ell_{m}] + \gamma n_1 w' - \mu_{1f} \frac{\partial d_{1f}}{\partial \ell_{1m}} + \sum_j n_j \rho_j [\ell_{jm} - \ell_{m}] \beta_j = 0 \]  
(24)
and (A11) imply
\[ \frac{\partial L}{\partial \ell_{2m}} = -n_2 \left[ \frac{\partial u_2}{\partial \ell_{2m}} + \rho_2 (\ell_{2m} - \ell_m) \right] + \gamma n_2 W' - \mu_2 f \frac{\partial d_{2f}}{\partial \ell_{2m}} + \sum_j n_j \beta_j (\ell_m - \ell_m) (1 - \beta_j) = 0 \] (A5)

Similarly, in Eqs. (A8) and (A9), we have used the first order condition for men's household work, i.e., Eq. (7). Similarly, in Eqs. (A8) and (A9), and substitute into Eq. (A10). Finally, use that together with \( \partial L/\partial \ell_f = \gamma n_1 f \), gives Eq. (16). Eqs. (17), (18) and (19) can be derived by analogous procedures.

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