Wage Subsidy, Cash Transfer and Individual Welfare in a Cournot Model of the Household

by

Indraneel Dasgupta[#]

School of Economics, University of Nottingham, Nottingham NG7 2RD, UK.
Phone: 44(0115)9514297 Fax: 44(0115)9514195
E-mail: indraneel.dasgupta@nottingham.ac.uk

Revised Version; JUNE 1999.

Abstract

We examine the implications of an income redistribution from men to women for the welfare of mothers and their children. We develop a Cournot model of a two-person household where agents provide market labor and allocate their spending between a private consumption good and goods for children. We show that, under plausible restrictions on individual preferences, small redistributions to women reduce their welfare. This happens because the income redistribution induces men to reduce their own spending on children by *more than* the amount redistributed. A relative increase in women's market wage may however improve children's welfare.

JEL Classification No.: H23, H31, I38, J16

Key Words: Cournot Model of Household, Nash Equilibrium, Cash Transfer, Wage Subsidy

[#] I am indebted to Prasanta K. Pattanaik for his comments on earlier versions of this paper. I also thank Taradas Bandyopadhyay, Richard Disney, Keith Griffin, R. Robert Russell, Kunal Sengupta and two anonymous referees for their helpful comments, without implicating them in the remaining shortcomings of this paper.

I. Introduction

This paper examines the view that income redistribution from men to women will improve the welfare of mothers as well as their children. To analyze this issue, we develop a Cournot model of a two-person household with endogenous labor supply, where each member provides market labor and allocates his/her own spending between a private consumption good and goods for children. Expenditure on children is a domestic public good. We examine the impact of alternative income redistribution policies on the welfare of women and children in this framework. We show that, under plausible restrictions on individual preferences, and for relatively small redistributions, women may become worse off as a consequence. Thus, women themselves do not necessarily benefit if their access to independent resources is improved. Instead, such measures may actually improve the well-being of children at the cost of their mothers. This happens because the income redistribution away from men may induce the male member of the household to reduce his contribution to children's expenses by *more than* the amount redistributed. Since the offsetting benefit to women is, at most, the amount redistributed, the net consequence is a reduction in the welfare of women, compared to the status quo. However, if the inter-gender income redistribution is implemented through a policy-induced relative increase in women's wage rate, the effect of such an increase may also be to improve children's welfare by increasing total household expenditure on them. While questioning the standard understanding of the relationship between women's access to independent income and their own well-being, the results also point to the possibility of a conflict between the interests of women and those of children.

Policy analysis has traditionally equated the well-being of individuals with the average (adult-equivalent) well-being of the household to which they belong. This approach has come under increasing criticism in recent times, as a growing body of literature has pointed to the existence of considerable disparity in resource allocation inside the household, especially along gender lines.[1] The recognition of such disparity, and that women and children often seem to constitute a disproportionate part of the poor and economically vulnerable segments of society, has motivated the search for appropriate policy measures, in both developed and developing countries, to reduce overall gender disparity and to target welfare programs and anti-poverty measures specifically towards women and children. This issue has acquired particular urgency in both developing and developed countries, due to the necessity of installing appropriate social safety nets to minimize the negative impact of structural adjustment in the former (Alderman et al. (1995)), and that of maintaining social support for more vulnerable members of society in the face of budgetary restraint and welfare cutbacks in the latter.

[1] See, for example, Sen (1984), Harriss (1990), Dasgupta (1993), UN (1995) and UNDP (1995). Using data on food consumption in southern Philippines, Haddad and Kanbur (1990) find that standard measures of inequality in calorie adequacy may be understated by as much as 30 to 40 percent, and standard measures of poverty understated

Measures suggested for targeting welfare programs towards women and children, and, more generally, for altering intra-household allocation of resources in their favor, often involve transferring resources directly to women. Child allowance policies such as the one introduced in the UK in the late 1970s, which provided for direct cash payments to the mother funded by taxes on the father's income, replacing the earlier system of tax exemption for the father, provide a straightforward example.[2] Free medical treatment and supply of vitamins and nutrients to pregnant and lactating mothers in many developing countries are typical examples of interventions targeted towards women effected through in-kind transfers. Perhaps the form of intervention that has received most attention in this context involves increasing women's access to independent income through improved labor market opportunities. In developed countries, policies intended to promote this goal have typically taken the form of equal pay legislation and positive discrimination/affirmative action programs. In developing countries in recent years, additionally, training, marketing support and micro-credit programs targeted towards women have received a lot of attention and support. Increasing state support for female farmers and "women's crops" has been suggested, especially in the context of sub-Saharan countries.[3] Indeed, the so-called "Women in Development" approach to development policy focuses on increased market access for women as the principal means of reducing gender-disparity. Expansions in female labor participation rates and reductions in the male-female wage differential are often taken as evidence of a relative improvement in women's welfare.[4] The basic purpose of this paper is to examine the robustness of this view.

Clearly, a relative increase in independent earnings for women as a group often involves, in effect and in the aggregate, some income redistribution from men, at least in the short run. Child benefit schemes such as the one mentioned earlier do this in an obvious way. While welfare and anti-poverty programs targeted towards women do not impose a direct income reduction on male members of target households, the latter's independent earnings in this case are lower than what they could have been, if the programs had been targeted towards them instead. Gender discrimination in the labor market, by restricting entry and movement by women, provides male workers a rent. Effective affirmative action programs and anti-discrimination legislation that reduce such restrictions may also reduce average male wage rates through increased competition, while increasing women's earnings. Thus, the presence of such programs often implies that average male earnings are lower than what they would otherwise be, given the overall rate of

---

by about 20 percent, due to the neglect of intra-household distribution. Similar sensitivity of welfare conclusions to intra-household inequality is established for Australian households by Apps and Savage (1989).

[2] See Brown (1984), Lundberg and Pollak (1993), and Lundberg et al. (1997).

[3] In particular, micro-credit and marketing support programs for women undertaken by the Grameen Bank in Bangladesh and SEWA in India have been suggested as models for both governments and NGOs funded by foreign donor agencies in developing countries. Pitt and Khandker (1994) and Goetz and Sengupta (1994) study Grameen Bank programs. Dey Abbas (1997) discusses gender divisions in the agricultural sector in sub-Saharan economies.

[4] See, among others, Boserup (1970), Tinker (1990) and Klasen (1993).

growth and productivity in the economy.[5] Hence, for analytical purposes, one may characterize the redistributive aspect of such programs as combining policy-induced income increases for women with policy-induced income reductions for men.

A reduction in male income, combined with an increase in female income, may however have a negative effect on male contribution to common household expenses. If policy interventions intended to increase women's relative independent earnings simultaneously reduce contributions from men (or, if men's contributions in a world with such interventions are lower than what they would otherwise have been), the impact of such policies on the welfare of *married* women becomes intuitively less clear-cut.[6]

Suppose that, in response to a fall in their own income, and an increase in that of their spouses, men indeed reduce their spending on domestic public goods (such as children's expenses, housing etc.). Since men can only reduce their contribution, at most, to zero, women would obviously be better off in spite of this reduction if the amount effectively transferred to them is larger than the male pre-intervention contribution. Suppose however that the amount transferred to women is smaller. Then, there does not appear to be any intuitive reason why husbands may not reduce their contribution by *more than the amount transferred to their wives*. Consequently, it is not clear why married women should necessarily be better off even if they have a larger independent cash income relative to their husbands.

This intuitive difficulty with the standard view is justified in part by earlier studies. Lundberg and Pollak (1993) and Kanbur (1995) develop models where state-imposed small lump-sum redistributions from husbands to wives "exactly crowd out" contributions from husbands, i.e. they are completely neutralized by an identical reduction in husbands' voluntary transfers. A similar conclusion follows from Becker's well-known "rotten kid" theorem (see Becker (1981) and Bergstrom (1989)).[7]

These studies justify the view that a policy-induced transfer from husbands to wives may be ineffective. They do not however show that such a transfer can be *counterproductive*. As discussed earlier, for this to happen, it is sufficient that husbands respond to an enforced transfer to wives by reducing their own voluntary spending on domestic public goods by *more* than the amount of the transfer. This paper addresses the issue of such *more than exact* "crowding out" of male contributions.

---

[5] If larger market participation by women increases overall productivity, then the positive long run impact on male incomes may outweigh the negative impact. This question has a formal similarity to that of the long run impact of immigration on domestic workers' wages. We abstract from such dynamic general equilibrium considerations.

[6] Obviously, such interventions can be expected to make independent single women better off.

[7] This problem is well-known in other, related, contexts as well. A large literature has developed from Barro (1974) showing that households may respond to a social security system for the elderly, funded through increased taxes on the young, by eliminating private intergenerational transfers. Similar consequences have been noted in the context of private charitable transfers (Roberts (1984)). See Cox and Jakubson (1995) for a review. Households in developing economies often respond to supplementary feeding programs for children by reducing the amount of food given to the target child at home (Beaton and Ghassemi (1982), Kennedy and Alderman (1987)).

We address this issue by analyzing the impact of alternative policies that redistribute income from male to female members of the household, taking explicit account of the endogeneity of labor supply decisions and the strategically interdependent nature of household decision-making. The analysis is developed through a Cournot model of a two-person household,[8] where each member consumes leisure, a private good and a domestic public good (interpreted as total household expenditure on children). Each member takes the other's spending on the public good as given, and chooses own market labor supply and spending on the private and the public goods. We model inter-gender redistribution programs in terms of an income support to women funded by a tax on men, and consider combinations of a lump-sum tax/transfer and a wage tax/subsidy. The lump-sum tax/transfer is intended as a generic device for modelling those measures which have low price-altering consequences, while the wage tax/subsidy stands for measures which essentially impact on the labor market, altering average male-female wage differentials. We assume that (a) all goods are normal goods, (b) leisure and children's expenditure are net substitutes and (c) the amount redistributed is smaller than the initial male contribution to children's expenses. We show that, under our restrictions, if men's wages are taxed to provide a wage subsidy or cash transfer to women, then men reduce their contribution by more than the amount of the tax revenue. This happens even if a wage subsidy to women is funded through a lump-sum cut in male incomes. For this reason, such interventions reduce women's welfare while also increasing their market participation and independent cash income. However, if the wage subsidy is funded by a lump-sum reduction in male incomes, the increase in women's spending on children will more than offset the reduction by men, thereby improving the welfare of children.[9] This may (though not necessarily) happen even if the wage subsidy is funded by a wage tax on men. Thus, children may benefit from increased relative independent income of their mothers, but at the cost of the mothers themselves.

Section II sets up the basic model. We present the formal results in Section III. Section IV discusses some possible extensions and interpretations. We conclude in Section V.

II. The Model

Assume a household with two adult members *M* and *F*. Each agent *k*,($k \in \{M, F\}$), derives utility from consumption of leisure l_k , a private consumption good x_k and a domestic public good *y*. We shall interpret the domestic public good as comprising of total household expenditure on children.[10] Agent *k* has

[8] See, among others, Ulph (1988), Woolley (1988), Lundberg and Pollak (1993) and Kanbur (1995).

[9] We identify children's welfare exclusively with household cash expenditure on them in this paper. Most studies indicate that increased earnings for mothers offset any negative effects of reduced time for child care (Leslie (1988)).

[10] This is a common interpretation in the literature. The model can be generalized by allowing multiple public goods. This however significantly increases the notational complexity without providing any additional insight.

a preference ordering represented by a strictly quasi-concave utility function $U^k(x_k, l_k, y)$. Furthermore, agent *k* has some non-labor income I_k, a time endowment 1, and faces a given market wage rate w_k. For notational simplicity, we assume that the price of private goods, as well as that of the domestic public good, is 1. Total personal cash income of agent *k* is h_k, $\mathsf{h}_k = I_k + w_k(1-l_k)$. Given any agent *k*, we shall refer to the other agent as agent *–k*. Each member *k*, taking the other's spending on the public good, y_{-k}, as given, chooses her labor supply and the allocation of her own total personal income between the private good and the public good. We assume that a Nash equilibrium exists in this game.[11]

Given any contribution y_{-k} by the other agent, agent *k*'s optimization problem is that of choosing the optimal levels of *y*, x_k and l_k subject to the budget constraint $[I_k + w_k(1-l_k) + y_{-k} = y + x_k]$, and the additional constraint $[y \geq y_{-k}]$. It can be checked that the solution to this problem yields the optimal levels of *y*, x_k and l_k as functions of w_k and $[I_k + y_{-k}]$ alone. Let these individual demand functions be given by (i) $y = g^k(w_k, I_k + y_{-k})$ (ii) $x_k = h^k(w_k, I_k + y_{-k})$ and (iii) $l_k = j^k(w_k, I_k + y_{-k})$. We impose the following restrictions on individual demand functions (and thus on individual preferences).

A1: For all $k \in \{M, F\}$, g^k, h^k and j^k are increasing in I_k.

A2: For any $k \in \{M, F\}$, given y_{-k}, suppose an increase (decrease) in w_k, Δw_k, is compensated by a reduction (expansion) in non-labor income, ΔI_k, such that $[\Delta I_k = -\Delta w_k L_k^*]$, where L_k^* is k's initial labor supply. Then, *k*'s demand for the domestic public good rises (falls).

A1, which requires that all goods be normal goods in the standard sense, suffices to ensure the uniqueness of the Nash equilibrium.[12] Then, the Nash equilibria yield the single-valued household demand functions $x_k^N = \bar{x}^k(w_k, w_{-k}, I_k, I_{-k})$ and $y^N = y_k^N + y_{-k}^N = \bar{y}(w_k, w_{-k}, I_k, I_{-k})$, as well as the household labor supply functions $L_k^N = \bar{L}^k(w_k, w_{-k}, I_k, I_{-k})$; $k \in \{M, F\}$.

We shall assume that both agents contribute a positive amount to the domestic public good in any Nash equilibrium.[13] Given this assumption, in any Nash equilibrium, we must have:

$$\bar{y}(w_k, w_{-k}, I_k, I_{-k}) = g^k(w_k, I_k + y_{-k}^N) \quad \text{for all} \quad k \in \{M, F\}. \tag{1}$$

Our key assumption, A2, is simply that cash spending on children and leisure are net substitutes for both members of the household.

---

[11] Bergstrom et. al. (1986) show that the existence of a differentiable single-valued demand function for the public good for each agent is sufficient to ensure the existence of a Nash equilibrium.

[12] See Bergstrom et. al. (1986).

III. Results

As discussed earlier, measures to reduce gender-based earnings differentials, often both aim at and involve, in the aggregate, a combination of a direct or indirect reduction in male incomes and an increase in that of women. Hence, for modelling purposes, it is convenient to think of such programs as consisting of an income transfer to women funded by a tax on men. Clearly, the distortionary element in such (whether actual or *as if*) tax-transfer programs vary significantly across programs and contexts. For our analysis, we shall model such programs as combinations of a lump-sum tax/transfer and a wage tax/subsidy. The lump-sum tax/transfer can be identified with all measures which have relatively low price-distortionary consequences, while the wage tax/subsidy should be identified with measures which significantly alter returns to market labor.[14] Effective anti-discrimination laws and equal pay legislation do this in an essential way, altering average male-female differentials in returns to market labor.

Clearly, income losses suffered by men due to gender-specific interventions need not, in general, be exactly equal to income gains by women, either at the aggregate level or at the level of the individual household. However, such differences in gains and losses, while important, bring in a complication qualitatively quite separate from the purely distributive aspect of the problem that we are interested in. We therefore assume that any income loss by men is exactly balanced by an income gain for women.

First consider the case where a lump-sum cash transfer to F is effectively associated with a fall in the M's wage rate. The British child-support policy mentioned earlier can be modelled in this manner. Transfers to women or children in kind, e.g. free/subsidized provision of medical treatment or dietary supplements for pregnant women, free school meals and nutrition supplements to pre-schoolers, etc. are equivalent to cash transfers to women, so long as women additionally purchase a positive amount of the commodity in the open market. If such programs are funded through taxes that, directly or indirectly, reduce the male wage rate, or are instituted in place of alternative programs that would have increased the male wage rate, we can conceptualize the problem, for modelling purposes, in terms of a lump-sum transfer to women funded by wage tax on men.

Let the initial, pre-intervention, value of the wage rate for any agent k be $w_k^{\bullet}$, and let the initial non-labor income be $I_k^{\bullet}$. Suppose that the state raises a 'small' amount T from a wage tax on M, and passes it on to F as a cash transfer. The intervention scheme is small in that it does not change the prices facing the household, except by the proportion given by the tax rate, t_M. The tax reduces M's wage rate

---

[13] Note that gains from household formation arise in this model only due to the presence of domestic public goods. If any agent contributes nothing to such goods, then the other agent has no incentive to continue in the household (abstracting from possible costs of divorce or household dissolution).

[14] We neglect distortionary taxes on the private consumption good. This generalization is straightforward.

to $w_M^{\bullet}(1-t_M)$, $1>t_M>0$, while the cash transfer increases F's non-labor income to $I_F^{\bullet}+T$, where $T=w_M^* t_M \bar{L}^M\left(w_M^*(1-t_M), w_F^*, I_M^*, I_F^*+T\right)$.

As discussed in Section I, our problem becomes trivial if T is more than M's contribution to children's expenses in the pre-intervention equilibrium. The next assumption is made to rule this out.

A3: $0<T<y_M^N\left(w_M^{\bullet}(1-t_M), w_F^{\bullet}, I_M^{\bullet}+T, I_F^{\bullet}\right)$.

It can be shown that A1-A3 together ensure that M must necessarily be spending more than the amount of the transfer, i.e., more than T, on children's goods in the pre-intervention equilibrium.

Proposition 1: *Suppose that the state taxes M's wage and provides the tax revenue, T, as a cash transfer to F. Then, given A1-A3, this tax-transfer policy will:*

(a) reduce M's spending on children by more than T,

(b) reduce total household expenditure on children; and

(c) reduce F's consumption of leisure and her welfare.

Proof: See the Appendix.

The key assumption driving Proposition 1 is A2, i.e., leisure and expenditure on children are net substitutes. The income effect of the wage tax is exactly the same as that of a lump-sum redistribution of T from M to F. Given the restriction imposed on the size of *T* by A3, it follows from the well-known neutrality property of Cournot games with public good(s) that intra-household consumption stays invariant under such a lump-sum redistribution: M would reduce his spending on children by exactly the amount redistributed, i.e. the tax revenue T (while F would increase hers by exactly this amount).[15] However, by A2, the substitution effect of a fall in M's wage rate also reduces his demand for the domestic public good. Therefore, the total effect is a reduction in M's spending on children by more than the tax revenue T. F's independent cash income however increases only by this amount. Hence, F's total non-labor income from all sources falls. This reduces F's welfare. Since all goods are normal goods, it also forces her to consume less of all goods, including the domestic public good. Hence, total household spending on children falls. Note that the fall in F's welfare occurs alongside an increase in her market participation and independent cash income (both labor and non-labor). Thus, Proposition 1(c) shows that such increases cannot be interpreted as necessarily implying an improvement in their well-being.[16]

---

[15] See Bergstrom et. al. (1986).

[16] A number of empirical studies have found that labor market participation by women often increases in developing countries in times of economic stress due to a fall in male wage rates and the consequent reduction in male contribution to household expenditures (see, for example, Kabeer (1991) and the references therein). A similar explanation is often offered for high labor participation rates among African-American women. This is quite in line with our results, which also suggest that, in such cases, women and children would be worse off even if the state intervened to maintain total household income through cash welfare payments to mothers.

If however A2 is violated, i.e., if leisure and the public good are net complements for M, then the substitution effect of the wage tax leads, instead, to M spending more on children. Since the income effect of the intervention reduces M's spending on children by exactly the amount of the tax revenue, the net reduction (if any) by M is less than this amount (in fact M's contribution may even rise, if the substitution effect is sufficiently strong). Consequently, F's total non-labor income from all sources increases, allowing her to consume more of all goods and improving her welfare. Total household expenditure on children will rise as well. Thus, in this case, the standard conclusions will hold.

The next case we consider is where measures that increase returns to market labor for women simultaneously involve a lump-sum reduction in male income. An example would be a poll-tax imposed on men used to provide a tax deduction to firms for hiring more women. If the tax revenue is passed on to F as a wage subsidy, then her wage rate would increase to $w_F^{\bullet}(1-t_F)$, $t_F < 0$; and $T = -\left[w_F^* t_F \bar{L}^F\left(w_F^*(1-t_F), w_M^*, I_M^* - T, I_F^*\right)\right]$.

As before, we assume that M spends more than T on children's goods in the pre-intervention equilibrium.

Proposition 2: *Suppose that the state imposes a lump-sum tax T on M and transfers it as a wage subsidy to F, and suppose that* $\left[0 < T < y_M^N\left(w_M^{\bullet}, w_F^{\bullet}, I_M^{\bullet}, I_F^{\bullet}\right)\right]$. *Then, given A1-A2, this policy will:*

(a) reduce M's spending on children by more than T,

(b) increase total household expenditure on children; and

(c) reduce F's consumption of leisure and her welfare.

Proof: See the Appendix.

Recall our key assumption that leisure and children's expenses are net substitutes. If women get a wage rise, their spending on children increases by more than the amount redistributed through the rise, T, due to the substitution effect. Since men lose only the amount T, this increases, in effect, total male non-labor income from all sources, allowing men to increase their private consumption and reduce their spending on children in response by more than the amount T, thereby reducing women's welfare as well. However, the additional spending by women on children more than compensates for the reduction by men, so that total household expenditure on children increases, making children better off.

The neutrality property discussed earlier shows that individual consumption bundles would remain identical regardless of whether a wage subsidy to F is funded by a lump-sum tax from M or from F herself. Hence, Propositions 2(b) and 2(c) are also applicable to wage subsidy programs for women funded by lump-sum taxes on them. These results thus imply that, under our assumptions, welfare programs involving cash or in-kind transfers to women are more effective in improving women's own welfare than employment expansion programs for them, while the opposite is true for children. More generally,

Propositions 1(b) and 2(b) also suggest that policies that increase parental wages may be more beneficial to children in poor households than direct state provisioning for them.

If leisure and expenditure on children are net complements for women, then a wage subsidy to women funded by a lump-sum tax on men will reduce total household expenditure on children, either increase men's contribution or reduce it by less than the amount of the transfer, improve women's welfare and may reduce their labor supply. Since, in this case, the consequences of a reduction in the gender-based wage differential for spending on children contradict much empirical evidence,[17] they seem to provide some support for our assumption that leisure and expenditure on children are net substitutes.

As mentioned earlier, the neutrality property implies that individual consumption bundles would remain identical regardless of whether a wage subsidy to F is funded by a lump-sum tax from M or from F herself. Hence, Propositions 1 and 2 can be directly combined to analyze measures, such as affirmative action programs, equal pay and anti-discrimination legislation, which reduce male-female wage differentials by altering both male and female wage rates, thereby redistributing income as well. We can model such interventions in terms of a wage support to F funded by a wage tax on M.

Proposition 3. *Suppose that the state taxes M's wage and provides the tax revenue, T, as a wage subsidy to F. Then, given A1-A3, this tax-transfer policy will:*

(a) reduce M's spending on children by more than T, and

(b) reduce F's consumption of leisure and her welfare.

A1-A3 together ensure that M spends more than T on children's expenses in the pre-intervention equilibrium. For reasons already discussed, the intervention reduces male spending on children's consumption by more than the amount redistributed, thus increasing women's labor supply and reducing their welfare. However, in this case, while the reduction in the male wage rate reduces household spending on children, the increase in the female wage rate increases it, making the overall effect indeterminate. Thus, children's consumption may (though not necessarily) go up as a consequence.

Like our earlier results, Proposition 3 depends crucially on A2. If leisure and children's expenses are net complements for both men and women, then a wage improvement for women associated with a wage reduction for men will either reduce male expenditure on children by less than T or even increase it, thereby necessarily improving the welfare of women. The effects on women's labor supply and total spending on children are indeterminate. The effects on women's welfare, their labor supply and male contribution are all indeterminate if A2 is violated for only one agent, but not both. If leisure and children's expenses are net substitutes for men, but net complements for women, then household spending on children must fall. It must rise if the opposite is true.

[17] See the references in footnote 20.

Note that the results are independent of, and compatible with, assumptions about differences in male and female preferences which may differentiate their labor supply and/or spending patterns, as well as assumptions about differences in magnitudes of market participation. Note further that we do not make any assumption about the size of the male-female wage differential either. This differential enters the model only indirectly, by influencing the size of male spending on the domestic public good, and thereby the upper bound on income redistributions for which the results will hold. Changes in the wage gap change this upper bound, but do not affect the results qualitatively.

IV. Extensions and Implications

The model can be extended to incorporate domestic labor by assuming that the domestic public good is produced from monetary inputs and domestic labor, and that members take each other's labor and monetary contributions as given and choose their own contributions. If, in addition, one assumes that the male wage rate is sufficiently higher than the female one, this extension can generate the traditional gender-based division of labor: the male member would provide only money for the public good. Another version would be one where the intra-household allocation mechanism is modeled as a Stackelberg game with one leader. Propositions 1 and 2 can be sustained in these alternative versions of the model as well.

If the intra-household decision-making is modelled as a cooperative bargaining game with the outcome given by the cooperative Nash or Kalai-Smorodinsky bargaining solution,[18] our conclusion that an income redistribution from men to women may reduce married women's welfare, will hold so long as the threat points are interpreted as individual utility levels in the non-cooperative Cournot equilibrium.[19]

Note that, in case of a relative increase in their wage rate, since women's market participation increases as well, their independent cash income must necessarily rise, and their consumption of the private good may also go up if leisure and the private good are net substitutes. Yet, by Proposition 2(c) and 3(b), even if children's consumption also increases as a consequence of improved relative market opportunities for their mothers, the mothers' own welfare must necessarily fall. Clearly, this happens essentially due to a fall in their consumption of leisure.

Studies often find evidence that a relative increase in women's independent labor income is associated with a change in the pattern of household consumption of goods and services, and in fertility

[18] The seminal papers are McElroy and Horney (1981) and Manser and Brown (1980). Bergstrom (1996), Ott (1992) and McElroy (1990, 1997) provide overviews and discuss extensions.

[19] Traditionally, the threat points in such models have been identified with individual utilities in case of divorce. Lundberg and Pollack (1993) justify the identification of the threat points with the non-cooperative Nash equilibrium inside an intact household instead by arguing that the divorce option is costly and may be dominated by sharing of domestic public goods in a formally intact household. McElroy (1997) also notes that, in the context of day to day decision-making, the divorce threat, not being credible, should not be considered the proper threat point. Note however that, even if divorce is costless, and the divorce threat credible, the non-cooperative Nash

decisions. In particular, a relative increase in women's market earnings has been found to increase total household expenditure on children (and other domestic public goods).[20] These studies are often cited as providing justification for expanding women's relative market participation and independent earnings through policy interventions.[21] Our results however show that even if improved relative market participation and wages for women in general are seen to be associated in practice with a rise in the consumption of purchased commodities by both mothers and their children, this cannot, by itself, be construed as evidence that such improvements would necessarily have the effect of improving the welfare of mothers as well. That the existing literature on intra-household policy targeting often draws such a conclusion is largely due to its neglect of the impact of increased time burden on women that larger market participation may entail.[22] Our results show that this neglect is not innocuous.

Anthropological studies identify goods as essentially "male" in many traditional societies. Alcohol, cigarettes, status goods, "female companionship" are all noted as male goods in these studies (Alderman et al. (1995) p. 11). Our results suggest that taxing male goods and subsidizing children's goods (or domestic public goods in general) may be more beneficial to married women and children than measures to reduce wage differentials or direct state provisioning of goods targeted towards the latter.

The results can be interpreted as supporting a 'trickle-down' or growth-oriented view of intra-household distribution. To the extent that a reduction in gender-based wage differential has improved the welfare of married women, this may be largely due to an increase in overall wage rates, rather than inter-gender income redistribution per se. The real beneficiaries of measures to reduce gender-based wage differentials seem to be single, rather than married, women, and, probably, children. Thus, their effect on the welfare of single women (including divorced mothers with non-contributory ex-spouses) and children, rather than of women in general, seems to provide a stronger justification for such programs.

An interesting extension would be to examine whether our welfare conclusions continue to hold with long run marriage market effects under alternative assumptions about marital contracts.

---

equilibrium can still be considered the relevant threat point, if, in case of divorce, continuing to contribute to children's expenses (irrespective of custody rights) dominates non-contribution for both parents.

[20] For recent surveys, see Thomas (1997) and Hoddinott et al. (1997). Leslie (1988) surveys studies that find a positive relationship between women's market earnings and household spending on children's health and nutrition.

[21] For example, Lundberg, Pollak and Wales, analyzing the change in the UK child benefit scheme, and finding evidence of increase in spending on women's and children's clothing relative to men's clothing, conclude that the most important implications of their result concern "…not the potential effects of alternative child allowance schemes on intrafamily distribution, but the potential effects of increased access to market work and market income for women…" (Lundberg et al. (1997, p. 479)). See also Klasen (1993) and UNDP (1995).

[22] Alderman et al. (1995, footnote 10) and Alderman et al. (1997, p. 286) point out this gap in passing.

V. Concluding Remarks

In this paper, we have examined the implications of an income redistribution from men to women for the welfare of mothers as well as their children. To analyze this issue, we have utilized a Cournot model of a two-person household with endogenous labor supply, where each member provides market labor and allocates his/her own spending between a private consumption good and a domestic public good (interpreted as children's expenses). We have assumed that: (a) all goods are normal goods, (b) leisure and the domestic public good are net substitutes and (c) the amount redistributed is smaller than the initial male spending on the domestic public good. We have shown that, under these restrictions, women become worse off as a consequence. This happens because the income redistribution away from men induces the male member of the household to reduce his spending on the domestic public good by *more than* the amount redistributed. Since the offsetting benefit to women is, at most, the amount redistributed, the net consequence is a reduction in the welfare of women, compared to the status quo. However, if the inter-gender income redistribution is implemented through a policy-induced relative increase in women's market wage rate, the effect of such an increase may also be to improve children's welfare by increasing total household expenditure on them. Thus, measures to improve women's access to independent resources may actually improve the well-being of children at the cost of their mothers. While questioning the standard understanding of the relationship between married women's access to independent income and their own wellbeing, the results also point to the possibility of a conflict between the interests of mothers and those of their children.

The crucial assumption driving our results is that expenditure on children (or, more generally, on domestic public goods) and leisure are net substitutes. It is essentially this assumption which results in "excessive crowding out" of male contributions in response to relative increases in women's independent income in our model. This in turn generates the adverse consequences for women's welfare. Clearly, the significance of our results in a policy context largely depends on the extent to which such male crowding out actually takes place. The existing empirical literature on intra-household distribution typically neglects measurements of male crowding out, making the "assessment of the impact of targeted transfers imprecise" (Alderman et al. (1997) p. 279). The theoretical analysis in this paper points to the critical need for such empirical investigation.

APPENDIX

Proof of Proposition 1:

(a) A cash transfer to F funded by a wage tax on M can be decomposed into (i) a cash transfer T to M funded by the wage tax on him, and (ii) a lump-sum redistribution of T from M to F. Given A3, the neutrality property of Cournot games with public goods implies that M will reduce his contribution by exactly T under (ii). Hence, we only need to show that M's spending on children must fall under (i).

Suppose not. Since leisure and the domestic public goods are net substitutes for M by A2, and all goods are normal goods by A1, this is possible only if y_F^N falls in the new Nash equilibrium. A1 implies that this can happen only if y_M^N increases, which, given A1, implies that y^N must increase as well (since (1) must be satisfied for F). Now, since (1) must be satisfied for M as well, A1 and A2 together imply that y^N can increase only if y_F^N rises. This contradiction establishes that y_M^N must be lower under the income compensated wage tax on M, and thereby, Proposition 1(a).

(b) Since (1) must be satisfied for F, Proposition 1(b) follows from A1 and Proposition 1(a).

(c) That F's labor supply will increase follows immediately from the assumption that leisure is a normal good and Proposition 1(a). As the two policies impact on F only through changes in her total non-labor income from all sources, the welfare conclusion follows directly from Proposition 1(a). ◊

Proof of Proposition 2:

(a) First compare M's spending on children initially to that under a lump-sum transfer of T to F. Given the restriction on the size of T, by the neutrality property, M's contribution will fall by exactly T. Hence, we only have to show that a wage subsidy to F funded by a lump-sum tax on her must reduce M's spending on the domestic public good. An argument symmetric to that used to establish Proposition 1(a) establishes that $\left(I_M + y_F^N\right)$ must be higher under the wage subsidy to F, as compared to the cash transfer to her. But, as leisure and private consumption are both normal goods for M by A1, this implies that M's spending on the public good must be less under the wage subsidy to F than under the cash transfer to her.

(b) Recall that $\left(I_M + y_F^N\right)$ must be higher under the wage subsidy to F, as compared to the cash transfer to her. Then, since (1) must be satisfied for M, A1 implies that household spending on children must be higher under the wage subsidy to F. Since, by assumption, F contributes a positive amount in any Nash equilibrium, the required result follows immediately from the neutrality property.

(c) By the neutrality property, F's consumption of leisure in the pre-intervention equilibrium would be the same as that under a lump-sum transfer to her. Hence, we only need to show that her labor supply rises when she receives a wage subsidy rather than a lump-sum. The compensated wage increase would increase F's labor supply through the substitution effect. Hence, for her to consume more leisure in equilibrium, given A1, it is necessary that M's contribution increase under the wage subsidy. However, we have already established in the Proof of Proposition 2(a) that M's contribution must in fact decrease under the

wage subsidy to F. Hence, F's labor supply must increase. The welfare conclusion follows immediately from Proposition 2(a) above. ◊

References:

Alderman, H., P. Chiappori, L. Haddad, J. Hoddinott and R. Kanbur (1995): "Unitary Versus Collective Models of the Household: Is it Time to Shift the Burden of Proof?" *The World Bank Research Observer*, 10 (1, November): 1-19.

Alderman, H., L. Haddad and J. Hoddinott (1997): "Policy Issues and Intrahousehold Resource Allocation: Conclusions", in L. Haddad, J. Hoddinott and H. Alderman (ed.s) *Intrahousehold Resource Allocation in Developing Countries*, (Baltimore: The Johns Hopkins University Press).

Apps, P. and E. Savage (1989): "Labour Supply, Welfare Rankings, and the Measurement of Inequality", *Journal of Public Economics*, 39 (3): 335-364.

Barro, R. J. (1974): "Are Government Bonds Net Wealth?" *Journal of Political Economy*, 82 (6, November-December): 1095-1117.

Beaton, G. and H. Ghassemi (1982): "Supplementary Feeding Programs for Young Children in Developing Countries", *American Journal for Clinical Nutrition*, 34 (4, supplement): 863-916.

Becker, G. (1981): *A Treatise on the Family* (Cambridge, Mass.: Harvard University Press).

Bergstrom, T. (1996): "A Survey of Theories of the Family", in M. R. Rosenzweig and O. Stark (ed.s), *Handbook of Population and Family Economics* (Amsterdam: North-Holland).

Bergstrom, T. (1989): "A Fresh Look at the Rotten Kid Theorem – and other Household Mysteries", *Journal of Political Economy* 97 (5): 1138-1159.

Bergstrom, T., L. Blume, and H. Varian (1986): "On the Private Provision of Public Goods." *Journal of Public Economics*, 29: 25-49.

Boserup, E. (1970): *Women's Role in Economic Development* (London: Allen and Unwin).

Brown, J. C. (1984): *Family Income Support Part 2: Children in Social Security*. Studies of the Social Security System 3 (London: Policy Studies Institute).

Cox, D. and G. Jakubson (1995): "The Connection Between Public Transfers and Private Interfamily Transfers", *Journal of Public Economics* 75 (1): 129-167.

Dasgupta, P. (1993): *An Inquiry into Well-Being and Destitution* (New York: Oxford University Press).

Dey Abbas, J. (1997):"Gender Asymmetries in Intrahousehold Resource Allocation in Sub-Saharan Africa: Some Policy Implications for Land and Labor Productivity", in Haddad et al. (ed.s) *Intrahousehold Resource Allocation in Developing Countries*, (Baltimore: The Johns Hopkins University Press).

Goetz, A. M. and R. Sengupta (1994): "Who Takes the Credit? Gender, Power and Control over Loan Use in Rural Credit Programs in Bangladesh", mimeo, Institute of Development Studies, University of Sussex, U.K.

Haddad, L. and R. Kanbur (1990): "How Serious is the Neglect of Intra-Household Inequality?" *Economic Journal* 100 (402, September): 866-81.

Harriss, B. (1990): "The Intrafamily Distribution of Hunger in South Asia" in A. K. Sen and Jean Dreze (ed.s) *The Political Economy of Hunger Vol. I* (New York: Oxford University Press).

Hoddinott, J., H. Alderman and L. Haddad (1997): "Testing Competing Models of Intrahousehold Allocation", in Haddad et al. (ed.s) *Intrahousehold Resource Allocation in Developing Countries* (Baltimore: The Johns Hopkins University Press).

Kabeer, N. (1991): "Gender Dimensions of Rural Poverty: Analysis from Bangladesh", *The Journal of Peasant Studies* 18 (2, January): 241-262.

Kanbur, R. (1995): "Children and Intra-Household Inequality: A Theoretical Analysis", in K. Basu, P. K. Pattanaik and K. Suzumura (eds.) *Choice, Welfare and Development: A Festschrift in Honour of Amartya K. Sen* (New York: Oxford University Press).

Kennedy, E. and H. Alderman (1987): "Comparative Analyses of Nutritional Effectiveness of Food Subsidies and Other Food-Related Interventions", *International Food Policy Research Institute*, Washington, D.C.

Klasen, S. (1993): *Gender Inequality and Development Strategies: Lessons from the Past and Policy Issues for the Future*. World Employment Programme Research, WP No. 41, ILO, Geneva.

Leslie, J. (1988): "Women's Work and Child Nutrition in the Third World", *World Development* 16 (11, November): 1341-62.

Lundberg, S. and R. A. Pollak (1993): "Separate Spheres Bargaining and the Marriage Market." *Journal of Political Economy*, 101(6, December): 988-1010.

Lundberg, S., R. Pollak and T. Wales (1997): "Do Husbands and Wives Pool Their Resources? Evidence from the United Kingdom Child Benefit", *The Journal of Human Resources*, 32 (3): 463-480.

Manser, Marilyn and Murray Brown (1980): "Marriage and Household Decision-Making: A Bargaining Analysis", *International Economic Review*, 21: 31-44.

McElroy, M. (1997): "The Policy Implications of Family Bargaining and Marriage Markets", in L. Haddad et al. (ed.s) *Intrahousehold Resource Allocation in Developing Countries*, (Baltimore: The Johns Hopkins University Press).

--- (1990): "Nash-bargained Household Decisions- Reply", *International Economic Review*, 31 (1): 237-242.

McElroy, Marjorie B. and Mary Jean Horney (1981): "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand", *International Economic Review*, 22 (2): 333-349.

Ott, N. (1992): *Intrafamily Bargaining and Household Decisions* (Berlin: Springer-Verlag).

Pitt, M. and S. Khandkar (1994): "Household and Intrahousehold Impacts of the Grameen Bank and Similar Targeted Credit Programs in Bangladesh." *The World Bank*, Education and Social Policy

Department, Washington, D.C.

Roberts, R. (1984): "A Positive Model of Private Charity and Wealth Transfers", *Journal of Political Economy* (92): 136-148.

Sen, A. K. (1984): "Family and Food: Sex Bias in Poverty", in A. K. Sen (ed.) *Resources, Values, and Development* (Oxford: Blackwell).

Thomas, D. (1997): "Incomes, Expenditures, and Health Outcomes: Evidence on Intrahousehold Resource Allocation", in Haddad et al. (ed.s) *Intrahousehold Resource Allocation in Developing Countries* (Baltimore: The Johns Hopkins University Press).

Tinker, I. (1990): "The Making of a Field: Advocates, Practitioners and Scholars", in I. Tinker (ed.) *Persistent Inequalities* (Oxford: Oxford University Press).

Ulph, D. (1988): "General Noncooperative Nash Model of Household Consumption Behaviour." Mimeo, Department of Economics, University of Bristol, UK.

United Nations (1995): *The World's Women: Trends and Statistics* (New York: United Nations).

United Nations Development Programme (1995): *Human Development Report* (New York: Oxford University Press).

Woolley, F. (1988): "A Non-Cooperative Model of Family Decision Making." Working Paper, No.TIDI/125, London School of Economics, UK.