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MAKING BEQUESTS WITHOUT SPOILING CHILDREN: BEQUESTS AS AN IMPLICIT OPTIMAL TAX STRUCTURE AND THE POSSIBILITY THAT ALTRUISTIC BEQUESTS ARE NOT EQUALIZING

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ABSTRACT

This paper examines the bequest\gift behavior of altruistic parents who do not know their children's abilities and cannot observe their children's work effort. Parents are likely to respond to this information problem by making larger bequests to higher earning children and by using their transfers implicitly either to tax at the margin low earning children or to subsidize at the margin high earning children. These implicit tax rates may be quite large, despite the fact that total transfers are small. The paper suggests that labor supply studies should take into account potential implicit family taxation as well as official government taxation. In addition, the fact that the family may play an implicit role in taxation means that there may be less need for the government to play such a role.

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The assumption that parents know perfectly the abilities of their children underlies most, if not all, of the theoretical research on intergenerational transfers. This assumption has a strong implication, namely that altruistic parents will make transfers to their children that are independent of their children's work efforts. As this paper demonstrates, if altruistic parents do not know their children's abilities and cannot observe their work effort, they will condition their transfers on the level of their children's labor earnings. To keep their children from pretending (by working and earning less) to be of low ability in order to garner a larger transfer, parents are likely to make larger transfers to high earning children and smaller transfers to low earning children. Indeed, in addressing their information problem, altruistic parents may produce more inequality in the final consumption of children than would arise if parents were not altruistic. To help keep their children from freeloading, parents may also make their transfers, at the margin, a function of their children's labor earnings. As a consequence children's marginal returns to labor supply can differ, and potentially greatly, from their observed after tax wages.

Those familiar with the optimal income tax literature (Mirrlees, 1971; Sadka, 1976; Stiglitz, 1987) may sense a parallel between a parent who redistributes among children of unobserved abilities and a government that redistributes among citizen of unobserved abilities. Indeed, the two problems are essentially isomorphic. An immediate implication of this proposition is that if government and parental preferences about the distribution of welfare coincide there may be no optimal income tax role for the government; i.e., parental choice of average and marginal transfers may substitute perfectly for the government's optimal tax structure.

The next section, II, contains a simple model that illustrates the nature of the parent's information problem. The model is used to show how the parent's total and marginal transfers depend on the child's observed earnings. Section III calculates for a specific utility function and a specified list of parameters the values of transfers, the implicit marginal tax associated with transfers, and other endogenous variables. Section IV discusses the model's implications concerning debt neutrality pointing out that, as in Feldstein (1988), Ricardian Equivalence will not hold in states of nature in which transfers are operative provided that in other states of nature transfers are inoperative. States of nature refer here to the realized abilities of children. Section IV also concludes the paper with suggestions for additional research.

II. The Choice of Transfers under Asymmetric Information

A static model suffices to clarify the problem of an altruistic parent who wishes to transfer to a child, but does not know the child's ability and can not observe the child's effort. The parent must infer from his (her) observation of the child's earnings the ability and effort of the child. The parent's utility depends on the parent's own consumption and the utility of the child. The utility of the child, in turn, is a concave function of the child's own consumption and the child's effort. Prior to observing the child's labor earnings, the parent announces a set of transfers to the child conditional on the child's labor earnings. Hence, the parent maximizes his (her) expected utility over the different possible states corresponding to different levels of the child's ability. The constraints in this maximization problem include the parent and child's combined budget constraint, self selection constraints, and nonnegativity constraints on transfers from parents to children. The self selection constraints ensure that the child will truthfully reveal his (her) ability.

With the exception of the nonnegativity constraints on transfers, the problem is isomorphic to that of a government maximizing a weighted average of its own utility from consumption and the utility of low and high ability workers in the case that ability is unobservable. In place of an optimal income tax, the parent uses his (her) transfer to the child both to redistribute and to provide the proper marginal incentives necessary for truthful revelation.

To illustrate the problem in the simplest manner let the child have two possible ability levels, A_l and A_h, where $A_l < A_h$. Earnings of the low and high ability children are denoted by E_l and E_h, respectively. The relationships between earnings, ability, and effort of the low and high ability children, L_l and L_h, are given by

$$(1) \qquad E_l = A_l L_l$$
$$E_h = A_h L_h$$

In equation (1) the wage per unit of effective labor supply is normalized to 1.

The expected utility function of the parent is given by

$$(2) \quad W_p = q[U(C_{pl}) + \beta V(C_{kl}, E_l/A_l)] + (1-q)[U(C_{ph}) + \beta V(C_{kh}, E_h/A_h)],$$

where q is the probability the child is of low ability, C_{pl} and C_{ph} are the consumption values of the parent if the child turns out to have low or high ability respectively, and V(,) is the utility function of the child which depends on his (her) consumption (C_{kl} for the low ability child and C_{kh} for the high ability child) and his or her effort L_l or L_h. In (2) these effort levels are replaced (using (1)) by earnings divided by ability.

The parent's problem is to maximize (2) with respect to C_{pl}, C_{kl}, C_{ph}, C_{kh}, E_l, and E_h subject to the budget constraints given in (3) and (4), the self selection constraints given in (5) and (6), and the nonnegativity constraints on transfers given in (7) and (8). In the budget constraints Y stands for the parent's income. Note that $Y - C_{pl}$ is the parent's transfer to the low ability child, and $Y - C_{ph}$ is the parent's transfer to the high ability child.

(3) $$Y + E_l \geq C_{pl} + C_{kl}$$

(4) $$Y + E_h \geq C_{ph} + C_{kh}$$

(5) $$V(C_{kh}, E_h/A_h) \geq V(C_{kl}, E_l/A_h)$$

(6) $$V(C_{kl}, E_l/A_l) \geq V(C_{kh}, E_h/A_l)$$

(7) $$Y \geq C_{pl}$$

(8) $$Y \geq C_{ph}$$

Let us associate the Lagrangian multipliers θ_l and θ_h with the constraints (3) and (4), respectively, the multipliers λ_l and λ_h with the constraints (5) and (6), respectively, and the multipliers μ_l and μ_h with the constraints (7) and (8), respectively. Equations (9)-(14) present the first order conditions for the choices of C_{pl}, C_{ph}, C_{kl}, C_{kh}, E_l, and E_h under the assumptions that (5) is binding, that (6) is not binding, and that transfers are nonnegative, i.e., that μ_l and μ_h are 0.

(9) $$qU'(C_{pl}) - \theta_l = 0$$

(10) $$(1-q)U'(C_{ph}) - \theta_h = 0$$

(11) $$q\beta V_1(C_{kl}, E_l/A_l) - \theta_l - \lambda_h V_1(C_{kl}, E_l/A_h) = 0$$

(12) $$(1-q)\beta V_1(C_{kh}, E_h/A_h) - \theta_h + \lambda_h V_1(C_{kh}, E_h/A_h) = 0$$

(13) $$q\beta V_2(C_{kl}, E_l/A_l)\frac{1}{A_l} + \theta_l - \lambda_h V_2(C_{kl}, E_l/A_h)\frac{1}{A_h} = 0$$

(14) $$(1-q)\beta V_2(C_{kh}, E_h/A_h)\frac{1}{A_h} + \theta_h + \lambda_h V_2(C_{kh}, E_h/A_h)\frac{1}{A_h} = 0$$

The combinations of (9) and (11) and (10) and (12) indicate that the parent equates his (her) marginal utility of consumption to β times the child's marginal utility of consumption plus a term that indicates how increasing the child's consumption through an increase in transfers (since transfers equal Y minus parent's consumption) affects the self selection constraint (5). In the case of equation (11) transferring another dollar to the child (increasing the child's consumption by a dollar) raises the high ability child's utility when he pretends to be of low ability; this makes the self selection more difficult to satisfy and therefore raises, at the margin, the cost of transferring to the child. The opposite occurs with respect to equation (12).

The addition of equations (12) and (14) indicate that the high ability child's marginal rate of substitution $-(V_2/V_1)$ between consumption and effort is equated to his (her) marginal productivity (A_h). This is not the case for the low ability child. The addition of (11) and (13) indicates that the low ability child faces an implicit marginal tax at rate τ, where τ is given by

$$(15) \qquad \tau = \frac{\lambda_h}{(q\beta - \lambda_h)\ V_1(C_{k1}, E_1/A_1)} H,$$

and

$$(16)\ H = V_1(C_1\ , E_{k1}/A_h) - V_1(C_1\ , E_{k1}/A_1) + V_2(C_{k1}, E_1/A_h)\frac{1}{A_h} - V_2(C_{k1}, E_1/A_1)\frac{1}{A_1}$$

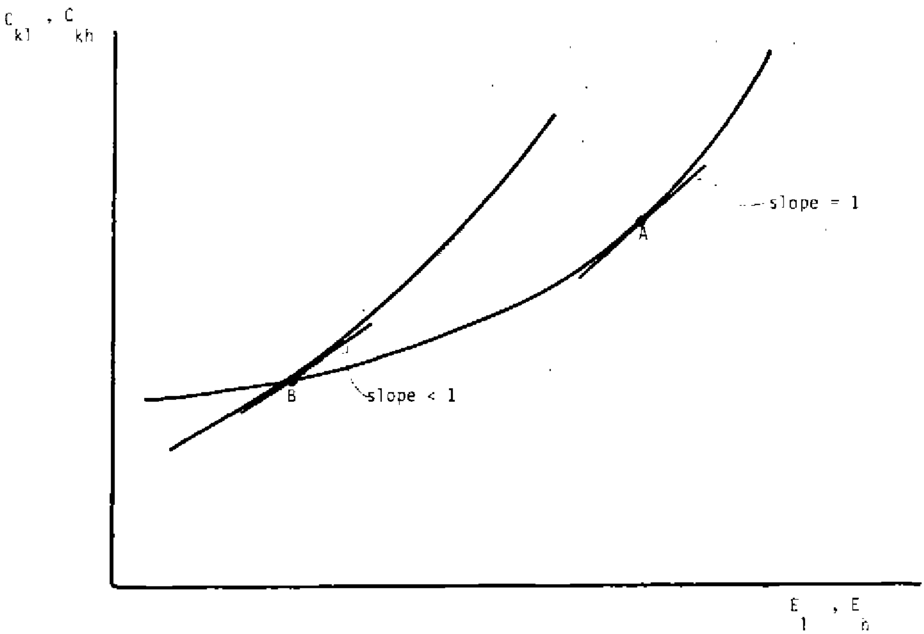
If $V_{12} \leq 0$, i.e., the marginal utility of consumption decreases with the amount of effort (increases with the amount of leisure), $q\beta - \lambda_h$ (from equation (11)) and H (from equation (16)) are positive. Hence, the tax rate on the high ability child is positive since λ_h is positive.

If the self selection constraint on the low ability child's utility (equation (6)) is binding, a similar argument indicates that the low ability child will face a zero implicit marginal tax, while the high ability child will face an implicit marginal subsidy.

In the case of full information there are no self selection constraints, so the solution can be found by simply setting λ_h or λ_1 equal to zero in the first order conditions for the choice of C_{p1}, C_{ph}, C_{k1}, C_{kh}, E_1, and E_h. In this case there is, of course, no distortion of the child's work effort, and the parent equates his (her) marginal utility of consumption to β times the child's marginal utility of consumption.

Figure 1 depicts the case in which the self selection constraint on the high ability child is binding. The diagram, which is, except for symbols, identical to that in Sadka (1976), plots the utility of the child in

Figure 1. Using Bequests as an Implicit Tax to Sort Children



consumption and earnings space assuming $V_{12} \le 0$. At any point in this space the slope of the high ability child's indifference curve is smaller than that of the low ability child. At the optimum the high ability child is at point A and faces no implicit marginal tax (i.e., the slope of his (her) indifference curve is 1). At point A the high ability child is indifferent between truthfully revealing his (her) ability and pretending to be of low ability by earning E_l and consuming C_{kl} at point B. The low ability child ends up at point B with the slope of his (her) indifference curve less than 1, indicating a positive implicit tax.[1]

III. Comparisons of the Asymmetric and Perfect Information Solutions

The log-linear utility function given in equation (17) is useful for illustrating differences between the full information and asymmetric information problems.

$$W_p = q[\log C_{pl} + \beta(\log C_{kl} - \alpha(E_l/A_l))] + (1-q)[\log C_{ph} + \beta(\log C_{kh} - \alpha E_h/A_h))], \quad (17)$$

It is easy to show for this function that the two self selection constraints can not simulataneously be binding. From the first order conditions it is easy to confirm the following relationships, where the superscript f stands for the case of full information and the superscript a stands for the case of asymmetric information.

$$(18)\qquad \begin{aligned} C^a_{pl} &> C^f_{pl} \\ C^a_{kl} &< C^f_{kl} \\ C^a_{ph} &< C^f_{ph} \\ C^a_{kh} &= C^f_{kh} \\ E^a_h &< E^f_h \\ E^a_l &\ ?\ E^f_h \end{aligned}$$

In words, in the asymmetric information case the parent of the high ability child consumes less and makes a larger transfer (since transfers equal $Y - C_{ph}$), while the parent of the low ability child consumes more and makes a smaller transfer. Hence, transfers are less equalizing for this utility function when information is asymmetric, and as presently described, under asymmetric information the transfer to the high ability child can exceed that to the low ability child, while the reverse holds under full information. The equations in (18) also indicate that the high ability child consumes the same, but earns less in the asymmetric information case with increased transfers making up for the lower earnings. The low ability child consumes less in the asymmetric case, but his (her) earnings may be larger or smaller.

Table 1 compares the asymmetric and full information solutions for this utility function for a range of parameter values. The results are quite striking. For each of the sets of parameters asymmetric information leads parents to transfer more to the high ability child than to the low ability child, i.e., transfers are not equalizing. For example, for the benchmark parameters the transfers, under full information, are 1.42 to the low ability child and .9 to the high ability child. With incomplete information, however, the transfers are almost the reverse, with only 1.04 going to the low ability child and 1.34 going to the high ability child. The counterpart of these differences in transfers is that the consumption of parents will be quite different when information is asymmetric than when it is not. For the benchmark parameters parents of high ability children consume 2.10 under full information but only 1.66 under asymmetric information, while parents of low ability children consume 1.58 under full information but 1.96 under asymmetric information.

The consumption of low ability children in the benchmark case is 1.50 with full information, but only 1.36 with asymmetric information; for high ability children, earnings adjust to maintain the same consumption level under full and asymmetric information. Hence, compared with the case of full information, the consumption of high and low ability children is less equal when information is asymmetric. Indeed, when information is asymmetric the process of parents transferring to their children can lead to more inequality in their children's consumption than would occur if parents were not altruistic and made no transfers to their children. For the benchmark parameters, but with $\beta = 0$, the high ability child's consumption is 2.00, while the low ability child's consumption is 1.50 (as in the full information case with $\beta = .95$).

The implicit marginal tax rates on the low ability child listed in Table 1 range from 7 percent to 28 percent. The 28 percent figure is particularly interesting. This implicit tax rate arises when A_h equals 1.25 while A_l

remains at .75. Compared with the benchmark case the implicit marginal tax rate is over three times larger, although the total transfer to the low ability child is almost 25 percent smaller. This comparison indicates that implicit marginal taxation through parental bequests and intervivos transfers can be quite large despite the fact that total transfers are small.

The different parameter combinations considered in the second two columns of Table 1 suggest that children's labor earnings can be quite sensitive to the extent of altruism (the level of β). Columns 5 and 6 of this Table consider a lower value of the probability q of having a low ability child. In the case of asymmetric information the smaller value of q leads to smaller transfers to both the high and low ability children, but to a higher implicit tax on the low ability child.

Section IV Implications for Debt Neutrality and Conclusions

Any new model of intergenerational transfers should be immediately examined with respect to Robert Barro's (1974) debt neutrality proposition (Ricardian Equivalence). As in Feldstein (1988) the model presented here will not exhibit Ricardian Equivalence in states of nature when altruistic transfers are operative unless transfers are operative in all states of nature. To see this suppose that the solution to the parent's problem involves zero transfers to the high ability child, but positive transfers to the low ability child. The self selection constraint (5) in this case may still be binding, because the high ability child may try to disguise himself (herself) as a low ability child to receive a transfer. If the government redistributes from the parent to the child independent of the child's earnings (in a lump sum fashion) the utility of the high ability child will increase. But this will alter the self selection constraint (5) and, thereby, alter the outcome when the child is of low ability. In particular, by increasing the left hand side of (5) the government policy relaxes this self selection constraint evaluated at the pre-government transfer optimum. As a consequence the total (government plus parent) transfers to the low ability child will likely be greater as a result of the government's policy. Hence, the policy will likely be effective in redistributing to the child regardless of whether the child turns out to be of high or low ability.

To summarize this paper's findings, the inability of parents to know or to monitor perfectly their children's work efforts can significantly alter parental transfers to children. Parents are likely to respond to their information problem by making larger bequests to higher earning children and by using their transfers implicitly either to tax at the margin low earning children or to subsidize at the margin high earning children. These implicit tax rates may be quite large, despite the fact that total transfers are small. Hence, labor supply studies should take into account potential implicit family taxation as well as official government taxation. In addition, the fact that the family may play an implicit role in taxation means that there may be less need for the government to play such a role.

Notes

1. To be more precise, the slope (the right derivative) of the budget constraint relating the child's pre-parent transfer earnings to his (her) post-parent transfer consumption at point B must be less unity. Indeed, this slope must be less than or equal to the slope of the high ability child's indifference curve at point B; i.e., the "marginal tax schedule" must have a kink at point B.

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Table 1

Calculations Based on the Log-Linear Utility Function

	Benchmark		β =.75		q = .25		α = .40		A_h = 1.25	
	AI	FI	AI	FI	AI	FI	AI	FI	AI	FI
C_{pl}	1.96	1.58	2.43	2.00	2.20	1.58	2.46	1.97	2.26	1.58
C_{ph}	1.66	2.10	2.15	2.67	1.87	2.10	2.09	2.63	1.75	2.63
C_{kl}	1.36	1.50	1.39	1.50	1.30	1.50	1.72	2.24	1.07	1.50
C_{kh}	2.00	2.00	2.00	2.00	2.00	2.00	2.50	2.50	2.50	2.50
E_l	.34	.08	.83	.50	.50	.08	1.18	.85	.33	.08
E_h	.67	1.11	1.15	1.67	.87	1.11	1.58	2.13	1.25	2.13
T_l	1.04	1.42	.57	1.00	.80	1.42	.54	1.03	.74	1.42
T_h	1.34	.09	.85	.33	1.13	.90	.91	.37	1.25	.37
τ*	.09	.00	.07	.00	.13	.00	.08	.00	.28	.00

Except where indicated all parameters are the benchmark parameters. The benchmark parameters are Y = 3, A_l = .75, A_h = 1, q = .5, β = .95, α = .5(
* τ stands for the implicit marginal tax on the low ability child. It is defined by $MRS_i = A_i(1-\tau_i)$ for i=l,h, where MRS is the marginal rate of substitution between consumption and effort.