Targeting Transfers through Restrictions on Recipients

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Our objective is to design transfer programs that maximize some social welfare function. Following the optimal income tax formulation, we assume that a random process endows individuals with characteristics that influence welfare, such as ability to earn income, medical condition, or unmonitorable income. The goal is to maximize the utility of a randomly chosen individual. (Other individualistic social welfare functions would lead to equivalent results.)

If the random characteristics were observable, a first best outcome could be achieved by making them the basis for lump sum transfers. In practice, however, we can observe only indicators of these characteristics, such as earnings, medical expenditures, or consumption patterns. The challenge for policy is to design an efficient second best transfer program based on indicators.

In this paper we argue that 1) An optimal transfer program in general must sacrifice productive efficiency to target efficiency. This is done by imposing restrictions on the choices made by intended beneficiaries. 2) A program that incorporates restrictions—such as means-tested in-kind transfers, commodity-specific taxes and subsidies, and even ordeals (i.e., the imposition of deadweight costs to qualify for a transfer)—will perform better than programs that rely solely on income taxes and cash transfers.

I. Optimal Income Tax—Restrictions on Earned Income

The optimal income tax has received more attention than any other redistributional mechanism. The literature traditionally posits a common utility function with consumption C, and effort E as arguments. The random characteristic, ability, as indicated by wage W, determines the available choices. Consumption equals earned income Y, plus transfers T; that is, $C = Y + T$. Effort is earned income divided by wage. For simplicity, assume that there are two individuals. The one who earns a low wage, B, is the intended beneficiary. The high-wage individual, A, is supposed to pay taxes that cover the transfer to B.

If the government could monitor wage levels or hours worked, it would levy a lump sum tax on A and transfer the proceeds to B to increase total utility. But this is not possible. The tax and transfer must be a function of income. It is easy to show that the optimal system takes the following form: If an individual's income is greater than $\bar{Y}$, he pays a tax of T. If it is less than $\bar{Y}$, he receives a transfer of T. The hope, of course, is that A pays the tax and B receives the transfer. The danger is that A may choose to be an impostor and masquerade as a low-ability individual. Specifically, he could reduce his pretax income (and effort) to qualify for the transfer. Thus, the scheme must pay heed to target efficiency. For any given $\bar{Y}$, T must be limited so that A is not an impostor; that is so that he chooses to earn more than $\bar{Y}$. The condition is that

$$U(Y_A^* - T, Y_A^*/W_A) > U(\bar{Y} + T, \bar{Y}/W_A),$$

where Y_A^* is the optimal amount to earn given that T must be paid in taxes and the wage is W_A. This condition defines a functional relationship between $\bar{Y}$ and T.

Since the purpose of the scheme is to help the low-ability individual, intuition might suggest that we should not constrain B's earnings. That is, for any transfer level under consideration, we would set $\bar{Y} = Y_B^*$, the amount of income B would choose to earn as the recipient of the transfer. Such a policy is not optimal, however, because as $\bar{Y}$ increases, T must be reduced to deter masquerading by A. The optimal value of $\bar{Y}$, in

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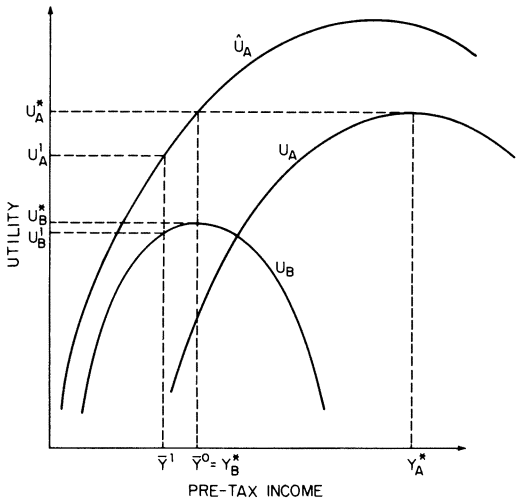

FIGURE 1. DETERRENCE EFFECT OF INCOME CONSTRAINT

fact, is less than Y_B^*. We impose a restriction on B that "hurts" him, but, by making the low position less attractive to A, permits a higher transfer before masquerading becomes desirable. In essence, the income restriction sacrifices productive efficiency by distorting B's labor-leisure allocation, but enhances target efficiency by allowing more income to be transferred to the condition with high marginal utility; that is, to the intended beneficiary, B.

The major themes of this paper are that, assuming well-behaved utility functions and the like, restrictions of this sort will always be (a) beneficial to target efficiency, and (b) desirable despite the productive inefficiency they generate. To illustrate the argument, Figure 1 plots utility as a function of pre-tax income for a particular T. The curve U_B shows B's utility given that he receives the transfer. Note that as pre-tax income rises, utility first rises and then falls as the marginal disutility of effort exceeds the marginal utility of income. Two curves are shown for A: U_A applies if A pays the tax and $\hat{U}_A$ applies if he masquerades and receives the transfer. The curves have been drawn so that if $\bar{Y} = Y_B^*$, A is just indifferent between earning Y_A^* and masquerading by earning $\bar{Y}^0 = Y_B^*$.

Now suppose we lowered $\bar{Y}$ slightly, to $\bar{Y}^1$. Beneficiary B's utility is reduced, but only slightly because U_B is flat in the neighborhood of Y_B^*. Now, however, A suffers a much greater loss if he masquerades. Since Y_B^* is far from A's optimum as an impostor, tightening the constraint on earned income has a high shadow price (deterrent value) for him. With A's utility as an impostor reduced, we can increase T without inducing A to masquerade. The increase in T is more than sufficient to compensate B for the loss in utility due to restricting his pre-transfer income. As $\bar{Y}$ falls and T increases, however, the loss due to restricting B's pre-tax income increases, while the gain in social welfare from transferring income from A to B declines, thus limiting the process.

Consider a simple numerical example. The two individuals have the common utility function, $U(C, E) = ln(C) + ln(10 - E)$, but A earns a wage of 2, while B earns a wage of only 1. The government's goal is to maximize the sum of individual utilities. Table 1 reports the results for three cases: no tax-transfer scheme; optimal transfer with $\bar{Y}$ not binding on B; and optimal transfer with $\bar{Y}$ binding. In the second case, when $\bar{Y} = Y_B^*$, B earns 4.375 and the maximum transfer possible is 1.25. In the third case, B is restricted to earning 3.600 and receives a transfer of 1.575

TABLE 1—A NUMERICAL EXAMPLE

Tax-Transfer Scheme	Transfer (T)	Incomes		Utilities		
		Y_A	Y_B	U_A	U_B	$U_A + U_B$
None	N.A.	10.0	5.0	3.912	3.219	7.131
Recipient's Income						
Unconstrained	1.250	10.625	4.375	3.783	3.454	7.237
Constrained	1.575	10.788	3.600	3.748	3.500	7.248

(absent the constraint, with that transfer he would choose to earn 4.213). Restricting B's earnings raises his utility, lowers that of A by a lesser amount, and thus increases the sum of their utilities.

The policy lesson is simple: If the income tax is our only tool, it will be desirable to restrict the eligibility for transfers to an income level lower than the intended (and actual) beneficiary would choose for himself, even if this dramatically changes earnings behavior. Our next question is whether there are circumstances that would justify augmenting the income tax scheme with income-based in-kind transfers, commodity-specific subsidies, and other mechanisms that generate deadweight losses in production and consumption.

II. In-Kind Transfers—Restrictions on Consumption Bundles

In the model outlined above, the government improves the welfare of the recipient and the efficiency of the transfer scheme by restricting the one choice open to individuals, the amount of income earned. In reality, however, individuals make a variety of choices; in particular, they must choose how to allocate their income among various goods. In this section and the next two, we show how redistributive efficiency can be improved in many circumstances by restricting or "distorting" these choices as well, through such instruments as in-kind transfers, commodity-specific subsidies, and work requirements.

Economists generally are highly skeptical of efforts to redistribute income through subsidies or in-kind transfers, since no individual will prefer a subsidy or in-kind transfer to its cash equivalent (in terms of cost to the government). Thus, for example, economists question the value of giving food stamps or subsidizing housing, since a cash transfer could make the recipients just as happy at lower cost. Exceptions to this general principle are made where commodity-specific externalities are present, or on the basis of paternalism or merit good arguments. For purposes of this paper, we shall assume that none of these traditional rationales for subsidies and in-kind transfers applies.

As before, we assume a common utility function for all individuals, but now the arguments are quantities of specific goods, effort, and random characteristics. The random characteristics could include such variables as medical condition, concealed income, the value of leisure, as well as the traditional variable, ability. Each individual selects his level of effort and his consumption bundle to maximize his utility, subject to the constraint that total expenditure on goods not exceed his after-tax (transfer) income.

In-kind transfers and subsidies will not be desirable when an individual's demand for a good is a function solely of its price and his income. (That is, when demand is independent of leisure, ability, and other unobservable characteristics once we control for income.) Suppose that the government subsidizes an inferior good, on the rationale that the primary beneficiaries of the subsidy will be low-income, low-ability individuals, precisely those it wishes to help. We know, however, that each individual's compensating variation will be less than the cost of subsidizing his consumption. If we eliminated the subsidy, we could use the savings to give each individual his compensating variation through the income-tax system, thus leaving everyone as well off as he was with the subsidy in place. In addition, there would be extra money left over that could also be returned via the income tax to effect a Pareto improvement.[1]

When demand depends on a random characteristic that also affects the marginal utility of income, however, policy instruments beyond an income tax will be beneficial. Consider, for example, goods that complement or substitute for leisure. At any given level of pre-tax income, lower-ability individuals have less leisure than those of higher ability, and thus will wish to consume more of goods that

[1]This is an important application of a result by Aanund Hylland and Zeckhauser, who demonstrate that if benefits from government programs depend only on income, such programs should seek to maximize total net benefits; all redistribution should be carried out through the income tax and cash transfer system.

are substitutes for leisure. In addition, preferences for some goods may vary systematically with ability. That is, even if we held income and leisure constant, individuals with different abilities would choose different bundles of goods. If ill health reduces one's earning capability, for example, consumption of medical care will be higher for "low-ability" individuals. We shall refer to goods differentially consumed by individuals with higher marginal utilities of income as "indicator goods."

If there is a relationship between ability (or other random characteristics) and demand for specific goods, the efficiency of the redistributive process can be increased through in-kind transfers of indicator goods. Suppose, once again, that we have only two individuals: the intended recipient (B) and the potential impostor (A). A pure income tax-transfer scheme is in place, under which B is restricted to a pre-tax income of $\bar{Y}$ and receives a cash transfer of T. Out of his total income of $\bar{Y}+T$, B purchases X_B^* worth of good X, its price normalized to 1. Were A to masquerade and receive the same income, he would buy only X_A^* worth of X. Thus, X is an indicator good. Figure 2 plots B's utility and A's utility, assuming the latter masquerades, as functions of the amount of X consumed. The plan has been optimized so that A barely prefers not to masquerade. Even with the optimal income tax-transfer scheme, however, B's marginal utility of income is higher than A's, so additional redistribution would be desirable.

Now let us convert part of the transfer from cash to in-kind provision of X (with restrictions to prevent resale). If $\bar{X}$ units are provided in-kind, the cash transfer must be reduced to $T-\bar{X}$. If $\bar{X} \leqslant \hat{X}_A^*$, the change has no impact. As we raise $\bar{X}$ above $\hat{X}_A^*$, A suffers increasing losses *if* he masquerades; B suffers no loss so long as $X \leqslant X_B^*$. Thus, at a minimum, we would want to set $\bar{X}=X_B^*$. That leaves B, the intended recipient, no worse off than he was with the cash transfer; neither does it harm A if he does not masquerade. If A masquerades, however, his utility falls to $\hat{U}_A^1$. The gap between U_A^* and $\hat{U}_A^1$ creates an opportunity to engage in more redistribution. In general it will be optimal to make $\bar{X}$

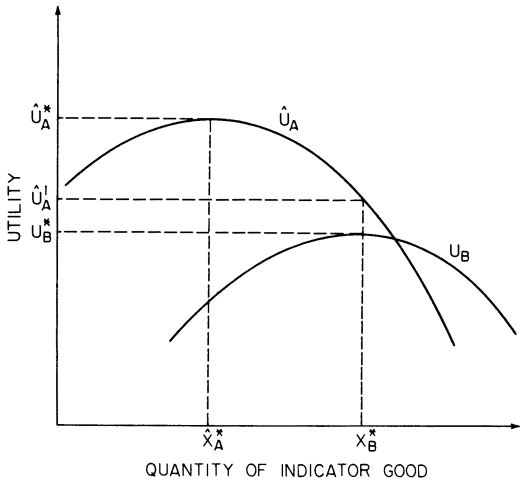

FIGURE 2. IN-KIND TRANSFERS TO DETER IMPOSTORS

larger than B would choose for himself, imposing a deadweight loss on him in order to increase the deterrent effect. (This is analogous to imposing a binding constraint on B's pre-tax income in the pure income tax model.) Figure 2 shows that as $\bar{X}$ increases beyond X_B^*, the marginal utility loss to B is initially minimal, but the loss to A if he masquerades is substantial, because $\bar{X}$ is already far from his optimum. Thus, the optimal in-kind transfer will force B to consume "too much" of X.

Note that indicator goods need not be inferior, so long as the transfer can be means tested. If income can be monitored perfectly, the good's income elasticity is irrelevant. The key factor is that at a given income, intended recipients wish to consume more of an indicator good than impostors would.

If the government cannot monitor income perfectly, however, the income elasticity becomes relevant. In-kind transfers of inferior goods can help deter potential impostors of a different sort, those with concealed incomes who appear to qualify for transfers intended for low-income individuals. Suppose, for example, that the type of housing consumed is strictly a function of income: "low-quality" housing is an inferior good. Assume that a cash transfer of $5,000 is made to those with a reported income of $1,000 per year. The

intended recipients, with an after-tax income of $6,000, spend $2,000 per year on "Type L" housing. Some of the recipients, however, are impostors, with additional concealed incomes of $9,000, for a total income of $15,000. They spend $4,000 per year on "type H" housing. If we alter the transfer to $3,000 in cash and $2,000 in type L housing, the intended recipients are no worse off. The benefits to imposture, however, are reduced; the impostors value the lower-quality housing at less than $2,000. Following our earlier principles, we could increase the deterrence effect even more, at little cost to the intended recipients, by providing even lower-quality housing—for example, $1,800 in "type Z" housing and $3,200 in cash. With the enhanced deterrent effect, it would then be possible to increase the transfer.

Existing redistribution policy relies heavily on in-kind transfers and subsidies of particular commodities. It is often alleged that these programs provide higher-quality goods than the recipients would choose for themselves if given the cash equivalent. The goods provided or subsidized may reflect, for example, the tastes of the individuals who design the programs, who have substantially higher incomes (and probably different preferences) than the intended recipients. If so, such programs are distorted in precisely the wrong direction, imposing a deadweight loss on recipients while *reducing* the deterrence effect.

III. Targeting through Subsidies

The utilitarian motivation for redistribution is to direct transfers to those individuals with higher marginal utilities of income, whom we might loosely refer to as the deserving. Thus far, in keeping with the optimal income tax literature, we have focused primarily on only one characteristic, ability. Many other characteristics, however, may affect the marginal utility of income. If two individuals have the same ability and income, for example, but one has a serious health problem that requires expensive medical treatments, their marginal utilities of income are unlikely to be the same. Similarly, a handicapped individual who needs the services of an aide in his home is likely to have a higher marginal utility of income than his nonhandicapped counterpart with the same ability to earn income. In such circumstances, income will be a poor indicator of the marginal utility of income.

The first best solution, as always, would be to make lump sum transfers based on the relevant characteristics, such as health condition in these instances. In a limited number of cases, lump sum transfers are feasible; the relevant characteristic can be observed with reasonable accuracy. Often, however, the characteristic is hard to observe, and in such cases in-kind transfers or, more likely, subsidies may be the most efficient mechanism for redistribution. Subsidizing health care, for example, leads to overconsumption of health care resources and deadweight losses, relative to an optimal lump sum scheme based on health status, but it may be the best way to transfer resources to those with greatest need, as defined by their marginal utilities of income. As in the models discussed in the previous section, we incur some deadweight loss by distorting recipients' choices in order to increase target efficiency. The greater the difference in demand between intended recipients and others, the greater the target efficiency of the subsidy. The less elastic the demand, the lower the deadweight loss. Note, however, that unless demand is perfectly elastic, some subsidy will be desirable, because as the subsidy rises from zero, its marginal deadweight loss initially is infinitesimal.

IV. Ordeals

The limiting form of restrictions on eligibility is the acceptance of pure deadweight costs, what we call "ordeals." Ordeals may enhance target efficiency if the benefits from transfers vary sufficiently across potential recipients. Say one welfare eligible would receive 100 utiles from a particular transfer, yet another would receive only 10. Then an ordeal that imposes an 11 utile loss in order to qualify for the transfer will be an effective sorting device. The demeaning qualification tests and tedious administrative procedures

involved in many transfer programs *may* serve such a sorting function.

The sorting function of ordeals will be enhanced if the costs they impose vary inversely with the benefits to be received. President Reagan recently focused national attention on the ordeal of a little girl with viral encephalitis, who preferred home to the hospital, but could only receive coverage under Medicaid if she remained in the hospital. (The hospital imposed the further inefficiency of substantially higher expenses.) Though none would quarrel with the exception made in this particular case—the president had the in-hospital requirement waived—on average efficiency may be served by requiring patients to be hospitalized before they receive reimbursement for medical expenses. This will be the case if medical conditions are not fully monitorable, and if hospitalization imposes less loss on those with greater need—that is, those who receive higher marginal utility from medical care. In most cases, those with great medical need actually will prefer the hospital setting, so that they suffer no loss from the ordeal.

Work requirements may also serve a sorting function as limited ordeals. Requiring welfare recipients to perform menial jobs for low wages, for example, may impose relatively little cost on the intended recipients, who have limited alternatives, while deterring potential impostors. In this context, the work requirement would preclude opportunities to earn concealed income or to pursue time-intensive leisure activities.

V. Conclusion

To promote target efficiency, eligibility requirements for transfer programs should restrict the behavior of recipients. Such restrictions can be placed on income, the composition of the consumption bundle, or the allocation of time. They even may entail the acceptance of pure deadweight costs, as with ordeals. To achieve their objective, such restrictions must impose substantially greater costs on impostors than on intended recipients. Restrictions of this sort generally can be devised and theoretically are desirable, as the productive efficiency losses they incur will be small initially. Our simple two-person examples, however, probably overstate the potential gains; with a continuous range of characteristics, any given individual is likely to be an intended recipient in some cases and a potential impostor in others. Any feasible set of restrictions will fail to deter some impostors, while denying benefits to some intended recipients. How widely such restrictions should be employed in practice will depend, as well, upon the administrative costs of imposing them, a matter that is beyond the scope of this analysis.

REFERENCES

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