Positive limitations on the scope of redistribution in market-oriented economies

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ABSTRACT

This paper aims to study the following positive question: If some of the central features of a market-oriented economy are explicitly taken into account, then what is the extent to which government policy can or can not reduce economic inequalities in such an economy?

It is shown that several qualitative observations about the scope of redistribution can be made based almost entirely on the government budget constraint. We examine the role of bureaucratic and administrative costs in inhibiting redistribution: bureaucratic inefficiencies not only reduce the scope of redistribution but, because of these costs, no redistribution is possible under a range on policies. Also, the presence of alternative transactions (that is, semi-legal or illegal transactions induced by government policies) is likely to reduce the scope of the redistribution. These and other similar observations apply to a wide range of policies (they do not depend, for instance, on the shape of various tax or subsidy schedules).

For restricted policy environments (where, because of bureaucratic and informational costs, only limited types of instruments are feasible), the paper illustrates how explicit assessment of the scope of redistribution can be made. Under plausible assumptions, it turns out that the scope of redistribution is quite limited in such environments.

The economic issues which our analysis raises have potential implications for several important controversies (including the debate on the virtues of market versus socialist economies). Some of these implications are discussed in the paper.

Typos not corrected

POSITIVE LIMITATIONS ON THE SCOPE OF REDISTRIBUTION IN MARKET-ORIENTED ECONOMIES

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Raaj Kumar Sah

The primary objective of this paper is to study the following *positive* question: If some of the central (and widely observed) features of a typical market-oriented economy are explicitly taken into account, then what is the extent to which economic inequalities across individuals in such an economy can or can not be reduced through government policy? One of the possible approaches to make this question more concrete is to go through the following four steps: (i) specify the personal distribution of real incomes (or some other indicator of an individual's welfare) in the absence of any redistributive policy, (ii) specify the range of feasible policy instruments, along with the corresponding responses of individuals, and the government's budget constraint (taking into account the bureaucratic and administrative expenses incurred by the government as well as individuals), (iii) ascertain the range of resulting income distributions, and (iv) derive qualitative judgments concerning the scope of redistribution, by comparing the distributions which emerge in the last step to that in the first step. This is the approach followed in this paper.

The above question has rarely been analyzed in the literature, even though those who advocate particular redistributive aims and policies must implicitly hold views on what is feasible and what is not. The reason for the lack of analysis could, in part, be that there are several conceptual and empirical obstacles one faces (for instance, what is the appropriate representation of an individual's choices in the face of a particular government policy, what are the magnitudes of bureaucratic costs for different policies, and how does one infer whether a particular redistribution is small or large). But at the same time, the implications of such analyses could be sufficiently far reaching for many different debates and controversies that, in my view, it is better to begin an attempt to confront these obstacles, rather than not to raise the question at all.

The analysis presented in this paper leads to several insights. It is shown, for instance, that a number of inferences about the scope of redistribution can be made based almost entirely on the government budget constraint. In other words, these inferences do not depend very much on the precise differences in endowments or tastes across individuals in the economy.

The bureaucratic and administrative costs of government policies turn out to be a critical force

inhibiting the scope of redistribution. The scope of redistribution is smaller if bureaucratic inefficiencies are greater. Further, because of these costs, no redistribution is possible within a range of government policies and, in fact, a subset of these policies may lead to a worsening in the welfare of every individual in the economy. Therefore, those public finance and public policy studies which simplify their analysis by ignoring bureaucratic costs might significantly underestimate the implications of these costs.

The paper also illustrates how explicit assessments of the scope of redistribution can be made under specific policy environments; for instance, environments where it is assumed that, because of bureaucratic and informational costs, the only feasible instruments are the pricing and taxation of consumption goods, or a linear income taxation. The particular method to measure redistribution which I employ is the real income gain (or loss) to the poor under a particular policy (in comparison to non–intervention). The choice of this metric is guided solely by convenience and brevity; and not by any ethical or normative reason. Two important conclusions emerge from this analysis. First, the scope of redistribution is markedly sensitive to the semi–legal and illegal transactions opportunities which are induced by government policies (we refer to these transactions as "alternative transactions"). Second, the maximum possible income gain to the poor turns out to be quite small. This suggests that there may be serious limitations on the scope of redistribution in such economies.

It is important to emphasize that this paper does not aim to study how the actual redistributive policies *are* chosen; an important example of such a study is Becker (1983) in which policies which are partly redistributive are chosen through an equilibrium of interest group pressures.[1] Nor is it our aim to study how redistributive policies *ought* to be chosen, which is what the optimal tax literature [Mirrlees (1986)] emphasizes by characterizing those policies which maximize a given social welfare function. Furthermore, to keep the analysis manageable, I focus exclusively on redistributive policies, and abstract from all other types of government policies (such as provision of public goods).

The paper is organized as follows. The framework of analysis is presented in Section I; it states the minimal restrictions on policy instruments, provides a formulation of the problem posed in the beginning of the paper, and delineates a simple method for measuring redistribution. In Section II, basic economic forces which inhibit redistribution are identified. These forces are analyzed in a general set–up; that is, the qualitative conclusions we derive from this analysis hold for a range of policies. Section III illustrates how

[1] Other well known approaches to the same problem are those which emphasize the role of voters and political parties.

the scope of redistribution can be explicitly assessed in specific policy environments. Concluding remarks are presented at the end.

I. THE FRAMEWORK OF ANALYSIS

This section begins by briefly describing the minimal set of restrictions on policy instruments. These restrictions provide a starting point for the rest of the analysis. A concise statement of the problem posed in the beginning of the paper is then provided. Finally, we delineate the metric which we employ to measure the redistribution entailed by different policies.

A. Minimal Restrictions on Instruments

For individual h, the vector of endowments is denoted by μ^h. The components of this vector include intrinsic abilities of different kinds (that is, abilities that are unalterable in the presence of alternative market opportunities and government policies) which differ across individuals. As a purely hypothetical benchmark, where forces inhibiting redistribution are entirely absent, we take the case where policy instruments can be conditioned directly on endowments and tastes. Then (and only then), as is well known, it would be possible for the government to use the particular type of individualized lump sum transfers which assure that every possible Pareto efficient allocation is attainable.[2] In Figure 1, the locus HH' denotes the resulting combination of utility levels in a two class economy, where V^h denotes the utility level of person h, and $h = P$ and Q respectively denote a poor and a rich person.

In the market economy under consideration, in contrast, it is assumed that all individuals face the same set of policies (for instance, the schedule of income tax or any other tax and subsidy is the same for every one) and that policy instruments can be conditioned only on the transaction which individuals undertake.[3] There are intuitive as well as analytical reasons for the above. If the conditioning of policies on characteristics such as sex and color is ruled out (which I do in the present analysis), and if interregional differences in policies are not the focus of attention, then, with appropriate interpretation, most of the policy instruments actually observed in typical market economies satisfy the above restrictions.

The most compelling analytical reason, on the other hand, is that the government faces incentive incompatibility as well as the lack of third party enforceability in its attempt to implement other types of

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[2] See Graaff (1957), for instance.

[3] Note that a head tax or subsidy is included in the set of feasible instruments. But neither a head tax nor a head subsidy, in itself, has any ability to redistribute. Policies conditioned upon transactions, therefore, are essential if there is to be any redistribution.

policies. Hammond's (1979) analysis points out, for instance, that if the government could infer individuals' endowments only on the basis of observed behavior, then incentive compatibility requires the policy instruments to be such that the same set of net trades (that is, the same possibilities of exchange) are potentially available to every individual in the economy.

To focus the analysis further I assume that: (i) no policy can be implemented without expenditure on bureaucratic costs; though these costs differ across policies depending on the transactions which are to be monitored, and (ii) there is a group of individuals (whom I shall call the "poor") whose endowment vector is strictly smaller than others in the economy.[4]

Two obvious conclusions concerning the feasible redistribution in a market economy (depicted in Figure 1 by ZZ') follow immediately. First, the feasibility locus ZZ' must lie inside the hypothetical locus HH' , except at the point 0 which corresponds to non–intervention. This is because every intervention entails a positive bureaucratic cost. Second, an equalization of consumption opportunities across individuals is not possible. To see this, consider the poor. They have fewer endowments than others, but they face the same policy schedules as well as the same market opportunities as others do. Consequently, their consumption opportunities must be smaller than others. Further, if tastes are sufficiently similar across individuals, then it also follows that there must remain some inequality in their levels of welfare. In Figure 1, the preceding observation implies that any combination of welfare levels below the 45° line is not attainable in a market economy.

B. Statement of the Problem

Government policies are denoted by z , where the non–intervention case is denoted by $z = z_0$. Note that this is a generic representation of policies (that is, it subsumes the specification of various linear or non–linear tax and subsidy schedules). The same policy applies to all individuals; though any policy can obviously have markedly different effects on different individuals.

$R^h(z)$ denotes the *net* revenue which the government collects from the transactions of person h . n^h denotes the proportion (fraction) of individuals of type h in the economy. $n^h > 0$, and $\Sigma n^h = 1$, where a summation without index means (throughout the paper) that the sum is being taken over all h . The per capita bureaucratic cost incurred by the government in implementing policy z is denoted by $B(z)$.

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[4] That is, at least one element of the vector μ^P is smaller, and no element is larger, compared to the corresponding vectors of other groups of individuals.

That is, $B(z)$ is the total bureaucratic cost divided by the number of individuals in the economy. The government budget constraint then is

(1) $$\Sigma n^h R^h(z) = B(z) .$$

$M^h(z)$ denotes the "full income" of person h (that is, the value of his endowments calculated on a before–tax and transfer basis) when he faces policy z. His corresponding utility level is denoted by the ordinal index of utility $V^h(z, M^h(z))$. For policy z, the distribution of utilities across individuals in the economy is denoted by $\{V^h(z, M^h(z))\}$. Our problem then is to attempt to make qualitative judgments about the scope of feasible redistribution, by comparing the distributions $\{V^h(z, M^h(z))\}$ to the non-intervention distribution $\{V^h(z_0, M^h(z_0))\}$. It is, of course, necessary to restrict oneself to only those policies which satisfy the government budget constraint, (1).

C. Measurement of Redistribution

We now describe the metric for measuring redistribution which is employed in the later analysis. The choice of this metric is motivated solely by convenience, rather than any ethical or normative reason. Though other metrics can also be constructed based on the same analysis, for brevity, we do not discuss here the merits of alternative metrics. This is because the broad qualitative judgments one derives are unlikely to be sensitive to the choice of metric, so long as one keeps in mind what is being measured through a particular metric.

Consider individual h. Ask the question, how large a hypothetical income transfer given to him at non–intervention, would have made him as well–off as he actually is when facing policy z. Denote this transfer by $I^h(z)$. Then this transfer is implicitly defined by

(2) $$V^h(z_0, M^h(z_0) + I^h(z)) = V^h(z, M^h(z)) .$$

Thus, $I^h(z)$ can be viewed as a particular way of quantifying the "real income gain" which a change in policy from z_0 to z brings to person h. As should be apparent, this real income gain is simply a generalization (to deal with changes in complex tax schedules, for example) of the concept of "equivalent variation" which has conventionally been employed in the context of an individual facing changes in the prices of consumption goods. Its properties are that: $I^h(z)$ is positive if the person h is better–off under policy z than he was under policy z_0, and $I^h(z)$ is negative if the reverse is the case.

The particular metric which I employ in the analysis below is

(3) $$\Delta^P(z) = I^P(z)/M^P(z_0)$$

which is the income gain or loss (due to the change in policy from z_0 to z) to a poor person, expressed as a ratio of his full income at non–intervention. This metric reflects the proportion by which the real income of a poor person has increased due to intervention. The central advantage of this metric is that it avoids several difficulties which arise in making interpersonal comparisons (including those due to differences in tastes among individuals); the key disadvantage is that it ignores altogether the changes in the welfare of everyone except those who are poor.

II. ECONOMIC FORCES INHIBITING REDISTRIBUTION

Our objective in this section is to analyze the key economic forces which affect and inhibit the scope of redistribution. The analysis is conducted in a relatively general set–up; that is, the qualitative observations made here do not depend on what set of policy instruments are under consideration. This analysis shows that several inferences about the scope of redistribution can be made based almost entirely on the government budget constraint. It also points out the critical role which bureaucratic costs and alternative transactions play in inhibiting redistribution.

The income gain to person h can be disaggregated into three components,

(4) $$I^h(z) = [M^h(z) - M^h(z_0)] - R^h(z) - D^h(z) ,$$

which have the following meaning. The first term, $M^h(z) - M^h(z_0)$, is the change in the full income (that is, the value of endowment) of person h due to a change in policy from z_0 to z. This change can be positive, zero, or negative. The second term, $R^h(z)$, was defined earlier; it is the net revenue which the government collects from the transactions of person h. The last term, $D^h(z)$, is the deadweight loss incurred by this person due to the changes in the transactions which a change in policy induces. This term also includes private administrative costs (such as the costs of acquiring information about the provisions of government policy, costs of record keeping, etc.). The deadweight loss is always non–negative; and its actual magnitude depends, in part, on the nature of transactions. What is important, however, is that if the change in policy has altered (no matter how slightly) even one of the numerous transactions undertaken by an individual (which is what one would expect under virtually all circumstances), then D^h is positive. Accordingly, (4) yields

(5) $$I^h(z) < [M^h(z) - M^h(z_0)] - R^h(z) .$$

An important conclusion which follows from (5) is that, no matter what the policy intervention might be, and no matter what the set of transactions undertaken by an individual might be, a necessary (but not sufficient) condition for an individual to become better–off is that the net revenue which the government collects from his transactions should be no larger than the increase in his full income.

Next, recall the government budget constraint, (1), and let R denote the average (per person) net revenue paid by all groups of individuals other than the poor. That is

(6) $$R = \Sigma_{h \neq P} n^h R^h / \Sigma_{h \neq P} n^P .$$

We refer to R as the average revenue paid by the "non–poor." The budget constraint, (1), then can be restated as

(7) $$n^P R^P + (1 - n^P)R = B .$$

Using (4) and (7), the real income gain for a poor person can be expressed as

(8) $$I^P(z) = [M^P(z) - M^P(z_0)] + \frac{(1 - n^P)}{n^P} R(z) - \frac{B(z)}{n^P} - D^P(z) .$$

The above expression provides a useful basis for an intuitive understanding of the central economic forces determining the scope of redistribution. For brevity, I interpret expression (8) by assuming that the change in the full income of the poor, which is the first term in the right hand side of (8), is not significant. Recalling that the full income was defined on a before–tax and transfer basis, the above assumption is approximately satisfied for many commonly employed policy instruments. But even when this is not the case, one can derive conclusions qualitatively analogous to those below.

The partial effects of the determinants of the income gain to the poor can be seen directly from (8). The income gain is larger if the net revenue per person from the non–poor is larger; if bureaucratic costs are smaller; and if the deadweight loss to the poor is smaller. While the overall income gain depends on the combination of these effects, it is useful to look at each of the effects separately.

Bureaucratic Costs: Clearly, if bureaucratic costs are too large (that is, if redistributive policies are conditioned on transactions which are too expensive to monitor), then the poor can not become better–off.[5] It is also apparent that if we compare two economies which are identical in every respect except that the bureaucracy is less efficient in one of them (in the sense that the schedule of bureaucratic costs is larger) then the scope of redistribution will be smaller in the economy with less efficient bureaucracy.

Another critical feature of bureaucratic costs is that a significant part of them are relatively fixed (for instance, income taxation requires some fixed expenditure on establishing a tax bureau, regardless of what the tax schedule might be). This feature acts as a "first charge" on the net revenue, and only the remaining revenue is available for potential redistribution. This can be seen by decomposing $B(z)$ as $B_1 + B_2(z)$ where B_1 is the fixed component (that is, $B_1 = 0$ at z_0 ; otherwise it is positive and its magnitude depends on how many different instruments are being employed). An immediate implication, from (8), then is that those policies which are close to "non–intervention" (in the sense that $R(z)$ in (8) is sufficiently close to zero) can only hurt the poor. An analogous argument applies to every individual in the economy. Therefore, because of the fixed component of bureaucratic costs, those policies which are sufficiently close to non–intervention result in a welfare loss for every individual in the economy.

Furthermore, different types of policy instruments require separate fixed costs. For example, a different bureaucracy is required if value–added taxes are to be employed in addition to income taxes, and yet another bureaucracy is required to administer housing subsidies if they were also to be employed. The addition of each new type of instrument, therefore, adds to the first charge on the net revenue, and this counteracts whatever the extra redistributive potential of the additional instrument might be.[6]

Alternative Transactions: For any redistribution to occur, it is necessary that at least some transactions are taxed, and at least some subsidized (this is simply a consequence of the government budget constraint, provided we rule out the case where no transactions are subsidized, but some are being taxed merely to pay for the bureaucracy). In either case, there are incentives for individuals to create and use semi-legal or illegal transactions to take advantage of the wedge created by the tax or the subsidy. In the

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[5] Many real world examples of such policies can be found, if one were to look for them. Land tax schedules in much of South Asia, for example, are conditioned upon land quality (presumably for reasons of fairness). This has led to an enormous volume of petty litigations, because who is to judge land quality, and how. Leaving aside the costs imposed upon individuals, the government makes a net revenue loss. Abolition of such taxes will be Pareto improving.

[6] Clearly, therefore, a positive comparison of the outcomes of two or more policy instruments with one another, or with non-intervention, requires attention to the bureaucratic costs. See Sah (1986a) for such an analysis of rations, queues and market.

familiar example of an income tax, the seller and the buyer of a labor service have an incentive to attempt to split between them some part of the tax; this in turn may induce the seller to become a self–employed person (in which case, the tax treatment changes) or a "moonlighter" (having a second job with undeclared income) or a "ghost" (people unknown to the British Inland Revenue Service). Similar incentives arise in the context of transactions which are subsidized (for instance, under–representation of income to obtain those housing subsidies which are conditioned upon income, and participation in a secondary market for tenancy rights in publicly subsidized housing schemes).

What is important from our point of view is that, regardless of the nature of alternative transactions, the overall effect of a greater prevalence of such transactions is to reduce the two middle terms, $[(1 - n^P)R - B]/n^P$, in the right hand side of (8). This is because at any given level of bureaucratic apparatus (for example, the number of bureaucrats of different types), the revenue received from taxed transactions declines and the revenue paid on subsidized transactions increases. Therefore, unless the deadweight loss to the poor has been significantly reduced in this process (which is unlikely), a greater prevalence of alternative transactions would reduce the potential income gain to the poor.

Limitations on Redistribution: From (7) and (8), it is apparent that if R is a larger positive number, then R^P is a larger negative number, and the corresponding gain to a poor person is larger. Now recall that R is the average (per person) revenue collected on the transactions of the non–poor.

Thus, if we define a "representative non–poor" to be the person who actually would have paid a net revenue R on his transactions, then the description of the representative no–poor would clearly depend on the distribution of characteristics among the non–poor, and on the policy which is in place. But at the same time, under realistic assumptions (that individuals' transactions are systematically related to their characteristics), the representative no–poor typically belongs to the middle range of the distribution of characteristics of the no–poor, rather than at the extremes. In a heuristic sense therefore, the larger the net revenue collected on the "average" transactions of the non–poor is, the larger would be the net revenue received by the poor on their transactions.

This has two implications. First, the potential gain to the poor is likely to be larger if the difference between their transactions and the average transactions of the non–poor is larger (that is, if the poor are "more different" than the average non–poor). Second, the degree to which differences in these transactions can become translated into the differences in the corresponding net revenue (which is what is crucial) is determined by the screening ability of policy instruments. For instance, with an instrument with greater

screening ability, it might be possible to subsidize to a greater degree those transactions which are more predominant for the poor (relative to the non–poor), while taxing other transactions to a greater degree. But the screening ability of policy instruments depends, in turn, on how large the bureaucratic costs are, and how sensitive different transactions are to taxes and subsidies (taking into account the possibilities of alternative transactions). These economic forces, along with the deadweight loss incurred by the poor (which is the last term in (8)) determine an upper limit to how much redistribution is possible in a market–oriented economy.

III. DIRECT ASSESSMENT OF THE SCOPE OF REDISTRIBUTION

The logical next step which the preceding analysis suggests is a direct assessment of how large the actual scope of redistribution might be. Such an assessment is obviously not possible in a general set–up in which every possible instrument which can potentially be conditioned upon transactions (along with its bureaucratic costs) is under consideration. For concreteness, it is necessary to specify: (i) a restricted set of policies which are under consideration (thus, other policy instruments have been presumed infeasible, or too expensive to be meaningful for redistribution, for reasons such as those outlined earlier), and (ii) a model of individuals' responses, including the nature of alternative transactions.

I have followed this approach for a detailed analysis of two classes of models in which: (i) the only feasible instruments are the taxation, subsidy, or pricing of some or all categories of consumption goods; thus, for instance, a tax conditioned on labor income is infeasible in this case;[7] and (ii) the only feasible instrument is a linear tax or subsidy conditioned upon labor income. In both models, I have examined a range of plausible representations of alternative transactions. The qualitative conclusions in both models turn out to be very similar. For expositional brevity therefore, I present here only a simplified version of the first model.[8,9]

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[7] There are important practical reasons to examine such a model. Taxation of goods (through excise tax, value–added tax, import and export taxes, etc.) is a major part of the government finances in most European countries. In developing economies, such taxation is even more important; not only do governments often collect virtually all of their revenues from such taxation (as in South Asia), but a large part of the revenue (after paying for bureaucratic costs) is spent on subsidizing food and related products (as in South Korea and Egypt).

[8] Details of the analysis of linear income taxation are available from the author. The scope of redistribution turns out to be highly sensitive to the nature of alternative transactions (opportunities for tax evasion and labor income concealment, for example).

[9] An earlier attempt to assess the scope of redistribution through taxation and pricing of goods, in Sah (1983), was based on many assumptions which are unsatisfactory compared to those employed below. The analysis there assumed, for instance, that: (i) there are no bureaucratic costs, (ii) alternative transactions are not possible, (iii) labor–leisure choice is absent, and (iv) all consumption goods can be taxed. For all these reasons, the analysis there led to a considerable overstatement of the scope of

The choices of individuals are represented as follows. Recall that the full income of person h is M^h. Let m^h denote his expenditure on goods which can potentially be taxed or subsidized (we shall refer to these goods as "taxable goods"). $M^h - m^h$ then denotes the remaining part of full income which includes expenditure on leisure as well as on non–taxable consumption goods. $\alpha^h = m^h/M^h$ denotes the proportion of full income spent on taxable goods. (For concreteness, it might be useful to view M^h as the value of time endowment, and to view m^h as the "money income" spent on taxable goods. Thus, if a person does not work for more than half of the total number of hours in a year, then α^h can not exceed 1/2, even if all of the consumption goods were taxable. In the numerical illustrations below, therefore, we assume that $\alpha^h \leq 1/2$ is the relevant range.)

Categories of taxable goods are denoted by the subscript i. p_i and q_i respectively denote the producer and the consumer price of good i. $t_i = q_i - p_i$ is the amount of tax on good i; a negative tax means a subsidy. $\theta_i = t_i/q_i$ denotes the tax rate, defined with respect to the consumer price. Thus, θ_i is positive for a taxed good, negative for a subsidized good, and it must be smaller than one for any finite level of tax. x_i^h is the quantity of good i consumed by individual h, and $w_i^h = q_i x_i^h/m^h$ denotes his budget share (that is, the fraction of money income spent on good i). Clearly, $1 \geq w_i^h \geq 0$, and $\Sigma_i w_i^h = 1$. $x_i = \Sigma n^h x_i^h$ denotes the average (per capita) consumption of good i in the entire economy. $m = \Sigma n^h m^h$ is the average money income. $w_i = q_i x_i/m$ denotes the average (economy–wide) budget share. It is straightforward to verify that

$$w_i = \Sigma n^h m^h w_i^h / \Sigma n^h m^h \; ; \tag{9}$$

that is, the economy's average budget shares are a weighted average of individuals' budget shares. For later use, define $\bar{w}^h$ to be the largest of the budget shares for person h, and $\underline{w}$ to be the smallest of the average budget share.

The government revenue from a tax policy depends not only on the consumption choices of individuals but also on the alternative transactions available in the economy. Assume, for now, that alternative transactions are absent; these are discussed later. Then, the net tax revenue which the government collects from individual h is $R^h = \Sigma_i t_i x_i^h$, and it can be restated as

$$R^h = m^h \Sigma_i \theta_i w_i^h \; . \tag{10}$$

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redistribution.

The government's budget constraint, (1), then can be expressed, using (10), as

(11) $$\Sigma_i \theta_i w_i = b ,$$

where $b = B/m$ is the total bureaucratic cost as a fraction of the aggregate money income. Clearly, $1 > b > 0$. One would normally expect bureaucratic costs to be larger if a larger number of goods are being taxed or subsidized. Also, if the similarity within a class of products is greater, then larger bureaucratic costs are incurred in taxing these products at significantly different rates. Now note from (10) and (11) that if the tax rates on two goods are close to one another then it is the sum of their budget shares which matters in these expressions. Therefore, unless the bureaucratic costs are quite large (in which case, no income gain can possibly occur to the poor), the appropriate definition of budget shares for the present purpose is that these shares are defined for broad categories of goods (such as "luxuries," "necessities," "other goods," etc.).

For brevity, I assume that the income of the poor is not significantly affected by the choice of tax rates. Accordingly, (5) implies that $I^P \leq -R^P$. Next, recall that $\Delta^P = I^P/M^P$, and $\alpha^P = m^P/M^P$. Using (10) and (11) then, the following ceiling on Δ^P can be obtained (see the Appendix for a derivation)

(12) $$\Delta^P < \alpha^P (1 - b)\bar{w}^P/\underline{w} .$$

Expression (12) is easy to interpret: Recall that the relevant range of α^P is less than half. Thus, even if there were no bureaucratic costs, the income gain to the poor can not exceed half of the ratio between the largest budget share of the poor and the smallest average (economy–wide) budget share. The bureaucratic costs lead to a further reduction in this ceiling as (12) indicates. To see an example, consider the entire range of taxes and subsidies under which the largest budget share of the poor does not exceed 40 percent (that is, $\bar{w}^P \leq .4$), the smallest average budget share is not smaller than 10 percent (that is, $\underline{w} \geq .1$), and the bureaucratic cost is not smaller than 5 percent (that is, $b \geq .05$). It follows from (12) that the real income gain of the poor can not exceed 1.9.

It should be emphasized that the right hand side of (12) does not represent the actual income gain of the poor; what it represents is an upper ceiling (exaggerated by a large margin, as the analysis below suggests) on the actual income gain. The important strength of this ceiling is its robustness to the underlying features of the economy. Specifically, the form of expression (12) is not affected by: (i) whether and how the tax policy alters producer prices, and the incomes of various groups except the poor (almost all of the general equilibrium effects, in other words, are subsumed in deriving these ceilings); (ii) what the

tastes of individuals are, and how they differ across individuals; and (iii) what the distribution of incomes is in the economy. The reason for this robustness is simple. The only economic fact which has been used in deriving (12) is that the government faces a budget constraint.

Alternative Transactions: Whenever there is a large positive tax on a good, competing sources of supply of the same good (or a sufficiently similar good) arise, which are less taxable. Whether these sources are semi–legal (for instance, a repackaging of the good, which has an ambiguous status according to the existing value–added tax code) or illegal (such as cross–national smuggling and excise tax evasion) is not crucial for the main concern of the present paper. What is important is their effect on the government revenue from the taxed goods. In the absence of such transactions, the revenue from the taxed good i (that is, from a good for which $t_i > 0$) is $t_i x_i$ per capita. In the presence of alternative transactions, keeping other taxes unchanged, the corresponding revenue is strictly smaller for at least some positive values of t_i, but not larger for any value of t_i.

Since the revenues from taxed goods decline in the presence of alternative transactions, it follows from the government budget constraint, (11), that the level of subsidies on subsidized goods must also decline. This particular implication of alternative transactions will have an unambiguous effect of reducing the maximum possible redistribution to the poor. The exact effect would depend, of course, on the precise description of the economic forces underlying alternative transactions.

A simplified representation which, from our point of view, captures the main implication of alternative transactions is as follows. Suppose the revenue from the taxed good i is unaffected by alternative transactions if the tax rate θ_i is smaller than or equal to $\bar{\theta}_i$, but the revenue becomes zero if θ_i is larger than $\bar{\theta}_i$. As is obvious, this representation understates the deleterious revenue effects of alternative transactions in the range of taxes below $\bar{\theta}_i$, and it overstates them in the range of taxes above $\bar{\theta}_i$. It is also apparent that tax rates larger than $\bar{\theta}_i$ can only hurt the poor, because no revenue is thereby obtained. Thus, the relevant range of tax rates is

$$\theta_i \leq \bar{\theta}_i \leq \bar{\theta} , \tag{13}$$

where $\bar{\theta}$ is the largest of the values of various θ_i. To see an example of what a particular value of $\bar{\theta}_i$ means, suppose that the tax revenue on the good i becomes insignificantly small if its consumer price is more than twice the producer price, then $\bar{\theta}_i = 0.5$ for this good.

Since the range of tax instruments is now more limited, it is intuitive to expect that the scope of redistribution will decrease. In fact, as shown in the Appendix, the earlier ceiling is now modified as

(14) $$\Delta^P < \alpha^P (\bar{\theta} - b)\bar{w}^P/\underline{w} .$$

As an illustration, suppose $\bar{\theta}$ is 0.5. Then the ceiling (14) on the income gain of the poor is approximately half of the corresponding ceiling (12) when alternative transactions were assumed to be absent.

Finally, note that alternative transactions are important not only in the context of the goods which are heavily taxed, but also for those goods which are heavily subsidized. For example, if the subsidy on a good is sufficiently large, then there is a correspondingly large opportunity to attempt to profit by recycling the good from consumers to producers. The effect on the government revenue spent on the good is that the expenditure is larger than it otherwise would have been. If we adopt a simplification analogous to the one used above, then the relevant range of subsidy rates will be bounded. These can be represented as

(15) $$\theta_i \geq \underline{\theta}_i ;$$

where, for instance, $\underline{\theta}_i = -1$ means that the government revenue spent on the subsidized good becomes too large (and hence can only reduce Δ^P) if the consumer price of this good is reduced by more than half of the producer price. As one would expect, the constraints of the type of (15) further reduce the ceilings on Δ^P. What is additionally interesting to note from (10) is that (15) puts another type of limit on Δ^P, which is

(16) $$\Delta^P \leq -\alpha^P \Sigma \theta_i w_i^P .$$

The above expression has an intuitive implication. Even if the government could subsidize every good (which it can not, because of the budget constraint) the presence of alternative transactions preclude an increase in the real income of a poor person by more than the right hand side of (16). The actual increase, which is determined in part by the public budget constraint, thus, must be even smaller.

An Exact Calculation of the Scope of Redistribution: Even though explicit calculations of the exact amount of redistribution are possible only under restrictive assumptions, they are highly illustrative as the analysis below shows. This analysis is based on the following assumptions: (i) The money income is half of the full income; that is, $\alpha^h = 1/2$. If all consumption goods were taxable, then this assumption implies that everyone's labor supply is half of his time endowment. (ii) Producer prices and the full incomes of various individuals are not affected significantly by changes in the tax rates on consumption goods. (iii)

There are only two categories of goods from the point of view of differential tax treatment. The category on which the poor spend a larger fraction of their income is called "necessities," while the other category is called "luxuries." We use $i = 1$ and 2 to denote these two categories respectively. (iv) The budget shares of an individual on the two categories of good are unaffected by the change in consumption prices. Since incomes are fixed, this assumption implies, from (9) that the economy–wide budget shares are also unaffected by tax rates. (v) The bureaucratic costs are the same for all tax policies. That is, b is zero if there is no taxation, and it is a fixed number for all tax policies.

From the government budget constraint, (11), and from the fact that $w_2 = 1 - w_1$, the tax rates on the two categories of goods must be related to one another as follows:

$$\theta_2 = [b - w_1\theta_1]/(1 - w_1) . \tag{17}$$

Thus, as one would expect, necessities can be subsidized only if luxuries are taxed, and vice–versa. Using (17), then the income gain or loss to the poor can be expressed directly in terms of the tax or subsidy rate on necessities. The relevant expression is[10]

$$\Delta^P = [(1 - \theta^1)^{.5w^P_1}\{1 - (b - \theta_1 w_1)/(1 - w_1)\}^{.5(1 - w^P_1)}] - 1 . \tag{18}$$

The above expression allows us to calculate the income gain to the poor over the entire range of feasible tax rates. Figure 2 depicts these gains on the vertical axis; the horizontal axis represents the amount of subsidy on necessities, expressed as a fraction of the producer price. This fraction is denoted by $s = -t_1/p_1$.

Figure 2 provides a number of useful illustrations. As one would expect, the poor lose when the necessities are taxed. But they lose (compared to no redistributive taxation) even when the necessities are being subsidized up to the point s^* ; this happens because of the "first charge" feature of the bureaucratic costs. In fact, it can be shown that because of bureaucratic costs, everyone in the economy is worse–off within a range of positive as well as negative s , in the neighborhood of non–intervention.

Furthermore, it can be seen in (18) that a reduction in the bureaucratic costs increases the income gain to the poor (or reduces their income loss) no matter what the tax policy might be (the dotted curve in

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[10] To derive (18), note that for the fixed budget shares (Cobb-Douglas) case, the utility function is: $V^h(t, M^h) = M^h \Pi_i(p_i + t_i)^{-\alpha^h w^h_i}$, where $i = 1$ and 2 . Using (2) and (3), one obtains: $\delta^h = [(1 - \theta_1)^{\alpha^h w^h_1}(1 - \theta_2)^{\alpha^h w^h_2}] - 1$. For $h = P$, and $\alpha^h = 0.5$, the preceding expression in combination with (17) yields (18).

Figure 2 depicts this). Other groups in the economy are affected by the bureaucratic costs in the same manner. For any tax policy that might be in place, therefore, a reduction in bureaucratic costs leads to a Pareto improvement. All of the above observations support the implications of bureaucratic costs which were emphasized in the earlier analysis.

Next, note in Figure 2 that the poor do begin to make an income gain when the subsidy on necessities increases beyond s^*, but only up to a point (denoted by s^{**}); any increase in the subsidy on necessities beyond s^{**} reduces the welfare of the poor. The reason for this is intuitive; beyond some point, the increase in the net revenue collected from the non–poor (that is, the rest of the population) either decreases, or it increases at a smaller rate than the increase in the deadweight loss to the poor. In either case, as the expression (8) indicates, the poor are worse–off.

The expression (18) also allows us to calculate, for any set of parameters, the numerical value of the income gain to a poor person, expressed as a fraction of his full income. Consider an example in which $w_1^P = 0.8$ (that is, the poor spend 80 percent of their income on the category of necessities, and the rest of the income on the remaining goods), $w_1 = 0.5$ (that is, the economy as a whole spends half of its income on each of the two categories of goods), and $b = 0.05$ (that is, the bureaucratic costs are 5 percent of the aggregate money income). Then, the largest value of Δ^P, which in Figure 2 occurs at s^{**}, is 0.073; that is, the maximum possible increase in the real income of the poor is no more than 7.3 percent.

Finally, to examine the consequences of alternative (semi–legal or illegal) transactions, suppose that deleterious revenue effects (which were described in the earlier analysis) arise if the consumer prices of luxuries are set at levels higher than twice their producer prices. Then θ_2 must be no larger than 0.5 for any redistribution to occur. This reduces the scope of redistribution, because the policy s^{**} in Figure 2 requires $\theta_2 = 0.62$, and that is no longer relevant for redistribution. If we therefore set the maximum relevant rate of $\theta_2 = 0.5$, then (17) and (18) show that redistributive taxation in this case can not increase the real income of the poor by more than 6.7 percent.

IV. CONCLUDING REMARKS

I conclude the paper with brief remarks on some of the broader (and speculative) implications of the question raised in the beginning of the paper.

(i) Many social scientists have observed that societies go through cycles of alternating between a perceived presence of redistributive concern (associated, in particular, with a sudden and marked increase in the societal discussion of redistributive issues) versus a perceived absence of such concerns. Hirschman (1982), for instance, has argued that many such patterns can be identified in the past, and that the perceived change in the societal concerns of late 1960's versus the present decade in North America is one of the examples of such a cycle.

Such phenomena have often been attributed to changing fads and fashions. An alternative explanation which is consistent with the thrust of the present paper is as follows. Suppose that there is partial ignorance about the limitations on the scope of redistribution. Then a particular generation which begins with an "excessive" concern towards redistribution, soon discovers the limits; this, in turn, dilutes the degree of concern. Those succeeding generations for which the memory of the past experiment is fresh will be less likely to repeat the same experiment but as the memory weakens with time, some other generation in the future will be more likely to undertake similar experiments.

(ii) Based on the available historical data, Simon Kuznets (1955) observed that there is a tendency for the income distribution to first worsen, and then improve, as an economy becomes more developed (that is, it becomes richer on a per capita basis). Subject to the weakness of data on which any such observation must necessarily be based, this hypothesis (known commonly as the Kuznet's Inverse U–curve) has been viewed as one of the basic stylized facts of the past century of economic development. The existing attempts to provide an explanation of this phenomena have typically abstracted from the role of government altogether, even though the nature as well as the scope of government activities appears to have undergone dramatic transformation in the process of economic development.

From the limited perspective of the present paper, an issue which is relevant for understanding Kuznet's hypothesis (or any other competing hypothesis addressing the relationship between income distribution and the stage of development) is the relationship between the stage of development and the scope of redistribution. Some aspects of development (such as the increasing attractiveness of market based transactions versus those mediated through family and other similar institutions, and an increasing

use of common accounting practices) suggest that development should, to some extent, not only decrease the bureaucratic costs associated with the government's use of various policy instruments, but it should also increase the potential for redistributive screening that these instruments might possess. Other aspects of development (such as increased possibility of interregional and international mobility of capital and labor, increased choices of transactions available to each individual, and the rise of private institutions selling services to reduce individuals' tax liabilities), on the other hand, suggest the contrary. The overall relationship between the level of development and scope of redistribution, therefore, is an empirical matter. If, however, it is the case that, within a range, the scope of redistribution is higher (with a time lag) at a higher level of development, then it can be shown that the pattern of (post tax and transfer) income distribution within a class of models of the economy will correspond to the inverse U-curve described above [see Sah (1986b)].

(iii) Note that this paper does not take a position on whether the limitations on the scope of redistribution in a market economy is a "strength" or a "weakness" of such an economy. In part, such a question can not be rightly posed from a positive point of view without specifying: compared to what? A natural candidate for such a comparison is a socialist system:. In fact, a comparison of the scope of redistributive potential of these two systems would be highly relevant because a significant part of the popular debate between the proponents of market versus socialist economy revolves around the presumed levels of equity that each of these two systems are capable of.

Such a comparison, however, does not appear possible at present because we do not yet have fully articulated models describing the positive aspects of personal income distribution in socialist economies [see Bergson (1984)]. For a socialist system of the type represented by the contemporary Soviet–style economies, for instance, one would need to analyze the set of forces which restrict the range of available choices which the party and the bureaucracy have concerning the distribution of personal incomes across different groups (party members, managers, workers and peasants) in the economy.

In the absence of such analyses, statements concerning the comparison of the scope of redistribution under alternative economic systems are likely to be misleading. For instance, to pose the question of the scope of redistribution in the utopian socialist model in which *every* individual is "willing to work according to one's abilities and get (consume) according to one's needs" is vacuous to at least the same degree as that in a market–oriented economy in which government policies can be costlessly conditioned on the intrinsic abilities of individuals. One is unlikely to learn much from such comparisons.

APPENDIX

Let $i \in J$ denote the index set of goods for which $\theta_i > 0$, and let $i \in K$ denote the index set for which $\theta_i < 0$. Note that $w_i^P \geq 0$, and $w_i > 0$. Since $I^P < -R^P$, it follows from (10) that

(A1) $$\Delta^P/\alpha^P \leq -\Sigma_{i\in J}\,\theta_i w_i^P - \Sigma_{i\in K}\,\theta_i w_i^P < -\Sigma_{i\in J}\,\theta_i w_i^P .$$

Further, $w_i^P \leq \bar{w}^P$. Thus, $-\theta_i w_i^P \leq -\theta_i \bar{w}^P$, if $\theta_i < 0$. Summing the preceding expression over $i \in K$, and substituting the resulting expression into (A1), one obtains

(A2) $$\Delta^P/\alpha^P < -\bar{w}^P \Sigma_{i\in K}\,\theta_i .$$

Next consider the public budget constraint (11). This yields

(A3) $$-\Sigma_{i\in K}\,\theta_i w_i = \Sigma_{i\in J}\,\theta_i w_i - b .$$

Using a reasoning analogous to that in the paragraph above, it is easily ascertained that $-\underline{w}_i \Sigma_{i\in K}\,\theta_i \leq \Sigma_{i\in K}\,\theta_i w_i$. Therefore, $-\Sigma_{i\in K}\,\theta_i \leq -[\Sigma_{i\in K}\,\theta_i w_i]/\underline{w}$. Substituting the preceding expression into (A2), and making use of (A3), one obtains

(A4) $$\Delta^P/\alpha^P < [\Sigma_{i\in J}\,\theta_i w_i - b]/\underline{w}^P/\underline{w} .$$

The above implies (12) and (14) because $\theta_i < \bar{\theta}_i \leq \bar{\theta} < 1$; and the sum of w_i is smaller than unity.

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