

The Sense of Relative Poverty and Its Effects on the Equity-Efficiency Tradeoff

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This paper presents a simple model incorporating the sense of relative poverty. The sense of relative poverty is interpreted as external diseconomies in consumption by the poor caused by the conspicuous consumption of the rich. It is shown that a competitive equilibrium without any government intervention is not Pareto optimal, and that with an equity-enhancing redistributive tax scheme is Pareto optimum achieved. Equity and efficiency do not comprise a big trade-off, but are rather found hand in hand in a developing economy where the sense of relative poverty prevails.

I. Introduction

Economic development in many developing countries seems to have solved the problem of absolute poverty to a large extent. Unequal distribution of the pie resulting from economic development, however, has produced an acute sense of relative poverty among a large portion of the population in some Asian countries and most Central and South American countries. The sense of relative poverty is known to exist when the economic disparities between the rich and the poor have become greater than before, and as a result, poor people do not feel that their economic conditions have improved through economic development. The sense of relative poverty can be comparable to the sense of relative deprivation, a concept generally used in sociology — the sense by which people feel that socioeconomic resources and opportunities available to fellow men are denied them.

In the general equilibrium macroeconomic model, the problem of relative poverty has not been dealt with as a significant factor. The con-

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ventional wisdom that there is a big trade-off between equity and efficiency has prevailed. This paper introduces the sense of relative poverty as a significant economic variable into the general equilibrium macroeconomic model, and argues that equity and efficiency are most likely to be complementary to each other in developing countries.

There can be several ways of introducing the sense of relative poverty into economic analysis. First, it can be hypothesized that the larger the size of the income in the high-income bracket, the lower the utility level of those in the low-income bracket will be. Second, concentration of wealth in a few rich people through illegal means decreases the utility level of the low-income population. Third, conspicuous consumption by the rich may decrease the utility level of the poor.

In this paper, the author will pay a special attention to conspicuous consumption as a major factor causing the sense of relative poverty among the poor in developing countries. The welfare of the poor decreases as their income disparities with the rich are visualized through the conspicuous consumption by the rich.

In section II, a simple pure exchange model incorporating the sense of relative poverty is presented. It is demonstrated that a competitive equilibrium without any government intervention is not Pareto optimal, but that with an equity-enhancing redistributive tax scheme is Pareto optimal. Equity and efficiency are found to be complementary.

Concluding remarks comprise section III. It is argued that the message of our simple model may extend to a more general model. Equity-oriented development strategies should be adopted in a developing economy where the sense of relative poverty prevails.

II. The Basic Model

1. *The Model*

The model is a two-good, two-class, pure exchange static economy. There are two kinds of goods, a necessity good and a luxury good in the economy. There are two classes, the rich and the poor. For simplicity, we assume just one rich man and one poor man. Each agent is endowed with both goods. There exists no production activity. A rich man and a poor man are denoted as R and D in superscript, while the necessity good and the luxury good are denoted as 1 and 2 in subscript, respectively. Each person is endowed with a fixed amount of both goods. The initial endowment of the rich man is denoted as (W_1^R, W_2^R) and that of the poor man as

(W_1^D, W_2^D) , where $W_i^D < W_i^R$ for $i = 1, 2$.

The preference of the rich is represented by the following utility function:

$$(1) \quad U^R = U^R(C_1^R, C_2^R), \quad U_1^R \equiv \frac{\partial U^R}{\partial C_1} > 0, \quad U_2^R > 0$$

where C_1^R and C_2^R represent the amounts of the necessity and luxury goods consumed by the rich, respectively. The utility function is assumed to be twice differentiable, with convex upper contour sets.

The preference of the poor is represented by the following utility function:

$$(2) \quad U^D = U^D(C_1^D, C_2^D, C_3^R), \quad U_1^D > 0, \quad U_2^D > 0, \quad U_3^D < 0$$

Where C_1^D and C_2^D are the amount of the necessity good and the luxury good consumed by the poor. The sense of relative poverty of the poor, discussed in the introduction, is captured in $U_3^D < 0$. As the rich consume more luxury goods, the utility of the poor decreases. The absolute value of U_3^D represents the magnitude of the sense of relative poverty. The poor's utility function is also assumed to be twice differentiable with convex upper contour sets.

Let P be the price of the luxury good in terms of the necessity good. The budget constraint of two classes is described by

$$(3) \quad C_1^i + PC_2^i = W_1^i + PW_2^i, \quad i = R, D$$

Each agent tries to maximize his utility subject to his budget constraint. Both the necessity and luxury goods markets are competitive.

2. Competitive Equilibrium

Necessary and sufficient conditions for each agent's constrained optimization problems consist of equation (3) above and equation (4) below.

$$(4) \quad \frac{U_1^R}{U_2^R} = \frac{1}{P} = \frac{U_1^D}{U_2^D}$$

Equation (4) shows the usual optimality condition that the marginal rate of substitution between any two goods should be equal to the price ratio of the two goods. Even though C_2^R gives an external diseconomy in consumption to the poor, C_2^R is not a choice variable of the poor. Therefore,

we get the usual optimality condition as formulated in equation (4).

Market clearing conditions are

$$(5) \quad C_1^R + C_1^D = W_1^R + W_1^D$$

$$(5)' \quad C_2^R + C_2^D = W_2^R + W_2^D$$

If either equation (5) or (5)' holds, then the other must also hold by Walras' Law of markets.

A competitive equilibrium of the economy is the set of consumption and price $(\bar{C}_1^R, \bar{C}_2^R, \bar{C}_1^D, \bar{C}_2^D, \bar{P})$, satisfying equations (3), (4) and (5). There are five equations and five unknowns. Unless there is a functional dependency or inconsistency among the equations, a competitive equilibrium exists, and it is unique.

3. Non-Optimality of the Competitive Equilibrium by Pareto Criterion

Let's check whether the competitive equilibrium is Pareto optimal. A Pareto optimal allocation in this economy is attained when the utility level of one class, given that of the other class, is maximized subject to the economy's endowment constraint.

$$(6) \quad \text{Maximize } U^R(C_1^R, C_2^R)$$

$$\text{s.t. } U^D(C_1^D, C_2^D, C_2^R) = \bar{U}^D$$

$$C_1^R + C_1^D = W_1^R + W_1^D$$

$$C_2^R + C_2^D = W_2^R + W_2^D$$

Necessary and sufficient conditions for the above optimization problem, and consequently for Pareto optimal allocation, are

$$(7) \quad \frac{U_1^R}{U_1^R + \frac{U_1^R}{U_3^D} U_3^D} = \frac{U_1^D}{U_2^D}$$

$$(8) \quad C_1^R + C_1^D = W_1^R + W_1^D$$

$$(9) \quad C_2^R + C_2^D = W_2^R + W_2^D$$

In the absence of the sense of relative poverty ($U_3^D = 0$), equation (7)

becomes identical to equation (4). In our model with $U_3^D < 0$, however, equation (4) is different from equation (7). The usual optimality condition that the marginal rate of substitution between any two commodities must be the same for any two consumers does not hold any longer for the optimal allocation of commodities among consumers when the sense of relative poverty prevails. Thus, the competitive equilibrium in our model is not Pareto optimal.

4. *Income Redistribution and Pareto Optimality*

Comparison of equation (4) with equation (7) suggests that the rich overconsume luxury goods under *laissez faire* perfect competition.

From a societal point of view, it should be the case that $\frac{U_1^D}{U_2^D} = \frac{U_1^R}{U_2^R + \frac{U_1^R}{U_1^D} U_3^D} > \frac{U_1^R}{U_2^R}$. However, the free market makes $\frac{U_1^D}{U_2^D} = \frac{U_1^R}{U_2^R}$

This occurs because the market does not take into account that consumption of the luxury good by the rich causes an external diseconomy in the consumption by the poor.

In this economy, a typical way to achieve Pareto optimal allocation is to levy a Pigouvian tax on luxury consumption by the rich. Suppose t units of the necessity good are levied as an excise tax on each unit of the luxury good consumed by the rich. The budget constraint of the rich then becomes

$$(3)' \quad C_1^R + (P + t)C_2^R = W_1^R + PW_2^R, \quad t > 0$$

The optimization problem of the rich, subject to the new budget constraint (3)', yields the first order condition

$$(4)' \quad \frac{U_1^R}{U_2^R - tU_1^R} = \frac{U_1^D}{U_2^D}$$

rather than equation (4). Hence, if the government sets

$$(10) \quad t = - \frac{U_3^D}{U_1^D} > 0$$

then equation (4)' then becomes identical to equation (7) and the com-

petitive equilibrium must also be Pareto optimal. As the sense of relative poverty becomes greater, the tax rate t also grows larger. As the tax rate becomes larger, the discrepancy in the living standards of the rich and poor diminishes. Economic policy which enhances equity is Pareto improving. This notable characteristic of our model is in sharp contrast to most previous pure exchange economy models where Pareto optimality is independent of equity.

In our model, the magnitude of t works as an "equity index." If t exceeds $-U_3^D/U_1^D$, then equity and efficiency constitute a big trade-off, as in Okun (1975). On the other hand, if t is less than $-U_3^D/U_1^D$, equity and efficiency are complementary. Hence, raising t to $-U_3^D/U_1^D$ in this case achieves both equity and efficiency. A developing economy where the sense of relative poverty prevails will usually be approximated by the latter case.

Strictly speaking, the Pigouvian tax discussed above is not an income redistribution policy, since tax revenue has not been distributed to the poor. Also, the tax is cast in the partial equilibrium set-up since the government budget constraint has not been considered. These shortcomings can easily be remedied.

Let τ units of the necessity good be given as a subsidy on each unit of the luxury good consumed by the poor. Then the budget constraint of the poor becomes

$$(3)'' \quad C_1^D + (P-\tau)C_2^D = W_1^D + PW_2^D, \quad \tau > 0.$$

The optimization problem of the rich is the same as above. Then the new competitive equilibrium yields

$$(7)'' \quad \frac{U_1^R}{U_2^R - tU_1^R} = \frac{U_1^D}{U_2^D + \tau U_1^D} \quad \text{instead of equation (7)'}$$

Equation (7)'' is rearranged as

$$\frac{U_1^R}{U_2^R - (t + \tau)U_1^R} = \frac{U_1^D}{U_2^D}$$

Thus, if the government sets

$$(11) \quad t + \tau = -\frac{U_3^D}{U_1^D}$$

the competitive equilibrium then becomes Pareto optimal. Since there is an additional unknown variable τ , another equation is needed. The government's budget constraint serves as that other equation. Tax revenue from the rich should equal the subsidy to the poor.

$$(12) \quad tC_2^R = \tau C_2^D$$

Properties of the competitive equilibrium under equations (11) and (12) are basically the same as those under equation (10).

5. An Example

Let the utility function of the rich be represented by $U^R = \sqrt{C_1^R C_2^R}$, and that of the poor by $U^D = \sqrt{C_1^D C_2^D / C_2^R}$. Assume that the endowment pattern of the rich and poor are $(W_1^R, W_2^R) = (7, 9)$ and $(W_1^D, W_2^D) = (3, 1)$, respectively. The *laissez-faire* competitive equilibrium will then be $(\bar{C}_1^R, \bar{C}_2^R, \bar{C}_1^D, \bar{C}_2^D, \bar{P}) = (8, 8, 2, 2, 1)$. This competitive equilibrium will not be Pareto optimal.

According to the Pigouvian taxation prescribed above, $t = 1/5$ units of the necessity good is levied as an excise tax for each unit of the luxury good consumed by the rich, and $\tau = 2/5$ units of the necessity good are given as a subsidy for each unit of the luxury good consumed by the poor. The after-tax competitive equilibrium is $(\hat{C}_1^R, \hat{C}_2^R, \hat{C}_1^D, \hat{C}_2^D, \hat{P}) = (8, 20/3, 2, 10/3, 1)$. This new competitive equilibrium is Pareto optimal. Since the competitive equilibrium in the absence of taxation will not be Pareto optimal, the redistribution policy that lowers the welfare of the rich is justified.

III. Concluding Remarks

The model discussed in the previous section is very simple. Yet its basic message that both equity and efficiency are, more often than not, compatible in developing economies cannot be easily dismissed.

The pure exchange economy model can be extended to a production economy. The middle class can be incorporated in a model as well. The static model can be generalized to a dynamic model to include economic growth. Even with all those revisions and extensions, the following basic proposition of the model remains valid: As long as some people in the economy have a sense of relative poverty as captured in equation (2), the *laissez-faire* competitive equilibrium is not Pareto optimal, and only income redistribution policy enhancing equity can ensure Pareto optimality.

In Japan, Korea and some Latin American countries the housing problem is quite severe. The fact that the wealthy have mansions, or even the mere fact that the middle class people have houses, cause those who do not own houses to feel a sense of relative poverty (deprivation). These problems can be analyzed through our model.

Maintstream economics teaches that a tradeoff between equity and efficiency generally exists. This conventional wisdom has led many developing countries to pursue growth-oriented strategies. It has been argued that equity-oriented strategies at the early stage of economic development will make the economy as inefficient as Socialist economies, and as stagnant as industrialized Western ones. It is true that a strong emphasis on equity will render the economy inefficient and stagnant. But this line of thought cannot be used to justify the neglect of economic welfare and equity in developing countries. The implication of our model is that economic welfare and equity are as important as economic growth and efficiency.

In developing countries, the social responsibility and moral restraint of the well-endowed are often stressed. In terms of the model we have studied, this is tantamount to urging the rich to solve a socially desirable optimalization problem such as equation (6). If the rich had such an attitude of enlightened self-interest, the sense of relative poverty as well as social conflict would not have prevailed in many developing countries, as the case has been. In order to enhance both equity and efficiency, governments should engage in sustained efforts to administer an effective and equitable redistributive policy.

References

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