Pergamon

World Development, Vol. 24, No. 1, pp. 91–96, 1996

0305–750X/96 $15.00 + 0.00

0305–750X(95)00110–7

Relief Programs: When it May be Better to Give Food Instead of Cash

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Summary. — A standard way to give relief to the needy is to organize employment or public works programs. It is often argued that in many situations paying workers in cash, instead of food, may be the superior option. The aim of this paper is to caution that some plausible spillover effects may weaken this argument. Observe that paying wages in food and in cash can have differential effects on prices. A cash-for-work program would typically enhance the demand for food, cause food prices to rise and result in more food in the hands of those who have received the wages. This will mean that those who are left out of the program (for example, the old and the infirm) could be worse off.

1. INTRODUCTION

A standard way to give relief to the needy during famines or even as an antidote to chronic poverty is to organize employment programs or public works programs. Though the idea and implementation of such programs go far back into history (see Dreze, 1990), in independent India they have been used frequently and fairly effectively. The usual practice has been to conceive of some infrastructure projects, such as road building and canal construction, fixing a low wage, offering employment to anybody who is willing to work on these projects at the specified wage and not fussing too much about whether the road is usable and the canal navigable. While it would be ideal if the projects did create durable infrastructure, the idea is that, even if they did not, the employment itself would help the poor by enhancing their entitlement of food (by which, I will throughout this paper mean "food and other essentials").

In recent years (especially since the mid-1970s) and during famine-like conditions, it has often been the practice to pay the wages of workers on relief programs in the form of food. Several economists have argued that in many situations paying workers an equivalent amount in cash, instead of food, may be fine and may even have some advantages.[1] One popular critical response to this is to posit that cash wages are undesirable because with rising prices the recipients will be unable to buy adequate food. This is an erroneous criticism because it overlooks the qualification 'equivalent.' An equivalent cash wage is one which is calculated taking account of price effects so that it is equivalent to the food wage in equilibrium.

While this criticism is erroneous the aim of the present paper is to tilt the argument toward the food-relief school by presenting a very different case for it.[2] Observe that seldom can relief be so meticulous as to reach everybody. An employment program for instance need not benefit the infirm and the old. A direct relief program where handouts are meant for those below a certain income implies that those above the critical income will remain unsupported.

Adhering to the context of employment programs consider the alternatives of paying equivalent wages in food and in cash. If these are really equivalent they will benefit the recipients equally. They can, however, have differential effects on prices. A cash-for-work (CFW) program would typically enhance the demand for food, cause food prices to rise and result in more food flowing into the hands of those who have received the wages. This will mean that for those who are left out of the program, the program can cause a deterioration in well-being. The old and the infirm could be worse off, and those who may not have been allowed to partake in the program because they were above the poverty line may be pushed below it now because of the price rise. The aim of this paper is to formalize the above intuition. This argument is not unknown in the literature. Dreze and Sen (1989) are

*The work on this paper began while I was a visitor at the Centre for Development Studies, Thiruvananthapuram, as part of UNDP's research project on *Strategies and Financing for Human Development in India*. I am grateful to Rimjhim Aggarwal, Jean Dreze and T. N. Krishnan for discussions. I have also benefited from the comments of two anonymous referees. Final revision accepted: July 6, 1995.

clearly aware of this "externality" of cash-relief programs, as is Ravallion (1990). But none of these authors formalize this problem. Formalization is important not only to check the validity of this argument but because the effects of relief programs would depend on whether the cash wage is pure injection into the system or whether it is taxed from the rich, on whether a combination of food and cash relief is used, and so on. The policy options are many and intuition can hardly be expected to lead us always to the right answers.

Given the practical importance of this topic it bears repeating that the aim of this paper is to take account, rigorously, of certain spillover effects of relief programs which have received very little attention in the literature. These spillover effects tilt the conventional recommendation a little toward paying wages in food instead of cash in relief programs meant to combat episodic downturns and famines in poor economies. In constructing a formal equilibrium model, however, we are forced to omit important macroeconomic (especially fiscal) issues which accompany any government-run program because these may be too complex for a fully formal analysis. The caveats which arise from such an omission are briefly mentioned in the last section. For the reader who wants to take the lessons of this model to the field the caveats are, however, important to be kept in mind.

2. CASH VERSUS FOOD: A FIRST GLIMPSE

To get a first (and, admittedly, somewhat imprecise) glimpse of the intuitive argument sketched in section 1, suppose the S and D curves are the supply curve faced by and demand curve of the potential beneficiaries of the employment program. Hence currently food price is P_0 and the food consumed by these people is X_0.

Suppose now that X_0 is considered inadequate and these people receive another X units of food directly as wages. Hence, to them, the supply curve of food shifts to the right by X. The new supply curve is S'. But the additional wage means that their total income is now higher (by X). If they are in a famine or near-famine situation it is arguable that their food demand will increase by the same amount as their income. Hence the demand curve shifts to D'. Thus the food-for-work (FFW) program results in an equilibrium shift from E_0 to E'. Note that as a consequence the beneficiaries will now have more food but food prices remain constant.

If on the other hand we give cash instead of food to the same people the demand curve for food will shift to the right but the supply curve remains unchanged. Hence by giving a sufficiently large amount of cash we can ensure that the demand curve shifts to D'' and

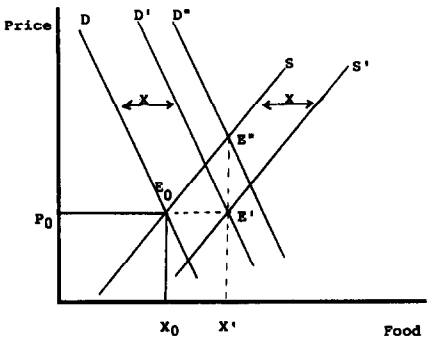

Figure 1. *The price effect of cash and food relief.*

the beneficiaries get the same amount of food, namely X', as they would get under FFW. But the equilibrium now established, i.e., E'', is one where the price of food is higher.

Hence, this analysis seems to suggest that FFW will not cause a deterioration in the condition of non-beneficiaries, whereas a CFW can leave them worse off. Since the nonbeneficiaries of an employment program can be a very large and vulnerable section of the population, a CFW can potentially be self-defeating, causing a shift in poverty rather than its eradication.

The above intuitive analysis has some weaknesses, the most significant of these being that it overstates the case for food relief. Firstly, it ignores the transactions, organizational and transportation costs of different relief systems. Some authors count the transportation cost of food by government agencies as a negative feature of food relief programs as opposed to cash relief. This is not a convincing line to take because it is not as if cash relief does not entail transportation costs. The food that gets drawn into the region as a consequence of cash relief is brought in by small private agencies and merchants and hence the transportation costs are less visible than when the Food Corporation of India sends truckloads of food into a food-shortage region, but they none the less exist. There may still be systematic differences in the (visible plus invisible) organizational and transportation costs of FFW and CFW and the above analysis ignores this. A more complete model should go into this but that is not my aim here.

A second problem with the above analysis is that it ignores the fact that changes in the demand and supply of food can affect the price of the other goods and can have feedback effects on the market for food. To take account of such feedbacks and also to analyze more varied policy interventions we need to construct a general equilibrium model. This is what the next section does.

3. THE MODEL

There are three classes or types of people in the economy: 1, 2 and 3. Of these, 3 is rich and 1 and 2 are poor. Class 1 consists of people who can benefit from the employment program; whereas 2 is beyond the reach of direct relief benefits. The number of persons of Class i is given by n_i. The economy has only two goods, cash and food. "Cash" could be thought of as the nonfood good and therefore enters the utility function as an argument. The initial endowment of a person of Class 1 is given by (x_1, m_1) where x_1 is the amount of food and m_1 the amount of cash.

A more elaborate model would not have cash as an argument in the utility function. There would be food and nonfood goods appearing in the utility function and cash would be used to buy either. The simplifying assumption used here, however, makes no qualitative difference.

Persons in Classes 1 and 2 receive utility from food alone, whereas a person of Class 3 has the following utility function:

$$U = (q - s)^{\alpha} m^{1-\alpha} \tag{1}$$

where q and m are the amounts of food and cash consumed by him or her and $s > 0$ is a constant. Actually people in this model do not have different utility functions. They all have Stone–Geary utility functions,[3] such that only food gives positive utility (with cash giving zero utility) as long as food consumption is below the subsistence level, s, and once it crosses s, the utility function is given by (1). Hence the indifference curves of all individuals are as in Figure 2. Since Classes 1 and 2 are poor we shall assume throughout that they operate to the left of point s in Figure 1. Moreover, it will be assumed that the rich operate to the right of s. Admittedly, the assumption that the poor spend all their income on food is an extreme one and would be falsified in reality. The general direction of the results established in this paper, however, would remain valid even if we allowed the poor people to have a marginal propensity to consume food less than one as long as their marginal propensity were more than the marginal propensity of the rich. Hence my use of the polar assumption may be thought of as one justified by the attempt to keep the algebra rigorous but simple.

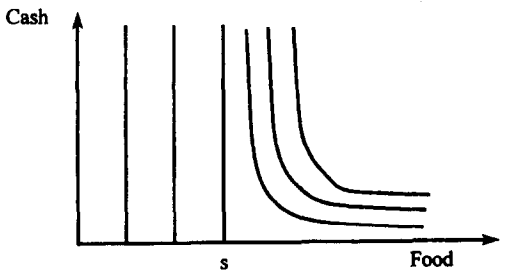

Figure 2. *Stone–Geary indifference curves.*

Subsistence consumption (that is, food consumption of s or less) does not here mean that people die at such a level of consumption but just that they are very poor. The aim of a good relief program is to push people who are to the left of s to higher indifference curves. We shall assume that the price of cash is (1). The price of food will be denoted by p. Since persons of Classes 1 and 2 spend all their incomes on food their demand functions are easy to derive and are given, respectively, by equations (2) and (3), below:

$$D_1(p) = \frac{m_1}{p} + x_1 \tag{2}$$

$$D_2(p) = \frac{m_2}{p} + x_2. \tag{3}$$

Class 3's demand function is derived by maximizing (1) subject to the constraint $px + m = px_3 + m_3$, where x and m are his consumption of food and cash. As it is easy to check, such maximization yields the following demand function:

$$D_3(p) = \frac{\alpha m_3}{p} + (1 - \alpha)s + \alpha x_3. \tag{4}$$

A Walrasian equilibrium is characterized by aggregate demand being equal to aggregate supply for each good. By Walras's law we know this must be true if demand equals supply for all but one good.

Hence p^* is a Walras equilibrium if

$$n_1\left[\frac{m_1}{p^*} + x_1\right] + n_2\left[\frac{m_2}{p^*} + x_2\right] + n_3\left[\frac{\alpha m_3}{p^*} + (1 - \alpha)s + \alpha x_3\right] = n_1x_1 + n_2x_2 + n_3x_3.$$

Solving this we get

$$p^* = \frac{n_1m_1 + n_2m_2 + \alpha n_3m_3}{(1 - \alpha)n_3(x_3 - s)}. \tag{5}$$

In order to avoid a technical existence problem, it is necessary that $(x_3 - s) > 0$. Fortunately, this follows from the assumption that the rich operate to the right of s.

Before going on to discuss policy, it is worth stressing that the model used is that of pure exchange, that is, though the model has both sellers and buyers of food, there are no producers. In other words, we are

considering a situation where the food has already been produced and the price influences only distribution and exchange. It seems to me that this is a reasonable assumption when we are concerned with a situation of crisis or a famine. In such episodic problems, the question of responding by producing more food is likely to be quite irrelevant. On the other hand, when considering relief programs for battling chronic poverty the issue of production does become important because a higher food price could ease the food problem through a production response and, likewise, a lower food price could exacerbate the problem of food by causing a lower production. So this model should ideally be used to analyze short-run policy problems.

4. RELIEF POLICY AND WELFARE

Let us now look at the consequences of injecting food and cash into this economy. Consider first the case where members of Class 1 are given food relief. That is, each person is given X units of food.[4] So the initial endowment of a Class 1 person now becomes $x_1 + X$. Since x_1 does not figure in equation (5), the price of food remains unchanged by such an injection. This corroborates the intuition of section 2. Hence, in the new equilibrium that emerges after such an injection, members of Class 1 are better off. This is obvious from equation (2), since their consumption of food is now given by $m_1/p^* + x_1 + X$. Observe that such relief to Class 1 persons leaves the welfare of Class 2 persons unchanged. This is obvious from equation (3).

Now suppose that instead of giving X units of food to Class 1 consumers, the government gives them M units of cash each. What is the effect of this on the welfare of the poor?

From equation (5) it is obvious that the new Walras equilibrium price will now be higher since m_1 in equation (5) is replaced by $m_1 + M$. Since m_2 and x_2 are unchanged, it immediately follows that members of Class 2 are necessarily worse off as a consequence of this policy. To see that Class 1 persons are better off, insert the value of p^* into equation (2) and derive the expression for a Class 1 person's consumption of food in a Walrasian equilibrium:

$$D_1^* = \frac{m_1(1-\alpha)n_3(x_3 - s)}{n_1m_1 + n_2m_2 + \alpha n_3m_3} + x_1. \qquad (6)$$

It is easily checked that $\partial D_1^*/\partial m_1 > 0$. Since for persons of Class 1 and 2 welfare is monotonically related to the consumption of food, it follows that if he is given cash relief, he will necessarily be better off.

The above results imply that if cash relief is given to some people, for instance, those who work in an employment program, the poverty and deprivation in society may actually rise. If n_2 is large and if people of Class 2 drop below the poverty line as a consequence of cash relief to members of Class 1, then the head-count measure of poverty could rise with the implementation of the employment program.

What if the food and cash distributed through a relief program are not pure injections but are transfers effected through taxing the rich and giving relief to the poor? Suppose X units of food is given to each person of Class 1 and this food is collected as tax from the well-off. So each rich person has to give up n_1X/n_3 units of food from his endowment. By replacing x_3 with $x_3 - (n_1X/n_3)$ and x_1 with $x_1 + X$ in equation (6), it is clear that this redistribution policy results in Class 1's food consumption, and therefore welfare, rising.

Unlike in the previous case, however, Class 2's welfare is not left unchanged when Class 1 receives the food relief. By replacing x_3 with $x_3 - (n_1X/n_3)$ in equation (5), it is obvious that this policy raises price. It follows from equation (3) that Class 2 is worse off.

If we now consider a policy of cash transfer, that is each member of Class 1 being given M units of cash with each member of Class 3 being taxed n_1M/n_3 units, it is easy to see that as in the case of injection, Class 1 benefits and Class 2 loses.

Our findings thus far are summed up in Table 1. We are considering four relief policies which increase Class 1's welfare. Table 1 summarizes the effect on Class 2's welfare of these policies.

Table 1 highlights how vulnerable Class 2 is. Only an injection of food does not harm the group. Of course, if $n_2 = 0$, then all the four policies discussed thus far become equivalent. But recall how we defined Class 2. Class 2 consists of all those individuals who fail to receive relief. In virtually all targeted poverty mitigation programs, it would be unnatural to find $n_2 = 0$. Hence, the vulnerable bystander cannot be ignored while crafting such policy.

The only kind of policy that could possibly reach all the poor is one which dispenses relief without targeting. Whoever asks for help gets it. Before 1978 Sri Lanka's food ration system and Kerala's public distribution scheme operated on this principle (see Basu, 1990, for discussion).[5] Our model can be used to investigate the effect of such policy.

Table 1. *Class 2's welfare*

	Injection (To Class 1)	Transfer (Class 3 to 1)
Food	Unchanged	Lowered
Cash	Lowered	Lowered

Suppose everybody is given X units of food each. Clearly the equilibrium price will drop. Hence, by equation (2) and equation (3), all people, that is of Classes 1 and 2, are better off. Now suppose that instead of everybody being given food, they are all given M units of the nonessential good which is here called cash. It follows from equation (6) that every member of Class 1 now consumes $D_1(M)$ units of food in equilibrium, where

$$D_1(M) = \frac{(m_1 + M)(1 - \alpha)n_3(x_3 - \alpha)}{n_1m_1 + n_2m_2 + \alpha n_3m_3 + M(n_1 + n_2 + \alpha n_3)} + x_1. \tag{7}$$

Class 2 being symmetrically placed under this policy, the food consumption of Class 2 is given by a symmetric equation, that is, by replacing the subscripts 1 and 2 in equation (7).

It is easy to check that the sign of the derivative of $D_1(M)$ is the same as the sign of $n_2(m_2 - m_1) + \alpha n_3(m_3 - m_1)$. Clearly this can be positive or negative. If, for instance, m_1 exceeds m_2 and m_3, Class 1 will be worse off as a consequence of everybody being given cash or nonessential relief. By this argument a sudden injection of nonessential goods into the economy can cause a famine without any accompanying decline in aggregate food availability. Since we have a similar expression as above for Class 2, if $m_1 = m_2 > m_3$, both groups get hurt by the relief program.

Of course, depending on the parameters of the economy, a generalized cash relief policy (that is, cash to all) could help all the poor, but a generalized food relief policy always helps the poor. In times of crisis, if a government has the choice, it may be safer to give food relief.

5. CONCLUDING REMARKS

The aim of this paper was to construct a rigorous theoretical model to shed light on an important policy question. The running of a relief program, however, also raises questions of macroeconomics and institutions which are too complex to be modeled theoretically. But in crafting policy it would be wrong not to be aware of them.

One such question of considerable importance concerns the source of government injection. If the government considers injecting food into the economy by paying wages in food, the desirability or otherwise of this policy may depend partly on the source from which government acquires the food. The simplest assumption is that the government has the food stocks already perhaps from past procurements or imports. But if no such stocks are available, government may have to consider buying food from the international market or from the farmers. The two can have very different implications, since a purchase from the farmers may cause food prices to rise. If, to prevent that, the government buys the food from the international market, to know what happens in the domestic economy, it is important to find out how it finances the imports. Is it done by cutting down on some other imports, using up existing foreign exchange reserves or borrowing from the international credit market at high interest rates? Each of these can have different implications, with long-run consequences on inflation and unemployment.

Likewise, if the government pays cash wages, a full prediction of its implication, if at all possible, requires us to investigate the funding of such a policy. Is it funded by increasing the fiscal deficit, printing money or by cutting down on some other government expenditure? To know which one of these will happen entails a fairly thorough understanding of the institution of government; and depending on which of these three happens the net effect on the economy could be very different. An immediate relative price adjustment could, for instance, get swept into unimportance by a round of inflation generated by reckless expenditure.

What all these arguments imply is that when it comes to actually recommending policy to a particular government during a particular crisis, one has to combine the insight that comes from formal models of the kind developed above with intuition concerning the larger macroeconomic issues raised in the previous paragraphs. At times these intuitions may overturn the recommendations that come from a formal model, but one hopes — especially if that "one" happens to be the modeler — that more often than not, though the intuitions may dilute them, the general thrust of the model's results continue to be valid.

This paper is concerned with one aspect of relief programs — whether it is better to give relief in the form of food or cash. Most of the literature on this subject has been focused on the welfare of the recipients as a consequence of such alternative relief policies. This paper argues that, barring very rare cases, relief seldom reaches all those who need it, and focuses on the welfare of the "excluded" poor. It is shown that while by varying the amount of relief, food and cash may well be equivalent from the recipient's point of view, they may have very different effects on those who are excluded from the program. It is argued that, in general, it may be better to give food relief instead of cash. Further, it turned out that between (a) giving direct food support to the poor, and (b) procuring food from the rich of the affected region and giving it to the poor, (a) may be the superior option from the point of view of the poor. Procuring food from the rich could cause a rise in food prices because of differential marginal propensities to consume food between the rich and the poor. Hence, if there are vulnerable people who do not manage to receive relief, they might be pushed below survival consumption by virtue of the relief program.

NOTES

1. See, for instance Basu (1981, 1982), Coate (1989), Dreze and Sen (1989) and Sen (1990).

2. Several writers have contributed to the food-versus-cash debate. In addition to the references in note 1, see Stewart (1986).

3. The qualitative results derived below do not depend on this particular utility function, which is used here for reasons of mathematical convenience. Essentially all we need is a utility function which implies that a poorer consumer has a higher marginal propensity to consume food.

4. I am here ignoring the other possible effects of an employment program, such as loss of welfare through loss of leisure. What an employment program does here is to provide a self-selection mechanism whereby those who are able and poor can come to collect the relief of their own accord. Class 1 individuals are, under this interpretation, both able-bodied and poor. If we instead want to consider a program to help laborers or the low caste, Class 1 will be the class of laborers or the low caste and as such will not include the peasant farmer or the *Brahmin* who is poor.

5. The effect of such policies in a labor market model with efficiency wage effects was studied in Basu (1992).

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