IMPACT OF THE FOOD STAMP PROGRAM VS. CASH TRANSFERS ON THE AGGREGATE DEMAND FOR FOOD: A THEORETICAL PERSPECTIVE*

by

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Abstract

Comparative analysis of food demand expansion effects of a cash program, as compared to food stamp program, is important for measuring tradeoffs between goals of raising farm income and improving nutritional status of the poor. This paper presents a theoretical basis for assessing food demand impacts under each program.

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The original food stamp program was designed to raise farm income and improve dietary standards of low income consumers. It has been argued that direct substitution of cash payments in lieu of food stamps would increase the "participation rate" among eligible households, and therefore would be most consistent with the objective of improving dietary status of low income consumers. Comparative analysis of demand expansion effects stimulated by food stamps or a cash program is important for measuring tradeoffs (or lack of tradeoffs) between raising farm income and improving nutritional status of the poor. Although theoretical analysis of food demand impacts under the food stamp provisions of 1974 has been developed (Mittelhammer and West), there is a general lack of theoretical analyses of comparative food demand impacts under different program provisions or a cash program.

Theory

Although stamps must be spent on food, the aggregate increase in food demand is not equivalent to the total face value amount of stamps issued. The food stamp program, by "freeing up" cash spent before participation for food, allows substitution on non-food for food items. A food stamp household receives, at no charge, a specified amount of food stamps and will choose among three options:[1]

1. The household will use the stamps to increase food expenditures by the face amount of the bonus stamps.

2. The household will not change their amount of food expenditures, and substitute an amount of cash equivalent to the face value of bonus stamps on non-food items.

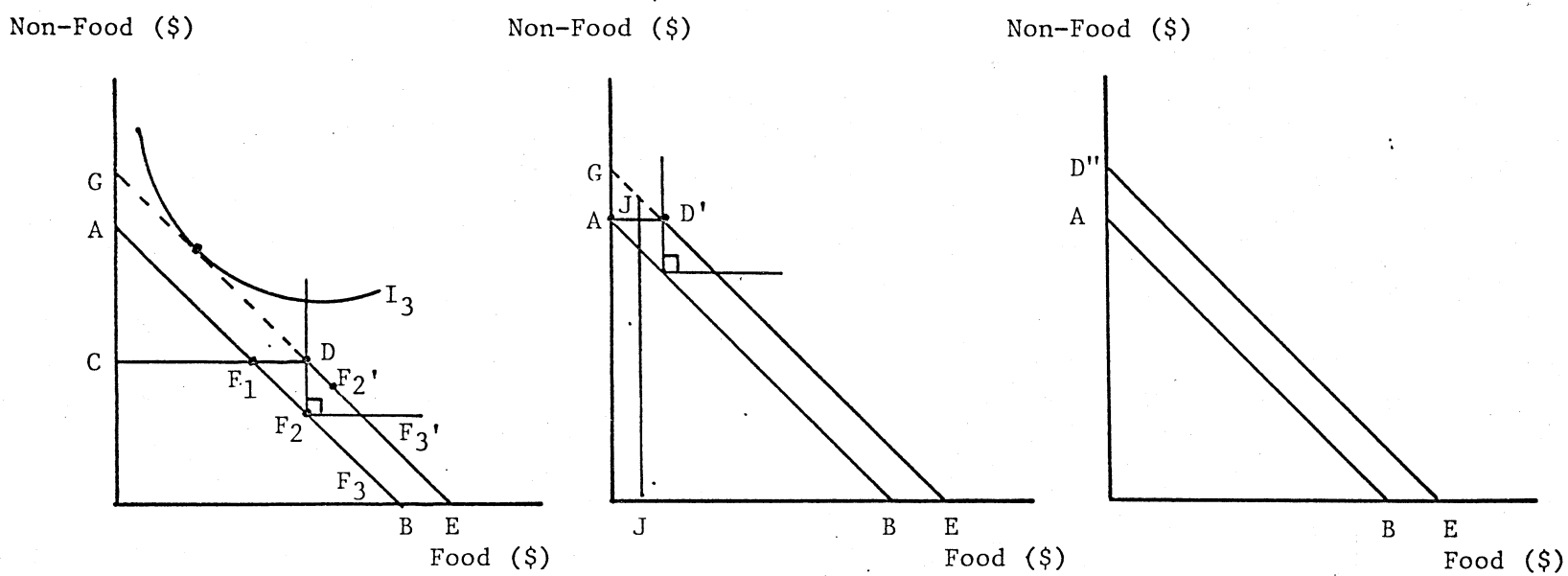
3. The household will increase food expenditures by less than the face value of the bonus stamps, and substitute some of the money formerly spent on food for non-food purchases.

If all participating households selected (1), the aggregate increases in food expenditures would be equivalent to the total face value of the bonus stamps. If all households selected (2), there would be no increase in food demand. Summing across all households, demand expansion due to food stamps lies somewhere in between the two extremes (option 3). The increase in aggregate food expenditures could be interpreted as the increase in retail demand for food. The estimated U.S. farm food share of each food expenditure dollar is 38¢ (Boehm and Belongia).

Indifference curve analysis can be used to show the three options of food stamp participant behavior, and comparative effects of changing program regulations on food demand. Figure 1 shows the graphical analysis of indifference curve theory applied to the food stamp program as it existed in 1974, in 1979 after elimination of the purchase requirement, and would exist under a cash transfer program.

In 1974, food stamp participants were required to pay AC dollars to receive a greater dollar amount of food stamps, CD. The value of the free (bonus) stamps, F_1D, depended on household size, income, and asset criterion. The participant's budget line is CDE, and the participant must consume at least CD dollars of food. The participant whose pre-

Figure 1. Indifference Curve Analysis of Food Stamp Participant Behavior



1974
Purchase Requirement[a/]

1979
No Purchase Requirement[b/]

19??
Cash Transfer Replaces Food Stamps

NOTES: Time period = 1 month and analysis assumes all stamps are used up within the same month.

a/ The participant pays AC dollars and receives CD dollars worth of food stamps. The difference between what a participant pays for the stamps and the total value of stamps received is called "bonus stamp value" ($F_1D = CD - AC$).

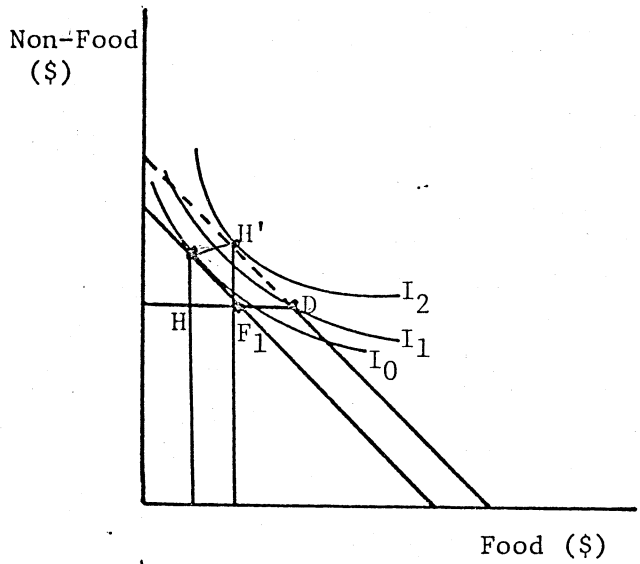
b/ The bonus value of stamps is the same in all three graphs ($F_1D = AD' = BE$).

stamp utility is maximized at point F_1, and who has a zero income elasticity for non-food at that point, will maximize post-stamp utility at point D. If all participants consumed at least CF_1 dollars worth of food prior to participation, and had a zero income elasticity for non-food, the increase in aggregate food expenditures would be equal to the value of bonus stamps issued (option 1).

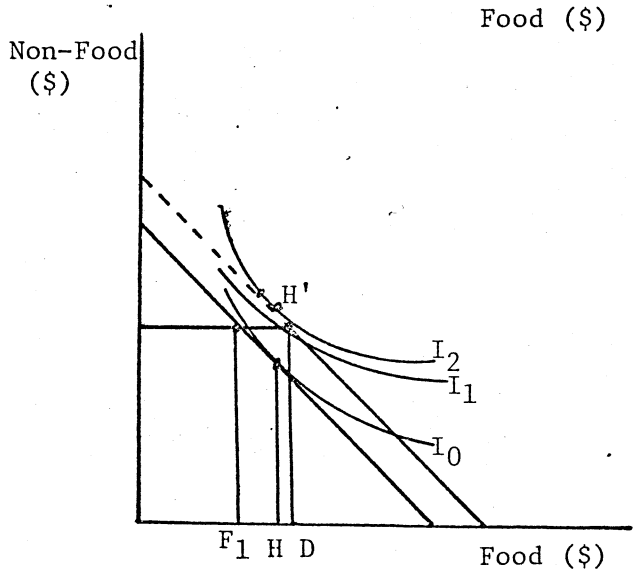
The participant whose pre-stamp utility is maximized at point F_2, and has a zero income elasticity for food at that point, will move to D and will not change household food expenditures (option 2). The participant whose pre-stamp utility occurs to the right of point F_2, and who considers both food and non-food to be normal or superior goods,[2] will increase expenditures on both goods, say to point F_2' (option 3).

For eligible households whose pre-stamp utility occurs to the left of point F_2 on budget line AB, there is the possibility that their utility maximizing post-stamp utility would occur to the left of point D on budget line GDE. An indifference curve of I_3 is unattainable for food stamp participants since food expenditure must be at least CD dollars. For those eligible households who do decide to participate, their utility will not be maximized as it would with a cash transfer since they would be "constrained" to operate at point D, but they would obtain a higher level of utility than pre-stamp utility. Case I in Figure 2 illustrates that a household's behavior may not fit into any of the three options of participant behavior when the minimum requirement that a participant consume at least CD dollars is a "tight" constraint. The household in Case I increases its food expenditure by HD, which is

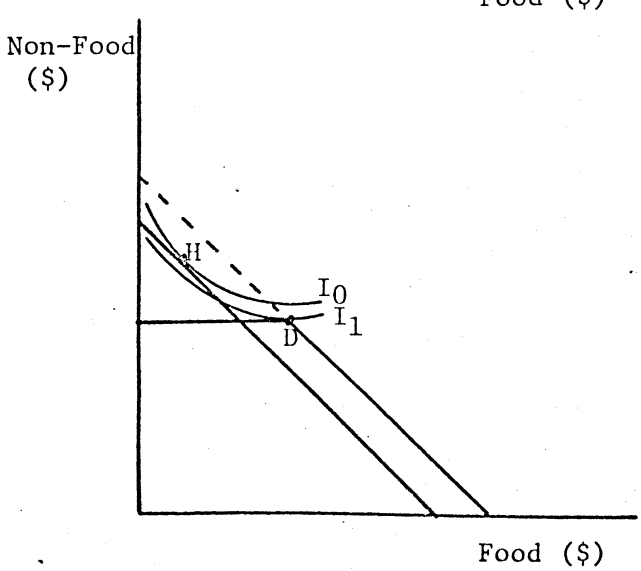
Figure 2. Utility Levels of the "Constrained" Eligible Food Stamp Household and the Decision to Participate, 1974 Food Stamp Regulations



Case I: Eligible household will participate in the program because point D on I_1 yields a higher utility than point H on the pre-stamp utility curve, I_0. Increase in food expenditures, HD, is greater than the bonus value of the stamps, F_1D.



Case II: Eligible household will participate in the program because point D on I_1 yields a higher utility than point H on the pre-stamp utility curve, I_0. Increase in food expenditures, HD, is less than the bonus value of the stamps, F_1D.



Case III: Eligible household will not participate in the program because point D on I_1 yields a lower utility than point H on the pre-stamp utility curve, I_0.

more than the bonus value of the stamps, F_1D. Thus, under food stamp regulations in effect in 1974, an additional option for participant behavior was:[3]

4. A participating household will increase food expenditures by more than the bonus value of the stamps.

Indifference curve theory suggests that the aggregate increase in food expenditures due to 1974 provisions could be measured by an amount consistent with their income elasticity for food (point H to H' in Case I or II) plus an additional amount required to meet the minimum required food expenditure, H'D:[4]

$$(1) \qquad \sum_{i=1}^{n} \left[\left(\frac{\%\Delta Q_f}{\%\Delta I}\right)_i (\%\Delta I)_i (Q_{f,i}) + F_i\right] = \text{Aggregate increase in food expenditures}$$

where:

n = number of participating households;

$\left(\frac{\%\Delta Q_f}{\%\Delta I}\right)_i$ = income elasticity for food of i^{th} household;

$(\%\Delta I)_i$ = the ratio of bonus stamp value to pre-stamp income for i^{th} household;

$Q_{f,i}$ = pre-stamp food expenditure by i^{th} household; and

F_i = additional food expenditures motivated by the required minimum level of food consumption ($F_i = 0$ if household is unconstrained).

In 1979, the purchase requirement was eliminated. Households are now given, free of charge, the bonus value of stamps. Under these regulations, a "constrained" participating household will never increase

their food expenditures by more than the bonus value of the stamps (JD' $\leq$ AD' in Figure 1), eliminating option (4). Equation (1) is still applicable for calculating the aggregate increase in food expenditures, although elimination of the purchase requirement implies that there is less probability that a participant will be "constrained" since the minimum food expenditure in 1979 is less than the minimum food expenditure in 1974, or AD' < CD. Equation (1) should not be used to immediately conclude that the aggregate increase in food demand with 1979 provisions would be less than the 1974 provisions. There is also a possibility that elimination of the purchase requirement will expand the set of participating households, say to m where m > n. Most of the households in Case III of Figure 2 would be expected to participate in the 1979 program because elimination of the purchase requirement would then allow a higher utility than pre-stamp utility. However, because "loss of pride" and other nonindifference curve criteria are significant reasons for nonparticipation among eligible households, it becomes difficult to know how the participation rate will change with elimination of the purchase requirement. Therefore, the comparative impact of the food stamp regulations in 1974 and 1979 on the demand for food is not immediately clear.

A cash transfer would imply that all $F_i = 0$ in equation (1). One would expect the set of participants to increase to p where p > m > n, because no household will be restricted to a minimum food purchase requirement. Assuming p > m > n, a cash transfer program would be most consistent with reaching the most people in need. However, without an

estimate of the new set of participating households, p, and associated income elasticities, and food expenditure levels, it cannot be said whether increasing the "participation rate" and demand expansion objectives are complementary goals or involve a tradeoff.

Empirical Estimates of Food Demand Expansion

Two methodologies that have been used to assess food demand impacts stimulated by the food stamp program are input/output analysis or a regression approach to estimate how a food stamp dummy variable affects food expenditures of eligible households. The input/output approach provides estimates of increases in business receipts of the food sector by assuming (a) how recipient household income is distributed among each sector after receiving food stamps, (b) constant prices, and (c) perfect elasticity of supply. The regression approach is used to derive estimates of the average propensity to consume, which can be used to assess food stamp impacts on the aggregate increase in farm level food demand. Table 1 shows estimated food demand impacts for fiscal year 1974 using the regression approach and an input/output model.

If a cash transfer replaced food stamps, the increase in demand for food would be consistent with individuals' income elasticities. The input/output solution under the cash program could be derived from the food stamp solution under the assumption that the aggregate amount of bonus stamps would not change. This assumption implicitly assumes that the participation rate does not change.

West, Price, and Price use the regression approach to show that the value of food is more than twice as responsive to receipt of bonus

Table 1. Use of APC Out of $1.00 of Bonus Stamps to Estimate Food Stamp Impacts on Food Demand, Fiscal Year 1974

	(1) APC Out of $1.00 of Bonus Stamps (Evaluated at Mean Income Level)	(2) Fiscal 1974 Value of Bonus Food Stamps	(3) Average Farm Share (All Foods)	(4) Total Change in Business Receipts for Farm Level Food
		(million dollars)		
West, Price, & Price (Washington State Sample)	.31	$2,714.1[a/]	.38[b/]	$319,720,980
Lane (California Sample)	.38	2,714.1	.38	391,916,040
West (BLS National Sample)	.50	2,714.1	.38	515,679,000
Nelson & Perrin (National Model)	----------Input/Output Model----------			407,715,000

[a/] SOURCE: Boehm & Gallo, p. 23.

[b/] SOURCE: Boehm & Belongia, p. 13.

stamps than the value of food is to income at the mean income level. By solving equation (1) for $\sum_{i=1}^{n} F_i$, it can be seen that the demand for food would decrease if a cash subsidy replaced the 1974 program under the very restrictive assumption that the set of participating households, n, would not change:

$$(1') \quad \text{Aggregate increase in food expenditures due to food stamps} = \sum_{i=1}^{n} B_i(APC_i) = \sum_{i=1}^{n} \left[\left(\frac{\%\Delta Q_f}{\%\Delta I}\right)_i (\%\Delta I)_i Q_{f,i} + F_i\right]$$

where:

B_i = amount of bonus stamps received by i^{th} household; and

APC_i = average propensity to consume of i^{th} household out of $1.00 of bonus stamps.

Summary

Neither the regression approach nor the input/output approach address how the participation rate would change if a cash transfer replaced the 1974 food stamp program. Similarly, neither method is useful for predicting how the participation rate would change with the elimination of the purchase requirement for food stamps. Without models to predict participation rates, the aggregate impact of a cash program, as compared to the current or 1974 food stamp program, on farm level food demand is unclear. Models to predict participation rates are needed to identify tradeoffs or consistency between different goals of the food stamp program.

Footnotes

[1]Assumes both food and non-food are not inferior goods; that is, the income elasticity for the good cannot be negative. The options correspond to current food stamp regulations.

[2]This implies that the income-consumption path will be positively sloped since income elasticity for food and non-food will be greater than zero.

[3]Analysis still assumes non-food and food are not inferior goods.

[4]The 1974 food stamp regulations also permitted the household to purchase any quarterly fraction of its allotment. Although inclusion of this consideration gave the eligible household more choice of budget lines, indifference curve analysis can be used to show that all choices open to the participant in 1974 fit into one of the four options.

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