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IMPACT OF THE FOOD STAMP PROGRAM ON THE DEMAND FOR FOOD--  
SOME THEORETICAL CONSIDERATIONS

By Ron Mittelhammer and Donald A. West

Abstract

A theoretical framework is used to develop methods for analyzing the impact of a food stamp transfer versus cash transfer on low-income households' demands for food. Preliminary comparisons suggest that many households' demands will be unaffected by the form of the transfer, but some households who would consume at levels below the U.S.D.A. low-cost food plan with a cash transfer likely demand more food under the stamp transfer.

Key words: Food stamps, Cash transfers, Consumption, Households and Low-income.

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## IMPACT OF THE FOOD STAMP PROGRAM ON THE DEMAND FOR FOOD--

### SOME THEORETICAL CONSIDERATIONS

By Ron Mittelhammer and Donald A. West\*

The U.S.D.A.'s Food Stamp Program (FSP) is rapidly becoming one of the largest items in the U.S.D.A. budget. The program was in effect briefly from 1939 to 1943 and then revived as a pilot program in 1961 (5:26-31). Since that time, the FSP has grown into an effort which in 1973 provided nearly \$4 billion in food stamps to participants who averaged more than 12 million persons per month (11:568). About 55 percent of the \$4 billion or \$2.14 billion was federal subsidy. Further expansion of the program is likely as a result of the congressional mandate that the FSP be in effect nationwide after June 30, 1974 (6:8). Because of the real and anticipated growth in the FSP, questions are now being raised about the impact of the program on the demand for food in the United States (for example, see 4).

In its pre-World War II inception, the FSP was developed as an alternative to direct distribution of commodities to relief families (9:38-43). Although the objective of providing adequate diets to needy persons was recognized, the FSP and related food distribution programs were viewed mainly as subsidies which would stimulate demand for farm products.<sup>1</sup> This latter objective is still

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<sup>1</sup>It should be noted that these objectives are consistent with one another.

recognized in recent analyses (7:387), but its importance seems diminished in an era when agricultural surpluses are not burdensome. Current concern, in contrast, appears to center more on the effect of an expanded FSP on the already strong demand for food products.

The purpose of this paper is to examine the impact of the in-kind transfer provisions of the FSP on spending decisions of recipients and on the resulting demand for food. Comparisons are made between the effect of the in-kind transfer specified under FSP regulations versus the effect of a hypothetical cash transfer of equivalent value.<sup>2</sup> Aggregate data and empirical illustrations are used to show what types of recipient households may alter their food expenditures under the FSP in-kind transfers relative to decisions under an equivalent cash transfer and which recipients are unaffected. Some additional comments are made regarding the merits of the FSP as a program for needy households.

#### THEORETICAL CONSIDERATIONS

In 1945, Southworth postulated an indifference framework for analyzing the effect of in-kind transfers of food on spending decisions of a consuming unit (9). An adaptation of that framework, modified to reflect 1972-73 FSP regulations, is presented in Figure 1. The diagram represents the relationship between food consumption, measured in homogeneous units on the horizontal axis, and money available for consumption of nonfood items measured on the vertical axis.

Under FSP regulations in effect from July 1, 1972, to July 1, 1973, a family of four with an adjusted net income of \$30 per month was eligible for a monthly food stamp allotment available in quarterly increments up to a maximum of \$112

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<sup>2</sup>Note that under the in-kind provision of the FSP, any food item sold in retail stores, ~~except food identified on the package as imported~~, can be bought with food stamps. All nonfood items such as tobacco products, soaps, pet food, etc., cannot be purchased with stamps.

per month.<sup>3</sup> Stamps were provided to beneficiaries with net incomes of \$30 per month or less at zero cost. A recipient household whose pre-transfer budget line was BP could receive a food subsidy equal to BA. (The regulations are written so that families have the option of choosing one-fourth, one-half, three-fourths or the full maximum monthly allotment of food stamps. It seems unlikely that families who can obtain the stamps at zero cost would choose to acquire less than their maximum allotments.)

The kinked budget line, BAC, which represents receipt of the in-kind transfer, differs from the budget line, EAC, representing the receipt of hypothetical cash transfer equal in amount to the net value of the food stamps. If the highest attainable indifference curve described by the utility function of the household were tangent to EAC at a point to the left of A, say at X, then the food stamp subsidy would encourage further consumption of food (X'A' on the diagram) relative to a cash transfer.<sup>4</sup> If the indifference curve were tangent to EAC at a point right of A, say at Y, then the household's demand for food would be unaffected by the form of the transfer. However, the quantity of food demanded would increase in either case consistent with the family's income elasticity for food (assuming that their income elasticity for food is greater than zero).

The budget line, KF, in Figure 1, represents a case where a family of four with a net monthly income of \$300 was eligible for a maximum food stamp allotment of \$112 per month (or quarterly fractions thereof). A family at this income

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<sup>3</sup>The period July 1, 1972, to July 1, 1973, was chosen for expository purposes. It is the latest fiscal year for which data are complete. Modifications in the FSP which have occurred since July 1, 1973, are recognized at a later point in the paper. The net income concept used in Figure 1 is the gross income of the family adjusted downward for taxes, medical costs, child care, disaster and educational expenses, and excessive shelter costs. (See 13 for a more detailed explanation.)

<sup>4</sup>The FSP subsidy has this effect under the assumption that the marginal rate of substitution of food for money is greater than zero, i.e., that the family is not completely satiated with food. However, it should be noted that analysis of the total effect on the demand for food among households whose indifference curves are tangent to the left of Point A in Figure 1 is complex and closely inter-related with the decision as to what fraction of the maximum allotment the household decides to purchase.

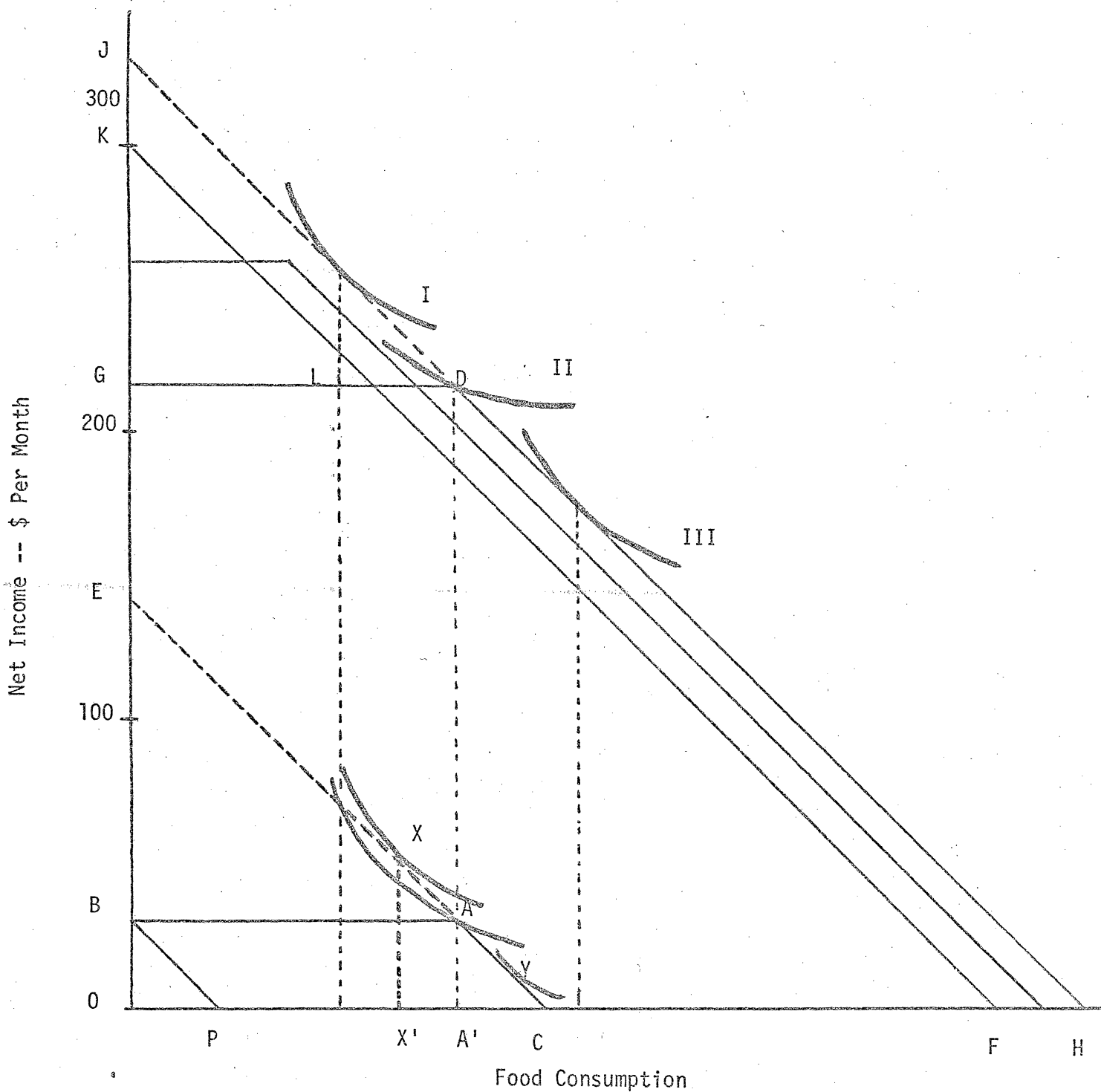


Figure 1.--Theoretical Relationships Between Consumer Choice and Cash Versus Food Subsidies

level could have purchased the maximum allotment at a cost of \$82 and received a net subsidy of \$30. The attainable combinations faced by this household after purchasing the maximum allotment of food stamps is represented by the kinked budget line, GDH. Note GD (equivalent to OA') represents the total value of food stamps purchased, and KG represents both the cost of the stamps and the reduction in monthly income available for nonfood purchases (\$112 and \$82, respectively, in this case). The net subsidy is represented by FH (\$30).

Similar kinked budget lines could be constructed for households purchasing one-fourth, one-half, or three-fourths of their maximum allotment. (Note that a hypothetical cash transfer of equivalent value is not defined until the decision is made as to which fraction of its maximum allotment the household will purchase.) A family which decided to purchase one-half of their maximum allotment of stamps would have attainable combinations represented by the unlabeled kinked budget line (Figure 1) whose lower segment lies between KF and JH. The equivalent hypothetical cash transfer would have a value equal to one-half of FH.

In theory, the household will purchase that amount of stamps which enables it to reach its highest indifference curve. Once that decision is made, a unique budget line is defined for the consuming unit. This budget restraint may be either the pre-transfer budget line (no stamps purchased) or any one of the four kinked lines defined by the purchase of a quarterly fraction or all of the maximum allotment of stamps. The comparisons which follow assume purchase of a maximum stamp allotment and a hypothetical cash transfer equivalent to the net food stamp subsidy. However, it is not implied that all households necessarily purchase the maximum allotment and the same analysis can be applied to the purchase of any quarterly fraction of stamps and a corresponding cash transfer.

As in the previous example and under the same assumptions, a family whose indifference curve, I, was tangent to the hypothetical cash transfer budget line

JH, at a point to the left of D would have maximized utility at a lower level, II, under the food subsidy plan. The amount of food demanded under the FSP transfer is GD which exceeds the amount that would have been demanded under an equivalent cash transfer by LD. Food consumption for a utility maximizing household with the indifference curve III, tangent to JH at a point to the right of D, would have been the same regardless of the form of the transfer.

Generalizing for any given family, the added incentive to purchase food under the FSP food subsidy, as compared to that resulting from a cash transfer, depends on the location of the family's indifference curve. If the curve is tangent to the hypothetical cash-transfer budget line at a point lying to the left of the kink in the food stamp budget line (to the left of points A and D in Figure 1), then the household will have incentive to purchase additional food under the FSP. The increase in aggregate demand for food resulting from the in-kind subsidy is then a function of the number of households whose indifference curves are tangent at points to the left of the kink D, and the distance on the food consumption axis from these points to D.

Empirical analysis of the effect of the form of the transfer on demand among households whose indifference curves are tangent to the left of the kink in their budget lines, such as D, is difficult. The primary obstacle is that the equivalent cash transfers are only hypothetical and no data are available on actual household behavior under such circumstances. A social experiment where similar households were given the food or cash subsidy under controlled conditions may be necessary to generate accurate data. The most that can be said at present is that on the basis of theory, and under certain assumptions with respect to the households' MRS of food for nonfood (see footnote 4), the food subsidy would be expected to increase the households' demand for food over the cash subsidy.

While empirical analysis of behavior to the left of the kink in their budget lines is difficult, analysis of behavior to the right is straightforward. The



test for identifying the latter group of households whose curves are tangent to the right of the kinks is quite simple. If a household purchasing a predetermined amount of stamps spends additional money for food consumed at home, then its indifference curve is tangent to the right of the kink. Survey data from households participating in the FSP could be used to address this question. To the authors' knowledge, such data are not currently available. Consequently, data from secondary and somewhat outdated sources are used in the following sections to demonstrate how the theoretical model could be followed. We wish to emphasize that the data are used primarily for illustrative purposes rather than as a basis for drawing inferences about the effects of the FSP on the demand for food.

#### EMPIRICAL COMPARISONS

The initial consideration in an empirical examination of the effects of a food stamp versus an equivalent cash subsidy is whether or not a given household spends money on food consumed at home in addition to its chosen food stamp allocation. Secondary data on income and food expenditures which are available include the 1960-61 Survey of Consumer Expenditures conducted by the Bureau of Labor Statistics and the U.S.D.A. Household Survey of 1965. The BLS data appear to be more reliable in terms of food expenditures and income (1). However, use of either data set in estimating consumers food expenditures in recent years necessitates the use of indices and thereby encounters the associated problems of changes in tastes and in the composition of food market baskets over time.

The BLS data are used to relate actual food expenditures by families with incomes of less than \$4,000 in 1960-61, to the cost of the U.S.D.A.'s low-cost food plan (LCFP).<sup>5</sup> The LCFP was selected as a basis for food expenditures

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<sup>5</sup>The U.S.D.A. Low Cost Food Plan is a list of suggested weekly food group quantities that provide nutritional adequacy at a low cost. However, this is not the bare minimum cost for a nutritionally adequate diet. The Economy Plan, which is approximately 20 percent lower in cost than the low-cost plan, is usually considered to be the subsistence level of food consumption (10:7).

Table 1.--U.S. Consumer Food Expenditures and Income, 1960-61, Adjusted to 1965

Income and Expenditure, 1960-61 <sup>a</sup>				Income and Expenditure in 1965 (\$) <sup>b</sup>			Mean Food Expenditures, 1965 (\$)		
Income Category	Mean Family Size	Mean Income After Taxes	Mean Expenditures on All Food	Income Category	Mean Income After Taxes	Mean Expenditures on All Food	Per Month	Per Family Member Per Month	Cost as % Per Family Member Cost of LCFP in 1965
<\$1000	1.6	535	370	<\$1060	567	393	32.71	20.44	72.6
\$1000-1999	2.0	1521	533	\$1061-2119	1612	566	47.13	23.56	83.7
\$2000-2999	2.6	2507	753	\$2120-3179	2657	799	66.58	25.60	91.0
\$3000-3999	2.9	3515	954	\$3180-4239	3726	1012	84.35	29.68	103.3

<sup>a</sup>Source: U.S. Department of Labor, Consumer Expenditures and Income, Total United States, Urban and Rural, 1960-61, BLS Report No. 237-93, February 1965, p. 11.

<sup>b</sup>Income data were adjusted by the Consumer Price Index for all items. Food expenditures were adjusted by the Consumer Price Index, food-at-home component.

because of the availability of published data on its cost over time including recent years.

The figures in Table 1 compare the 1960-61 food expenditures, adjusted to 1965, with the cost of the LCFP (whose composition was permanently established in 1965) on a monthly and per family member basis. Since the LCFP is developed on the basis of 21 meals per week (consumed at home), BLS data showing expenditures on all food consumed were selected for the purpose of comparison.<sup>6</sup> The weekly cost of the LCFP in 1965 for a family of four persons including two adults and two school-aged children was \$26.00 (10, 1965, p. 584). When adjusted to a monthly basis (multiplying by a factor of 4.33) and calculated per household member (dividing by a factor of 4), the monthly per person cost amounted to \$28.14. Actual expenditures as estimated from the BLS data (adjusted to 1965) on a monthly per-person basis range from 72.6 percent of the LCFP cost for persons in the <\$1,000 income category to 103.3 percent for persons in the \$3,000-3,999 category.

The comparison of actual expenditures with the cost of the LCFP is subject to the data restrictions and the assumptions made. Nevertheless, the data suggest that actual expenditures on food among persons in lower income categories range from somewhat below to nearly the same as the cost of the LCFP on a per family member basis. It should be recognized that no analysis of the food expenditures of stamp recipients relative to the cost of the LCFP can be made for the year 1961 since the FSP was only a pilot project at that time. The purpose of the comparison of adjusted figures in Table 1 is simply to establish the LCFP as a basis for estimating food expenditure of low-income households.

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<sup>6</sup>The expenditures on all food are not strictly comparable to the LCFP cost because the BLS data overestimate the cost of food ingredients by preparation and serving costs of food consumed away from home. Cost of food consumed away from home as a percent of total food expenditures in 1960 ranged from 12.6 percent for consumers in the \$1,000-1,999 income category to 17.9 percent for those in the \$3,000-3,999.

The LCFP's did not change in composition from 1965 to 1974. Meanwhile, the cost of food (and the cost of the LCFP's)<sup>7</sup> adjusted by the food-at-home component of the Consumer Price Index (CPI) rose less than did the index of disposable per-capita income (Figure 2). Assuming that low-income households shared equally in the increase in per capita disposable income, it is likely that their outlays for food, adjusted by the food-at-home component of the CPI, were higher in 1972-74 than in 1965.<sup>8</sup>

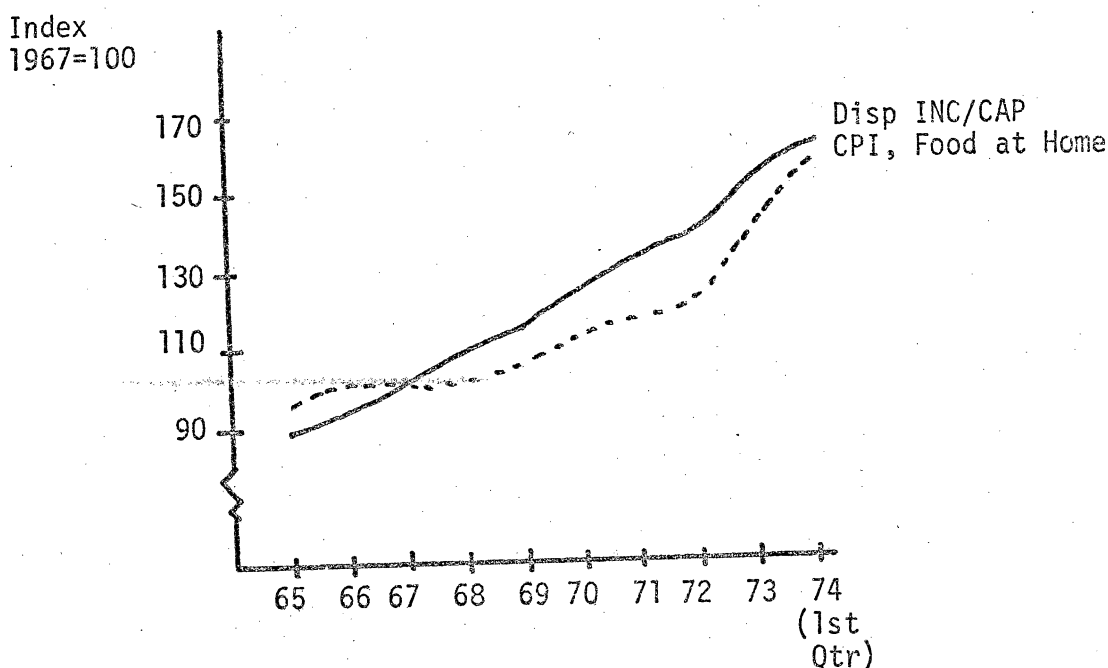


Figure 2.--Comparison of the Consumer Price Index--Food-at-Home Component -- With the Index of Disposable Income Per Capita, 1965-74.<sup>a</sup>

<sup>a</sup>Indices taken or derived from Monthly Labor Review, selected issues.

<sup>7</sup>The April 1973, cost of the LCFP for a given family was adjusted by the "food-at-home" CPI index published in the Monthly Labor Review for the various months from January 1972, to March 1974. Note that this method of derivation yields an approximation of the cost changes in the budget, versus a more precise method of directly pricing the individual food components of the budget. April 1973 costs were taken from 12:567).

<sup>8</sup>An increase in the outlay for food requires the assumption that the income elasticity of food for these households is greater than zero.

Under the assumptions made, the positions of households' indifference curves relative to their critical points (A and D in Figure 1) are determined by whether or not the expenditures on food consumed at home exceed their chosen food stamp allocation. To develop a basis for comparing these food expenditures with maximum food stamp allotments, we use the adjusted LCFP's as the basis for estimating outlays on food. These estimated outlays were calculated for selected low-income households over the period from January 1972, to March 1974. Maximum food stamp allotments were determined for these same households using the tables specified under the FSP regulations for the time period identified. The estimated food costs and maximum allotments for three types of households are presented in Table 2.

The lowest segmented curve illustrated in Figure 3 represents the maximum food stamp allotment for a two-person household during the period from January 1972, to March 1974. The associated continuous curve represents the cost of food consumed at home under the LCFP for a retired man and woman, both over 75 years of age. The curves illustrate that throughout the time period (except for July 1972), this household following the LCFP would consistently have purchased more food for consumption at home than could have been purchased with the maximum value of food stamps allotted to it. If the LCFP accurately estimated outlays on food consumed at home for this household, then the relative positions of these curves suggest that the amount of food purchased would have been the same with the FSP as with an equivalent cash transfer.

The set of curves in the center of Figure 3 represent the maximum food stamp allotment and cost of the LCFP for a family consisting of one woman, 20-35 years of age, and two pre-school children, 1-3 and 3-6 years of age. The curves illustrate that from January 1972, through February 1973, and between January and March of 1974, the household following the LCFP would have purchased less food than could have been obtained with their maximum food stamp allotment. From

March to December 1973, the household would have purchased food in excess of the level attainable through exclusive use of food stamps. Consequently, during the early part of the 1972-74 period, this household would have purchased more food with the maximum FSP allotment than it would have with an equivalent cash transfer (assuming it followed the LCFP).

The uppermost set of curves in Figure 3 correspond to the maximum food stamp allotment and cost of the LCFP for a family of four consisting of a man and woman between 20 and 35 years of age, and two pre-school children 1-3 and 3-6 years of age. Under the LCFP, this household would have consistently purchased food for home consumption in excess of the amount that could have been obtained by the exclusive use of its maximum allotment of food stamps. This household's demand for food would have been the same under the FSP or a cash subsidy of equivalent value.

Maximum food stamp allotments and LCFP's were also identified for other representative households. Although not illustrated, the results show that any two-person family with members less than 75 years of age would have purchased an amount of food greater than that indicated for the elderly two-person household in Figure 3. Likewise, a four-person family with school-aged children would have purchased an amount of food greater than that indicated for the four-person household in Figure 3. It appears that these other households would have purchased the same quantity of food for home consumption regardless of whether they received food stamps or a cash subsidy of equivalent value.

#### Effect on Aggregate Demand

A primary consideration in determining how the aggregate demand for food is affected by the FSP is the proportion of recipient households that spend more than their food stamp allocations on home-consumed food. The demand for food among households whose food purchases just equal their food stamp allotments

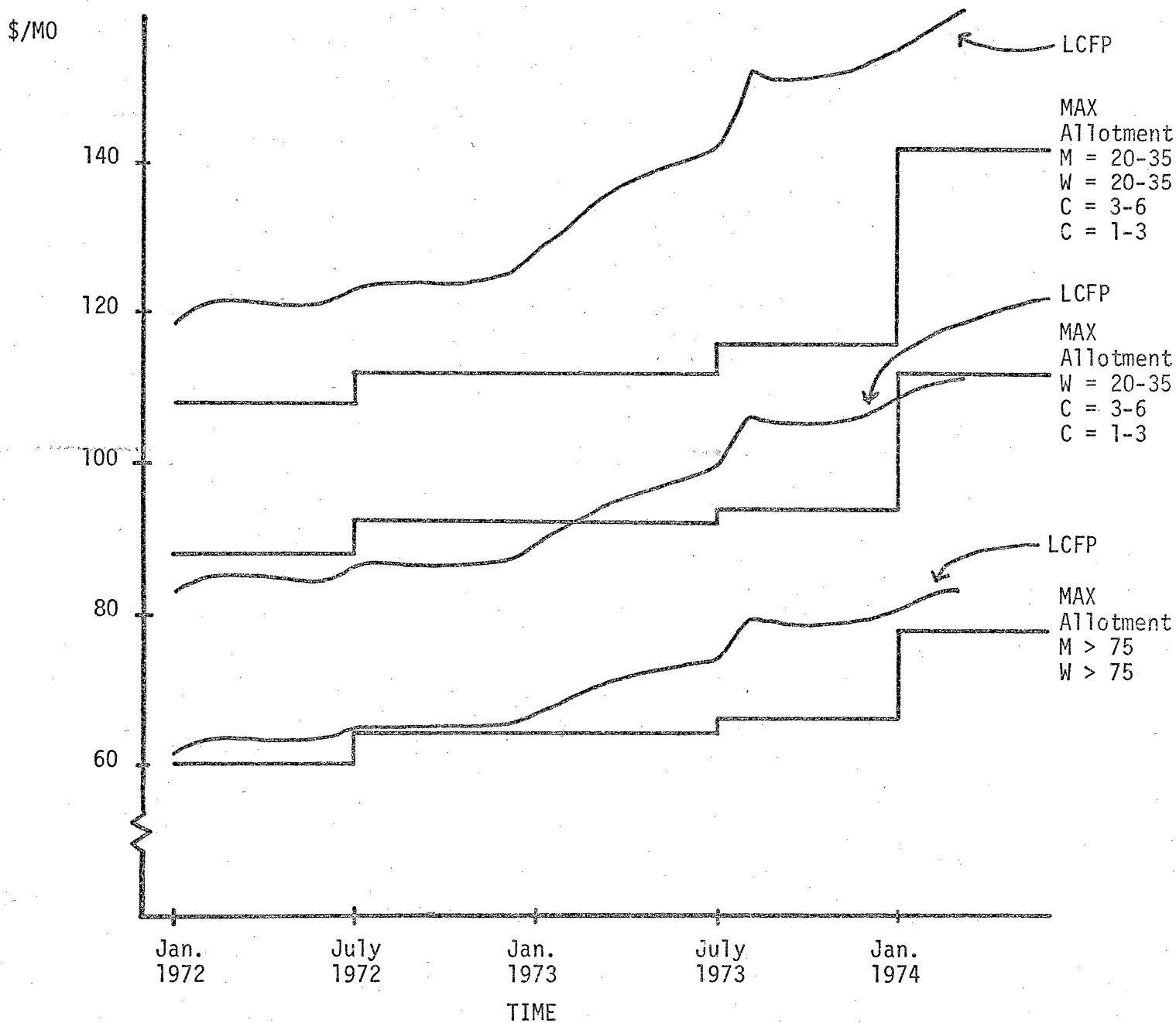
Table 2.--Low-Cost Food Plan vs Maximum Food Stamp Allotments, Selected Households<sup>1</sup>

Time	Food Stamps: 2-Person Maximum Allotment/Mo	LCFP: Avg. Food Cost/Mo M, 75 W, 75	Food Stamps: 3-Person Maximum Allotment/Mo	LCFP: Avg. Food Cost/Mo W, 20-35 C, 1-3 C, 3-6	Food Stamps: 4-Person Maximum Allotment/Mo	LCFP: Avg. Food Cost/Mo M&W, 20-35 C, 1-3 C, 3-6
1 Qtr., 1972	60	62.78	88	84.28	108	120.61
2 Qtr., 1972	60	63.16	88	84.79	108	121.35
3 Qtr., 1972	64	64.28	92	86.29	112	123.50
4 Qtr., 1972	64	64.70	92	86.86	112	124.30
1 Qtr., 1973	64	68.41	92	91.83	112	131.42
2 Qtr., 1973	64	72.32	92	97.08	112	138.94
3 Qtr., 1973	66	77.12	94	103.53	116	148.17
4 Qtr., 1973	66	78.68	94	105.62	116	151.16
1 Qtr., 1974	78	82.29	112	110.48	142	158.11

<sup>1</sup>Derived from U.S.D.A. food plans as published in Agricultural Statistics, 1973. Allotments taken from Food Stamp Fact Series, selected issues.

M = man, W = woman, C = child; numbers following letters indicate years of age.

Figure 3.--Low Cost Food Plan vs MAX Food Stamp Allotment for Selected Households, January 1972 - March 1974<sup>1</sup>



<sup>1</sup>In the figure, M = man, W = woman, and C = child. The numbers following the letters refer to the age in years of the individuals. The segmented curves represent the maximum food stamp allotment and the continuous line represents the cost of the LCFP for an individual family of the composition stated.



likely exceeds the demand that would result if they received a cash transfer of equivalent value. Using data from the 1965 Household Survey, Peterkin and Clark estimated that 62 percent of urban families in the United States used food at home valued above the LCFP and 38 percent consumed food valued at less than the FSP. While inferences about the proportions of FSP recipients spending additional money for food depend on the accuracy of the Household Survey data<sup>9</sup> and the cost of the LCFP relative to food stamp allotments, it nevertheless appears that the proportions who do and do not spend money in excess of their allocations are sizable in either case.

Table 3.--Percentage of Urban Families in Two Income Groups Using Food at Home Valued Above the Cost of U.S.D.A. Food Plans, Spring 1965<sup>a</sup>

Income	Plans			
	Economy	Low-Cost	Moderate Cost	Liberal
<\$3,000	77%	62%	41%	25%
\$5,000- 6,999	92%	81%	61%	40%

<sup>a</sup>Adapted from Family Economics Review, September 1969, p. 7.

While no precise statements can be made from data now available regarding the proportion of FSP recipient households whose food consumption exceeds the cost of the LCFP, it does appear likely that this proportion has not diminished over time. The cost of the LCFP relative to per-capita income was less from January 1972, to the first quarter of 1974, than it was at the time of the 1965 survey.

<sup>9</sup>Criticisms of the 1965 Household Survey data are that they overestimate food consumption and provide only rough estimates of household income. In addition, there is some reason to believe that households receiving food stamps have above average needs or desires for food. We are indebted to Stephen J. Hiemstra, Assistant to the Administrator, Food and Nutrition Service, U.S.D.A., for pointing out these deficiencies in the data.

This relationship suggests that, other things being equal, the proportion of households in 1972-74 who were consuming food at home in amounts at or above the level of the LCFP was no smaller than the proportion in 1965.

#### SUMMARY AND IMPLICATIONS

The purpose of the paper was to examine whether or not an in-kind subsidy under the Food Stamp Plan would alter the demand for food from that expected to result from a cash subsidy of equal value. Examination in a theoretical framework indicated that any differences in the quantity of food demanded associated with the form of the subsidy is dependent on the household's preference for food relative to nonfood items. Households whose post-transfer expenditures on food under a hypothetical equivalent cash subsidy would be less than their chosen allocation of food stamps would tend to increase food purchases under the FSP. The quantity of food demanded by households whose post-transfer expenditures under an equivalent cash subsidy would be greater than their chosen allocation of food stamps would not be affected by the form of the subsidy received.

Data from secondary sources were used to suggest types and proportions of low-income households whose demand for food would be greater under the FSP than under an equivalent cash transfer. Tentative indications are that food purchases under the FSP are higher than they would be with a cash transfer for some households while food expenditures of many other households would be unaffected.

If food purchases by the majority of low-income families are unaffected by the form of subsidies, allocative efficiency could favor a cash subsidy program. However, the significant portion of households whose demand for food may be further stimulated by the in-kind provision of FSP are households whose food purchases fall below those required to maintain diets under a low-cost food plan. Through the political process, society has mandated that these families be provided with an incentive to upgrade their food consumption. (See 10 for an expanded

discussion of society's preferences for in-kind and cash subsidies.) Further research is needed to determine the types and proportions of families who are further stimulated to upgrade their diets under the in-kind provision of the FSP and to estimate the benefits from that upgrading.