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DETERMINANTS OF PARTICIPATION IN
THE FOOD STAMP PROGRAM: SPRING 1979*

FINAL REPORT

by

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INTRODUCTION

It has been well established that participation in the food stamp program among the eligible population has been and continues to be less than 100 percent. Estimates of participation rates prior to the implementation of the Food Stamp Act of 1977 place them below 50 percent (Bickel and MacDonald, 1975; U.S. Bureau of the Census, 1976; Coe, 1977, 1979). Estimates of participation following the implementation of the Food Stamp Act of 1977, which eliminated the purchase requirement and tightened eligibility, indicate a significant rise (FNS, 1981a). Recently, Beebout (1981b) estimated a participation rate of 61 percent among eligible persons in July 1979 and 69 percent in January 1981. Nevertheless, taking these most recent numbers at face value implies that roughly one-third of the persons eligible to receive food stamps at a given point in time still do not do so. For households--the actual decision-making units--this proportion is even greater.

Policymakers, analysts, and other observers variously cite such factors as low benefit levels, inadequate program outreach, the welfare stigma, and overly broad eligibility criteria to explain the incomplete utilization of food stamps among the eligible population; and they propose equally varied solutions. Understanding of the true reasons why many eligible households do not use food stamps is essential to effective policymaking. Yet our knowledge in this regard remains sketchy. Research has been hampered by inadequate data. Investigators have had to use annual income and very limited assets data to simulate the food stamp program's

complex eligibility and benefit formulas, which employ a monthly time frame, essentially. In using an annual time frame for their analyses, researchers have had to ignore the implications of changes in household composition, which probably have a major impact on eligibility. Moreover, limited data on transfer income have made it difficult to model the role of economic factors in determining participation. Perhaps not surprisingly, therefore, findings have conflicted on such fundamental questions as the relationship between participation and the size of the food stamp bonus. MacDonald (1977) found the magnitude of the food stamp bonus to be one of the strongest predictors of participation. Coe (1977, 1979), using data from later waves of the same panel survey, found the bonus value to have no net effect.

The Income Survey Development Program (ISDP) 1979 Research Panel, conducted as a large scale pre-test for the proposed Survey of Income and Program Participation (SIPP), was specially designed to yield more accurate and detailed income and assets data, and for shorter time intervals, than any survey previously. This report presents the results of an analysis using data from the spring wave of the ISDP 1979 Research Panel to investigate determinants of food stamp participation among eligible households. This study provides the best approximation of food stamp eligibility in a microanalysis to date and thus allows a close look at the characteristics of the eligible population and the economic, social and demographic factors that differentiate food stamp participants from nonparticipants.

The report is organized as follows. We begin by reviewing theories of participation and summarizing the major findings from previous research. Then we present estimates of eligible households and participation rates

based on the ISDP data, taking time to reconcile these participation rates with recent microsimulation model estimates. Next we examine the explicit economic factors influencing participation: income, asset holdings, and the expected value of food stamp benefits. Following this we explore socio-demographic differentials in participation in order, first, to document variation in food stamp use among significant subgroups of the poverty population and, second, to shed some light on the noneconomic or not explicitly economic factors affecting food stamp use. In particular, we look at family size and composition as well as the age, race and educational attainment of the household reference person. Finally, we close by speculating about the implications of these findings for explaining nonparticipation.

BACKGROUND

Nonuse of food stamps by households eligible to receive them raises obvious questions about the relationship between food stamp eligibility and genuine need. Here we examine the administrative definition of need, as expressed in the food stamp eligibility and benefit formulas that were in effect in the spring of 1979, and consider the major reasons why "needy" (i.e., eligible) households might choose not to participate. Following this we review the major research on differential food stamp participation.

Food Stamps and Need

The intent of the food stamp program is to ensure that each person in the United States is able to obtain a nutritionally adequate diet without heavily taxing the resources required to meet other needs. To this end, the eligibility criteria define a target population whose available resources are judged insufficient to meet these basic nutritional needs without requiring excessive sacrifice. The benefits provided by the program to eligible households reflect general estimates of two factors:

- (1) the amount of money required to procure a nutritionally adequate diet for a household of size N;
- (2) the ability of a household to procure such a diet from its own income and resources.

Estimates of these factors by household size are incorporated into the food stamp benefit formula. The first is expressed in a maximum potential allotment. This is the dollar value of food stamps available each month to a household of size N having no income net of certain allowable deductions. The allotment is based on the Thrifty Food Plan. The second factor is

expressed in the form of a tax rate on income: i.e., it is expected that a household will be able to contribute a given share of its net income toward the purchase of this minimum amount of food, and benefits are reduced accordingly.

Under the Food Stamp Act of 1977, a household¹ is eligible for food stamps if its total monthly income, net of certain allowable deductions, is less than one-twelfth the annual poverty threshold for a nonfarm family of that size, as defined by the Office of Management and the Budget (OMB), and if its countable assets do not exceed \$1,750 (\$3,000 if the unit contains a person 60 years old or greater and at least one other person).² The benefit formula specifies a maximum allotment of stamps for each food unit size. The total dollar value of the stamps to which a food unit is entitled is equal to this maximum allotment less 30 cents for every dollar of net income.

Eligibility for food stamps during the month of application is based on the household's circumstances during the entire month, which may be defined on a calendar or fiscal basis (FNS, 1979: 109). For subsequent months, the eligibility determination is based on a unit's prospective

¹ The concept of a food stamp household, or food unit, differs from the Census household concept (all persons who share a housing unit) in that the food unit comprises those members of a household who regularly share their meals. Thus a household may contain two or more food units, and each may apply separately for food stamps, although there are restrictions governing the division of households into multiple food units.

² Countable assets include liquid assets plus the equity value of certain nonliquid resources (see FNS, 1979: 76-90). Equity in a home and lot, as well as household and personal goods, life insurance and pension funds, is not counted. For licensed vehicles, fair market value in excess of \$4,500 (for each vehicle) is counted toward the asset limit. Income producing vehicles are excluded. Beginning in 1980, the asset ceiling for nonelderly households was lowered to \$1,500.

income rather than income over any specific past period. The Food Stamp Certification Handbook (FNS, 1979: 110-111) specifies:

For the purpose of determining the household's eligibility and monthly allotment, the EW (eligibility worker) shall take into account the income already received by the household during the certification period and any anticipated income the household and the EW are reasonably certain will be received during the remainder of the certification period.

Income received during the past 30 days shall be used as an indicator of the income that is and will be available to the household during the certification period. However, the EW shall not use past income as an indicator of income anticipated for the certification period if changes in income have occurred or can be anticipated. If income fluctuates to the extent that a 30-day period alone cannot provide an accurate indication of anticipated income, the EW and the household may use a longer period of past time if it will provide a more accurate indication of anticipated fluctuations in future income. Similarly, if the household's income fluctuates seasonally, it may be appropriate to use the most recent season comparable to the certification period, rather than the last 30 days, as one indicator of anticipated income. The EW shall exercise particular caution in using income from a past season as an indicator of income for the certification period. . . . In no event shall the EW automatically attribute to the household the amounts of any past income.

Depending on the eligibility worker's assessment of the stability of a household's current circumstances (including composition), the household is certified for a period of one to six months, after which it must apply for recertification. During the period of certification, a household must still report any significant change in its income or assets; based on these changes the monthly benefit will then be recomputed.

The poverty thresholds and maximum and minimum monthly allotments of food stamps by food unit size applicable in early 1979 are reported in table 1. These values were published in the Federal Register, November 21, 1978 (43FR54199).

TABLE 1
MONTHLY POVERTY THRESHOLDS AND MAXIMUM AND
MINIMUM FOOD STAMP ALLOTMENTS BY FOOD UNIT SIZE: SPRING 1979

Food Unit Size	Monthly Poverty Threshold	Maximum Food Stamp Allotment	Minimum Food Stamp Allotment
1	\$ 277	\$ 57	\$ 10
2	365	105	10
3	453	150	14
4	542	191	28
5	630	227	38
6	718	272	56
7	806	301	59
8	894	344	76
9	982	387	92
10	1,070	430	108
11	1,158	473	124
12	1,246	516	141
13+	a	b	c

^aThe poverty threshold increases by \$89 for each additional person beyond 12.

^bThe minimum allotment increases by \$43 for each additional person beyond 12.

^cThe maximum allotment increases by approximately \$16 for each additional person beyond 12. This minimum allotment refers to the bonus value of the stamps to which a unit with net income at the poverty threshold is entitled.

SOURCE: Food and Nutrition Service, USDA.

For food units with little or no income, food stamps provided monthly benefits ranging from \$57 for a single-person unit to nearly \$200 for a four-person unit and well over \$300 for an eight-person unit. For food units with net incomes at half the poverty line for their respective sizes, the benefit formula described above yields only \$15 for a single-person unit but \$110 for a four-person unit and \$210 for an eight-person unit. These latter benefits diminish considerably as the unit's net income approaches the poverty line, but they do not disappear entirely. From table 1 we see that a single-person unit could expect a benefit of only \$10 if it barely qualified for food stamps,¹ while a four-person unit would receive \$28 and an eight-person unit, \$76.

Because the benefit amounts are based on a concept of need, they may be interpreted as approximate measures of need, expressed in dollars. An eligible food unit which foregoes the food stamps to which it is entitled is, presumably, either not meeting its food needs or is meeting them at the expense of other needs.

Microeconomic theories of participation in transfer programs express the probability of participation as a function of the net utility gained from participating, rather than the needs that will go unmet if a household does not participate. Thus it is proposed that a household will participate if the benefits from doing so exceed the costs. These alternative perspectives can be reconciled if we allow that the marginal utility of a given benefit amount is greater to a household with low income than to a household with moderate or high income.

¹ The \$10 amount is a special floor established for one and two-person units; the benefits implied by the formula are actually negative.

The elimination of the purchase requirement, effective January 1979, removed one of the principal costs of obtaining food stamps. Under the old regulations, all food units were entitled to receive the maximum allotment of food stamps for their size. However, the stamps had to be purchased at a price determined by the unit's net income. Thus, in order to receive \$100 in stamps a household with income near the poverty line might have to pay \$70. For units with cash flow problems, this could pose a serious obstacle. Moreover, in order to obtain its bonus value of \$30, such a unit would have to commit \$100 to food purchases, which might entail diverting some resources from other preferred uses. Under the new regulations, a unit receives its bonus value of food stamps without charge.

As noted earlier, the elimination of the purchase requirement significantly increased the number of units opting to receive food stamps. However, other costs--both monetary and psychic--remain, and a unit deciding whether or not to obtain food stamps must weigh the expected bonus value against these additional costs. Coe (1979: 3-4) summarizes these costs:

The process of obtaining certification of eligibility and the stamps themselves may involve the expenditure of money (for gas, parking, bus fare, etc.), of time (getting to the welfare office or the stamp distribution center, waiting in line), and of peace of mind (the stigma felt by some from receiving welfare, the condescending or rude behavior of some local welfare officials or retailers).

Together these constitute a transaction cost which will give participation a negative net marginal utility as long as the benefits do not exceed this cost. For any given unit this cost is constant--i.e., it is the same in absolute terms regardless of the amount of the food stamp bonus. Thus,

as the bonus value expected by a given household increases, the relative importance of the transaction cost diminishes. Moreover, while the transaction costs will not be constant across units, there is no obvious reason why these costs should vary significantly with the amount of the food stamp bonus. Therefore, the relative importance of the transaction costs should diminish across as well as within food units as the expected bonus value increases.

The welfare stigma may be the most important of these costs--and the most variable across households. We would predict that the stigma is most strongly felt in households that are parts of communities (in the broad, social sense) within which poverty is a rare phenomenon and least strongly felt in communities wherein poverty is a common occurrence, although we would also anticipate considerable variation within these communities. On the assumption that the welfare stigma varies among social and demographic groups, some researchers have used socio-demographic variables as proxies for this stigma (see Maxfield, 1979). Moffitt (1981), using a very different approach, incorporated stigma directly into a formal model of welfare participation by making it part of the utility function--as a distaste for welfare.

Apart from the economic and psychic costs of participation, there are other factors which operate to lower participation rates. One is inadequate information on eligibility and benefits. A household that lacks such information cannot make a rational choice. Among very low income households this lack of information will be less of a factor than among higher income households, as the former can more readily infer their eligibility (although for some there may be extenuating circumstances that

raise doubts--home ownership, for example). Sample survey evidence suggests that a very large proportion of eligible nonparticipants actually believe themselves to be ineligible (Coe, 1979; see below).

Two other factors are particularly important when we look at participation within a single month at a time. In a given month some of the eligible nonparticipants will be eventual participants: they may have already applied for food stamps but not yet received them or simply may not yet have determined that they need food stamps. One implication of the former is that maximum participation in a given month will be something less than 100 percent, and this needs to be considered when interpreting monthly participation rates. The second situation suggests that there may be a significant time element in participation decisions. Many households may try to make it on their own for a while before concluding that they need food stamps (the welfare stigma may be influential here). Depending on what proportion of the eligible households at a given point in time are newly poor, the proportion delaying decisions may be of significant size. This phenomenon will be more important in the food stamp program, with its comparatively high eligibility turnover rate, than in most other transfer programs and this needs to be considered when comparing participation

The other factor arising when we look at monthly participation rates is that some of the apparently eligible households may be experiencing a very transient drop in income, such that when prospective income is taken into account they would not qualify for benefits at all.

Previous Research

The Census Bureau merged annual income data from its March 1975 Current Population Survey (CPS) with food stamp reciprocity data collected in the April 1975 CPS and used the combined data file to estimate food stamp participation rates among the poverty population in 1974. Of the families classified as poor in 1974, 40.3 percent purchased food stamps at least once during that year while 20.4 percent of the unrelated individuals did so (U.S. Bureau of the Census, 1976: 6).

Significant differences by race and sex of head were observed. Among female heads of families, 58.0 percent purchased food stamps, compared to only 26.2 percent of male heads. Likewise, 57.2 percent of blacks and 33.3 percent of whites participated in the food stamp program. Among unrelated individuals a comparable racial differential was evident, but a much weaker sex differential appeared.

Participation among families was inversely related to the age of the head, ranging from highs of 63.1 percent for female heads under 35 and 29.1 percent for male heads under 35, down to 24.7 percent for women 65 and older and 22.0 percent for men (U.S. Bureau of the Census, 1976: table 10). Age differences among unrelated individuals were erratic: they peaked for women at 26.4 percent (ages 35-54) and declined to 15.5 percent among younger women and 20.4 percent among women 65 and older. For men the peak occurred at ages 55-64, at 37 percent, and fell to 12.1 percent among the elderly and 9.4 percent among the young. Participation rates also increased with the size of the family and were much lower among families with employed heads (23.8 percent) than other families (51.7 percent).

Two multivariate analyses of the effects of major economic and demographic variables on the probability of food stamp participation stand out. MacDonald (1977) used data from the 1972 wave of the Panel Study of Income Dynamics (PSID) to estimate a dummy variable regression equation predicting participation among a sample of 480 eligible households. With eligibility defined on the basis of 1971 annual income and participation defined as ever-receipt of food stamps during the year, MacDonald estimated an average participation rate of 42 percent. As the size of the expected annual bonus value increased from \$200 to over \$1,000, the probability of participation increased from 34 to 61 percent. For households which received welfare payments at any time between 1967 and 1971, the participation rate was 53 percent; among households without welfare it was only 27 percent. The age of the head exhibited a curvilinear relationship with participation, starting at 39 percent for households with heads under 25 and then rising to 52 percent among households with heads 25-44 before declining to 43 percent among those with heads 45-64 and 35 percent among heads 65 and older.

Savings exhibited a quite strong negative effect on participation while the head's presence in the labor force during 1971 had a weak negative effect. The county unemployment rate displayed a moderate positive association with participation, but education and student status had no net effects at all.

MacDonald concluded from the strength of welfare status and the food stamp bonus as predictors of participation that need may be the major determinant of participation. From the welfare result and the association between labor force status and participation, MacDonald (1977: 122-123)

speculated that the food stamp program's failure to attract the working poor may be a major contributor to the low overall participation rate.

Using data from the 1977 wave of the PSID, Coe (1979) estimated an overall participation rate of 41.3 percent among a sample of 1,201 eligible households defined on the basis of annual income. Among households that received AFDC or general assistance (GA) payments during the year, the participation rate was 75.6 percent compared to 27 percent for non-welfare households. The participation rate among blacks was 49.1 percent versus 37.3 percent for whites. Households headed by an unmarried female 30-59 received food stamps in 53.8 percent of the cases compared to 42.2 percent for married couples and 29.9 percent for households headed by single males. For households with heads aged 60 and older, all of these rates were roughly 20 percentage points lower. Households with expected monthly bonus values of less than \$50 were participants only 33 percent of the time while those with larger bonus values received stamps about 55 percent of the time.

Coe estimated a multiple regression equation containing all of the above variables plus a measure of the head's labor market attachment in 1976, whether the household was poor in 1975, the number of children under 18, the food stamp purchase price, the county unemployment rate, the size of the largest city in the county, whether public transportation is available, and region. The effect of welfare reciprocity declined only modestly but the racial differential and the effects of the food stamp bonus value disappeared entirely, and the female headship effect reversed itself. Statistically significant effects were evident for several of the variables. Participation increased by 6.5 percentage points for each child under 18. Households where the head worked fewer than 1,500 hours in 1976 --and was not disabled or a student--had a net participation rate 17 points

higher than households where the head worked 1,500 hours or more (the disabled participated at an even higher rate). The food stamp purchase price had a negative effect on participation while the county unemployment rate and the availability of public transportation had small positive effects. Finally, participation was highest in the South and lowest in the West, with the difference between the two being 16 percentage points.

The 1977 wave of the PSID asked nonrecipients whether they thought their households had been eligible for food stamps at any time in 1976 and, if so, why they had not applied for them. In analyzing these responses, Coe found that 59.4 percent of the estimated eligible nonrecipients did not think they were eligible. An additional 8.4 percent claimed they had tried to obtain food stamps but been refused. These results draw attention to the role of poor information as an obstacle to participation, but it would be incorrect to infer that most or even many of these households would have participated had they been aware of their eligibility. Their lack of information may reflect a lack of motivation to pursue their possible eligibility, such that even if they knew themselves to be eligible they would tend not to apply for stamps. On the other hand, there undoubtedly exist many households for which the difficult access to reliable information on food stamp eligibility and benefit amounts stands in the way of rational economic behavior.

DATA

The findings reported here are based on an analysis of a special extract of data from the second wave of the ISDP 1979 Research Panel.¹ The 1979 survey was carried out in conjunction with the design and planning of the much larger SIPP, which will collect detailed longitudinal data on income and in-kind transfers, as well as other topics, from a nationally representative panel of initially 20,000 households. Co-sponsored by the U.S. Department of Health and Human Services and the Department of Commerce, SIPP is scheduled to be fielded in early 1982.²

The 1979 Research Panel collected monthly income data of unprecedented detail from a representative national sample of the civilian non-institutional population of the United States (the 50 states and D.C.). Initially 11,300 households were drawn from combined area frame and list frame samples. The area frame sample consisted of 9,300 households drawn from two sources: the 1976 SIE area frame (7,150 households) and a Census area frame (2,150). The list frame sample consisted of 2,000 households--1,000 each from lists of Basic Educational Opportunity Grant (BEOG) recipients and Supplemental Security Income (SSI) blind and disabled recipients. An additional 1,000 SSI recipients were added to the sample in the second wave. Low income (annual income less than \$2,500) and upper income (greater than \$34,500) households were oversampled from the SIE area

¹ For a detailed description of the data file used for this analysis, including the construction of income and assets measures, see Mathematica Policy Research, Inc. (1981). For an overview of the 1979 Research Panel see Coder (1980).

² As of this writing, funding for SIPP is no longer included in the federal government's fiscal year 1982 budget. Prospects for its restoration appear slim. The ultimate future of the survey is likewise in doubt.

frame. The BEOG and SSI recipients are, of course, low income households as well.

Quarterly interviews were conducted (by the Census Bureau) with each household, and respondents were asked to report receipt of a wide variety of types of income, by month, for each of the three preceding months. The questionnaire was designed with the intent of yielding more accurate reporting of income than in previous income surveys, including the annual income supplement to the CPS. Interviews were conducted on a staggered schedule, so that one-third of the sample was interviewed each month. Thus, aggregate income estimates for any calendar month will be based on responses from one-third of the sample reporting income "three months ago," one-third reporting income "two months ago," and one-third reporting "one month ago."

Second wave interviews were conducted in May, June and July, 1979, so reported income covers the period from February through June, with April being the only month common to all three segments of the sample. The present study utilizes only the area frame sample, as national weights for the combined sample have not yet been developed. As a result of gains and losses from the original 9,300 area frame households, roughly 7,200 area frame households were present for the second wave interview. Our analysis, of course, uses only a subset of these.

Four features render these data uniquely suited to an analysis of food stamp participation. First and second, the monthly periodicity and the accuracy of the income data make it possible to simulate food stamp eligibility better than has been possible at any time before. The simulation is still not perfect, as the food stamp program uses prospective

income while we use actual income, but the advantages over annual income are enormous. Third, the reporting of food stamp reciprocity is presumably more accurate than in earlier surveys, although reporting is apparently far from complete. Fourth, the longitudinal nature of the data permit a dynamic analysis of food stamp participation--a particularly important feature as turnover in both eligibility and participation are much higher than in most other transfer programs. The present analysis does not use this longitudinal feature, as the three month time period is too short to allow adequate observations of transitions.¹

¹ Such analysis is contemplated under the present contract, providing that linked files become available in sufficient time.

ESTIMATES OF ELIGIBILITY AND PARTICIPATION

Following up on the preceding discussion of the data set used in this investigation, we begin here by describing the operationalization of key concepts and then present alternative estimates of eligible food units and participation rates. These provide a basis for evaluating the data and determining the appropriate universe for the analysis of determinants of participation.

Defining the Food Unit

The unit of analysis in this investigation is the food stamp unit, which, as we have noted, may be an entire household or a subset of that household, depending on whether the members of the household normally share their meals together. To operationalize this concept we employed the following convention.¹ If a household received food stamps, then we defined a food unit to be the set of members for whom the stamps were actually received.² If some members were nonrecipients, they were defined as a separate food unit (or perhaps multiple units). Nonrecipients, in general, were grouped into food units on the basis of responses to three questions (ISDP, 1979: 65):

Does everyone living here generally prepare and eat meals as a group?

¹ This convention as well as those pertaining to the definition of eligibility was specified originally by Gary Bickel of FNS and Maurice MacDonald of the University of Wisconsin-Madison in the course of preparing for FNS a congressionally mandated paper on the assets of low income households (see Bickel, MacDonald and Bishop, 1981).

² The interview schedule asked, "Who was covered under these food stamps?" (ISDP, 1979: 43).

Who usually prepares and eats meals together with you?

Do the other adults living here who don't share meals with you usually prepare and eat meals as a group?

Households may have multiple food units, but in very few cases will more than one unit be eligible for food stamps. However, on the basis of the reciprocity information collected during the interview we identified a number of households with multiple recipient units.

Eligibility

Eligibility was determined by comparing estimates of each food unit's monthly net income and net countable assets with the official eligibility levels in effect at the time (see the discussion, Food Stamps and Need, above). Net income was constructed to parallel very closely the net income concept specified in the program regulations. Specifically, net income in a given month was estimated as the food unit's total income that month (except earnings of children under 16 and children 16-18 in school) less the following:

- \$65 plus 20 percent of countable income
- a child care deduction not exceeding \$80
- a shelter deduction not exceeding \$80 less the child care deduction.

Countable assets were estimated as the sum of money on hand and in checking and saving accounts, certificates of deposit, savings bonds, stocks, and the market value of non-commercial vehicles in excess of \$4,500. Asset holdings were estimated as of the interview date, so they may not correspond to actual holdings in a given reference month.

Following Bickel, MacDonald and Bishop (1981), we did not include other countable nonliquid assets. The specification of countable versus excluded assets is at times ambiguous, and there exists some doubt as to how well the countable nonliquid assets are picked up by eligibility workers. In any event, Bickel, MacDonald, and Bishop's findings indicate that only a very small minority of otherwise eligible households have significant amounts of these other kinds of assets.

Income and assets were corrected for underreporting where the respondent reported an income source or asset holding but either did not indicate the amount or else reported the amount for only one or two of the three months. Bickel, MacDonald and Bishop (1981: 11,13) summarized the manner in which the missing amounts were imputed:

Respondents who reported an income source or asset holding but who failed to provide its amount were assigned an amount corresponding to the average for that income or asset type reported by other households with similar characteristics. To obtain these average income and asset amounts, all households that did report fully the particular item were grouped into 18 types, defined by whether or not the household received food stamps, the number of adults in the household, and the age of the household head. Second, respondents who reported income or asset amounts for part, but not all, of the reference period were imputed values only for the missing portion of their record. For example, if a person reported AFDC was received in all 3 prior months, but reported amounts for only 2 months, the missing month's AFDC income was imputed, based on the average monthly amount of AFDC reported by households with similar age of head, number of respondents and food stamp recipient status.

If a respondent did not acknowledge a particular income source or asset type, no correction was made. Moreover, no attempt was made to correct for underreporting of income or asset amounts.

The imputations have a considerable effect on the estimated number of eligible food units each month. Table 2a displays alternative estimates of eligible food units based on net income and countable assets with and without imputation of nonreported amounts. With imputed income and assets, the estimates of eligibles nationwide range from 12.3 to 12.4 million over the three months. If uncorrected income and assets are used for the computation, the resulting estimates range from 17.3 to 17.5 million--a difference of 5 million units.¹ Without the income and assets corrections, in other words, the number of units eligible for food stamps in a given month is overestimated by roughly 40 percent. Even with the correction for nonreporting, the true number of eligibles is still overstated to some degree as a result of nonreporting of particular income sources and underreporting of income amounts in general, for which no correction was made.

The reported food stamp recipients in each of the three reference months include a significant number of food units that lie outside the universe of eligibles, as estimated here. In month 1 the number of such units projected to the nation as a whole is nearly 800,000 when imputed income and asset amounts are used to define eligibility and still nearly 700,000 when no imputed amounts are used. The numbers decline to 571,000 and 494,000 by month 3. These "seemingly ineligible recipients" may

¹ Better than half of this difference is attributable to the assets corrections. In reference month 1, for example, the estimate of eligibles obtained if assets alone are corrected is 14.5 million. Thus the asset correction by itself reduces the estimated number of eligibles by 2.8 million. The income corrections remove another 2.3 million units.

TABLE 2a

ALTERNATIVE ESTIMATES OF ELIGIBLE FOOD UNITS BY REFERENCE MONTH AND QUARTER: SPRING 1979

Universe	Income Estimate	
	Imputed	Not Imputed
	<u>Reference Month 1</u>	
Eligibles Only	12,257,000 (1,552)	17,294,000 (2,038)
Eligibles plus Other Recipients	13,041,000 (1,627)	17,961,000 (2,100)
	<u>Reference Month 2</u>	
Eligibles Only	12,349,000 (1,554)	17,487,000 (2,048)
Eligibles plus Other Recipients	12,990,000 (1,614)	18,068,000 (2,098)
	<u>Reference Month 3</u>	
Eligibles Only	12,416,000 (1,575)	17,496,000 (2,064)
Eligibles plus Other Recipients	12,987,000 (1,640)	17,990,000 (2,117)
	<u>Quarter</u>	
Eligibles Only	12,422,000 (1,588)	17,282,000 (2,061)
Eligibles plus Other Recipients	13,208,000 (1,660)	18,029,000 (2,125)

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Cell entries are the estimated numbers of eligible food units in the United States and (parenthesized) the unweighted numbers of sample food units. The time reference of the estimates reflects staggered interviewing. Estimates for reference month 1 are based on single-month income "three months ago" and summed over February, March and April samples. Estimates for reference months 2 and 3 are based on income reported for "two months ago" and "one month ago" and are centered around April and May, respectively. The quarterly estimate is based on three-month average income as reported for February-April, March-May, and April-June. See the text for a further explanation.

The Food Stamp Act of 1977 eliminated categorical eligibility for AFDC and SSI recipients, but the states were allowed until March 1, 1979, to begin certifying new applicants under the new regulations and were given until June 30, 1979, to apply the new rules to all continuing participants (FNS, 1981: 2-3). Thus an AFDC or SSI household with net income above the food stamp eligibility limit could continue to receive stamps through part or all of the reference period covered by the second wave ISDP interview. Of the 498,000 units that were seemingly ineligible in reference Month 1 and did not change status the next month, 181,000 were AFDC or SSI recipients. The decline in the number of seemingly ineligible recipients between reference months 1 and 3 is likewise consistent with the rule changes accounting for a large share of the seemingly ineligible recipients in reference month 1.

The remaining 317,000 seemingly ineligible recipients are 7.5 percent of all recipients in reference month 1. This is more than double the 3.7 percent found to be wrongly certified eligible on financial criteria in the January-June 1978 quality control study (FNS, 1978).¹ Still, if some allowance is made for a likely growth in misclassifications during early 1979, as the new regulations were going into effect, then the seemingly ineligibles left unaccounted for in reference month 1 are perhaps only 2-3 percent of all the recipients in that month. Whether or not we can explain the occurrence of seemingly ineligible recipients, however, there remains the issue of whether to include them in the universe for our analysis of conditional participation. This issue is addressed below.

¹ Other recipients might be ineligible on grounds that we cannot detect with our simulation--e.g., failure to register for work.

The estimates of eligibles include a small number of units that although eligible by the income and asset criteria are ineligible under provisions specific to three states. Recipients of SSI in California, Massachusetts and Wisconsin are excluded from the food stamp program because the state supplemental payment includes allotments for food. This affects primarily the elderly. In fact, since most of the elderly who qualify for food stamps also qualify for SSI, food stamp eligibility among the elderly in these three states will be close to zero. However, as the data file with which we are working contains no geographic identifiers, we are unable to operationalize this aspect of eligibility. Based on estimates of food stamp eligibles 65 and older by state (which we prepared in the course of carrying out another FNS-sponsored project; see Czajka, 1981), we estimate that roughly 300,000 persons and perhaps 1 percent of the otherwise eligible food units were ineligible in the spring of 1979 as a result of these state-specific provisions.

The last feature of interest in table 2a is the contrast between the number of eligibles estimated on the basis of monthly versus quarterly income. Somewhat surprisingly, the quarterly number of eligibles is higher than the highest monthly number when we use imputed income and asset amounts in the eligibility determination. This indicates that a significant number of the ineligibles in any month must have incomes just above the cut-off level and experience a drop during one of the other months, so that their average incomes are brought below the eligibility level. The quarterly estimate may not be as far from the number of ever eligibles as we might have expected. When the additional waves are linked together, it will be interesting to see whether this phenomenon is repeated over the

duration of a year. The phenomenon is not present when eligibility is defined on the basis of income and assets without imputations but this is not at all surprising as these data presumably include greater monthly fluctuations (as a result of the missing amounts) than actually occurred.

Participation in the Food Stamp Program

Participation rates based on these alternative estimates of eligible food units and on direct reports of food stamp reciprocity (i.e., with no imputation) are presented in table 2b. The monthly participation rates for eligibles defined by imputed income and assets and excluding seemingly ineligible recipients range between 28 and 31 percent, increasing over time. Adding the seemingly ineligible recipients to both the numerator and denominator raises the participation rate 3 to 4 points in each month. The quarterly participation rates are 2 to 3 points higher than the highest monthly rates, reflecting the sizable turnover in participation from month to month. Substituting an eligible population defined on the basis of uncorrected income and assets reduces the monthly and quarterly participation rates by 7 to 10 points.

Even the highest participation rates recorded in table 2b are much lower than the rate of 61 percent estimated by Beebout (1981b) for July 1979, using an administrative count of food stamp recipients as the numerator and a microsimulation estimate of eligibles for the denominator. To give credibility to our analysis, we must reconcile these radically different numbers.

Several points of the difference are attributable to the fact that the estimates in table 2b pertain to food units whereas Beebout's estimate

TABLE 2b

ALTERNATIVE ESTIMATES OF FOOD STAMP PARTICIPATION RATES BY REFERENCE MONTH AND QUARTER: SPRING 1979

Variable	Income and Assets Estimate	
	Imputed	Not Imputed
	<u>Reference Month 1</u>	
Eligibles Only	28.27%	20.72
Eligibles plus Other Recipients	32.58	23.66
	<u>Reference Month 2</u>	
Eligibles Only	30.51	21.89
Eligibles plus Other Recipients	33.94	24.40
	<u>Reference Month 3</u>	
Eligibles Only	31.17	22.56
Eligibles plus Other Recipients	34.19	24.68
	<u>Quarter</u>	
Eligibles Only	33.41	24.24
Eligibles plus Other Recipients	37.37	27.38

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

is for persons. Members of large food units weigh more heavily in the computation of a person rate than a food unit rate, and large units have higher participation rates than small (see below).

Another few points are attributable to differential treatment of seemingly ineligible recipients. Beebout's estimate includes them in the numerator but not the denominator, which yields a higher rate than either of the combinations in table 2b. Technically, such a number is not a rate but a ratio and should not be interpreted as a rate. In defense of the rate interpretation, however, it may be argued that the population of eligibles computed on the basis of monthly income includes persons who could not yet have appeared among the population of recipients and thus yields a "rate" that understates the true level of participation; including all participants in the numerator simply compensates (approximately) for the inflated denominator. As noted earlier, rates of the kind reported in table 2b must be interpreted with an awareness that complete participation would yield a rate below 100 percent. For our part, use of the rates reported in table 2b is dictated by the microanalytic approach: the denominator in each case represents a given universe, and the numerator can only be a subset of that universe.

The largest component of the difference, however, appears to be the result of underreporting of food stamp reciprocity in the ISDP 1979 Research Panel, compounded by an undercount of single-parent, female headed households. The net underestimate of food stamp recipients may be determined by comparing the reference month 1 total (4,249,000 units) with the average of the February, March and April benchmark estimates developed in Doyle et al. (1981: table 4.21) specifically for the Research Panel. The three

month average benchmark estimate is 5,774,000, and the Research Panel estimate is only 73.6 percent of this target. The undercount of sn

The undercount of single-parent, female headed households, documented by Coder (1980), amounted to 11.1 percent of the estimated total of such households. If the undercount was not selective with respect to food stamp reciprocity, then it will lower the estimated number of food stamp recipients by roughly 3 percent. If food stamp recipients were undercounted disproportionately, the undercount will lower the estimated number of food stamp recipients by more than 3 percent. If the former, then roughly 13 percent of the recipients (weighted) in the ISDP sample did not report their receipt of food stamps, leaving aside sampling error.

To illustrate the contributions of these three factors to the discrepancy between the ISDP estimates and Beebout's 61 percent figure, let us begin with the rate of 28.27 percent reported in table 2b for reference month 1 and based on imputed income and asset amounts, a numerator consisting only of eligible recipients and a denominator consisting only of estimated eligibles. If we add seemingly ineligible recipients to the numerator--but not the denominator--we obtain 34.67 percent. If we then substitute the benchmark estimate of recipients for the ISDP estimate but retain the ISDP denominator, we obtain a "rate" of 47.11 percent. Next, if we compute the corresponding rate for persons rather than food units, we get 55.76 percent. Finally, if we make a small adjustment for the ineligibility of SSI recipients in California, Massachusetts and Wisconsin (see above), we obtain 56.37 percent as the overall participation rate--a figure only 5 points less than Beebout's.

This remaining discrepancy could reflect growth in participation between March and July as the effects of the elimination of the purchase requirement and other changes in regulations played themselves out. The participation rates reported in table 2b increase 2 to 3 points between reference months 1 and 3. Probably a larger share is due to differences in the two estimates of eligibles, as the estimates are completely independent. To the extent that the income and asset amounts on which the ISDP eligibility determination is based were underreported, the ISDP estimate of eligibles will be excessive. On the other hand, the fact that the ISDP estimate is based on actual monthly income, rather than a simulation of monthly income, confers a relative advantage.¹ Regardless of which estimate of eligibles is the more accurate, however, the two estimates are in fact remarkably similar, which probably speaks well for both of them.

The magnitude of the underestimate of total food stamp recipient units raises a concern about the representativeness of the results we are about to present--particularly if we also choose to exclude seemingly ineligible recipients from the study universe. To get a sense of how well or poorly the ISDP food stamp recipients might represent all food stamp recipients, we compared several characteristics of the ISDP recipient sample with those of an administrative sample of recipients. Sample

¹ Beebout (1981a) presents a number of parallel time series of microsimulation estimates of persons eligible to receive food stamps between 1974 and 1981. These include estimates adjusted for short-term economic fluctuations and differences among the base-year and simulation year data files.

surveys of 15,000 households certified as eligible to receive food stamps were conducted by FNS in February 1978 and November 1979 (see FNS, 1980 and 1981b).¹ These dates bracket the ISDP second wave reference period by several months more than we would prefer, but the changes between February 1978 and November 1979 were small enough that this is not critical.

Comparison of the ISDP and administrative estimates was possible on a number of dimensions: the size of the unit; the age, race, sex and employment of the head; receipt of income from various sources; gross and net income; and the food stamp bonus value. We chose not to make comparisons with respect to gross and net income, as the income data collected in the FNS surveys are known to be very incomplete. We did compare food stamp benefit amounts, however.

The FNS and ISDP estimates of the characteristics of food stamp units (recipients) are reported in table 3. The ISDP estimates are presented by reference month, separately for eligible recipients and all recipients. The ISDP recipients include slightly fewer female heads (presumably a result of the aforementioned undercount of single-parent, female headed households) but about a third more blacks than the FNS recipients. The ISDP recipients are somewhat older than the FNS recipients, having a larger proportion of unit heads in each of the three highest age categories (35-44, 45-54 and 55+), with the difference being made up in the

¹ In February 1978 the number of households certified as eligible to receive food stamps is estimated to have been about 10 percent greater than the number of households that actually obtained food stamps (FNS, 1980: 7). As a result, the FNS survey estimates may misrepresent recipients slightly. With the elimination of the purchase requirement, this discrepancy probably diminished, so the November 1979 numbers may be more accurate than the February 1978 figures.

TABLE 3

COMPARISON OF ISDP AND FNS SURVEY ESTIMATES OF CHARACTERISTICS OF FOOD STAMP HOUSEHOLDS

Food Stamp Unit Characteristic	FNS Survey Estimates		ISDP Estimates by Reference Month					
	February 1978	November 1979	Eligible Recipients			All Recipients		
			(1)	(2)	(3)	(1)	(2)	(3)
<u>Percentage Distribution of Food Units</u>								
Sex of Head								
Female	68.8	69.3	68.5	66.5	66.9	64.4	66.0	65.8
Male	31.1	29.8	31.5	33.5	33.1	35.6	34.0	34.2
Unknown	0.1	0.9	--	--	--	--	--	--
Race of Head								
Black	29.2	33.1	44.2	41.9	43.8	43.4	41.5	43.4
White, other	59.8	65.2	55.8	58.1	56.2	56.6	58.5	56.6
Unknown	11.0	1.7	--	--	--	--	--	--
Age of Head								
Under 18	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
18-34	42.3	41.5	34.1	33.1	32.9	35.7	33.2	35.0
35-44	18.0	14.3	19.1	20.8	19.9	20.9	21.3	20.9
45-54	11.9	9.7	13.1	12.7	13.6	12.7	13.9	12.5
55+	26.8	28.2	30.6	33.4	33.6	30.7	31.5	31.5
Unknown	0.4	5.5	--	--	--	--	--	--
Size of Unit								
1	27.2	32.0	35.0	33.1	34.2	29.7	29.4	30.4
2	22.1	21.8	17.8	17.6	17.5	19.0	18.4	20.1
3	17.3	18.8	18.6	17.2	15.4	19.8	18.7	16.2
4	13.1	12.4	5.3	6.4	6.9	6.1	6.8	7.6
5	9.1	7.8	9.5	8.7	8.5	10.6	11.6	9.9
6	5.7	4.2	4.1	4.8	4.9	4.9	4.5	4.9
7	2.7	2.0	2.8	5.7	5.5	4.4	4.9	4.8
8+	2.8	1.0	6.9	6.6	6.9	5.6	5.6	6.0
<u>Average Characteristics</u>								
Average Unit Size	2.97	2.67	3.08	3.22	3.22	3.20	3.24	3.21
Percentage of Units with 1 or more Persons 60+	--	24.2	27.4	27.0	27.7	24.7	25.3	26.0
Percentage of Heads Employed								
Male heads	20.8	21.7	23.4	21.5	20.1	26.2	23.0	26.6
Female heads	14.0	13.4	16.5	15.7	14.6	19.8	20.7	18.2
All heads	16.2	15.8	18.7	17.6	16.4	22.0	21.5	21.1
Percentage of Units with the Following Income Sources								
AFDC	42.6	34.0	36.0	35.0	33.2	34.4	33.5	32.4
SSI	21.5	20.0	27.6	26.5	27.2	25.1	26.0	27.6
Social Security	21.5	19.0	28.6	29.0	30.5	27.6	27.5	29.0
Earnings	18.4	19.0	27.6	29.4	28.0	37.2	36.7	34.9
Average Food Stamp Bonus Value by Household Size								
1	\$ 27	\$ 32	\$31	\$31	\$32	\$33	\$32	\$32
2	52	62	58	56	54	57	52	63
3	82	99	82	87	89	76	78	82
4	103	122	122	140	132	132	126	128
5	115	143	132	137	140	119	123	126
6	142	184	160	130	127	142	122	120
7	154	190	166	137	137	130	131	137
8+	208	217	174	170	188	174	170	188
All households	75	82	79	81	82	79	78	82

(continued)

TABLE 3 (continued)

SOURCE: The February 1978 estimates are from FNS(1980). The November 1979 estimates from FNS(1981). The remainder were computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

18-34 category. The ISDP eligible recipients are slightly older than the ISDP total recipients; 27 percent of the former units have one or more persons aged 60 or older, compared to an average of 25 percent of the latter.

The ISDP units are markedly larger than the FNS units. Given the decline in average size from 2.97 to 2.67 between February 1978 and November 1979, the average size during the reference period would have been roughly 2.8. The ISDP estimates are, with one exception, 3.2, for an average difference of almost half a person. From the distribution of units by size it can be seen that the bulk of this difference is attributable to an excess of units with seven or more persons. Oddly, the ISDP recipients include only half as many four-person units as the FNS samples.

Reflecting the age and sex differences noted above, the ISDP sample includes relatively more SSI and social security recipients and fewer AFDC recipients than the FNS samples. As an indication of the problem with the FNS income data, we note that only between 18 and 19 percent of the FNS sample reported earnings, compared to an average 28 percent of the ISDP eligible recipients and 36 percent of the total recipients, a result which is only partially reflected in the relatively higher proportion of ISDP unit heads who are employed. It is in earnings that we find the greatest discrepancy between the ISDP eligible recipients and total recipients, which is more or less what we would expect. Apparently many of the seemingly ineligible recipients became employed during the reference month after having received their food stamps. Surprisingly, there are actually proportionally more AFDC recipients among the ISDP eligible recipients than among the ISDP total recipients despite the fact that categorical eligibility for AFDC recipients under the old law is one of the factors

contributing to the occurrence of seemingly ineligible recipients. Very possibly the seemingly ineligible income earners removed from the sample contain very few AFDC recipients, so that the share of recipients who are AFDC recipients is simply increased as a result.

Finally, the average bonus value of the food stamps received by the ISDP food stamp households is very consistent with the FNS estimates, falling between the February 1978 and November 1979 numbers. For households of size three and above the ISDP bonus amounts actually tend to run below the FNS amounts--in some instances markedly so. However, the greater average household size in the ISDP sample compensates for the lower reported benefits within households.

On the whole, the characteristics of the ISDP recipients, whether total recipients or eligibles only, are sufficiently similar to those of the recipients surveyed by FNS that they give us no reason to suspect that the undercount of recipients will significantly bias our analysis of participation. This is true despite the fact that the reference month 1 total recipients (weighted) are only 74 percent of the benchmark estimate, and the eligible recipients are only 60 percent of the benchmark. With the ISDP eligible recipients being as well matched to the FNS recipients as are the ISDP total recipients, there would also appear to be no problem with restricting our analysis to the eligible units only. This is fortunate because there are compelling arguments for doing just that, as we explain below.

The Universe of Eligibles

It being our intent to analyze participation in the food stamp program conditional upon eligibility, we were forced to decide whether to include the seemingly ineligible recipients among the universe of eligibles or to exclude them from the analysis entirely. The issue is not whether they should appear in a food stamp participation rate but whether their inclusion in the analysis population will yield improved or distorted estimates of the relationships we wish to measure.

The arguments in favor of inclusion are principally two. The first is that, with a fairly small number of exceptions, the seemingly ineligible recipients are or were in fact eligible to receive the food stamps that they report having received and that our determination of eligibility simply lacks the precision to tell us so. In short, they belong in the study population. The second and related argument is that by excluding these or any other recipients we exclude some aspect of participation from our scrutiny, and the end result may be a distorted view of the relationships we wish to observe.

The principal arguments against inclusion revolve around fairly obvious distortions that would be introduced into the estimated participation differentials. One argument notes that counting the seemingly ineligible recipients among the eligibles is asymmetric. Households in similar economic circumstances but which do not receive food stamps are not counted among the eligibles. Consequently, population subgroups which contain relatively large numbers of seemingly ineligible recipients will be observed to have relatively high participation rates. Income provides the best example. Participation is expected to decrease with income, net

of family size, and it may do so over the range of eligible incomes. But incomes outside this range will be represented solely by the seemingly ineligible recipients, so that participation rates at these income levels will be 100 percent. If we were to attempt to measure the income-participation relationship with a single regression coefficient, the true inverse relationship would be partly if not completely obscured.

From another point of view the problem is not so much one of asymmetry as it is one of measurement error: or, more specifically, of measuring certain characteristics at the wrong point in time. For many of the seemingly ineligible recipients the economic and labor force characteristics that we observe in the reference month are not the characteristics that determined whether and how large a benefit was received that month. To use these characteristics in this way will induce bias into the estimated relationships. If the food stamp regulations did not specify that prospective income be considered in determining eligibility, we could use economic circumstances from the previous rather than current month in attempting to predict participation in the current month. But given the regulations as they stand, we might introduce more bias than we eliminate. The easiest solution is to keep the seemingly ineligible recipients out of the analysis.

Yet another argument may be raised--one which recognizes the special problems inherent in trying to measure influences on participation at a time when the definition of eligibility is changing. Particularly during the first reference months, many of the seemingly ineligible recipients will be AFDC or SSI recipients certified under categorical eligibility provisions terminated in early 1979. For these households the

problem is not one of lagging particular characteristics the right amount but, in truth, lagging the regulations under which they were certified eligible. If we were to attempt to do so, we would face a symmetry problem again: households that were eligible under categorical eligibility but chose not to receive food stamps will not be in the sample. Again, the easiest solution is to restrict the analysis sample to those units which satisfy the net income and assets tests. In view of all of these considerations, this is what we chose to do.

As a final note on eligibility, we reiterate that our primary objective in this paper is to shed light on why a large part of the food stamp target population does not receive food stamps. Our method of determining eligibility does not take into account the work registration requirement. Failure or unwillingness to register for work are grounds for a household being declared ineligible. Nevertheless, even if we had the data to determine whether a reference person were unwilling to register for work, we would not use work registration to define the universe of eligibles. From a policy standpoint the target population is the poor, and our interest centers around why the poor do or do not use food stamps. Persons unwilling to register for work are not necessarily any the less poor for it. Work registration is better viewed as a cost of participation --part of the transaction costs which possibly deter many households from participating. If we had data on work registration, we would use them in that context.

The same comments apply to the voluntary quit provision. A household is ineligible to receive food stamps if its primary wage earner voluntarily quit his or her most recent job without good cause. (Households

already receiving food stamps are exempted from this stipulation.) As long as such households are determined to be poor, we would include them in the universe of eligibles, and the voluntary quit would be looked on as a factor explaining nonparticipation.

THE ECONOMICS OF FOOD STAMP PARTICIPATION

Earlier we reviewed arguments predicting that the probability of an eligible food unit's participating in the food stamp program will decrease as the unit's income rises and increase as the expected food stamp bonus increases. As we have noted, both MacDonald (1977) and Coe (1979) included measures of the food stamp bonus value in their models of participation--to quite different effect--but neither included a direct measure of income. In this section we examine the gross and net effects of both variables. The income relationship is of particular interest because it will reveal to what extent the food stamp program is serving the very poor compared to the more well-off members of the poverty population. Moreover, it will provide policy relevant information on the potential consequences of changing the eligibility ceiling.

In looking at the relationships between food stamp participation and both income and expected food stamp values, we must give special consideration to the mediating or conditioning role of welfare reciprocity. Many but not all of the units eligible to receive food stamps will also be eligible for some form of public assistance (including SSI). Acceptance of public assistance has several implications for food stamp reciprocity. First, by raising income, public assistance receipt reduces the need for food assistance. Second, by raising income, public assistance receipt also reduces the expected food stamp benefit. Both these results imply reduced participation rates. However, these consequences may be outweighed by a potentially more important implication of welfare reciprocity: for households already receiving public assistance, the receipt of food stamps may entail only very minimal psychic costs beyond those already being

endured, so the marginal cost of obtaining and using food stamps will be small.

However, in addition to the actual effects of welfare receipt, there may be a strong selective element. Persons who choose to receive public assistance may include a disproportionate number who for whatever reason are not particularly sensitive to the stigma of welfare receipt--i.e., they do not assign it a high disutility. This orientation itself predisposes them toward acceptance of welfare or food stamps, and other welfare receipt makes little if any unique contribution.

Another problem in dealing with welfare reciprocity in a cross-sectional context is that for some welfare recipients, food stamp reciprocity may actually have started first. With turnover rates being much higher in the food stamp program than in public assistance programs generally, it is likely that food stamp reciprocity may have preceded public assistance reciprocity for many joint recipients.¹ Where this is true, the use of welfare reciprocity to predict food stamp reciprocity is circular and contributes to a misstatement of the true effect of welfare reciprocity.

To describe properly the relationship between welfare and food stamp reciprocity, it may be necessary to model the participation decisions jointly, recognizing that a decision to obtain one kind of benefit may occur at the same time as a decision to obtain the other, while also allowing for the imperfect overlap between the eligible populations. This paper employs a more limited approach. The relationship between income and participation is examined in two ways: first, by looking only at pre-

¹ The turnover analysis scheduled under the present contract will produce evidence bearing on this issue.

welfare income (that is, income net of any welfare payments) and, second, by looking at both pre-welfare and welfare income. The first approach avoids the potential circularity discussed above, and it argues in effect that the most appropriate measure of the need which conditions food stamp acceptance is a food unit's ability or inability to meet its expenses from its own resources (including transfers other than welfare payments).¹ The empirical results will tell us to what extent the population served by food stamps is characterized by such need. The second approach may incorporate some circularity, but it also recognizes the legitimate argument that both the expected benefits of reciprocity and the actual need for them are reduced by welfare reciprocity.

Gross Differences in Participation

Initially, we examine food stamp reciprocity as a simple function of pre-welfare income and total income. To standardize for household size, we have divided each food unit's income by the SSA poverty threshold for a nonfarm family of the same size, so that income is expressed as a proportion of the poverty line. Food stamp participation rates by categories of income are reported in table 4 for each of the three reference months. As in all of the tables below, the universe consists of all eligible food units, as determined from their imputed countable incomes and assets. The proportionate distributions of eligible food units among the income categories, by month, are reported as well.

¹ However, this approach makes no allowance for the possibility that pre-welfare income--in particular, earnings--may be reduced by the availability of public assistance.

TABLE 4

FOOD STAMP PARTICIPATION RATES AND PROPORTIONATE DISTRIBUTION OF ELIGIBLE FOOD UNITS BY MONTHLY PRE-WELFARE AND TOTAL CASH INCOME, MEASURED RELATIVE TO THE POVERTY LINE

Income as a Percentage of the Poverty Line	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
	<u>Pre-welfare Income</u>					
Zero Income	44.6%	49.0%	47.4%	.240	.238	.232
1-24%	40.6	30.3	46.2	.054	.049	.062
25-49	44.6	48.4	43.6	.127	.139	.134
50-74	28.3	31.1	36.2	.133	.144	.127
75-99	20.6	22.3	22.1	.218	.218	.211
100-124	8.9	13.5	16.6	.132	.116	.142
125 or more	6.6	2.9	3.2	.096	.096	.092
	<u>Total Cash Income</u>					
Zero Income	3.8	6.3	3.6	.107	.104	.096
1-24	35.0	19.5	35.7	.038	.036	.046
25-49	46.8	51.2	45.8	.102	.108	.104
50-74	48.4	49.9	56.3	.209	.220	.210
75-99	33.2	36.4	35.7	.275	.281	.279
100-124	12.9	16.2	15.3	.170	.153	.170
125 or more	6.6	4.9	4.4	.098	.100	.095
Total	28.3	30.5	31.2	1.000	1.000	1.000

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Pre-welfare income includes all cash income during the month except welfare or public assistance payments (which, for the purposes of this analysis, include SSI). Poverty thresholds used to construct the income ratios are based on Social Security Administration definitions for nonfarm

Pre-welfare income. Looking first at pre-welfare income, we find as expected that the rate of participation in the food stamp program among eligible food units does indeed decline with increasing income, but this decline does not begin until the middle of the income range. The three categories below 50 percent of the poverty line display roughly the same participation rates. These rates hover within the 40 percent range, the lone exception being the 30.3 percent participation rate observed in month two among units with incomes 1-24 percent of the poverty line. This low rate may reflect simply sampling fluctuation, as this category comprises only about 5 percent of all households in each of the months.

If the participation rates at the low end of the income distribution were in the 60s or 70s rather than the 40s, then the plateau would have a ready explanation. With reasonable allowance for underreporting and for the average lag between attainment of eligibility and the receipt of stamps, participation rates in the 60s could reflect very nearly full participation. A plateau at such a level at the low end of the income distribution would make perfect sense: it would simply indicate that the perceived costs of participation did not begin to outweigh the benefits of participation for any units until income rose above half the poverty line. With participation rates well below the maximum level, however, this interpretation does not work. An alternative interpretation is suggested by the pattern of participation observed across the categories of total cash income, as we shall see. First, however, we have some observations on the distribution of eligible food units by pre-welfare income.

The distribution of food units by pre-welfare income is fairly rectangular but bottom heavy, with nearly one-quarter of the units in

each month reporting no pre-welfare income whatsoever. Apart from this the largest concentration of units is in the 75-99 percent category, where between 21 and 22 percent of the units are found each month. The category sizes diminish in either direction away from this category. The upper end of the distribution--units with income above 125 percent of poverty--contains only between 9 and 10 percent of the eligible units, although to some extent this may reflect the location of the eligibility ceiling within this category.

One of the strongest impressions fostered by the monthly distributions of pre-welfare income is that the great bulk of food stamp eligibles have pre-welfare income well below the poverty line and are therefore reliant on other income sources to bring them even close to the poverty level. We have noted already that nearly one-quarter have no pre-welfare income at all. More than 75 percent are below the poverty line, and more than 40 percent are below half the poverty line.

Total cash income. When we add welfare income to pre-welfare income in order to obtain total cash income, the distribution of households by income changes, but the change is not radical. The growth occurs in the categories between 50 and 125 percent of the poverty line, with the lower two of these three categories showing the sharpest gains. Welfare income pushes very few units across the poverty line--between 3 and 4 percent--but it moves a large number closer to it. Still, nearly 25 percent of the units remain below half the poverty line in a given month.

Participation rates by total cash income show a marked change from the pattern recorded for pre-welfare income, and in this change can be seen one of the problems generated by the use of welfare income to predict food

stamp reciprocity. In the zero income category of total cash income, the food stamp participation rate does not exceed 4 to 6 percent over the three reference months, and even in the next higher category the monthly participation rates are below the levels observed for the corresponding category of pre-welfare income. Significantly higher participation does occur in the 50-74 category, where the participation rates of 48 to 56 percent are 20 points higher than for pre-welfare income. In the 75-99 category, participation is about 13 points higher than in the earlier table. The two highest categories show only marginal changes, however.

To understand the curious pattern of participation by total cash income, we must keep in mind the source of the change in the distribution of food units by income when we shift from pre-welfare to total cash income. This is particularly significant for the zero income category. The units which leave the zero income category all receive public assistance payments. Those that remain do not. Given the substantial correlation between welfare and food stamp reciprocity, noted earlier, a significant number of food stamp recipients will be selected out of the zero income category, leaving behind a group with a lower participation rate.

Zero income households. While the preceding explanation accounts for the shift in participation rates between categories of pre-welfare and total cash income, it does not explain adequately why participation is so low within the presumably neediest segment of the population. This category accounts for 10 percent of all the eligibles, so the low participation rate here brings down the overall participation rate by about 3 percentage points. Moreover, the low participation of this group reduces the participation rate of the zero pre-welfare income group by anywhere from 10 to

nearly 30 points, depending on what alternative participation rate we specify for the zero income group. If there is anything peculiar about the zero income group, therefore, it could explain why participation rates are uniform across the first three categories of pre-welfare income rather than being very high at the zero category and declining to the observed 45 percent by the 25-49 category.

One possibility that merits consideration is that the zero income nonrecipients consist largely of units that are in fact ineligible but were retained in the sample because of the imperfect replication of the eligibility criteria. Perhaps they include a large number of students living away from home. The program regulations treat students uniquely, making them ineligible if they are tax dependents of ineligible parents or if they are not working a required number of hours while attending school. Unfortunately, enrollment was not ascertained in the second wave of the ISDP Panel, so a direct test of this hypothesis is not possible. However, educational attainment may serve reasonably well in its place, as these students would be attending college or graduate school. Education is included in the regression equations estimated to ascertain the net effects of income and other variables on participation, so if the educational composition of the zero income group does contribute to its low participation rate, the net participation rate will be higher than the unadjusted rate seen here.

Another aspect of our imperfect replication of the eligibility criteria is our inability to use prospective income in the way that it is used by the food stamp eligibility workers. It is possible that some of the zero income nonrecipients are households awaiting the starting date of employment that has already been accepted and which therefore renders them

ineligible for food stamps. This cannot be verified with the ISDP data, although jobs with delayed starting dates may be, for the most part, jobs requiring college education. To the extent that this is true, the use of educational attainment in the manner described above may largely control for this phenomenon.

Another possible explanation for the very low participation rates of zero income households is that they have relatively large assets--not large enough to disqualify them (although they could be underreporting their true assets to the ISDP interviewers) but enough to allow them to subsist without an income flow for a time. The inclusion of an assets measure in the regression equations estimated to obtain net effects of the income and other variables will adjust the low income food stamp participation rates for a compositional effect of this kind.

Welfare. We have noted several times that welfare recipients are much more likely to receive food stamps than are other eligible food units. The extent of this difference is illustrated in table 5, where participation rates are reported for welfare recipients and nonrecipients. Between 63 and 65 percent of eligible welfare recipients--who are about one-third of all eligibles--also received food stamps, compared to only 12 to 15 percent of welfare nonrecipients. Yet while this difference is striking, its implications are unclear, for the reasons discussed at the beginning of this section. To the extent that the decision to apply for and use food stamps springs from the same cause as the decision to apply for public assistance, the association between reciprocity of the two types of aid is spurious. Economic circumstances are the most obvious source of the relationship between food stamp and welfare reciprocity. If the relationship remains

TABLE 5

FOOD STAMP PARTICIPATION RATES AND PROPORTIONAL DISTRIBUTION
OF ELIGIBLE FOOD UNITS BY WELFARE AND EMPLOYMENT
INCOME RECEIPT IN CURRENT MONTH

Income Source	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
Welfare Income						
Unit did <u>not</u> receive	12.0%	14.5%	15.4%	.675	.673	.677
Unit did receive	63.2	65.2	65.4	.325	.327	.323
Employment Income						
Unit did <u>not</u> receive	32.8	34.8	36.5	.630	.630	.620
Unit did receive	21.5	24.7	23.6	.370	.370	.380

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Welfare income includes any one of the following paid to any member of the unit: AFDC, General Assistance, Emergency Assistance, work incentive (WIN), SSI, Foster Child Care, and other welfare and unknown welfare payments.

after controlling for income, some non-spurious element may be indicated, although we should not overlook the role of tastes. Reciprocity of both forms of aid may be indicative of a weak distaste for welfare.

Part of the observed relationship may in fact be causal, but the causality could conceivably work in both directions. Where welfare reciprocity precedes food stamp reciprocity, their relationship may reflect the mediating role of welfare reciprocity.¹ By accepting welfare, a household will already have paid the major psychic costs attending food stamp receipt--costs which might otherwise block food stamp acceptance. Where food stamp reciprocity precedes welfare reciprocity, the reverse is true. In this case, using welfare reciprocity to "predict" food stamp reciprocity is circular. Finally, the relationship between the two may reflect a joint participation decision, whereby the combined benefits are weighed against the combined costs--including a common stigma element.

We cannot test these alternatives with the available data; a longer longitudinal file is required. Nevertheless, we can ascertain how large a welfare reciprocity "effect" remains after adjusting for economic and socio-demographic influences common to both food stamp and welfare receipt and thus establish how strong the relationship is net of the more easily measured sources of spuriousness. We return to this below.

Employment. Table 5 also reports food stamp participation rates for units with and without employment income during the current month. Units

¹ Prior to the implementation of the 1977 Food Stamp Act, this mediating role was institutionalized: in many states, units certified for AFDC or SSI were automatically certified for food stamps. The 1977 Act eliminated this practice.

with employment income, which comprise 37 to 38 percent of all eligible units, show participation rates 10 to 13 percentage points lower than units without employment income. Several factors undoubtedly contribute to this observed relationship, the most important of them being, presumably, the income effect: units with employment income are probably less needy and can anticipate smaller food stamp benefits than units without employment income. Without adjusting for income and for demographic composition as well, we cannot infer that the observed relationship implies anything about the relevance of employment per se. What we can infer, when we consider these differential participation rates together with the employment status of eligibles as a whole, is that only about one quarter of the food units receiving stamps have any employment income in the current month. Thus nearly three quarters of the recipients must satisfy their needs entirely from unearned or transfer income.

Food stamp benefits. Next we turn our attention from measures of need to measures of benefits--i.e., the expected value of food stamp benefits facing each eligible unit. Table 6 reports participation rates across the categories of three alternative measures of expected food stamp value. The first of these is simply the absolute dollar value of the expected benefits; the second is the ratio of the expected benefits to the maximum allotment for a food unit of that size; and the third is the ratio of the expected benefits to the poverty line. Benefit amounts were imputed from net income (adjusted for nonreporting) by using the formula discussed earlier in the text and illustrated in table 1. Imputed rather than reported benefit amounts were used for actual recipients in order to avoid biasing the results should the mean reported benefit deviate significantly from the mean

TABLE 6

FOOD STAMP PARTICIPATION RATES AND PROPORTIONATE DISTRIBUTION OF ELIGIBLE FOOD UNITS BY EXPECTED MONTHLY VALUE OF FOOD STAMPS

Measure of Food Stamp Value	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
Dollar Value						
< \$25	21.0%	19.5%	20.8%	.315	.318	.322
25-49	23.8	30.0	28.9	.230	.200	.210
50-74	20.3	22.0	21.7	.175	.200	.176
75-99	52.0	48.7	52.1	.059	.061	.070
100-149	41.6	47.3	46.5	.129	.122	.136
150-199	38.3	45.4	48.1	.054	.061	.052
200+	56.3	62.3	61.1	.038	.039	.034
Percentage of maximum benefit						
10-19%	12.1	11.5	11.5	.246	.237	.248
20-29	29.3	25.3	26.5	.115	.120	.120
30-39	31.1	44.2	40.4	.114	.103	.099
40-49	45.8	45.4	53.4	.088	.086	.100
50-59	50.4	51.2	49.9	.078	.086	.078
60-79	46.3	53.4	52.0	.103	.106	.105
80-99	54.9	54.7	58.4	.076	.077	.070
100+	10.6	10.8	13.1	.179	.185	.181
Percentage of poverty line						
< 5%	15.0	14.6	13.8	.240	.228	.229
5-9	24.5	26.4	25.5	.222	.226	.225
10-14	34.4	41.7	43.1	.142	.142	.143
15-19	36.3	37.4	40.7	.209	.218	.224
20+	38.0	41.2	41.4	.186	.186	.179

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Expected value of food stamps is computed from benefit formula described in text and illustrated in table 1. Imputed income amounts were used to estimate net income. For food stamp recipients, expected rather than actual benefits are used in this table.

imputed benefit.¹

Looking first at the absolute dollar value of the benefits we find that, in general, the probability of participation rises with the benefit amount, with the range being roughly 40 points--i.e., from 20 percent in the lowest category to 60 percent in the highest. In the lowest category, expected monthly benefits are less than \$25, so low participation rates are understandable in terms of the benefits probably not exceeding the costs. However, participation does not climb significantly until the benefits reach \$75. At that point the participation rates more than double--to the high 40s and low 50s--but then exhibit no further significant rise (in month 1 there is a decline from 52 percent to 38 percent) until monthly benefits reach \$200. There the participation rates in months 2 and 3 reach the low 60s (in month 1 the increase is to 56 percent).

The distribution of eligible units by the expected food stamp bonus is of some importance, for it provides possible evidence as to why the overall rate of participation is not higher. Nearly one-third of the eligible units are entitled to food stamp benefits of fewer than \$25 per month, and close to three-quarters would receive no more than \$75. It is not hard to imagine the transaction costs approaching \$25, and if we take into account that households with potential benefits this small may not be aware of their eligibility, we can build a very plausible case for why participation among these households is as low as it is. But for benefits ranging up to \$75 it can not be taken for granted that the benefits are

¹ As it turned out, the two sets of means differed by only two to three dollars. Average benefits were roughly \$80 per month.

simply too small. Now, this may in fact be the case--i.e., it may be that for benefit amounts below \$75 only units in special circumstances find that the trade-offs favor acceptance of food stamps. If true, however, this would represent a rather important finding from a policy standpoint, and such a finding needs to be established more rigorously than we have done here.

If we express the expected food stamp benefit as a proportion of the maximum allotment for a unit of the same size with zero net income, we find a closer correspondence between the amount of the benefit and the probability of participation, although we again observe that the participation rate reaches a plateau and levels off--this time prior to a sharp plunge. Among food units with expected food stamp benefits equal to between 10 and 19 percent of the maximum (none were lower), only 12 percent actually received food stamps in any month. The participation rate increased steadily to levels ranging from 46 to 53 percent among eligibles with expected benefits between 40 and 49 percent of the maximum, but it rose only very gradually and unevenly from there until falling to only 11 to 13 percent among eligible units that could expect the maximum benefit (roughly 18 percent of all eligible units).

This sharp discontinuity at 100 percent of the maximum benefit is related, undoubtedly, to the low participation among the zero income population. Units eligible to receive the maximum food stamp benefit will consist almost exclusively of units that receive no welfare payments and who, as we have seen, tend not to use food stamps. In short, the peculiar reversal in the relationship between food stamp participation and the relative size of the food stamp benefit probably reflects selection rather

than any direct or indirect effect of the bonus value itself.

The bottom panel of table 6 expresses food stamp participation rates and the proportional distributions of eligible food units by the size of the expected food stamp benefit measured relative to the poverty line. Participation rates are 15 percent or less among units whose expected benefits amount to less than 5 percent of the poverty line. The participation rates grow rapidly as the relative benefits increase, but they level off once the benefits exceed 10 percent of the poverty line. The fact that they level off at rates lower than we observed for the other benefit measures does not necessarily imply that the size of the benefits relative to the poverty line is less important as an inducement than either the absolute cash value of the stamps or the value relative to the maximum allotment (which, as we have noted, serves as a fairly good measure of need). In contrast to this last measure, the ratio of expected benefits to the poverty line may simply not concentrate the zero income non-welfare recipients in a single category; instead they are distributed among the higher categories in such a way as to counterbalance the rise in participation with increasing relative benefits.

Assets. The final economic variable we examined was the food unit's liquid assets: specifically, its cash on hand and in checking accounts, savings, certificates of deposit, savings bonds and stocks. These, together with vehicle assets in excess of \$4,500 and certain other non-liquid assets, are counted toward the food stamp program's asset limits. Participation rates by level of liquid asset holdings, and the distribution of eligible households by these asset holdings, are reported in table 7.

Nearly half of the food units have no liquid assets at all, and

TABLE 7

FOOD STAMP PARTICIPATION RATES AND PROPORTIONATE DISTRIBUTION
OF ELIGIBLE FOOD UNITS BY HOLDINGS OF LIQUID ASSETS

Value of Assets	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
\$ 0	34.1%	34.6%	34.6%	.473	.492	.488
1-99	31.2	36.3	38.2	.250	.246	.239
100-249	24.2	25.0	30.2	.106	.100	.092
250-499	8.8	19.0	17.2	.054	.050	.062
500-999	21.3	23.4	23.4	.065	.062	.063
1000+	4.0	4.1	3.8	.051	.051	.055

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Asset holdings are measured as of the time of the interview-- i.e., one month after reference month three, two months after reference month two, and three months after reference month one. Assets included here are money on hand and in checking accounts, savings, certificates of deposit, savings bonds and stocks. Vehicle asset holdings countable under food stamp regulations are not included.

nearly three-quarters have less than \$100. To place the asset amounts in perspective, we note that the monthly poverty threshold is \$277 for a single individual and \$542 for a family of four. It should also be kept in mind that these assets are measured as of the interview date; a unit may have had greater assets during the month(s) that it was estimated to have been eligible for food stamps. Even with this caveat, the liquid asset holdings of most of the food units eligible for food stamps are negligible. Perhaps only 10 to 15 percent of the units have sufficient assets to sustain them through a period of little or no income.

Participation rates among the units with less than \$100 in assets are only a few percentage points higher than the overall average. As assets increase, the probability that a unit received food stamps diminishes, but not evenly, although the sudden dip to between 9 and 17 percent at the \$250-499 category is probably a sampling phenomenon rather than an accurate reflection of the full universe of eligible units. Among units with assets in excess of \$1,000, the participation rate is only 4 percent in any of the months, but these units number only 5 percent of all eligible units. On the whole, then, liquid asset holdings do not appear to be a very important factor in explaining why food stamp participation rates are not higher.

Net Differences

To determine the net effects of these economic variables upon the probability of an eligible food unit's receiving food stamps, we specified two alternative models and estimated them as dummy variable regression equations, separately for each reference month.¹ Model 1 states that the

¹ Given the dichotomous nature of the dependent variable (food
(continued)

probability of food stamp participation is a function of a food unit's pre-welfare income, the expected cash value of the food stamps to which it is entitled, its liquid assets, whether it has any employment income, whether any member of the food unit was unemployed during the three month interval, plus several demographic characteristics including the age, race, educational attainment, and sex and marital status (a combined measure) of the reference person, as well as the number of children under 16 and whether a child under six was present. Model 2 states that food stamp participation is a function of all the variables included in Model 1 plus whether the unit received any public assistance during the month, the amount of the monthly welfare payment, and the interaction between welfare reciprocity and pre-welfare income. The demographic variables were included as further measures of need and potential access to economic resources and as indirect measures of the strength of the perceived stigma of welfare reciprocity. The rationale behind the selection of these variables as well as their estimated relationships to food stamp reciprocity are discussed later in this report.

Results for the economic variables are presented in table 8, with Model 1 preceding Model 2. Effects are reported in the form of adjusted

stamp reciprocity versus nonreciprocity), ordinary least squares (OLS) regression is not an appropriate estimating technique, strictly speaking, and may produce results that are to some extent misleading. However, the distortion induced by OLS is a function of how closely the mean of the dependent variable approaches the extreme values of 0 percent and 100 percent, and the average food stamp participation rate of approximately 30 percent lies far enough from these extremes to render such distortion quite small. Therefore, for the purposes of this report, ease of presentation and inter-

TABLE 8

ADJUSTED FOOD STAMP PARTICIPATION RATES
AND NET EFFECTS: ECONOMIC VARIABLES

Variable and Categories	Adjusted Food Stamp Participation Rate			Net Category Deviation from Overall Mean		
	(1)	(2)	(3)	(1)	(2)	(3)
	<u>Model 1</u>					
Pre-welfare income						
:poverty line						
< 25%	50.1%	51.9%	49.3%	21.5%	20.8%	17.7%
25-49	47.1	51.4	48.0	18.5	20.3	16.4
50-74	26.0	26.4	34.1	- 2.6	- 4.7	2.5
75-74	13.8	15.2	16.3	-14.8	-15.9	-15.3
100-124	7.1	13.5	15.2	-21.5	-17.6	-16.4
125+	5.6	3.9	8.3	-23.0	-27.2	-23.3
Food stamp value						
:poverty line						
< 5.	37.9	39.2	36.2	9.3	8.1	4.6
5-9	32.8	34.5	33.3	4.2	3.4	1.7
10-14	37.5	46.1	46.0	8.9	15.0	14.4
15-19	20.1	23.8	25.4	- 8.5	- 7.3	- 6.2
20+	14.7	14.1	19.6	-13.9	-17.0	-12.0
Liquid assets						
<\$1,000	28.9	30.8	32.0	0.3	0.3	0.4
1,000+	23.4	25.1	23.9	- 5.2	- 6.0	- 7.7
Employment income						
No income	29.2	33.3	34.6	0.6	2.2	3.0
Any income	27.5	27.4	26.8	- 1.1	- 3.7	- 4.8
Overall mean	28.6	31.1	31.6	0.0	0.0	0.0

(continued)

TABLE 8 (continued)
 FOOD STAMP PARTICIPATION RATES
 AND NET EFFECTS: ECONOMIC VARIABLES

Variable and Categories	Adjusted Food Stamp Participation Rate			Net Category Deviation from Overall Mean		
	(1)	(2)	(3)	(1)	(2)	(3)
	<u>Model 2</u>					
Pre-welfare income ±poverty line						
Nonrecipients	29.2	22.9	25.3	- 7.7	- 8.2	- 6.2
<25%	8.9	9.3	10.0	-19.7	-21.7	-21.6
25- 49	21.1	33.6	31.0	- 7.5	2.5	- 0.6
50- 74	11.2	12.1	22.9	-17.4	-18.9	- 8.7
75- 99	20.3	21.8	22.3	- 8.4	- 9.3	- 9.3
100-124	15.6	20.0	20.6	-13.1	-11.1	-11.0
125+	14.3	9.8	13.0	-14.3	-21.3	-18.6
Welfare recipients	44.7	47.9	44.7	16.1	16.9	13.1
<25%	68.8	72.8	71.2	40.2	41.8	39.6
25- 49	59.9	58.3	55.1	31.3	27.2	23.5
50-74	46.4	49.2	50.2	17.8	18.2	18.6
75-99	14.1	17.3	10.4	-14.5	-13.7	-21.2
100-124	9.5	15.5	8.7	-19.2	-15.5	-22.9
125+	a	a	a	a	a	a
Food stamp value ±poverty line						
< 5%	25.3	28.2	27.7	- 3.3	- 2.9	- 3.9
5- 9	23.2	25.1	25.1	- 5.4	- 6.0	- 6.5
10-14	32.6	40.0	40.5	4.0	8.9	8.9
15-19	33.9	36.0	37.5	5.3	4.9	5.9
20+	30.4	29.4	30.3	1.8	- 1.7	- 1.3
Liquid assets						
<\$1,000	29.1	31.7	31.0	0.5	0.6	0.6
1,000+	19.3	20.2	21.5	- 9.3	-10.9	-10.1
Employment income						
No income	29.2	32.6	33.8	0.6	1.5	2.2
Any income	27.5	28.6	28.0	- 1.1	- 2.5	- 3.6

(continued)

TABLE 8 (continued)

ADJUSTED FOOD STAMP PARTICIPATION RATES
AND NET EFFECTS: ECONOMIC VARIABLES

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: The adjusted participation rates and net deviations were computed from dummy variable regression coefficients. Models 1 and 2 refer to two equations estimated each month. The dependent variable was a dichotomous variable coded "1" for food stamp recipients and "0" for nonrecipients. The independent variables consisted of dummy variable representations of the variables shown in the table plus the age, race and educational attainment of the reference person, the number of children under 16, the presence or absence of children under 6, the family composition of the food unit, and whether or not any member of the unit was unemployed during the three month interval. The categories of these additional variables are reported in table 9 below. Besides these variables, Model 2 also contained a set of dummy variables representing the amount of welfare income (see the text). The full regression equations, together with summary statistics and approximate t-statistics, are reported in the appendix.

^a

No observations fell into this category among welfare recipients.

food stamp participation rates for the individual categories of each independent variable and also as deviations from the overall mean.¹ The first form permits a direct comparison with the observed (or unadjusted) participation rates reported in tables 4-7, while the second form simplifies the computation of predicted food stamp participation rates for combinations of characteristics.²

Looking first at the Model 1 results, which are less likely to reflect circularity than the results for Model 2 (which includes welfare reciprocity as a predictor), we find that adjusting for the effects of all the other variables does not diminish the relationship between pre-welfare income and the probability of food stamp participation. The range of adjusted participation rates in months 1 and 2 (5.6 to 50.1 and 3.9 to 51.9 percent) is greater than the range of the unadjusted participation rates reported in table 4 (6.6 to 44.4 and 2.9 to 49.0). In month 3 the range of the adjusted rates is only slightly smaller (8.3 to 49.3) than the range of the unadjusted rates (3.2 to 47.4).

As with the unadjusted rates, the adjusted rates show very little decline in participation with higher income among food units with pre-welfare

¹ The full equations, with coefficients expressed as deviations from excluded categories and with approximate t-statistics for these deviations, are reported in the appendix.

² One consequence of using OLS rather than logit or probit estimation is that the predicted participation rates are not bounded by 0 and 100 percent. Predicted values outside the valid range are particularly likely to occur when a number of variables exhibit quite strong effects, as they do here. Thus it is seen that in month 2 a food unit with an income above 125 percent of the poverty line and assets of \$1,000 or greater has a predicted food stamp participation rate of -2.1 percent. Obviously, caution is required when interpreting predicted food stamp participation rates--especially when one or more of the variable categories being examined has a strong effect.

income below one-half the poverty line. Participation then declines rapidly with rising income until income approaches the poverty line, where the rate of decline slows (particularly in months 2 and 3). Participation rates then tumble again as income rises above 125 percent of poverty. If we are correct in viewing pre-welfare income as an inverse measure of need, then food stamp participation is clearly very responsive to this need.

While netting out the other variables has little impact on the relationship between pre-welfare income and food stamp participation, it has a very profound effect on the relationship between the expected food stamp value and participation. In fact, it largely reverses the relationship. Where we observed strong positive relationships between all three measures of expected food stamp value and the probability of participation (table 6), we now observe an essentially inverse relationship between participation and the expected food stamp value expressed as a proportion of the poverty line. The moderate decline of participation as the expected bonus value rises is broken only in the 10-14 percent category--especially in months 2 and 3, where participation exhibits pronounced peaks in this category.

Careful interpretation of these results is necessary. As noted above, the relationship between the expected food stamp value and the probability of participation may be somewhat circular in that the size of the food stamp bonus is affected by welfare income, and the decision to accept welfare and the decision to accept food stamps may be for many people a joint decision. Model 1 does not control for welfare reciprocity, except indirectly through some of the demographic variables, so the

estimated effects of the food stamp bonus value are adjusted only for pre-welfare income. Consequently, what we see as the effect of a large food stamp bonus is in part the effect of not receiving welfare. Predictably, therefore, the probability of participation in the food stamp program declines fairly steeply with increasing food stamp benefits once the benefits reach a stage where further increases increasingly imply nonreceipt of public assistance. In view of these considerations we hesitate to infer anything more about the effects of the food stamp bonus from the Model 1 results. The presence of the food stamp bonus in Model 1 is more important as a control variable to highlight the predictive strength of pre-welfare income than as an indicator of the effects of the food stamp bonus itself.

Looking at the two remaining economic variables, we find first that while having liquid assets of \$1,000 or more continues to reduce the probability that a food unit will receive food stamps, the effect of asset holdings has been diminished considerably by controlling for pre-welfare income and the other variables. While the observed participation rate among households with assets of \$1,000 or more is only 4 percent (table 7), the adjusted participation rate is between 23 and 25 percent over the three months. In short, very little of the unadjusted effect of asset holdings is independent of other characteristics of these households, with pre-welfare income almost certainly the major factor. The magnitude of the asset effect does grow over time, as is evident from the net deviations, but only very slightly.

Employment likewise has a more modest adjusted than unadjusted effect on participation, although this effect also grows over time. In month 1 a food unit with employment income is only 1.7 percentage points

less likely to receive food stamps than a unit with no employment income, while by month 3 this differential has grown to 7.8 points. The comparable unadjusted deviations (table 5) are 11.3 and 12.9 points, respectively. In month 1, then, it is probably safe to conclude that most of the unadjusted effect of employment is no more than an income effect. In month 3, however, the better part of the unadjusted effect remains after controlling for income and the other variables. We suggest three possible explanations for this independent effect of employment. The first is that employment is related to prospective income and that food units with a member employed tend to anticipate a rise in income that will make food stamps unnecessary (or unavailable). The second is that employed persons tend to feel the negative stigma of food stamp reciprocity more strongly than other persons. The third is that employed persons often may not have the time to obtain certification, perhaps because the hours of operation of the certification office conflict with their work schedules.

We turn now to Model 2, which differs from Model 1 in its inclusion of welfare reciprocity, the amount of welfare income (not shown in the table; see below), and the interaction between welfare reciprocity and pre-welfare income. We included this interaction in order to determine whether the strength and shape of the relationship between pre-welfare income and the probability of receiving food stamps--in particular, the plateau--differs between welfare recipients and nonrecipients. The Model 2 results are laid out to highlight this perspective on the interaction. The effects of pre-welfare income are reported separately for nonrecipients and recipients of welfare payments. Also, adjusted participation rates and deviations are reported separately for all welfare recipients and nonrecipients. These

reflect the average contrast between welfare recipients and nonrecipients within categories of pre-welfare income.

The very substantial unadjusted differential in participation by welfare reciprocity, seen earlier (table 5), is halved by controlling for pre-welfare income and the other variables. Participation rates for nonrecipients range from 20.9 to 25.3 percent over the three months while participation rates for recipients range from 44.7 to 47.9 percent. The unadjusted rates differed by 50 percentage points; the adjusted rates differ by about 25 points on the average. Still, the net relationship is quite strong. Were there no net relationship at all, of course, the issue of circularity would be moot: we would have found the common determinants that account for the unadjusted relationship between reciprocity of food stamps and public assistance. As things stand, however, a sizable relationship remains to be explained, but doing so falls outside the scope of the present paper.

Looking now at the relationship between pre-welfare income and food stamp reciprocity among welfare recipients and nonrecipients, we find striking differences. Among nonrecipients there is little relationship to speak of. Participation is low among those with incomes above 125 percent of the poverty line, but it is even lower among the very poor, adding further to the puzzle of why these persons do not participate and how they make ends meet. Were it not for the exceedingly low participation of units in the bottom income category, there would be a modest negative relationship between pre-welfare income and food stamp reciprocity, for the highest participation rates are found in the second lowest income category (units with incomes 25-49 percent of the poverty line).

Among welfare recipients, on the other hand, we find a very strong negative relationship between pre-welfare income and the probability of receiving food stamps. In the lowest income category, participation rates hover around 70 percent over the three months. Participation rates among food units with pre-welfare income between 50 and 74 percent of the poverty line are in the high 40s and low 50s while rates among units with greater pre-welfare income are in the teens or lower. In fact, among food units with pre-welfare income above 75 percent of the poverty line, welfare recipients are actually less likely than nonrecipients to receive food stamps. For these higher income units participation seems to be an either-or proposition. If a unit chooses to receive some form of assistance, it chooses to receive either public assistance or food stamps but not both.

The contrast between these two sets of results--the strong negative relation between pre-welfare income and food stamp reciprocity among welfare recipients and the much weaker and non-monotonic relationship among non-recipients of welfare--suggests an image of welfare recipients as behaving consistently with microeconomic theory (in their response to incentives) and nonrecipients as behaving inconsistently with the theory. This observation raises anew the question of why these latter persons are not responding to the economic inducements before them--particularly those non-recipients with incomes below 25 percent of poverty. We discussed several possible answers earlier. First, they may not actually be the impoverished units they appear to be; reported income and assets may exclude important flows or resources. Second, they may lack sufficient information to respond to the economic inducements--perhaps because of inadequate program outreach. Third, they may have actually applied for food stamps but not

received them as yet. Fourth, they may have applied but been refused. Fifth, they may be flatly opposed to the acceptance of such aid--i.e., the cost of reciprocity, in the form of a stigma, may exceed the benefits. The answer to this question has important policy implications, as some of these explanations admit of ready policy responses to alter the situation (e.g., increased outreach efforts to improve information about eligibility and benefits) while others do not--or do not require any response. Answering this question should assume high priority in further research.

Turning now to the remaining Model 2 results, we find first of all that even after controlling for welfare reciprocity and the amount of welfare income, the relationship between the size of the food stamp bonus and the probability of participation over the first half of the bonus range is now greater than the decline over the latter half. Participation rates are in the mid-20s among households with expected food stamp benefits amounting to less than 10 percent of the poverty line. They rise to 40 percent among units with benefits measuring 10-14 percent of the poverty line (in months 2 and 3) and then decline to about 30 percent in the highest category of benefits. This decline in participation at the high benefit levels still presumably reflects the peculiar nonparticipation among a sizable segment of the extremely low income population, although the inclusion of welfare reciprocity in the model has absorbed much of the effect recorded in Model 1.

Overall these results suggest that food stamp participation is more responsive to need than it is to the size of the benefits. From a policy standpoint this is a desirable result. If the size of the bonus value affects participation independently of need, the implication is that the benefit formula is creating incentives or disincentives over and above

responding to needs. Presumably such incentives are not intended by policymakers, although they may be built in inadvertently if, for example, the costs of feeding additional children are over- or underestimated in the official poverty thresholds or if the transaction costs are over- or underestimated by the minimum benefits.

The curvilinear relationship between benefit levels and participation implies that benefits for higher income units tend to discourage participation (which probably tells us something about transaction costs--namely, that they are high relative to the minimum benefits); benefits for moderately poor units tend to encourage participation; and benefits for very poor units neither encourage nor discourage participation (although the presence of a significant number of actually non-needy or ineligible units would push down apparent participation in the very low income group). Since the poverty thresholds vary quite substantially by food unit size, it may be necessary to disaggregate these effects by family size in order to judge their full policy implications. In the absence of such disaggregation, probably the most significant observation is that concerning benefit levels at the low end. These provide a partial explanation for why the overall participation rate is not higher and a plausible answer as to what might be done to increase participation, although raising participation in this segment of the eligible population presumably carries a low priority among policymakers.

As for the other economic variables, liquid assets in excess of \$1,000 exert a somewhat stronger downward effect on food stamp participation in Model 2 than Model 1--and more consistency across the months--but the difference is only modest and we attach no particular significance

to it. Employment income has an even smaller effect than earlier; food units with employment income during the month are only marginally less likely to receive food stamps than units without employment income, although the relationship still appears to be growing over time.

As noted earlier, Model 2 included a measure of welfare income--specifically, the amount of welfare income expressed as a proportion of the poverty line--but this variable is not reported in table 8. With the effects of pre-welfare income being estimated separately for welfare recipients and nonrecipients, adding welfare income to the equation allows us to determine whether welfare income affects the probability of food stamp participation differently than nonwelfare income. However, with welfare income being to quite a large extent determined by pre-welfare income, the expected net effect of welfare income is correspondingly reduced. We observed a moderate and curvilinear relationship between welfare income and the probability of food stamp participation. Over most of the scale of welfare payments, the relationship is negative, as expected, with a range of 20 percentage points. Participation then rises sharply in the first two months and about half as far in month 3. This upturn may be a result of the otherwise extreme poverty of those food units receiving very large welfare payments--an effect not captured by pre-welfare income because the low income group is so heterogeneous. To such units, food stamp receipt may be simply a matter of course along with their acceptance of welfare.

THE SOCIAL DEMOGRAPHY OF FOOD STAMP PARTICIPATION

Previous research has demonstrated significant demographic variation in food stamp use. It is well known from studies of the poverty population that eligible food units come disproportionately from female-headed families, from the elderly, from blacks, and from the less educated. Among eligibles, all of these groups except the elderly are disproportionate users of food stamps; usage among the elderly poor seems to be lower than in other age groups. With the ISDP data we can seek confirmation for these earlier findings and extend them as well. Here we look first at the raw differentials in participation rates among socio-demographic groups and follow this with an examination of the net relationships estimated from Models 1 and 2.

Gross Differences in Participation

Table 9 reports food stamp participation rates and the proportionate distribution of eligible food units by categories of several socio-demographic variables: family composition, the number of children under 16, the presence of a child under age 6, and the age, race and educational attainment of the reference person. Separate results are reported for each reference month.

Age exhibits a curvilinear relationship with the probability of receiving food stamps. Participation is highest at ages 30-49 with rates ranging from the mid-30s to the low 40s over the three months. Participation rates decline to the mid-20 percent range among food units with elderly reference persons and to less than 10 percent among units with reference persons under age 20, although it is likely that many of these latter units are actually ineligible (they being either students or dependents of

TABLE 9

FOOD STAMP PARTICIPATION RATES AND PROPORTIONATE
DISTRIBUTION OF ELIGIBLE FOOD UNITS BY SOCIO-DEMOGRAPHIC VARIABLES

Variable and Categories	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
Age of reference person						
< 20	5.4	7.6	7.0	.027	.026	.029
20-29	30.8	30.2	29.8	.227	.230	.235
30-39	34.0	41.8	38.1	.155	.161	.171
40-49	36.3	38.0	43.8	.141	.140	.134
50-59	27.6	30.5	31.7	.128	.126	.124
60-69	24.3	24.8	25.7	.140	.138	.134
70+	22.8	25.6	26.8	.182	.177	.173
Family composition						
Husband-wife head	21.6	29.0	28.4	.317	.304	.304
Single female head	37.4	37.3	39.3	.509	.522	.511
Single male head	15.8	15.9	15.5	.173	.174	.185
Number of children under 16						
None	20.0	20.6	21.8	.629	.638	.631
One	32.9	37.5	38.1	.145	.128	.125
Two	39.4	43.2	37.6	.110	.105	.108
Three	49.7	48.7	53.2	.057	.067	.067
Four	54.9	74.7	63.9	.028	.031	.038
Five	47.2	59.3	67.8	.013	.013	.013
Six or more	88.2	92.6	94.9	.018	.018	.018
Percent of child under 6						
Child percent	45.3	53.1	49.6	.201	.187	.196
Child with percent	24.0	25.3	26.7	.799	.813	.804
Race of reference person						
Black	46.4	44.8	49.2	.269	.286	.277
White, other	21.6	24.8	24.3	.731	.714	.723

(continued)

TABLE 9 (continued)

FOOD STAMP PARTICIPATION RATES AND PROPORTIONATE
DISTRIBUTION OF ELIGIBLE FOOD UNITS BY SOCIO-DEMOGRAPHIC VARIABLES

Variable and Categories	Food Stamp Participation Rates			Proportionate Distribution of Eligible Food Units		
	(1)	(2)	(3)	(1)	(2)	(3)
Education of reference person						
< Grade six	45.3	49.3	50.5	.146	.146	.147
Grades 6-8	29.0	32.8	31.9	.237	.240	.239
Grades 9-11	34.9	38.1	40.8	.211	.204	.207
Grade 12	19.2	21.8	20.7	.257	.256	.258
1-3 yrs. college	34.1	28.3	30.4	.078	.092	.085
4+ yrs. college	3.1	0.3	3.4	.072	.062	.065
Total	28.6	31.1	31.6	1.000	1.000	1.000

SOURCE: Computed by Mathematica Policy Research from ISDP 1979
Research Panel data.

ineligible parents). In any event, units with reference persons under age 20 make up less than 3 percent of all eligible food units, so their participation has little effect on the overall participation rate. The relatively low participation of units with reference persons in their 20s, who make up 23 percent of the eligible units, may reflect some overstatement of eligibility as well. Controlling for educational attainment will help to compensate for this to some degree, but it would be better to be able to identify students directly.

Households with elderly reference persons (60 or older) make up more than 30 percent of all the estimated eligibles. It has been suggested that the low participation of the elderly seen here and elsewhere may be illusory--that standard methods of estimating eligibility tend to over-select the elderly because the elderly support themselves from income flows

participation rate of the elderly might be identical to that of younger households. Results from Models 1 and 2 provide a test of this hypothesis. These results are presented later in this section.

Family composition differentials in food stamp participation parallel the distribution of eligible food units. Units headed by single females comprise more than half of all eligible units, and female headed units display the highest participation rates, ranging from 37 to 39 percent over the three months. Husband-wife units comprise somewhat fewer than one-third of all eligible units and exhibit moderate participation rates. The increase in aggregate food stamp participation between reference months 1 and 2 is to a large extent an increase in participation among husband-wife units. Finally, units with single male reference persons are 17 to 18 percent of all eligible units; their participation rates are the lowest at less than 16 percent. That participation should parallel the distribution of eligible units is to be expected. If one group comprises a disproportionate share of eligibles, then the odds are that the eligibles in this group will be disproportionately needy. It is partly for this reason that the relatively low participation of the elderly attracts our interest: it suggests that the elderly may not be receiving adequate assistance.

The number of children under 16 is very strongly related to the probability of receiving food stamps, with participation rates rising from roughly 20 percent among units with no children to more than 90 percent among units with six or more children. A significant question raised by this strong relationship is whether participation is more responsive to the economic needs created by large families or to the sizable food stamp

benefits available to large families. As we have seen, the monthly food stamp benefits grow quite large as family size increases, but so, presumably, does the cost of feeding such a family. Moreover, a family's capacity to increase its income flow in response to the cost of additional children may be very limited. On the other hand, if the food stamp benefit formula underestimates the returns to scale in feeding a large family or, more likely, underestimates the utility that large families derive from children relative to alternative uses of their time and money, then food stamp benefits may be relatively more valuable to large families than to small families.

To even attempt to answer this question empirically would require a more focused effort than we have intended in this paper. In particular, we would have to develop a model specification which allows variable utilities to be attached to children and can assume alternative returns to scale. For the present, the empirical question we pose is whether these differentials in participation by number of children remain after we have controlled for income and food stamp benefits expressed relative to official poverty thresholds. If strong differences do remain, this can signal any of a number of possibilities; but, at the least, it will indicate that need and benefits, as we measure them, do not explain the increase in participation as the number of children rises.

The strength of the relationship between food stamp participation and the number of children should not lead us to ignore the fact that large families are relatively rare among eligible units. From table 9 we see that 63 percent of the eligible food units have no children under 16; another 13 to 14 percent have only one; and 11 percent have two. Thus

only 12 to 13 percent of the eligible units have as many as three children, and half of these have no more than three. Even with the high participation rate, households with more than three children are only 16 percent of all food stamp recipients in month 3 while households with no children represent 44 percent.

We looked at differences in participation by whether a child under 6 was present because children of pre-school age are a greater obstacle to the mother's working than are older children. With the mother unable or preferring not to work, food stamps assume more significance as a prospective income source. Only 20 percent of the eligible units have children under 6, but the food stamp participation rate among these units is almost double what it is among units without young children: it averages close to 50 percent over the three reference months compared to a little more than 25 percent among the other units.

Participation among blacks is twice as high as among whites and others--a difference which we would assume to be largely economic, poor blacks being poorer than poor whites. If family composition exerts any influence upon participation independently of income, this too will contribute to a higher participation rate among blacks, as single female family heads are more common among blacks than whites. It is plausible, in addition, that the negative welfare stigma may be weaker among blacks than whites. The fact that poverty is more common among blacks than whites, combined with the residential segregation of the two races, suggests that blacks may face a less negative community reaction to food stamp or other welfare use than do comparably situated (economically and demographically) whites. If so, we may observe a net racial effect on

participation after adjusting for the other variables in the equations.

The size of the observed racial differential in participation is great enough to have a marked effect on the composition of food stamp recipients. Food units with black reference persons are only a little more than one-quarter of all eligible units, but they are more than 40 percent of the recipient units.¹

Differentials by the educational attainment (completed years of regular schooling) of the reference person are also quite substantial but uneven. Overall, participation declines with increasing education, but this trend is interrupted in two places. Participation is highest (at 50 percent by month 3) among units whose reference persons completed fewer than six grades. It declines in the next interval (grades 6-8) but rises in the subsequent interval (9-11). Participation among units with high school graduates as reference persons is lower than in any of the preceding categories, averaging a little more than 20 percent, but it rises to more than 30 percent among units whose reference persons have completed between one and three years of college. Finally, participation is 3 percent or less among college graduates.

The very low participation in the latter group may reflect a number of factors, but we are probably correct in suggesting that most of these units are actually ineligible. They may include a large number of graduate students who are still dependents, persons awaiting the start of jobs they have already accepted, or persons who can draw on adequate unmeasured

¹ The earlier comparison of ISDP and administrative estimates of recipient characteristics suggested that this latter proportion is high, but the first proportion could be high as well, in which case the impact of the racial differential on the composition of recipients could still be as large as we have observed.

resources. Units with college graduates as reference persons amount to between 6 and 7 percent of the estimated eligible units, so our estimate of eligibles may be high by at least this amount (and the participation rate correspondingly low).

The units with reference persons having some college education but fewer than four years present a puzzle--even more so when we consider that some of these units are probably headed by (ineligible) dependent students, meaning that the true participation rate in the category is understated. Without being able to identify students on the analysis file, we cannot estimate the size of this group--or its participation rate, which ought to be near zero. For the remainder, their noncompletion of college may be symptomatic of extenuating circumstances or motivational problems affecting their prospects for employment, so that in the longer term they are either more needy than high school graduates with no college experience or else more willing to rely on assistance. In any case, it seems likely that the food stamp participation in this group is not an effect of education in the usual sense--i.e., where education increases earnings potential and thus reduces need. Amounting to between 8 and 9 percent of all eligibles and a comparable proportion of recipients, the partially college educated group merits a closer look in future research.

A comparison of the educational attainment of reference persons in eligible units with the educational distribution of family heads in the general population in March 1979 indicates how heavily concentrated are the eligibles at the low end of the distribution. Given the differentials in participation by education, recipients are even more heavily concentrated at the low end than are eligibles. In reference month 3, 38.6 percent of

the eligibles and 47.6 percent of recipients have 8 or fewer years of schooling, compared to only 17.3 percent of the general population (U.S. Bureau of the Census, 1980). In all, 59.3 percent of eligibles and 74.3 percent of recipients completed fewer than 12 years of school, compared to 31.8 percent of family heads overall. At the opposite end of the spectrum, 6.5 percent of eligibles and 0.7 percent of recipients are college graduates, whereas 17.8 percent of all family heads have attained this level of education. In sum, the population estimated to be eligible for food stamps is drawn heavily from families with low earnings potential, based on a traditional measure of human capital, and food stamp recipients are drawn even more heavily from this group.

The food stamp participation rates presented in table 9 indicate very wide variation in participation along major socio-demographic dimensions within the eligible population. To a large extent, these differentials probably reflect differences in income and in the size of benefits to which different food units are entitled--in most cases, we would argue, because the socio-demographic variables influence food stamp participation through their effects on income or benefit amounts, rather than because the demographic differentials are in any sense spurious. Factors besides income and benefit amounts may contribute to these differentials, however, and we have alluded to some possibilities in the course of discussing the raw differentials. The equations estimated to obtain measures of the net effects of the income variables contained dummy variable representations of the six socio-demographic variables, with categories corresponding to those in table 9. From the equation coefficients (see the appendix) we computed adjusted food stamp participation rates and net

effects for the categories of the six socio-demographic variables. We turn now to these results.

Net Differences

Estimates of net differentials in food stamp participation, based on both Models 1 and 2, are presented in table 10. We advise here, as earlier, that the Model 2 results be viewed with caution. The inclusion of welfare reciprocity as a predictor of food stamp reciprocity may not be entirely appropriate and, therefore, the results may underestimate the influence of some of the variables in the model (as well as overstating the effect of welfare reciprocity). Where the effects of a variable differ little between Models 1 and 2 we have stronger evidence of that variable's independent influence on food stamp participation than we do from Model 1 alone. However, where the effects of a variable decline significantly between Models 1 and 2, we cannot necessarily conclude that a major part of this variable's effect on food stamp reciprocity works through welfare reciprocity, although in some instances that may indeed be the case.

Of the six socio-demographic variables, only one--the presence of a child under 6--exhibits essentially no relationship to food stamp reciprocity net of the other variables in the two models. For two other variables--family composition and race--the net relationships are markedly weaker than the unadjusted relationships but remain moderately strong--particularly in Model 1. For age, children under 16 and educational attainment, the relationships remain largely unchanged by the adjustments--again, especially in Model 1, where the relationships hardly differ from the unadjusted relationships. Thus, pre-welfare income, liquid assets, the size of the food stamp bonus, family composition, the number of children

TABLE 10
ADJUSTED FOOD STAMP PARTICIPATION RATES AND NET EFFECTS: SOCIO-DEMOGRAPHIC VARIABLES

Variable and Categories	Adjusted Food Stamp Participation Rate			Net Category Deviation from Overall Mean		
	(1)	(2)	(3)	(1)	(2)	(3)
	<u>Model 1</u>					
Age of reference person						
<20	12.3%	11.0%	11.2%	-16.3%	-20.1%	-20.4%
20-29	35.7	38.0	36.5	7.1	6.9	4.9
30-39	31.9	38.4	35.8	3.3	7.3	4.2
40-49	32.7	34.2	38.9	4.1	3.1	7.3
50-59	26.5	27.6	30.5	- 2.1	- 3.5	- 1.1
60-69	24.7	25.3	25.7	- 3.9	- 5.8	- 5.9
70+	20.7	23.1	24.1	- 7.9	- 8.0	- 7.5
Family composition						
Husband-wife head	21.7	29.1	26.8	- 6.9	- 2.0	- 4.8
Single female head	35.9	35.6	37.7	7.3	4.5	6.1
Single male head	19.7	21.1	22.5	- 8.9	-10.0	- 9.1
Number of children under 16						
None	21.4	24.1	24.2	- 7.2	- 7.0	- 7.4
One	27.7	30.5	32.3	0.9	- 0.6	0.7
Two	43.9	43.9	40.6	15.3	12.8	9.0
Three	47.7	44.2	48.4	19.1	13.1	16.8
Four	44.9	61.7	56.3	16.3	30.6	24.8
Five	41.8	52.4	62.6	13.2	21.3	31.0
Six or more	84.4	92.9	92.4	55.8	61.8	60.8
Presence of child under 6						
Child present	32.7	36.9	34.6	4.1	5.8	3.0
Child not present	27.6	29.7	30.9	- 1.0	- 1.4	- 0.7
Race of reference person						
Black	39.0	38.6	40.5	10.4	7.5	8.9
White, other	24.8	28.1	28.2	- 3.8	- 3.0	- 3.4
Education of reference person						
< Grade six	45.4	49.7	51.1	16.8	18.6	19.5
Grades 6-8	33.1	35.1	34.2	4.5	4.0	2.6
Grades 9-11	24.3	26.9	28.9	- 4.3	- 4.2	- 2.7
Grade 12	21.6	25.4	24.6	- 7.0	- 5.7	- 7.0
1-3 yrs. college	29.1	28.0	31.2	0.5	- 3.1	- 0.4
4+ yrs. college	15.9	13.2	14.4	-12.7	-17.9	-17.2
Overall mean	28.6	31.	31.6	0.0	0.0	0.0

(continued)

TABLE 10 (continued)

ADJUSTED FOOD STAMP PARTICIPATION RATES AND NET EFFECTS: SOCIO-DEMOGRAPHIC VARIABLES

Variable and Categories	Adjusted Food Stamp Participation Rate			Net Category Deviation from Overall Mean		
	(1)	(2)	(3)	(1)	(2)	(3)
	<u>Model 2</u>					
Age of reference person						
<20	21.6%	21.3%	21.5%	- 7.0%	- 9.8%	-10.1%
20-29	34.8	36.3	36.2	6.2	5.2	4.6
30-39	33.7	41.7	37.1	5.1	10.6	5.5
40-49	30.3	31.4	36.2	1.7	0.3	4.6
50-59	25.1	26.9	29.4	- 3.5	- 4.2	- 2.2
60-69	24.2	24.4	25.4	- 4.4	- 6.7	- 6.2
70+	22.0	24.2	24.4	- 6.6	- 6.9	- 7.2
Family composition						
Husband-wife	25.6	32.2	29.9	- 3.0	1.1	- 1.7
Single female	32.6	32.8	35.1	4.0	1.7	3.5
Single male	22.3	24.2	24.8	- 6.3	- 6.9	- 6.8
Number of children under 16						
None	25.5	27.8	27.9	- 3.1	- 3.3	- 3.7
One	23.8	26.8	28.4	- 4.8	- 4.3	- 3.2
Two	37.6	37.6	35.4	9.0	6.5	3.8
Three	39.3	36.8	39.4	10.7	5.7	7.8
Four	35.6	52.8	48.1	7.0	21.7	16.5
Five	32.7	43.9	49.9	4.1	12.8	18.3
Six or more	72.5	71.2	81.1	43.9	40.1	49.5
Presence of child under 6						
Child present	28.8	31.4	30.4	0.2	0.3	- 1.2
Child not present	28.5	31.0	31.9	- 0.1	- 0.1	0.3
Race of reference person						
Black	36.7	36.6	39.1	8.1	5.5	7.5
White, other	25.6	28.9	28.7	- 3.0	- 2.2	- 2.9
Education of reference person						
< Grade six	40.3	44.6	46.0	11.6	13.5	14.4
Grades 6-8	33.1	34.8	33.2	4.5	3.7	1.6
Grades 9-11	24.0	25.9	28.7	- 4.6	- 5.2	- 2.9
Grade 12	23.4	28.2	26.9	- 5.2	- 2.9	- 4.7
1-3 yrs college	30.5	28.3	31.7	1.9	- 2.8	0.1
4+ yrs college	20.2	18.2	21.2	- 8.4	-12.9	-10.4

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: The adjusted participation rates and net deviations were computed from dummy variable regression coefficients. Models 1 and 2 refer to two equations estimated each month. The dependent variable was a dichotomous variable coded "1" for recipients and "0" for nonrecipients. The independent variables consisted of dummy variable representations of the variables shown in the table plus the ratios of pre-welfare income and the food stamp value to the poverty line, the value of the unit's liquid assets, whether the unit had any employment income in the reference month, whether anyone in the unit was unemployed during the three reference months, and, for Model 2, whether the unit received welfare income, the total amount of welfare income (relative to the poverty line), and the interaction between welfare receipt and the pre-welfare income ratio. The income variable categories are given in table 8. The full regression equations, together with summary statistics and approximate t-statistics, are reported in the appendix.

in the food unit and the educational attainment of the reference person fail to explain really any of the relatively low food stamp participation of the elderly, which remains 7 percentage points below the mean and 10-14 below that of the most heavily participating age groups. Income, assets, the size of the food stamp bonus, the age and education of the reference person, and the presence of a pre-school child fail to explain why participation increases so dramatically with the total number of children. And income, assets, the size of the food stamp bonus, the number of children, and the age of the reference person fail to explain why units whose reference persons have less than a sixth grade education participate at a rate 20 points above the mean and college graduates participate at a rate almost as far below the mean; nor do they explain the peculiar upswing in participation among units headed by persons with one to three years of college education.

It would appear that the effect of higher asset holdings among the elderly, which would account for some of their lower participation, is countered by the reverse effect of lower income, which would tend to raise their participation. However, because the asset limit is greater for elderly than for nonelderly households, the asset effect we estimate may understate the true effect of asset holdings among the elderly. On the other hand, low income is generally not as transitory a condition for the low income elderly as for younger low income families, so on these grounds we might expect assets to be less of a deterrent among elderly than non-elderly households, in which case the recorded effect of assets may actually overstate the effect of assets among the elderly. In short, the true role of assets among the elderly remains to be established.

For the number of children variable, the net differentials we observe may actually be a function of the food stamp benefit value, even though we have presumably controlled for benefit value. Two explanations have considerable credibility. First, if the official poverty thresholds underestimate the economies of scale for large families or do not make adequate allowance for the utility that parents of large families derive from their children, our measure of food stamp benefits relative to the poverty line may understate the value of stamps to large families. As a result, the food stamp benefit measure will not control adequately for the value of food stamp benefits among large families and, therefore, we will overestimate the net effect of the number of children. Alternatively, the explanation may lie not in the inaccuracy of the poverty thresholds but in the magnitude of the food stamp benefits. For large families the absolute value of the food stamp benefits may be great enough to overcome the transaction costs perceived by virtually all eligible units--even when these benefits are small relative to the poverty line. Since we are not capturing this effect with our measure of food stamp value, it will show up as part of the net effect of the number of children. Both of these explanations remain speculative. Moreover, since the needs and potential food stamp benefits associated with large families are literally off the scale of needs and benefits for small families,¹ attempting to control for these quantities statistically rather than experimentally may be a futile task. Consequently, the source of the strong positive relationship between the number of children under 16 and the probability of food stamp reciprocity must remain unknown through the present effort.

¹ This is why we chose to measure benefits as a proportion of the poverty line, but households may not view their benefits that way.

In some respects these results replicate the earlier findings of MacDonald (1977) and Coe (1979). Like MacDonald we obtain a curvilinear relationship between food stamp participation and the age of the reference person, although the relationship at the lower end of the age distribution is flattened considerably by the other variables in the model. Like Coe we find a very strong positive relationship between participation and the number of children (under 16 in our case; under 18 for Coe) living in the household.

In other respects, however, our results differ significantly from those reported by MacDonald and Coe. Where MacDonald found no net relationship between participation and the educational attainment of the reference person, we find a rather pronounced, net inverse relationship, with a curious upswing in participation associated with one to three completed years of college. Where Coe found lower net participation among female headed households than among other households, after having observed just the opposite in the raw differentials, we find relatively higher net as well as gross participation among female headed households. Finally, where Coe found no net racial differential in participation, we find the net participation rate of blacks to be about 11 points higher than that of whites and others.

With regard to this latter finding, there is good reason to suspect that the racial difference in Coe's analysis is washed out by one or two variables that we would have included in our own models had they been available--namely, region and the local unemployment rate. Regional differences in food stamp participation have been found consistently to be quite large, although there is recent evidence of a considerable narrowing

of these differentials outside the mountain and plains states (see Beebout, 1981b). Czajka (1981) estimated food stamp participation rates by race/ethnicity for all 50 states in October 1979 and found evidence that while black participation rates exceed white in virtually every state, the black population is more heavily concentrated in states with high participation rates. Controlling for region, therefore, would almost certainly reduce the net racial differential. Likewise, blacks may be more heavily concentrated than whites in cities with high unemployment; if so, taking this into account could reduce further the racial differential in food stamp participation. We were unable to include either variable in our analysis because the source file obtained from the Census Bureau lacked any geographic identifiers whatsoever.

DISCUSSION AND CONCLUSION

Using data from the spring wave of the ISDP 1979 Research Panel, we have investigated determinants of participation in the food stamp program among households estimated to be eligible on the basis of monthly net income. This use of actual monthly income rather than simulated monthly or annual income represents a significant advance over earlier studies of food stamp participation.

Our results provide strong evidence for the importance of income in determining the probability that an eligible household will participate in the food stamp program. Participation diminishes significantly as a food unit's pre-welfare income (measured relative to the poverty line) rises. The average net participation rate among units with pre-welfare incomes 75 percent of the poverty line or better is only one-fourth what it is among units with incomes less than half the poverty line. Since the former (higher income) units comprise more than 40 percent of all eligible households, their low participation depresses the overall participation rate substantially.

Despite the strength of the income-participation relationship, there remains a sizable group of very low income units that does not participate. These bring down the average participation rate of low income units, lowering the overall participation rate still further. Many of these may in fact be ineligible, but we lack the data to demonstrate this. Further analysis along the lines indicated below will help to resolve some of this uncertainty.

Other economic variables appear much less important. Liquid asset holdings do lower the probability of participation--but only marginally.

possibly the absolute level of benefits provided to large households or the frequent inability of such households to raise their incomes above the poverty level via the marketplace.

A sizable differential in participation by education was evidenced, with the less educated showing relatively higher participation than the more educated, although most of the variation is attributable to the extreme categories: fewer than six grades and four or more of college. One interpretation views education in terms of the potential earnings capacity it implies: a college educated food unit head can be more optimistic about future income flows than a grade school educated eligible. Moreover, the former may be more likely to have a job lined up already and simply be awaiting the start. The distribution of eligible households by educational attainment gives evidence of the role of education in determining the size of the eligible population: eligible households have markedly less education than the general population.

We found relatively low participation among the elderly, in line with earlier results, and relatively high participation among blacks and

the ISDP survey. In addition, identifying students will resolve some questions about the zero income group. Second, we recommend pursuing a number of the remaining questions with a longitudinal analysis once a six-month or longer linked file becomes available. In particular, such analysis would be well suited to disentangling the welfare-food stamp relationship and determining how much of the nonparticipation in a given month is preceded or followed by participation. Third, we recommend that decision-making with regard to welfare and food stamps be modeled jointly, as this may best parallel the actual process whereby households come to participate in either program. Again, this may lead to an improved understanding of the welfare-food stamps relationship.

APPENDIX TABLE A

ESTIMATED COEFFICIENTS OF DUMMY VARIABLE REGRESSION EQUATIONS PREDICTING THE PROBABILITY OF FOOD STAMP PARTICIPATION

Variable and Categories	Model 1						Model 2					
	(1)		(2)		(3)		(1)		(2)		(3)	
	b	t	b	t	b	t	b	t	b	t	b	t
Age of reference person												
< 20	-.084	(1.18)	-.121	(1.66)	-.129	(1.83)	-.003	(0.05)	-.029	(0.42)	-.029	(0.45)
20-29	.159	(3.31)	.149	(3.27)	.124	(2.74)	.128	(3.05)	.121	(2.85)	.118	(2.79)
30-39	.111	(2.42)	.153	(3.21)	.117	(2.51)	.118	(2.71)	.175	(3.91)	.127	(2.88)
40-49	.120	(2.68)	.111	(2.42)	.148	(3.24)	.093	(1.99)	.072	(1.67)	.119	(2.73)
50-59	.058	(1.43)	.022	(0.59)	.016	(0.42)	.022	(0.67)	.002	(0.06)	.010	(0.29)
70+	--	--	--	--	--	--	--	--	--	--	--	--
Family composition												
Husband-wife	--	--	--	--	--	--	--	--	--	--	--	--
Single female	.142	(5.47)	.065	(2.49)	.109	(4.10)	.071	(2.89)	.006	(0.23)	.052	(2.40)
Single male	-.020	(0.60)	-.080	(2.35)	-.043	(1.26)	-.033	(1.03)	-.080	(2.54)	-.051	(1.58)
Number of children < 16												
None	--	--	--	--	--	--	--	--	--	--	--	--
One	.081	(2.12)	.064	(1.67)	.081	(2.21)	-.017	(0.46)	-.010	(0.27)	.005	(0.14)
Two	.225	(5.41)	.198	(4.63)	.164	(3.89)	.121	(3.06)	.098	(2.44)	.075	(1.86)
Three	.263	(4.93)	.201	(3.79)	.242	(4.66)	.138	(2.76)	.090	(1.00)	.115	(2.32)
Four	.235	(3.34)	.376	(5.54)	.321	(5.13)	.101	(1.54)	.250	(3.93)	.202	(3.40)
Five	.204	(2.20)	.283	(3.01)	.384	(4.17)	.072	(0.83)	.160	(1.83)	.220	(2.51)
Six or more	.630	(7.01)	.688	(7.58)	.682	(7.56)	.0470	(5.33)	.433	(4.94)	.532	(5.86)
Presence of child under 6												
Child present	.051	(1.43)	.072	(2.03)	.037	(1.06)	.003	(0.08)	.004	(0.11)	-.015	(0.46)
Child not present	--	--	--	--	--	--	--	--	--	--	--	--
Race of reference person												
Black	.142	(6.06)	.105	(4.49)	.123	(5.56)	.111	(5.03)	.077	(3.54)	.103	(4.66)
White, other	--	--	--	--	--	--	--	--	--	--	--	--
Education of reference person												
< Grade six	--	--	--	--	--	--	--	--	--	--	--	--
Grade 6-8	-.123	(3.65)	-.146	(4.29)	-.169	(5.03)	-.072	(2.28)	-.097	(3.08)	-.128	(4.01)
Grades 9-11	-.211	(5.84)	-.228	(6.22)	-.222	(6.10)	-.162	(4.84)	-.187	(5.48)	-.173	(5.02)
Grade 12	-.238	(6.53)	-.243	(7.29)	-.168	(4.97)	-.168	(4.07)	-.164	(4.77)	-.190	(5.55)
1-3 yrs. college	-.163	(3.40)	-.217	(4.63)	-.199	(4.16)	-.098	(2.18)	-.163	(3.70)	-.143	(3.15)
4+ yrs. college	-.295	(5.79)	-.365	(6.80)	-.367	(7.12)	-.201	(4.74)	-.263	(5.28)	-.248	(5.06)

(continued)

APPENDIX TABLE A (continued)

Variable and Categories	Model 1						Model 2					
	(1)		(2)		(3)		(1)		(2)		(3)	
	b	t	b	t	b	t	b	t	b	t	b	t
Food stamp value : poverty line												
< 5%	--	--	--	--	--	--	--	--	--	--	--	--
5-9	-.051	(.153)	-.047	(1.42)	-.029	(0.87)	-.021	(0.67)	-.031	(0.99)	-.025	(0.79)
10-14	-.004	(0.10)	.069	(1.75)	.098	(2.52)	.074	(1.93)	.119	(3.12)	.128	(3.33)
15-19	-.178	(4.25)	-.154	(3.61)	-.108	(2.60)	.086	(1.83)	.079	(1.68)	.098	(2.10)
20-24	-.108	(1.86)	-.086	(1.48)	-.044	(0.76)	.086	(1.39)	.083	(1.37)	.057	(0.92)
25+	-.300	(5.74)	-.342	(6.49)	-.234	(4.36)	.033	(0.53)	-.027	(0.43)	.010	(0.15)
Pre-welfare income : poverty line												
< 25%	--	--	--	--	--	--	--	--	--	--	--	--
25-49	-.030	(0.82)	-.005	(0.15)	-.013	(0.37)	.122	(2.50)	.243	(5.09)	.210	(4.43)
50-74	-.241	(6.03)	-.255	(6.46)	-.152	(3.81)	.023	(0.48)	.028	(0.58)	.129	(2.56)
75-99	-.363	(8.97)	-.367	(9.01)	-.330	(8.29)	.113	(2.18)	.124	(2.37)	.123	(2.35)
100-124	-.430	(8.51)	-.384	(7.59)	-.341	(7.21)	.067	(1.08)	.106	(1.76)	.106	(1.79)
125+	-.445	(7.55)	-.480	(8.33)	-.410	(7.30)	.054	(0.78)	.004	(0.07)	.030	(0.45)
Product of pre-welfare income and welfare receipt												
< 25%	--	--	--	--	--	--	--	--	--	--	--	--
25-49							-.211	(3.01)	-.388	(5.55)	-.371	(5.23)
50-74							-.248	(3.55)	-.264	(3.77)	-.339	(4.70)
75+							-.660	(9.12)	-.679	(9.06)	-.731	(9.49)
Welfare income : poverty line												
zero	--	--	--	--	--	--	--	--	--	--	--	--
1-107							.738	(12.44)	.718	(11.60)	.732	(11.56)
20-34							.558	(10.20)	.665	(11.75)	.641	(11.41)
35-49							.541	(9.87)	.552	(9.83)	.553	(9.88)
50-74							.513	(10.40)	.512	(11.38)	.534	(10.72)
75+							.686	(10.87)	.724	(11.03)	.606	(9.14)

(continued)

APPENDIX TABLE A (continued)

Variable and Categories	Model 1						Model 2					
	(1)		(2)		(3)		(1)		(2)		(3)	
	b	t	b	t	b	t	b	t	b	t	b	t
Liquid assets												
< \$1,000	--	--	--	--	--	--	--	--	--	--	--	--
1,000+	-.055	(1.16)	-.063	(1.31)	-.081	(1.81)	-.098	(2.26)	-.115	(2.57)	-.107	(2.54)
Employment income												
No income	--	--	--	--	--	--	--	--	--	--	--	--
Any income	-.017	(0.54)	0.059	(1.89)	-.078	(2.57)	-.017	(0.58)	-0.40	(1.38)	-0.58	(2.04)
Presence of unemployed person												
No person present	--	--	--	--	--	--	--	--	--	--	--	--
Any person present	.057	(1.76)	.032	(1.00)	.119	(3.78)	.033	(10.9)	.019	(0.63)	.115	(3.85)
Intercept	.496	(9.07)	.592	(10.80)	.515	(9.38)	.022	(0.34)	.103	(1.64)	.066	(1.03)
\bar{R}^2	.306		.324		.333		.414		.427		.420	
N	1517		1518		1536		1517		1518		1536	

SOURCE: Computed by Mathematica Policy Research from ISDP 1979 Research Panel data.

NOTE: Equations were estimated by ordinary least squares. The variables are defined in the text. The t-statistics reported here assume simple random sampling and thus understate the true level of significance of the coefficients.

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