Employment Factors Influencing Food Stamp Program Participation

Final Report

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Abstract

This study examines how employment characteristics of low-income households influence Food Stamp Program (FSP) participation. The relationship between employment and FSP participation is of special interest because, although more low-income working families are eligible to participate, many do not. Low-income working households are less likely to participate in the FSP if they work traditional daytime hours, hold multiple jobs, and work more hours, but they are more likely to participate if they frequently change jobs. However, the relationship between employment and FSP participation was stronger in the early 1990s than in the late 1990s, suggesting that barriers to participation among working families decreased during the decade.

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Section I. Introduction

Food stamp participation rates plummeted from 75 percent in 1994 to 59 percent in 2000 (Cunnyngham 2002, p. 3).[1] In response to plummeting participation rates, and with the new flexibility brought about by the 1996 federal welfare reforms, many states are re-engineering their programs to improve accessibility (Rosenbaum 2000; Bell, et al. 2001). States are extending office hours, establishing automated call centers, and improving outreach, among other changes. But not all program changes are geared toward increasing participation rates. States have strong financial incentives to keep Food Stamp Program certification error rates low, a goal that often runs counter to improving participation rates. States are making policy decisions—which have strong implications for Food Stamp Program participation decisions—without the benefit of knowing the factors that make some eligible working persons choose to participate and others choose not to participate. This study will examine how low-income households' employment characteristics influence Food Stamp Program participation.

The relationship between employment and Food Stamp Program (FSP) participation is of special interest for two reasons. First, characteristics of the food stamp caseload and the food stamp eligible population have changed to include more working low-income households. As Gleason et al. (2000) note, there has been a large increase in the proportion of food stamp participants with earnings. Among food stamp recipient families with children, the percentage working increased from 27 percent in 1993 to 42 percent in 1999 (Center on Budget and Policy Priorities 2001a, p. 1). Second, along with the declining participation rate has come a growing concern that eligible working low-income families are not participating in the Food Stamp Program. "Food stamps are crucial to helping low-wage working families make ends meet. A family of four supported by a full-time, year-round minimum wage worker will fall short of the poverty line by 25 percent (even after counting the earned income tax credit) if the family does not receive food stamps. Food stamps increase the typical monthly purchasing power of such a family by 39 percent" (Center on Budget and Policy Priorities 2001a, p. 4). Food stamp participation may reduce the chance that families are unable to financially meet basic needs and so use other forms of public assistance. It is important to understand how the Food Stamp Program works for the large fraction of the caseload that is

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[1] The food stamp participation rate is defined as the percent of food stamp *eligible* individuals who receive food stamp benefits.

employed, but it is even more important to understand why the Food Stamp Program does not work for low-income working persons who do not participate.

The Food Stamp Program structure, with its numerous application rules, program requirements, and administrative practices, may be one reason that working low-income persons choose not to participate. As Besharov (2000) has argued, the Food Stamp Program was built around the non-working poor and the program for the working poor looks like an afterthought.

Indeed, important aspects of the program do make participation difficult for the working low-income persons by effectively raising the monetary and nonmonetary costs of participation. For example, many individuals are required to appear in person at their local food stamp office to apply for food stamps and, in most cases, for periodic recertification. In-person application and recertification are more costly for the working low-income persons because the opportunity cost of their time is higher and they may have less available free time. It may be especially costly for people who work during traditional hours (for example, from 9 am to 5 pm) because they have a smaller time window to get to the food stamp office and may need to be absent from work to apply or be recertified for benefits. Certification policies provide another example of the increased cost of participation for the working low-income persons. In the late 1990s, many states shortened the certification period for households with a history of earned income to reduce the number of errors in the Food Stamp Program (Gabor and Botsko 2001).[2] As a result, working food stamp recipients were required to return to the food stamp office for recertification even more often than non-working persons (Dion and Pavetti 2000). Furthermore, since food stamp benefits decline with income, working low-income persons face higher costs to participation for a smaller benefit amount.

To provide an understanding of the relationship between employment and FSP participation, this analysis examines the employment characteristics and patterns of the working food stamp eligible population. In particular, we address three research questions:

1. What are the detailed employment characteristics of low-income, working food stamp participating and non-participating households? Do household members work traditional hours? Are there multiple jobholders in the household? How many hours do household members work? Do they change jobs frequently?

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[2] A study by the Center on Budget and Policy Priorities (2001b) finds that "21 states now [2001] require at least one-third of all working food stamp households to reapply for food stamps every three months. In most cases, a face-to-face interview with the food stamp caseworker is required when a household reapplies for benefits" (p. 4).

2. How do detailed measures of employment characteristics affect food stamp
   participation?
   - Does labor force attachment affect participation?
   - Are persons who work non-traditional hours more likely to participate?
   - Does holding more than one job decrease the likelihood of participation?
   - Does working more hours decrease the likelihood of participation?
   - Do frequent job changes decrease the likelihood of participation?

3. How has the relationship between employment factors and Food Stamp Program
   participation changed since federal welfare reform?

Understanding the factors that affect participation decisions among working low-income individuals is necessary to ensure access to program benefits. Identifying these factors will shed light on how the Food Stamp Program is currently operating for the working low-income individuals and how it might be changed to better accommodate these individuals.

Section II. Relevant Literature

The Food Stamp Program participation literature provides findings regarding the characteristics of eligible persons most likely to participate, the events that lead people to exit and enter the program, and the duration of food stamp receipt. While this literature is substantial, our review shows that there is limited information about the relationship between employment characteristics and Food Stamp Program participation. Some earlier studies have included employment status in their participation model, but none have explored the effect of employment factors such as job changes, number of jobs, and traditional versus nontraditional work hours on Food Stamp Program participation, a primary focus of this study. Furthermore, studies of Food Stamp Program participation post-welfare reform are limited, and none have examined how the relationship between employment factors and Food Stamp Program participation has changed since federal welfare reform, our third research question. A somewhat different but related literature examines how the length of recertification periods affects state food stamp caseloads. The discussion below first describes the employment characteristics of the working low-income persons, then reviews the food stamp participation and recertification literatures, and concludes with our contributions to the literature.

Employment Characteristics of the Working Poor

Studies by Acs et al. (2000), using the 1997 National Survey of America's Families, and Kim (1998), using the March 1994 Current Population Survey, describe the characteristics of the working poor. Acs et al. find that the working poor have substantial job-market disadvantages compared with their higher-income counterparts. Working low-income families are more likely to have a work-limiting condition and more children, and to be less educated, minority, and unmarried. Kim too finds job-market disadvantages among many of the working poor: eight percent are disabled, seven percent are age 60 or older, 22 percent are involuntarily employed part-time, and four percent are single parents with children under age six (p. 67). Acs et al. also find that low-income working families are less likely to work traditional hours and have spent less time with their current employer than their higher-income counterparts. As for hours worked, Kim finds that on average, the working poor work full-time (35 or more hours per week) but do not work a full year (50 or more weeks per year) (p. 68). Acs et al. find that the primary earner in low-income working families tends to work full-time and full-year, but that others in the family are less likely to work. Next we turn to the literature on

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the employment and demographic characteristics of Food Stamp Program participants and nonparticipants.

Food Stamp Program Participation and Employment and Demographic Characteristics

Descriptive Analyses: Studies that examine the food stamp eligible population show that employment and earnings are related to Food Stamp Program participation. Cunnyngham's (2002) analysis of CPS and FSP administrative data finds that the food stamp participation rate is considerably higher for individuals in households with no earnings than for individuals in households with earnings. For example, in 2000, 50 percent of food stamp eligible individuals in households with earnings participated in the Food Stamp Program, while a substantially higher 67 percent of individuals in households with no earnings participated in the Food Stamp Program (p. 21). That is, the food stamp participation rate was 32 percent higher for food stamp eligible individuals in households with no earnings than for those in households with earnings.

Ponza et al. (1999) use data from the National Food Stamp Program Survey (NFSPS) to examine the characteristics of FSP participant and eligible nonparticipant households. These data were collected between June 1996 and January 1997 and show several differences between food stamp participant and eligible nonparticipant households.[3] Consistent with Cunnyngham's analysis, Ponza et al. find that eligible nonparticipants are more likely to have earned income than participants. For example, they find that 52.7 percent of FSP-eligible nonparticipant households have earned income, while only 32.5 percent of FSP participant households do. They also find several other differences between FSP-eligible nonparticipant and FSP participant households: FSP-eligible nonparticipant households are more likely to reside in a rural area, contain an elderly member (age 60 or over), and be headed by an individual who is married, white, and has a high school degree or more.

A descriptive analysis by Gleason et al. (1998) examines the relationship between earnings and FSP entries and exits. Using data from the 1991 SIPP panel, the authors find that the FSP entry rate is about two times higher for individuals in households with no earnings as compared to individuals in households with earnings (p. 26). In addition to being more likely to enter the Food Stamp Program, individuals who begin their food stamp spell with no earnings have longer duration of food stamp receipt—the median duration for individuals in households with no earnings at the spell start is about 60 percent longer than for individuals in households with earnings at the spell start (p. 59). The authors also find that individuals in households that have no earners are more likely

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[3] The NFSPS contains data on 2,454 FSP participants, 450 FSP-eligible non participants, and 405 near-eligible nonparticipants.

to reenter the food stamp program than their counterparts who live in households that had an earner (p. 84).

Gleason et al. (1998) also examine how earnings change near to the time when individuals exit the Food Stamp Program. This analysis shows that individuals in households that experience an increase in earnings (with no change in household composition) are about 75 percent more likely to exit the FSP than the full population of food stamp recipients (p. 76). This is consistent with an analysis of food stamp leavers in Illinois that suggests a substantial proportion of individuals exit the food stamp program when earnings increase (Rangarajan and Gleason 2001, p. 25).

Multivariate Analyses: Gleason et al. (1998) provide a review of the Food Stamp Program literature, reviewing studies that examine FSP participation as well as those that examine entries into and exits from the FSP. Gleason et al. study summarize results from the *FSP participation* studies (as opposed to FSP entry and exit studies) into a consistent set of findings:[4] "FSP participation rates are highest among nonwhite and nonelderly people, and people living in households that: are low income; include children; do not own their home; are eligible for the highest FSP benefits; have a household head that is not well educated; and include members who participate in other welfare programs such as AFDC [Aid to Families with Dependent Children] or Medicaid" (p. 7-8); and among people who live in high unemployment rate areas.

Separate entry and exit models allow researchers to account for state dependence—that the decision to participate may depend on whether the individual participated last period—and to separately examine factors that lead individuals to enter and exit the FSP. For studies examining entries into and exits from the FSP, the major findings from Gleason et al. and others include:[5] (1) change in income is the primary trigger event leading to food stamp entry and exit both in the mid-1980s and early 1990s, though a change in household composition, especially a change in the number of potential earners, also played a major role; (2) economic status and household composition are the most important determinants of how long people receive food stamps; and (3) more than one third of recipients who exit the FSP reenter again within one year.

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[4] The papers reviewed include MacDonald (1977), Czajka (1981), Chen (1983), Coe (1983), Fraker and Moffitt (1988), Ross (1988), Corson and McConnell (1990), McConnell (1991), Dynarski, Rangarajan, and Decker (1991), Trippe and Doyle (1992), Trippe et al. (1992), Martini and Allin (1993), and Trippe and Sykes (1994). Most of these participation results are based on samples of low-income or FSP-eligible individuals or households (Gleason, Schochet and Moffitt 1998).

[5] Researchers examining the dynamics of Food Stamp Program participation include Coe (1979), Carr et al. (1984), Lubitz and Carr (1985), Burstein and Visher (1989), Murphy and Harrell (1992), Burstein (1993), Bartlett et al. (1995), Blank and Ruggles (1996), and Gleason et al. (1998), Wallace and Blank (1999), and Wilde et al. (2000).

While this literature provides general employment characteristic of FSP participants and low-income nonparticipants, it does not provide detailed employment characteristics (e.g., work traditional daytime hours, number of jobs held, number of employer changes) for these populations. In addition, few studies control for unobserved heterogeneity (unobserved differences) when including potentially endogenous variables, such as employment status and TANF receipt, in their Food Stamp Program participation models.[6] Unobserved heterogeneity is of concern because there may be unmeasured characteristics of eligible food stamp recipients that affect both their employment status and Food Stamp Program participation. For example, people who have a distaste for work may have a strong preference for transfer programs. Ignoring this heterogeneity would wrongly ascribe the part of program participation due to the preference for transfer programs to employment status.

Food Stamp Program Participation and Recertification Periods

Recent studies have examined the relationship between food stamp caseloads and recertification periods. These studies use the variation in recertification periods across state and time to explain changes in food stamp caseloads. Overall, these studies suggest that shorter recertification periods reduce food stamp caseloads.

Currie and Grogger (2000) use the 1989 to 1999 waves of the March CPS, along with FSP administrative data (i.e., the Quality Control (QC) data). These administrative data are used to create a measure of state recertification periods in each year. Each state's recertification period is measured as "the average recertification interval for working families with children" (p. 11). The results of this analysis suggest that shorter recertification intervals reduce participation in the Food Stamp Program.

Kornfeld (2002) also examines recertification periods and food stamp caseloads using FSP QC data and the March CPS (1988-2000), but measures the recertification period somewhat differently. The variable used to capture the recertification period "is the *frequent recertification rate*, equal to the number of participants in the household with both earnings and a recertification period of one to three months divided by the number of participants in households with earnings" (p. 5-5). Consistent with Currie and Grogger (2000), a main finding of this study is that shorter recertification periods reduce food stamp caseloads among multiple adult households with children and among adults living separately.

Kabbani and Wilde (2003) also use FSP QC data, but in this analysis, state recertification periods are measured as the percentage of the food stamp caseload

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[6] Fraker and Moffitt's (1988) examination of individuals' food stamp participation and labor supply, using data from the 1979 panel of the Incomes Surveyed Development Program (ISDP), is an exception.

assigned a short (one to three month) recertification period. Again, the authors find that short recertification periods reduce food stamp participation rates: "increasing the proportion of participants receiving short recertification periods by 10 percentage points reduces food stamp participation rates by 0.24 percentage points" (p. 22).

One issue with these analyses is that the variables measuring state recertification periods are potentially endogenous, and could therefore bias the results. For example, "if a state imposes a one to three month recertification period on some working families, and a large proportion of these families respond by leaving the FSP while the exit rate among other working families is lower, then the estimated proportion of families working with short recertification periods could go down overtime as caseloads decline, even though short recertification periods really do reduce caseloads" (Kornfeld 2002, p. 5). Our measure of state's recertification periods also suffers from the same potential problems. We discuss our results with this potential endogeneity in mind.

Food Stamp Program Participation and Welfare Reform

Food Stamp Program participation rates have dropped nearly 20 percent since the 1996 federal welfare reform.[7] The role that welfare reform played in the participation rate decline has been the focus of several studies. Some of these studies focus more narrowly on the food stamp participation of current and former TANF recipients, but others look more broadly at the working poor or the broader food stamp eligible population. Overall, welfare reforms, first under state AFDC waivers and then under TANF, combined with economic conditions to reduce food stamp participation. Major results from this literature can be summarized as:

- Families that left welfare were more likely to leave the Food Stamp Program than were similar families that had not been on welfare (Zedlewski and Brauner 1999; Zedlewski 2001);

- Welfare reform explains five to 24 percent of the food stamp caseload decline from 1994 to 1998 (Wallace and Blank 1999; Gleason, et al. 2000; Wilde, et al. 2000; Ziliak, Gundersen and Figlio 2000);[8]

- The strong economy explains 19 to 45 percent of the food stamp caseload decline (Figlio, et al. 2000; Gleason, et al. 2000; Kornfeld 2002; Wallace and Blank 1999; Wilde, et al. 2000; Ziliak, Gundersen and Figlio 2000).

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[7] The food stamp participation rate dropped from 72.7 percent in September 1995 to 59.3 percent in September 2000 (Cunnyngham 2002).

[8] Currie and Grogger (2000) find that policy changes associated with welfare reform explain up to 66 percent and the strong economy a further 17 percent of the decline in food stamp participation among female-headed families. However, these results are not robust to the inclusion of state-specific time trends.

These studies examine the relationship between welfare reform and food stamp caseloads, but none examine whether the relationship between employment characteristics and food stamp participation has changed since welfare reform.

Contributions to the Literature

This review highlights three major gaps in the literature. We know little about: (1) the detailed employment characteristics of working food stamp participants and low-income non-participants; (2) the relationship between detailed employment characteristics and food stamp participation, especially after controlling for unobserved heterogeneity; and (3) how this relationship has changed since welfare reform. This study builds upon and contributes to the literature by:

- Analyzing the relationship between detailed employment factors—such as job changes, number of jobs, traditional versus nontraditional work hours, and number of hours worked—and Food Stamp Program participation.

- Controlling for unobserved heterogeneity in analyzing the relationship between employment factors and food stamp participation; and

- Analyzing pre- and post-welfare reform changes in food stamp participation among low-income working adults, with particular focus on how the relationship between employment factors and food stamp participation has changed since the reforms, using the 1990 SIPP panel (which provides information from October 1989 through October 1992) and 1996 SIPP panel (which provides information from December 1995 through February 2000).

The next section describes the conceptual model which serves as the foundation for the empirical analysis.

Section III. Conceptual Model

Participation in the Food Stamp Program (FSP) brings both benefits and costs. A recent study by Lerman and Wiseman (2002) suggests that costs relative to benefits play a role in decisions to participate in the FSP. Individuals choose to participate in the FSP only if the benefits from participation outweigh the costs—the utility when participating in the program is higher than the utility when not participating.

The benefits and costs of participation depend on a variety of factors and both are expected to differ for the working and nonworking population. The working population is likely to have higher income, and thus is eligible for a lower food stamp benefit amount. This working population also faces more constraints on their time, thus a higher cost of participation, all else equal. Taken together, this suggests lower FSP participation rates among working individuals eligible for food stamps than among nonworking individuals eligible for food stamps. The various factors hypothesized to affect FSP participation are discussed below. The determinants of the benefits and costs of participation differ, so we discuss them separately.

Benefits: The primary benefit of FSP participation is that it provides households with nutritional assistance by making available resources to purchase food. Once eligible, the dollar value of food stamps a household receives is a function of six factors: earned income, unearned income, allowable income deductions, household composition, U.S. citizenship, and year. The food stamp benefit amount is higher for households with lower earned and unearned income, as well as for households with higher income deductions (e.g., excess shelter costs and medical expenses) (U.S. Department of Agriculture 2002a). Household composition plays a role, as the value of the food stamp benefit increases with the number of persons in a household.[9] Food stamp rules for non-citizens were changed with the 1996 federal welfare reform legislation, which made legal immigrants and refugees ineligible for food stamps. These restrictions were subsequently eased to allow, for example, legal immigrants (persons legally admitted into the U.S. for permanent residence) living in the U.S. on August 22, 1996 to be eligible for food stamps (U.S. Department of Agriculture 2002b). The year of food stamp receipt is also related to the benefit of participation, as there have been changes in policies over time and the dollar value of food stamp benefits also has changed over time.

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[9] Zedlewski and Brauner (1999) find that food stamp take-up rates declined sharply with income relative to need. (Income relative to need is a function of both household income and household size.)

Household earned income and unearned income can be further disaggregated. Household *earned income* is the product of hours worked in the wage labor market and the wage rate. Total household *hours worked* in the wage labor market are determined by several factors: the wage rate of employed adults, non-earnings income, number of children in the household, number of adults in the household, age of the adults in the household, household members' health or disability status, state of the economy, and household preferences. The *wage rate* available to individuals in a household, another important determinant of household earned income, depends primarily on education level and on-the-job training level, as predicted by the human capital theory. The wage rate may also depend on household members' race and sex (if discriminated against), their age (again through either human capital theory or discrimination),[10] geographic location (higher wages in metropolitan areas), and the economy (a robust economy may result in higher wage labor market opportunities).

Household *unearned income* is primarily comprised of government transfers (such as TANF), private transfers, and asset income. The amount of government and private transfers a household receives is in part a function of preferences. Some individuals, for example, may simply prefer to get by without financial help. A preference for not receiving government transfers may be related to stigma associated with receipt, but not necessarily. The economy may also affect household unearned income as returns on investments will affect asset income.

By specifying these components of households' earned and unearned income, a more reduced form specification of the benefit of FSP participation can be expressed as:

Benefit = f[
    Allowable Income Deductions (+);
    Household Composition: [1]
        number of children (+), number of adults (+/-);
    Demographic Characteristics:
        age (younger and older adults +), health or disability status (poor
        health +), education level and on the job training level (less
        education +), race (nonwhite +), sex (female +), U.S. citizenship
        (non-citizen -);
    Geographic Location (MSA +, region indicators +/-)
    Economic Conditions (poor economy +);
    Year (+/-);
    Preferences (prefer financial help+)].

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[10] Human capital theory, first developed by Becker and Mincer, explains the pattern of individuals' lifetime earnings. In general, the pattern of earnings are such that they start out low (when the individual is young) and increase with age (Becker 1975, p. 43), and then earnings tend to fall somewhat as individuals near retirement.

where the hypothesized effect of each factor is shown in parentheses.

Costs: Along with benefits of FSP participation come costs. These costs are both monetary and nonmonetary. Nonmonetary costs include stigma and time costs, where time costs result from the time participants must spend applying for and recertifying eligibility for benefits. A study by Ponza et al. (1999) provides estimates of nonmonetary costs and finds that individuals spend an average of roughly five hours applying for food stamps and 2.5 hours recertifying for food stamp benefits (p. xvi). The authors also find that administrative hassles and stigma associated with the FSP are important reasons individuals eligible for the FSP program do not participate.[11] Consistent with this study, Zedlewski and Brauner (1999, p. 25) find that administrative problems or the hassle of maintaining benefits is the second most self-reported reason for *leaving* the FSP.[12] Monetary costs occur because, for example, some workers may have to miss work, and thus lose earnings, in order to recertify for benefits during office hours.[13]

The *time* FSP participants spend applying for and recertifying eligibility for food stamps is a cost of participation. Since the food stamp certification period is shorter, in general, for workers versus nonworkers, we expect employment status to affect time costs. We also expect employment characteristics to affect time costs. When an individual in a household changes employers, a household member is required to report the change to the local food stamp office. As a result, households with individuals who have frequent employment changes will experience a higher cost of participation than households whose members have steady jobs. Having multiple jobs in the household also can increase the cost of participation due to the more time intensive application and recertification process (e.g., additional time needed to verify income from multiple sources). As attachment to the labor force, as measured by work hours, increases, the opportunity cost of participation also increases because the adult household members have less time to spend on the application and recertification process. Finally, a household with individuals who tend to work during the daytime (i.e., the same hours the food stamp office is open) will have difficulty completing the application and recertification process, thereby making the cost of participation higher for households whose members work traditional hours. Having more adults in the household can lower the household's cost of FSP participation by providing more flexibility to apply for and recertify for food stamp benefits.

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[11] While Ponza et al. (1999) find that administrative hassles and stigma are important reasons cited for non participation in the FSP program, they find that the most important reason for non participation was misperceptions about FSP eligibility.

[12] Increased earnings or a new job is the most frequent self-reported reason for leaving the FSP.

[13] Individuals may also incur out-of-pocket monetary costs when they travel to and from the food stamp office. Ponza et al. (1999) estimate these costs are relatively small—about $10 for the application and $6 for the recertification (p. xvi).

Food Stamp Program policies also affect the time cost of application and certification. In the late 1990's, many states shortened the certification period for households with a history of earned income to reduce error rates (Gabor and Botsko 2001). However some food stamp offices have increased flexibility for their food stamp participants. For example, some offices now allow clients to recertify by mail or over the phone rather than in person.

As part of the 1996 federal welfare reforms, food stamp work requirement rules changed in a way that made FSP participation more time costly for 18-50 year old able-bodied adults who have no children. In order to receive food stamp benefits for more than three months in a 36-month period, these able-bodied adults must be working or in a training program other than job search (U.S. Department of Agriculture 2002a), increasing their cost of participation.

Prior experiences with public assistance also may affect the time cost of food stamp participation. Individuals who previously participated in a welfare program may have knowledge of the program, and therefore, have a lower cost of participation. Current TANF recipients also may have a reduced time cost of food stamp participation, as the application for food stamps is likely to be less time consuming after eligibility for TANF benefits is determined. TANF receipt is in turn related to many factors including earned income, unearned income, number of children, age, sex, educational attainment, marital status, and year (i.e., pre- or post-welfare reform). We control for the reduced form determinants of TANF receipt in our empirical model. We expect, for example, that a household headed by an unmarried mother is more likely than a household headed by a couple to participate in the TANF program, so this unmarried mother is expected to face a lower time cost of participation than the couple, all else equal.[14]

The *stigma* cost of FSP participation is likely related to prior welfare receipt, demographic characteristics, and time. Individuals who have previously received welfare benefits may associate less stigma with program participation. Demographic characteristics related to both prior welfare receipt and the stigma of participation include: age, gender, race, marital status, educational attainment, and health and disability status. With the higher rate of TANF receipt among never married mothers, we hypothesize that a young, never married household head faces a lower stigma cost of FSP participation than a middle-aged, married household head. The stigma of food stamp participation may also change with time. In particular, the stigma cost of participation may have increased since the 1996 federal welfare reforms that coincided with steep

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[14] Without holding all else equal (e.g., number of adults and children in a household) the hypothesized effect is less clear. Unmarried mothers may be more likely to participate in TANF and so have a lower cost of participating in the FSP, but on the other hand, single-parent families have more limited time resources for dealing with paperwork.

declines in welfare caseloads. Fewer people on welfare may increase stigma for those on welfare.

By disaggregating the nonmonetary (time and stigma) components of cost, the cost of FSP participation can be expressed as:

Cost = f[Employment Characteristics: [2]
        employment status (employed +), employer change (+), multiple jobs
        (+), more hours of work (+), work traditional hours (+);
    FSP Policies (+/-);
    Household Composition:
        number of children (-), number of adults (-), marital status (never
        married -), 18-50 year old able-bodied adult with no children (+);
    Demographic Characteristics:
        age (younger and older -), race (nonwhite -), sex (female -), education
        level (less education -), health or disability status (poor health -);
    Year (post welfare reform +/-)].

Putting it Together: Combining the determinants of FSP participation benefits and costs, we arrive at the more reduced form determinants of Food Stamp Program participation:[15]

FSP Participation (P*) = f[
    Employment Characteristics: [3]
        employment status (employed -), employer change (-), multiple jobs (-
        ), more hours of work (-), work traditional hours (-);
    FSP Policies (+/-);
    Household Composition:
        number of children (+), number of adults (+/-), 18-50 year old able-
        bodied adult with no children (-);
    Demographic Characteristics:
        age of adults (younger and older +), health or disability status (poor
        health +), education level and on the job training level (less
        education, +), marital status (never married +), race (nonwhite +),
        sex (female +), U.S. citizenship (non-citizen -);
    Allowable Income Deductions (+);
    Economic Conditions (poor economy +);
    Year (post welfare reform +/-);
    Preferences (prefer government help+)].

The hypothesized effects (shown in parentheses) represent our hypothesized effect of the variable on food stamp participation. In many cases, there are factors pulling the hypothesized effect in both directions. For examples, individuals who are

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[15] Note that a higher cost of FSP participation results in a lower likelihood of food stamp receipt.

disabled or in poor health may have less stigma associated with FSP, but they may also face greater challenges in applying and being recertified. Additionally, while individuals with low education levels may have lower opportunity cost of their time, and lower stigma cost associated with the FSP, they may also have limited skills in "navigating the system." This conceptual model has allowed us to identify relevant variables to incorporate into our empirical model.

Section IV. Empirical Model

Our empirical analysis is designed to examine how employment characteristics affect FSP participation. We estimate the determinants of FSP participation in models that do and do not control for unobserved heterogeneity. Unobserved heterogeneity is of concern if unmeasured characteristics, such as preferences, affect both food stamp participation and employment status. For example, people who have a distaste for work may have a strong preference for transfer programs. Ignoring this heterogeneity would wrongly ascribe the part of program participation due to the preference for transfer programs to employment status. If this is the case, then models that do not control for these unmeasured characteristics would overstate the effect of employment status on food stamp participation.

We begin with a logit model of FSP participation that does not provide controls for unobserved heterogeneity (Model 1). We then control for individual-specific unobserved heterogeneity using Chamberlain's fixed effects logit model (Model 2). A comparison of Models 1 and 2 will allow us to examine how the results differ for models that do and do not control for unobserved heterogeneity and to test whether there is indeed heterogeneity using a Hausman specification test. If there is no unobserved heterogeneity, then Model 1 is the preferred specification because it is more efficient than Model 2, as explained below. These two models are discussed in turn.

Model 1: Food Stamp Program Participation Model

The Food Stamp Program participation model is based on a utility maximization framework where the net benefit of FSP participation (*P**)—the benefit minus the cost of participation—for individual *i* is a linear function of explanatory variables (X and Emp), estimated coefficients (β and δ), plus an error term (ε):

$$P_i^* = \alpha + \beta' X_i + \delta' \text{Emp}_i + \varepsilon_i$$
$$P_i = 1 \text{ if } P_i^* > 0, \text{ and } 0 \text{ otherwise}$$

[4]

Based on the conceptual model, the explanatory variables include employment characteristics that affect the benefit and cost of FSP participation, denoted by the vector Emp. The explanatory variables also include FSP policies, household composition, demographic characteristics, allowable income deductions, economic conditions and time period, denoted by the vector X.

In this analysis we do not observe the net benefit of FSP participation (P*), only whether individuals participate (P=1)—the benefit is greater than the cost—or do not participate (P=0)—the benefit is less than or equal to the cost. With this discrete outcome, we assume the error term has a logistic distribution and estimate FSP participation using a logit model. In this standard model, the probability of the two outcomes (no food stamp receipt and food stamp receipt) can be written as:

$$\text{Prob}(P_i = 0) = P_{\text{No Food Stamps, i}} = \frac{1}{1 + e^{Z_i}}$$

$$\text{Prob}(P_i = 1) = P_{\text{Food Stamps, i}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \tag{5}$$

where $z_i = \alpha + \beta' X_i + \delta' \text{Emp}_i$.

An important issue is the timing of the employment variables. Most of the employment characteristics included in the model are measured last month (*m-1*). With this timing, we measure how employment characteristics last month affect FSP participation this month. One exception is that we measure number of employer changes with two quarterly lags—number of employer changes last quarter and two quarters ago. We use this lag structure on these change variables because employer changes, which require reporting to the food stamp agency, may not result in an immediate withdrawal from the Food Stamp Program, but rather, the withdrawal may occur three months down the line if quarterly recertification is required, or six months down the line if semi-annual recertification is required. We rewrite the above equation as:

$$z_{im} = \alpha + \beta' X_{im} + \delta_1 E_{im\text{-}1} + \delta_2 EC_{iq\text{-}1} + \delta_3 EC_{iq\text{-}2}, \tag{6}$$

where *i* represent the individual, *m* represents the current month, *m-1* represents last month, and *q-1* and *q-2* represent one and two quarterly lags, respectively. The vector E represents employment characteristics measured at time *m-1* and EC represents the variables measuring the number of employer changes. In this model, the coefficients on the employment variables (δ_1, δ_2, δ_3) provide information about the relationship between employment characteristics and FSP participation.

We examine the relationship between employment and FSP participation separately before (years 1990-1992) and after welfare reform (years 1996-1999). In addition, we combine all years of data in one model and interact all of the model's covariates with a variable indicating the later (1996-1999) time period, and then conduct a Chow test for structural change across the two time periods.

The longitudinal data we use for the analysis allow us to observe individuals in multiple periods. To take advantage of these data we include persons in the model multiple times (each time observed), and adjust the standard errors for the non-independent observations.

Model 2: Food Stamp Program Participation Model with Fixed Effects

Unobserved heterogeneity is of concern if unmeasured characteristics (e.g., household preferences) affect both food stamp participation and employment status. For instance, if individuals have some unmeasured fixed characteristics that lead them to both not work and take-up food stamp benefits (e.g., a distaste for work and a taste for transfer programs), then our estimate of the effect of employment status on Food Stamp Program participation would be overstated. Consistent with this concern, Fraker and Moffitt (1988) find evidence that unobserved factors affecting employment are negatively related to unobserved factors affecting FSP participation: individuals that are less likely to work are more likely to participate in the FSP. The model described below expands Model 1 to include a component that captures this potential fixed unobserved heterogeneity component.

To show the individual-specific unobserved heterogeneity component we expand the equation for z_{im} above to:

$$\widetilde{z}_{im} = \alpha + \beta'X_{im} + \delta_1 E_{im-1} + \delta_2 EC_{iq-1} + \delta_3 EC_{iq-2} + \mu_i, \qquad [7]$$

where μ_i represents the individual-specific heterogeneity component. A standard approach for dealing with this unobserved heterogeneity term is to estimate a fixed effects model. A fixed effects logit model can be written as above:

$$P_{Food\ Stamps,\ it} = \frac{e^{\widetilde{z}_{im}}}{1 + e^{\widetilde{z}_{im}}} \qquad [8]$$

where $\widetilde{z}_{im}$ includes the unobserved individual-specific term, μ_i.

Controlling for unobserved heterogeneity using fixed effects in a discrete, nonlinear framework is not as straightforward as doing so in a linear model. "In this nonlinear model, it is not possible to sweep out the heterogeneity by taking differences or deviation from group means" (Greene 2000, p. 839). However, using Chamberlain's conditional (fixed effects) logit model we can obtain both consistent and efficient estimates.[16] Chamberlain's model controls for unobserved individual-level fixed effects by focusing on changes in each individual's food stamp participation over time. Accordingly, only individuals who change their food stamp participation status are included in the model.

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[16] Greene (2000) describes how the logit model lends itself to the fixed-effects framework, while the probit specification does not (pp. 837, 839).

More formally, Chamberlain's approach is based on maximizing a conditional logit model, where the likelihood function is conditioned on the sum of each individual's outcomes (i.e., $\sum_t p_{it}$). The conditional likelihood function can be written as:

$$L = \prod_i \text{Prob}\left[P_{i1} = p_{i1}, P_{i2} = p_{i2},...., P_{iT_i} = p_{iT} \middle| \sum_t p_{it} \right],$$ [9]

where T_i represents the number of months FSP participation is observed for person i. The estimated coefficients from this model are based on the data in which individuals change their FSP participation over the T time periods. Individuals who do not change their participation do not contribute to the conditional likelihood function. Chamberlain's model is inefficient if used when there is no unobserved heterogeneity because it often does not use all the data, among other reasons. With no unobserved heterogeneity, the standard logit estimator used in Model 1 is both consistent and efficient. However, if there is unobserved heterogeneity, the Chamberlain's conditional (fixed effects) logit is both consistent and efficient, and the standard logit model is inconsistent (Greene 2000, p. 841). We use a Hausman specification test—as recommended by Greene (2000, p. 841) specifically for use with Chamberlain's fixed effects model—to test whether there is indeed unobserved heterogeneity.

Model 2 identifies the effect of employment characteristics on FSP participation by looking at individuals who experience a change in food stamp receipt, and examining how changes in their employment characteristics are related to that change in food stamp receipt. For example, this model estimates how a person with the same employment status, same level of income, and same demographic characteristics, etc. changes his or her FSP participation with a change in hours worked.

This model is designed to provide unbiased estimates of the relationship between employment status and food stamp participation if individuals' unobserved components are fixed overtime. That is, the model can only eliminate bias from unobserved characteristics that are fixed over time, not unobserved characteristics that change over time. Additionally, the model does not control for the possibility of reverse causation—that the Food Stamp Program affects employment status. Although these limitations exist, this analysis examines unique employment outcomes and takes steps to control for potential endogeneity that has been given limited attention in the literature.

Study Population

Our primary study population is working-aged adults (age 18 through 59) ever observed living in a low-income household. In this analysis, a low-income household is defined as one in

which the household is below 175 percent of the poverty threshold and readily available assets are less than or equal to $4,000, or $5,000 if at least one household member is age 60 or older.[17]

This study population is a trade-off between a population that is too broadly defined and a population that is too narrowly defined. If the study population is defined too narrowly, then it likely results in select group of individuals. Individuals at the margin can slightly alter their behavior to become eligible for benefits, so if the elasticity of labor supply does not equal zero, the pool of persons that should be examined as eligible is larger than those who would actually qualify for the program under current income and asset limits (Ashenfelter 1983). Suppose, for example, that in the absence of the FSP the economic status of two households is identical, with both households having incomes and assets that are slightly above the current FSP eligibility criteria. Now suppose food stamps are made available to these two households. The members of the first household enjoy working and have a strong distaste for welfare programs, so the introduction of food stamps does not changed their behavior. Conversely, the members of the second household have a distaste for work and a taste for welfare programs, so the introduction of food stamps reduces their work effort making them eligible to collect food stamp benefits. In this example, narrowly defining the study population to be food stamp eligible households will result in a study population that has an above average distaste for work and taste for welfare programs (i.e., a select population), which in turn can lead to biased estimates of the effect of employment characteristics on FSP participation. If, on the other hand, the study population is defined too broadly, the estimated effect of employment characteristics on FSP participation may be washed out even if the effect on low-income households is substantial.[18,19]

Our primary study population of adults ever observed living in a household below 175 percent of the poverty threshold (and readily available assets of $4,000 to $5,000) was designed with these two competing concerns in mind.[20] To test the sensitivity of our results to our choice of study population, we carry out our multivariate analysis with a more restricted secondary population. This secondary population is defined as adults ever observed living in a household below *130 percent of the poverty threshold* (and readily available assets of $4,000 to $5,000), which more closely approximates the food stamp eligible population.

By using both income and assets as inclusion criteria, we ensure that the sample excludes short-term low-income, high asset households (such as professors in summer). We use persons *ever* observed living in a low-income household, as opposed to living in a low-income household

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[17] Readily available assets include checking, savings, money market, non-retirement stocks (1990 SIPP panel only), and bonds.

[18] Grogger (2000, p.11) argues a similar point in his analysis of welfare reform and time limits.

[19] Gleason et al. (1998) do not limit their study population based on income or assets. They use (1) adults over age 18 and (2) households as the unit of analysis, but the main focus is on the analysis of adults. In general, they find similar results for the two populations.

[20] The average income-to-needs ratio for individuals in this study population who are not food stamp recipients is 2.6.

in a particular month or year, because it allows us to capture a population that does not change over the panel and exploits the longitudinal nature of our data. By observing people in multiple time periods, we can examine how FSP participation changes under alternative employment patterns and statuses.

Section V. Data

Our analysis uses data from the 1990 and 1996 panels of the Survey of Income and Program Participation (SIPP). The SIPP is designed for use in program planning and policy analysis and has been identified as a "principal data source" for conducting research on food assistance and nutrition program outcomes (Logan, et al. 2002). We use the (monthly) core SIPP data as well as the SIPP topical modules on work schedules and migration history. We supplement the SIPP data with FSP policy variables from Kabbani and Wilde (2003) and Kornfeld (2002), monthly state unemployment rates from the U.S. Department of Labor (2001) and quarterly real Gross Domestic Product (GDP) from the U.S. Department of Commerce (2001). The SIPP data and variables generated from them are discussed in turn below.

Each panel of the SIPP is a nationally representative (non-institutional) sample of households whose members are interviewed at four-month intervals (waves) over approximately a two- to four-year period. The sample sizes range from 21,900 households in the 1990 panel to 36,700 households in the 1996 panel. The 1990 SIPP provides data from December 1989 through August 1992 and brings the benefits of capturing food stamp participation prior to welfare reform. The 1996 SIPP panel is the most recently available and provides data from December 1995 through March 2000, allowing us to capture food stamp participation post-welfare reform. While federal welfare reform was not signed into law until August 1996, many states changed their welfare programs under federal waivers prior to 1996, so we broadly refer to our later sample period as post-welfare reform.

A primary strength of the SIPP lies in its monthly data on Food Stamp Program participation, employment, income, and household composition. At each interview, data are collected on these and other variables for each of the preceding four months. Food stamps are received monthly, not annually, so the monthly SIPP data allow us to examine participation over the same time that benefits are received. These monthly SIPP data allow for detailed analyses of the relationship between monthly employment characteristics and monthly food stamp receipt. The SIPP work schedule topical module identifies whether individuals work traditional or nontraditional hours. The work schedule topical module is included in the fourth wave of the 1990 panel and the fourth and tenth waves of the 1996 panel. The SIPP migration history topical module measures whether an individual is a U.S. citizen. This module is included in the second wave of

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the 1990 and 1996 panels. The SIPP also captures the current Hispanic and immigrant populations, which may be particularly important in examining food stamp participation and changes in participation over time.

Studies of welfare program dynamics (i.e., AFDC/TANF and food stamps) using SIPP data have been concerned with the "seam phenomenon"—transitions are more likely to occur between interview waves than months within the same wave. Some studies have used wavely data rather than monthly data, although several researchers have used monthly data (Blank and Ruggles 1996; Fitzgerald 1991; Gleason, et al. 2000). To control for the seam phenomenon in their monthly analyses, Blank and Ruggles and Fitzgerald include a dummy variable that identifies the seam month. As a primary strength of the SIPP lies in its monthly data, we too use the monthly data and include a dummy variable to control for the seam month (reference month one).[21] The seam phenomenon is of less concern in our logit analysis, which focuses on FSP participation, than in an analysis that focuses on transitions into and out of the FSP. Also, to avoid errors in the reporting of food stamp receipt, we smooth food stamp receipt in the SIPP so that a household must remain in or out of the Food Stamp Program for at least two months before we consider it a change in food stamp receipt status.

Underreporting is a concern when using survey data to analyze food stamp receipt. Estimates suggest that the SIPP underreports food stamp receipt by seven percent to 19 percent (Cody and Tuttle 2002; Bitler, Currie and Scholz 2002). Cody and Tuttle provide a of range of seven percent to 19 percent (p. 21), while Bitler et al. estimate food stamp receipt is underreported by 10 percent (p. 13).[22] Both of these studies compare the SIPP to the Current Population Survey (CPS) and find that the underreporting of food stamp receipt is lower in the SIPP than in the CPS. Cody and Tuttle, for example, find that the CPS underreports food stamp receipt by 26 percent to 37 percent (p. 21). While estimates suggest that food stamp underreporting is smaller in the SIPP than CPS, the estimated underreporting in the SIPP is not negligible. One could consider adjusting the SIPP data to account for the underreporting, but this requires understanding the root cause(s) of the underreporting. Cody and Tuttle's analysis suggests that "it may not be possible to identify the root causes [of the underreporting]" and that "underreporting is most likely the result of multiple causes, making it [] difficult to identify the right adjustment" (p. 28). These authors also suggest that choosing the wrong adjustment strategy could lead to greater biases (Cody and Tuttle 2002, p. 25).

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[21] The seam phenomenon may be a lesser concern when examining the food stamp program as compared to other programs. Food stamp entry and exit rates derived from SIPP data are close to the rates derived from administrative data, which is not the case with other programs, such as the Social Security program (Citro and Michael 1995, 419).

[22] Estimates suggest that underreporting is lower in the 1996 SIPP panel than in the 1990 SIPP panel (Cody and Tuttle 2002, p. 23).

Bitler et al. (2002) also examine underreporting of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in the SIPP and find that the SIPP underreports WIC participation to a greater extent than FSP participation—25 percent versus 10 percent, respectively (p. 13). Their analysis further suggests that the underreporting of WIC participation in the SIPP is randomly distributed across categorically eligible WIC groups (Bitler et al. 2002, p. 15), suggesting that any bias from the underreporting is likely to be small.

The longitudinal nature of the SIPP creates a concern of attrition bias. Research suggests that poorer persons are more likely to leave the SIPP sample prior to the end of the panel (Citro and Michael 1995, p. 414-15). However, even with this limitation, the National Research Council Panel on Poverty and Family Assistance recommends that the SIPP replace the March CPS to become the official source of U.S. poverty statistics (Citro and Michael 1995, p. 391), suggesting that the SIPP is a strong data set for studying the low-income population. The SIPP's strengths—relatively high reporting of food stamp receipt and monthly data on FSP participation, income, and family composition—likely outweigh the attrition bias drawback.

To account for nonresponse sample attrition and a complex sample design, we use SIPP person weights throughout the descriptive analyses. Similar to Gleason et al. (1998), we do not use weights in the multivariate analyses because the sampling probabilities for sample member subgroups are defined by our explanatory variables and are not defined by our dependent variable (DuMouchel and Duncan 1983, as cited by Gleason, Schochet, and Moffitt 1998).

Variables Used in the Analysis

Using data from the 1990 and 1996 SIPP, we measure the variables discussed in the conceptual model. Food Stamp Program participation, our dependent variable, is measured as a dichotomous variable that takes the value one if an individual participates in the Food Stamp program during the current month and zero otherwise[23]. The unit of analysis for defining participation in the Food Stamp Program is the SIPP household, as food stamp eligibility and benefits are calculated at the household level.[24]

Although working age adults are our primary study population, many of the explanatory variables are defined at the household level because, as mentioned, food stamp eligibility and benefits are calculated at the household level. The characteristics of both the adult and other household members will affect whether the household and thus

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[23] To define FSP participation, we use the response to a SIPP survey question that asked all persons age 15 or over if they received food stamps sometime during the reference month.
[24] A SIPP household consists of all persons who occupy a housing unit, including all unrelated persons.

the working age adult participates in the Food Stamp Program. The unit of observation for the dependent and explanatory variables is person-month.[25]

Employment Characteristics. The household's employment status is measured with three variables that capture varying degrees of household employment.[26] The first variable measures whether someone, but not everyone in the household was employed last month (had a job at least one week of the month). The second variable measures whether everyone in the household was employed but not everyone was working full time (more than 35 hours per week). The third variable measures whether everyone in the household was employed and working full time. These variables are interpreted relative to the omitted employment category, no household member employed last month.

We use two variables to capture whether households worked traditional (regular daytime) hours last month.[27] These two variables are also based on households' attachment to the labor force, where we only define a household as working traditional hours if all adult household members worked full-time—more than 35 hours per week. With this requirement, the traditional hours variables are designed to identify households where adults are the most likely to have difficulty getting to the food stamp office because of their work schedule. The first variable measures whether *all* household members worked traditional hours (in a household where all adults worked full-time), and the second variable measures whether *some, but not all,* adult household members worked traditional hours (in a household where all adults worked full-time). These variables are interpreted relative to the omitted category which includes individuals in households where (1) all adults in the household are employed full-time, but no one works traditional hours or (2) at least one adult in the household is *not* employed full-time. The traditional hour variables are only available in the work schedule topical module administered during waves four (1990 and 1996 panels) and 10 (1996 panel). To incorporate them into our monthly data, we assume that households that worked traditional hours in the months observed, also worked traditional hours in all other months of the panel (1990 panel) and in surrounding months (1996 panel).[28]

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[25] As discussed in the empirical model section, the standard errors in the multivariate analysis are adjusted to account for multiple observations per person.

[26] We use a household-level measure of employment because employment of anyone in the household can affect whether an individual participates in the Food Stamp Program. For each adult in our study population, our monthly employment variable captures whether anyone in his or her household had a job at least one week in the month.

[27] If an individual reports working evening, night, rotating, split, or irregular hours, then he/she is defined as working non-traditional hours.

[28] In the 1996 SIPP panel, we extrapolate the traditional hours variable from wave four to waves one through six, and from wave 10 to waves seven through 12.

Three variables capture the remaining employment characteristics—hours worked, number of jobs held, and employer changes. We measure the total number of hours all adult household members worked last month, the total number of jobs all adult household members held last month, and the number of employment changes the household had last quarter and two quarters ago. We measure the number of employment changes over the past two quarters because a change in employment, which requires reporting to the Food Stamp agency, may only affect participation three months down the line if quarterly recertification is required, or six months down the line if semi-annual recertification is required.

Income Measures. To better isolate the employment-related cost components of food stamp participation, we include a household income volatility measure in all estimation models and a total household income measure in some estimation models. As described in the conceptual model, households with individuals who have frequent employment changes will experience a higher cost of participation and thus be less likely to participate than households whose members have steady jobs, all else equal. But, without holding all else equal, households with frequent employment changes may have less stable income and so be more likely to participate. Our analysis isolates some of the cost component of frequent employment changes by holding constant household income volatility. We use the coefficient of variation measured over the past year as our income volatility measure.[29]

Total household income is an important determinant of the food stamp benefit amount and thus participation. While our empirical models control for income by holding constant income's reduced form determinants (as described in the conceptual model), we also estimate a secondary set of models that include a measure of total household income in the past month. The concern is that if income is not fully controlled for in the reduced form model, then the employment characteristics in our empirical model might reflect both the costs and benefit of participation, not only the cost.

FSP Policies. We include measures of Electronic Benefit Transfer (EBT) and recertification periods from 1990 through 1999. The EBT variable measures the proportion of the fiscal year in which a statewide EBT system was in effect (Kornfeld 2002). The two recertification periods variables, which are derived from the Food Stamp Quality Control (QC) data, measure the proportion of working food stamp recipients with a one to three month recertification period and the proportion of working food stamp recipients with a four to six month recertification period (Kabbani and Wilde 2003).

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[29] The coefficient of variation, as measured over a year, is the standard deviation of income over the year divided by the mean of income over the year.

Allowable Income Deductions. Allowable income deductions are imperfectly measured in the data. Excess shelter costs are captured in part by variables measuring the region of the country the household lives in and whether the household lives in a metropolitan area. Medical expense deductions for elderly or disabled household members are captured in part by variables measuring whether any household member is over age 60 in the current month and whether anyone in the household is disabled in the current month. While this is imperfectly measured, 2001 data show that only 13 percent of elderly and seven percent of disabled FSP participating households take a deduction for medical expenses (U.S. Department of Agriculture 2003, p. 44). We do not have information on households that take the dependent care deduction, but this is not of particular concern because like the medical expense deductions, few households take the deduction. For example, only 14 percent of food stamp households with earnings took the dependent care deduction in 2001 (U.S. Department of Agriculture 2003, p. 44).

Household Composition. Household composition is well captured in the data with the following variables. Household headship is captured with two variables measuring whether the household is headed by a single female or a single male in the current month. These variables are interpreted relative to a two-adult headed household, the omitted category. Household composition is further captured with variables measuring the number of adults in the household, the number of children in the household, and whether the individual is an able-bodied (i.e., non-disabled) adult between ages 18 and 50 living in a household without children, elderly, or disabled members. The latter category follows FSP rules in capturing able-bodied adults without dependents (ABAWDs) between the ages of 18 and 50. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) limited this group of ABAWDs to three months of food stamps in any three year period unless they were working (Dagata 2002).

Demographic Characteristics. Demographic characteristics for our working-age adult (18 through 59) study population are measured during the current month and at the individual-level. Age is measured with indicator variables capturing whether the adult is under age 25, age 26 through 35, or age 36 through 45. These variables are interpreted relative to age 46 through 59, the omitted group. As mentioned, we also include indicators of whether anyone in the household is age 60 or over or disabled. Gender is measured with a variable indicating whether the individual is a female (male being the omitted group). Race and ethnicity are measured with indicators of whether the individual is non-Hispanic black or Hispanic, where non-Hispanic white is the omitted group. Education level is captured with variables measuring whether the individual has a high school education (diploma or equivalent) or has more than a high school education. These variables are interpreted relative to less than a high school education, the omitted group. We also measure whether the adult has never been married and whether the adult is a U.S. citizen. Since U.S. citizenship is provided at only one point in time, we assume

individuals that were U.S. citizens in the month observed, also were U.S. citizens in all other months of the panels.

Household Preferences. Household preferences are captured to some extent with household composition, demographic characteristic, region, and metropolitan area variables. In fixed effect models, time-invariant household preferences are fully controlled for with individual-level fixed effects.

Economic Conditions. Economic conditions are measured with monthly state unemployment rates (not seasonally adjusted) from the U.S. Department of Labor (2001) and quarterly real gross domestic product (GDP) from the U.S. Department of Commerce (2001).

Section VI. Results

In response to declining FSP participation rates and using the flexibility brought about by the 1996 federal welfare reform, states are changing their food stamp programs to improve accessibility, especially for low-income working persons. Knowledge of the detailed employment characteristics of low-income working households and the factors that make some adults choose to participate in the Food Stamp Program and others not participate are important to inform policy decisions. The descriptive results below describe the detailed employment characteristics of low-income households and the multivariate results measure the factors that affect participation.

Both the descriptive and multivariate analyses are based on our study population of working-age adults (age 18 through 59) *ever* observed living in a low-income household.[30] Our study population is broader and more constant than a population of individuals eligible to participate in the FSP in a given month. This study population ensures that the population is constant over time and not selected based on behavior and thus potentially biased.

Descriptive Results

While it is well known that fewer Food Stamp Program participants have earnings, compared with non-participants, it is less widely recognized that the nature and characteristics of employment is distinctive even for those participants who work. We begin the descriptive results by confirming that key FSP participation and employment trends described in the Introduction exist for our study population. We then describe the detailed employment characteristics of our study population of ever-low-income FSP participants and non-participants, one of this study's contributions to the literature.

Food Stamp Program Participation and Employment

Consistent with well known trends in the literature, in our study population of working-aged adults in ever low-income households, household employment increased from 1990 to 1999 (Figure 1), the percentage of food stamp participants declined from 1990 to 1999 (Figure 2), and the characteristics of FSP participants changed to include a larger share of working households (Figure 3). Among our study population, FSP

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[30] The study population and our definition of a low-income household are provided in the Study Population section of the paper.

participants are far less likely to live in a working household than non-participants. While 51.5 percent of FSP participants have a household member who is employed, 91.5 percent of non-participants do (Table 1).[31] This descriptive analysis shows that the employment of low-income FSP participants and non-participants has changed over the last decade, which is something we examine more thoroughly in the multivariate analysis below. We now examine the detailed employment characteristics of low-income households in our study population.

Detailed Employment Characteristics of Low-Income Households

Differences between FSP participants and non-participants go beyond whether they live in employed households. The nature and characteristics of employment are distinctive even for those participants who live in working households. Among adults living in a working household in our study population: FSP participants (compared with non-participants) are more likely to live in households where employment levels are lower, adults are less likely to work traditional daytime hours, and employment instability is higher. These differences are presented in Table 1 and described in further detail below, along with the detailed employment characteristics of all adults in working households in our study population. Table 1 presents results for the 1996 through 1999 and 1990 through 1992 time periods. The text below focuses on the 1996 through 1999 time period, using person-months as the unit of observation.

Employment Status: In our study population, 88.5 percent of adults live in working households (someone in the household is employed this month). Among adults in working households in our study population, the majority (59.2 percent) live in a household where all adults are employed, making it potentially difficult for these individuals to visit food stamp offices. More specifically, 40.7 percent live in a household that has someone but not everyone employed, 45.6 percent live in a household that has everyone in the household employed, but not everyone working full time (more than 35 hours per week), and 13.6 percent live in a household that has everyone in the household employed and working full time (Table 1, column 1).

As summarized above, food stamp participants are more likely to live in working households with lower levels of employment than non-participants. Participants are more likely to live in a working household with someone but not everyone employed (51.9 percent versus 40.2 percent) than in a household where everyone is employed (1.7 percent versus 14.2 percent, Table 1).

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[31] Results from a study population using a lower-income cut off—ever 130% of poverty rather than 175% of poverty—are qualitatively similar. For example, 50.7 percent of FSP participants have a household member who is employed, while 90.3 percent of non-participants do.

Traditional versus Non-Traditional Hours: The majority of adults in working households in our study population live in households where all adults work full-time and some, but not all adults work traditional hours (53.9 percent, Table 1 column 1). Further, more than one in four live in households where all adults work full-time and traditional hours (26.2) and so could have difficulty visiting food stamp offices open only during traditional hours. The remaining 20 percent of adults live in households where no adults work traditional hours or not all adults are employed full-time.

There are differences in the household employment patterns of FSP participating and non-participating in our study population. Participating adults are more likely than non-participating adults to live in households where all adults are working full-time and no adults are working traditional hours (34 percent versus 19 percent), and less likely to live in households were some but not all adults are working traditional hours (47.0 percent versus 54.2 percent) or all adults are working traditional hours (19.0 percent versus 26.5 percent).

Other Employment Characteristics: On average, adults in working households in our study population live in households where adults work a combined total of 129 hours per month in 1.7 jobs (Table 1, column 1). Again, the household employment level is lower for FSP participants than non-participants. Participants live in households that work an average of 87 hours per month in 1.3 jobs, while non-participants live in households that work an average of 131 hours per month in 1.7 jobs (Table 1, column 2). Employment instability also appears to be higher in participating households than non-participating households, as measured by the number of employment changes the household had last quarter (0.66 versus 0.52, respectively).

In summary, the descriptive results show that trends in our study population of working-aged adults in ever-low-income households are consistent with key trends and characteristics of food stamp households detailed in Cunnyngham (2002), Gleason et al. (1997 and 2000), Ponza et al. (1999), and U.S. Department of Agriculture (2003). From the early to late 1990s, household employment increased, the percentage of food stamp participants declined, and the characteristics of FSP participants changed to include a larger share of working households.

Our distinct contribution to the literature comes from looking beyond general employment characteristics to describe the detailed employment characteristics for these populations. We find that roughly 90 percent of our sample of working-aged adults in ever-low-income households live in households where at least one adult is working. Generally, all adults are not working full-time in these working households. Among adults in working households, the majority (80.1%) live in households where someone works traditional hours (and all adults work full-time), and more than one quarter live in

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households where all adults work traditional hours and full-time. Food stamp recipients are less likely than non-recipients to live in households where adults work traditional hours and full-time. In addition, food stamp recipients have higher levels of employment instability than non-recipients.

These descriptive findings provide some evidence that detailed employment characteristics are related to FSP participation. We turn to the multivariate results to measure the conditional relationship between employment characteristics and FSP participation and to begin disentangling the participation costs associated with employment characteristics from the benefits.

Multivariate Results: The Determinants of FSP Participation

The multivariate results measure the relationship between employment characteristics and FSP participation while controlling for income measures, FSP policies, household composition, demographic characteristics, economic conditions, geographic characteristics, and the year.[32] In the fixed effects model specifications, time-invariant individual-level unobservables also are controlled for.

Mid- to Late-1990s (1996-1999)

The results of our multivariate analysis based on the 1996 SIPP panel, which represents the 1996 through 1999 time period, suggest that detailed employment characteristics are important determinants of Food Stamp Program participation.

Logit versus Fixed Effects Logit: A comparison of the logit and fixed effects logit results (which do not and do control for individual-level unobserved heterogeneity, respectively) reveals some similarities but also important differences. The signs on the employment variable coefficients and levels of statistical significance are consistent across the two models, making the employment findings qualitatively similar across models. However, the magnitude of the coefficients on most employment characteristic variables are significantly different across the models. For those employment coefficients that differ significantly across the models, the (absolute) magnitude of the coefficients are generally smaller after controlling for unobserved heterogeneity in the fixed effects model,[33] which is consistent with our expectations as described in the empirical model section (Section IV). Suppose, for example, the unobserved characteristic (i.e., heterogeneity) is individuals' preferences, where individuals who have a distaste for work also have a strong preference for transfer programs. In this case,

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[32] A correlation matrix shows that the employment characteristic variables are not highly collinear—only three of the correlation coefficients are above 0.4 (in absolute value).
[33] The one exception is the coefficient on "number of hours worked last month," which is –0.003 in the logit model and –0.004 in the fixed effect logit model.

ignoring this unobserved heterogeneity (which is done in the logit model) wrongly ascribes the part of program participation due to the preference for transfer programs to employment status, thereby overstating the effect of employment status on food stamp participation in the logit model.

Many demographic variable coefficients also differ across the logit and fixed effects logit models. Hausman tests between the logit model and the fixed effects logit model provide evidence to reject the hypothesis that the coefficients from these two models are the same.[34] Since the fixed effects logit models are preferred to the more basic logit models, the discussion below focuses on the results of the fixed effects models.

Household Income: Household income is an important determinant of FSP benefits, so without controlling for income, employment characteristics will reflect both the benefit and cost components of FSP participation. To better isolate the cost component in our employment measures, the models include the reduced form controls for income identified in the conceptual model. As described in our specification checks below, we also include a direct control for income in some specifications and find similar results.

Employment Characteristics: The results presented in Table 2 show that household employment status and the times that household members work (i.e., traditional daytime hours versus evening or weekend hours) influence FSP participation (Table 2, columns 4-6). Individuals in households with an employed adult(s) are less likely to participate in the FSP than individuals in households with no employed adult. Not surprisingly, the level of adult household members' employment (as measured in the prior month) also plays a role. Individuals in households where all adult household members were employed full-time last month are the least likely to participate in the FSP this month. This is followed by individuals in households where all adult household members were employed, but not full-time, and then by individuals in households where some, but not all, adult household members were employed.

The magnitudes of these effects are quite large. For example, living in a household where all adult household members were employed but not all were working

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[34] In many cases, the covariance matrix of the differences between the fixed-effect logit and logit models was not positive definite, violating the asymptotic assumptions of the Hausman test. The differences between the diagonal elements of the covariance matrices were close to zero and often negative. This provides evidence that the fixed-effect logit estimates are as efficient as the logit estimates, that the test statistic is essentially infinitely large, and that the null hypothesis of equal fixed-effect logit and logit parameters should be rejected. In addition, in specifications where the Hausman test did not violate the asymptotic assumptions, the test statistic was large, clearly rejecting the hypothesis that the coefficients from the fixed-effect and non-fixed effect models are the same.

full-time versus living in a household where no adult household members were employed, reduces the probability of participating in the FSP by 53.5 percent (1 minus the odds ratio of 0.465 is 0.535, or 53.5 percent).[35] Living in a household where some, but not all, adults were employed versus living in a household where no adult household members were employed reduces the probability of participating in the FSP by 39.9 percent.

One might think that these results indicating that more attachment to the labor force lowers food stamp participation reflect the lower food stamp benefits associated with working (as a result of higher income) rather than the higher food stamp costs associated with working. However, these results are generated from an individual-level fixed effects model that helps to sort cost effects from benefit effects. This fixed-effect model identifies how, on average, a person's food stamp participation changes as his or her employment status changes over time, while controlling for factors such as income, FSP policies, household composition, demographic characteristics, economic conditions, geographic characteristics, and time period (year).[36] Thus, we are able to measure the effect of an employment status change for the same person with the same income, same household composition, same other employment characteristics, etc. Because this model measures the effect of employment status while holding constant the key determinants of food stamp benefits, it most likely measures the costs associated with employment status changes, not the benefits. This same *within person* interpretation holds for all results generated for the (individual-level) fixed effects logit model.

Among individuals in households where all adults are employed full-time, individuals in households where adults work traditional daytime hours are less likely to participate in the FSP than individuals in households where adults work nontraditional hours. Recall that we measure traditional daytime work hours with two variables: (1) all adult household member worked full-time and *all* worked traditional hours, and (2) all adult household member worked full-time and *some, but not all*, worked traditional hours.[37] Our finding that living in a household where adults work traditional daytime hours versus nontraditional hours decreases the probability of FSP participation suggests

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[35] The odds ratios are the exponentiated values of the estimated coefficients. For an explanatory variable, the odds ratio tells us how a one unit change in that explanatory variable affects the probability of participating in the FSP relative to not participating in the FSP. Odds ratios that are greater than one indicate that the coefficient on that variable was positive and, therefore, that a one unit change in the variable increases the probability of participating in the FSP. On the other hand, odds ratios that are less than one indicate that the coefficient on that variable was negative, and that a one unit change in the variable decreases the probability of participating in the FSP.

[36] The specification presented in Table 2 controls for the reduced form determinants of income.   The specification presented in Table A2 explicitly controls for income and finds similar results.

[37] These variables are interpreted relative to the omitted category made up individuals in households where (1) all adults in the household are employed full-time, but no one works traditional hours or (2) all adults in the households are *not* employed full-time.

that working traditional daytime hours makes it difficult for individuals to get to the food stamp office to apply for and recertify for food stamp benefits during typical hours of operation. As discussed above, these findings are generated from the individual-level fixed effects model, which is based on differences within people over time, thereby suggesting that as household members work moves towards more traditional hours, household members are less likely to participate in the FSP.

The other four employment variables are also significantly related to FSP participation (Table 2, columns 4-6). Number of jobs held by adult household members and the number of hours worked by adult household members are both negatively related to FSP participation. Since the model controls for employment status, these variables capture the relationship between these employment characteristics and FSP participation for the group of low-income working adults. The odds ratio of 0.86 for number of jobs held by adult household members, for example, suggests that increasing the number of jobs held by one will decrease the probability of participating in the FSP by 0.140 (1 minus 0.86), or 14.0 percent.[38] Increasing by one the number of hours worked by adult household members is found to decrease the probability of participating in the FSP by 0.004, or 0.4 percent. Both of these effects are in the hypothesized direction. Recall from the conceptual model that an increase in the number of jobs or work hours is hypothesized to increase the cost of participation, thereby decreasing the net benefit, and likelihood, of FSP participation.

Our final employment variables measure the number of employer changes for adult household members over the last quarter (q-1) and two quarters ago (q-2). The results suggest that an additional employer change increases the probability of FSP participation—by 5.4 percent if the change occurred in the last quarter and by 2.4 percent if the change occurred two quarters ago. This result is not in the hypothesized direction, as employer changes were hypothesized to increase the cost of FSP participation. It may be the case that persons with many employer changes have less stable income and food security (Lerman and Wiseman 2002) and are therefore more likely to need the Food Stamp Program. While the model does include a measure of income volatility, this variable may not fully control for the food security of working low-income households.

Income Volatility: We include a measure of household income volatility over the past year to better isolate the employment-related cost components of food stamp participation. As described in the data section, income volatility is measured using the coefficient of variation. We find that indeed, an increase in income volatility increases the likelihood of FSP participation. The odds ratio of 1.064 suggests that a one standard

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[38] As discussed below, in specifications that explicitly include income (rather than their reduced form determinants of income) this one coefficient goes to zero; however, the coefficients on the other eight employment variables are qualitatively similar and remain statistically significant.

deviation increase in income volatility increases the probability of FSP participation by 6.4 percent. Including this measure of income volatility in the model does reduces the size of the coefficient on the number of job changes, but as mentioned above, it remains positive and significant.

Food Stamp Policy Variables: Our analysis shows that state recertification periods are related to FSP participation (Table 2). We measure state recertification policies in each year with three variables: the proportion of the working FSP population subject to a (1) one to three month (short) recertification period, (2) four to six month (medium) recertification period, and (3) seven plus month (long) recertification period (omitted group). Somewhat surprisingly, we find that the coefficient on the short certification period variable is not statistically different from zero, suggesting that FSP participation is not influenced by whether the state has a short or long recertification period. [39] However, we find that the coefficient on the four to six month (medium length) recertification period is significant and in the hypothesized direction. That is, we find that individuals who face a medium-length recertification period are less likely to participate in the FSP program than individuals who face a longer recertification period. The results suggest that a one unit increase in the percent of FSP participants who are subject to a medium-length recertification period, decreases the probability of FSP participation by about 0.3 percent. In addition, we find that the presence of EBT is not significantly related to FSP participation.

Earlier studies examining the relationship between FSP participation and FSP policies have found that shorter recertification periods reduce FSP participation. Our results differ somewhat from earlier studies, as, for example, Kornfeld (2002) and Kabbani and Wilde (2003), find that one to three month (short) recertification periods reduce FSP participation relative to longer duration recertification periods. While there are differences between our findings and earlier findings, the studies, taken together, suggest that long recertification periods are associated with higher FSP participation.

Demographic Characteristics and Other Control Variables: FSP participation is related to household- and individual-level demographic characteristics, as well as economic and geographic characteristics. Characteristics of the household, including

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[39] We attempted to sort out this relationship by estimating an additional specification that includes a set of interactions between the state-level recertification variables and the employment status variables. The relationship between the length of recertification and FSP participation may vary with employment because shorter recertification periods are targeted at working households. The results of this model suggest that both short and medium-length recertification periods reduced FSP participation among adults in households where (1) all adult members were employed, but not full-time, last month and (2) some, but not all, adult members were employed last month. This model, however, also suggests that short and medium-length recertification periods increase FSP participation among individuals in households where all adult members were employed full-time last month, which is contrary to our expectation.

household headship, number of adults, number of children, and disabled person in households, are significantly related to FSP participation (Appendix Table A1). We find, for example, that individuals in single female-headed households are the most likely to participate in the FSP, followed by individuals in single male-headed households, and then by persons in two-adult households. Since these findings are generated from the fixed effects model, they suggest that has as individuals move from two-adult headed households (or single male-headed households) to female-headed households, they are more likely participate in the Food Stamp Program.

We capture the FSP rule related to ABAWDs by identifying able-bodied adults age 18 to 50 who are living in households without children, elderly, or disabled members. The costs of participating should be higher for these able-bodied adults without dependents (ABAWDS) because they must be working or in a training program other than job search in order to receive benefits for more than three months in a 36-month period (U.S. Department of Agriculture 2002a). Consistent with this hypothesis, we find that these able-bodied adults are less likely to participate in the FSP than their counterparts who are not identified as ABAWDs. Additionally, we find that individuals in households with more adults are less likely to participate in the FSP, while individuals in households with more children are more likely to participate in the FSP. Finally, the results suggest that living in households with an adult age 60 or over or with a disabled person increases the likelihood of FSP participation.

In terms of economic characteristics, we find that higher unemployment rates lead to increased FSP participation and that higher GDP leads to reduced FSP participation, as hypothesized. Living in a metropolitan area reduces participation. Looking across the years in the 1996 SIPP panel (1996-1999), we find that FSP participation was higher in 1996 and 1997 as compared to 1998 and 1999.

Alternative Specifications: To assess the robustness of our results, other specifications were examined. Our first additional specification includes a measure of household income in the prior month. As described in the conceptual model, household income is an important determinant of the food stamp benefit amount and thus participation. Although our primary model (presented in Table 2) controls for income by holding constant income's reduced form determinants, we estimate a second model that includes household income. A comparison of the individual-level fixed effects logit models that exclude and include household income, shows that the results are quite similar (Appendix Table A2). The primary difference is that the coefficient on the number of jobs held by adult household members goes to zero, suggesting that the number of jobs may affect FSP participation through income.

A second specification limits the sample to a more economically disadvantaged subgroup of adults. We limit the sample to adults ever observed living in a household below *130 percent of the poverty threshold,* whereas the main models are estimated on our study population of adults ever observed living in a household below *175 percent of the poverty threshold.* Our study population (175 percent) has the advantage of not being overly restrictive, but it introduces the concern that a considerable share of the population is not eligible for the Food Stamp Program and would become eligible only if they experienced a large income change. This more restrictive sample addresses this concern. The results of the model estimated with this subpopulation are very similar to the models estimated on our broader study population (see Appendix Table A3). The one noteworthy difference is that the presence of the EBT program is found to increase FSP participation for this more economically disadvantaged subpopulation, where it is found to have no impact on FSP participation on our broader study population. Finally, we estimate state-level fixed effects logit models, and find that these results are, by and large, similar to results from the logit model.[40]

Comparison of 1996-1999 and 1990-1992 Time Periods

Our analysis shows that there are differences in the factors influencing FSP participation in the pre- and post-welfare reform periods—the years covered by the 1990 SIPP panel (1990-1992) and the years covered by the 1996 SIPP panel (1996-1999). A Chow test comparing results across the two time periods rejects (at the one percent level) the hypothesis that the coefficients are the same across these two time periods. We find that household employment characteristics affect FSP participation in both the early 1990s and in the late 1990s; However, in general, the magnitude of these effects (in absolute value) are larger in the early 1990s than in the late 1990s. This result is consistent with the general observation that the FSP was less amenable to working participants in the early 1990s than in the late 1990s.

Like the 1996 SIPP panel results, the 1990 SIPP results show that individuals in households with an employed adult(s) are less likely to participate in the FSP than individuals in households with no employed adult (Table 3).[41] The level of employment matters in the early 1990-1992 period, as it did in the 1996-1999 period. Individuals in households where all adult members were employed full-time in the past month are the

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[40] Exceptions include the state-level variables included in the model—monthly state unemployment rates and state policy variables.
[41] The models presented in Table 3 do not include variables that identify whether household members work traditional versus non-traditional hours. The 1990 SIPP panel provides work schedule information (i.e., traditional vs. non-traditional work hours) only once during the panel, so it is not possible to identify the effect of work schedules on FSP participation in a fixed-effect logit model. The fixed-effect logit model requires changes in the independent variable over time to identify the effect of the independent variables on the dependent variable.

least likely to participate in the FSP in the current month, followed by individuals in households where all adult household members were employed, but not full-time, and then by individuals in households where some, but not all, adults household members were employed. Across these three employment status variables, the magnitudes are larger in the earlier period. For example, living in a household where all adult household members were employed, but they were not all working full-time, versus living in a household where no adult household members were employed, reduces the probability of participating in the FSP by 54.5 percent in the 1996-1999 period, but by 70.2 percent in the 1990-1992 period. Consistent with the 1996 SIPP panel results, the 1990 SIPP panel results show that an increase in income volatility increases the likelihood of FSP participation.

With regard to state recertification policies, there are differences across the early and late 1990s. Unlike the 1996 SIPP panel results, the 1990 panel results show that an increase in the proportion of the working FSP population subject to short and medium-length recertification periods (as compared to long recertification periods) reduces FSP participation, as expected.[42] The magnitudes of the effects are substantially larger in the earlier 1990s as compared to the late 1990s.

This multivariate analysis has examined the relationship between FSP participation and employment characteristics, FSP policies, household composition, demographic characteristics, and economic conditions. We estimate fixed effects logit models as a way to control for time-invariant individual-level unobservable characteristics. The results of our analysis suggest a strong relationship between FSP participation and employment characteristics in both the pre- and post-welfare reform periods. We find that state recertification periods also play a role, although the EBT program is not found to significantly influence FSP participation. Finally, we find that other characteristics such as household composition, number of adults and children in the household, and economic conditions are important determinants of FSP participation.

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[42] Recall that in the more recent 1996 SIPP panel, only the coefficient on the medium length recertification period is statistically significant.

Section VII. Conclusion

This study examines the relationship between Food Stamp Program (FSP) participation and employment characteristics. This relationship is of special interest as (1) food stamp participation rates have fallen in recent years and there is concern that eligible working families may not be taking up the food stamp benefits they are entitled to and (2) the food stamp caseload and food stamp eligible population now include more working low-income persons. So that we can better understand the relationship between employment and FSP participation, this study addresses three research questions:

1. What are the detailed employment characteristics of low-income, working food stamp participating and non-participating households?

2. How do detailed measures of employment characteristics affect food stamp participation?

3. How has the relationship between employment factors and Food Stamp Program participation changed since federal welfare reform?

These questions are examined using data from the 1990 and 1996 panels of the Survey of Income and Program Participation (SIPP), which cover the early 1990s (1990-1992) and the mid- to late-1990s (1996-1999). We use both descriptive and multivariate methods, where our multivariate analysis includes fixed effects logit models which control for individual-specific unobserved heterogeneity. To capture a population that is more likely to participate in the FSP, we restrict our analysis to working-age adults (age 18 through 59) ever observed living in a low-income household, measured as ever observed living below 175 percent of the poverty line and having few assets.

Our analysis shows significant employment among our population of working-age adults ever observed living in a low-income household. During the recent 1996-1999 period, nearly 90 percent of these individuals lived in households where at least one adult worked. Among food stamp recipients, the percentage was lower, but still relatively high at 52 percent. These employment rates are somewhat lower for the earlier 1990-1992 period (85 percent and 46 percent, respectively), showing that employment has increased among low-income FSP participants and non-participants. Our descriptive analysis also shows that a high fraction of adults in working households in our study population live in households where adults work traditional hours. For example, during the 1996-1999

period, 80 percent lived in households where someone worked traditional hours and everyone worked full-time. Additionally, more than one in four lived in households where all adults work traditional hours and so could have difficulty visiting food stamp offices open only during traditional hours. Other differences between FSP participating and non-participating households in our study population include hours worked, number of jobs held, and employment instability. For example, employment instability, as measured by the number of employment changes the household had last quarter, is higher in our sample of FSP participating households than non-participating households.

The multivariate analysis examines the relationship between FSP participation and detailed employment characteristics, which has not been examined in prior studies. We examined this relationship using a individual-level fixed effects logit model, which is a powerful model as it controls for all (observed and unobserved) individual-level characteristics that do not change over time (e.g., individuals tastes and preferences). We also estimate this relationship using a straightforward logit model, and while many of the findings across the two models are qualitatively similar, a Hausman test between the logit model and the fixed effects logit model provides evidence to reject the hypothesis that the coefficients from these two models are the same. Our multivariate analysis also examines the relationship between FSP participation and several other variables including FSP policies, household composition, demographic characteristics, and economic conditions. Finally, we examined how the relationship between these characteristics and FSP participation differs in the pre- and post-welfare reform periods, something prior studies have not examined.

We find that work schedule (i.e., working traditional daytime versus non-traditional hours), number of jobs, number of hours worked, and number of employer changes are all significantly related to FSP participation. These results hold up in models that control for employment status and income volatility. Consistent with our hypotheses, we find that individuals in households where adults work traditional daytime hours are less likely to participate in the FSP than individuals in households where adults work nontraditional hours. Working traditional daytime hours may make it difficult for individuals to get to the food stamp office to apply for and recertify for food stamp benefits during typical hours of operation. We also find that the number of jobs held by adult household members and the number of hours worked by adult household members are negatively related to FSP participation, as expected.

Our result related to the number of employer changes is not in the hypothesized direction. An increase in the number of employer changes is hypothesized to increase the cost of FSP participation, leading to a reduction in FSP participation. The results, however, suggest that an additional employer change increases, not decreases, the probability of FSP participation. It may be the case that our employer change variable is

capturing income instability, and it is income instability that is associated with an increase probability of FSP participation.[43]

The results of this analysis are robust to additional specifications—models that include income and models estimated on a subpopulation of working-aged adults ever observed living below *130 percent of the poverty threshold*.   Models that exclude and include household income produce results that are similar, with one exception.   The coefficient on the number of jobs held by adult household members move (from negative) to zero when income is introduced into the model, suggesting that the number of jobs held may affect FSP participation through income. The estimated coefficient on the employment variables are similar in models estimated on the full study population and the more economically disadvantaged subpopulation of adults ever observed living below 130 percent of the poverty threshold.

Overall, these results suggest that the cost of FSP participation may lead to reduced participation in the Food Stamp Program. As a result, federal and state efforts to reduce the cost of participating in FSP may increase FSP participation of low-income working households.

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[43] While our model does include a control for income volatility, it may not fully control for the food security of the working poor.

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Figure 1:
Percentage of Employed Households
Among Working Aged Adults in Ever Low-Income Households,
1990 & 1996 SIPP Panels

Year	Percent
1990	85.9
1991	84.5
1992	83.2
1996	87.9
1997	88.0
1998	88.6
1999	89.1

1990 SIPP Panel   1996 SIPP Panel

Year

Figure 2:
Percentage of Food Stamp Program Participants
Among Working Aged Adults in Ever Low-Income Households,
1990 & 1996 SIPP Panels

Year	Percent
1990	12.3
1991	13.5
1992	14.5
1996	9.2
1997	8.1
1998	6.9
1999	6.2

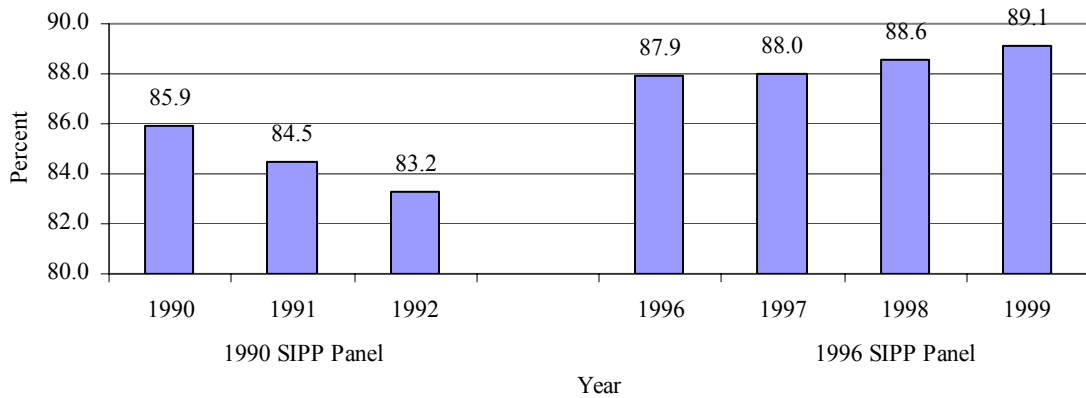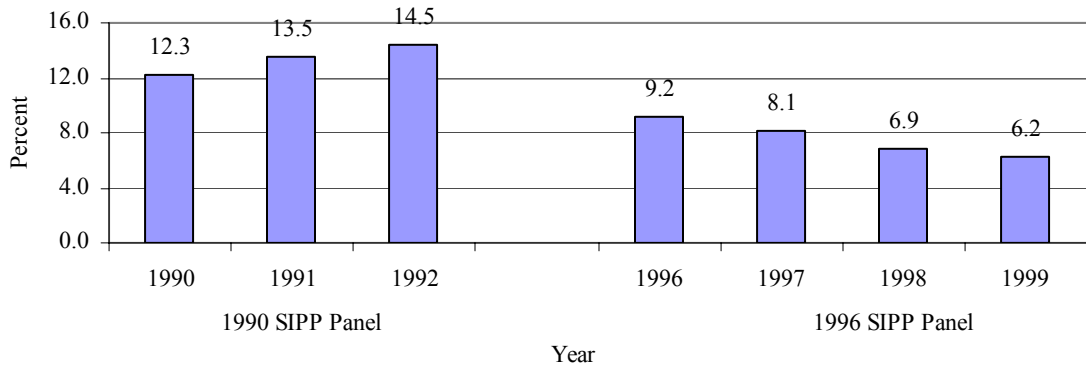1990 SIPP Panel   1996 SIPP Panel

Year

Figure 3:
Percentage of Food Stamp Program Participants Employed
Among Working Aged Adults in Ever Low-Income Households,
1990 & 1996 SIPP Panels

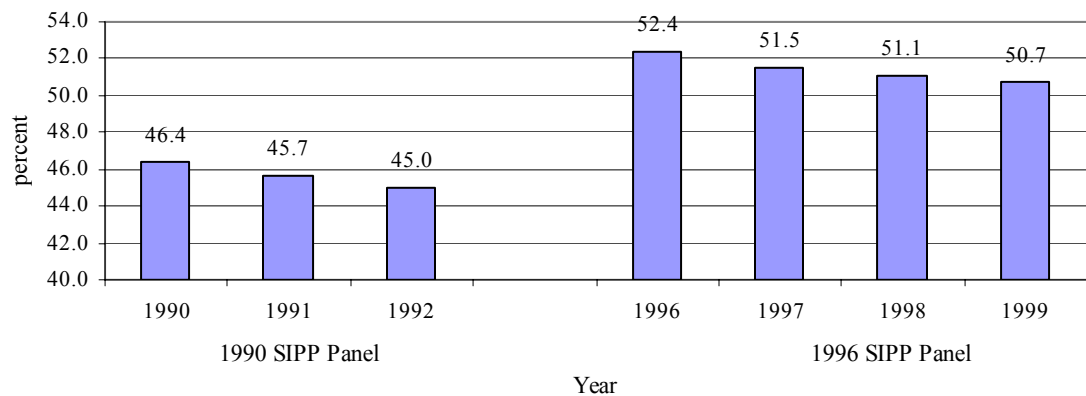| Year	percent
1990	46.4
1991	45.7
1992	45.0
1996	52.4
1997	51.5
1998	51.1
1999	50.7

1990 SIPP Panel   1996 SIPP Panel

Year

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Table 1: Mean Household Employment Characteristics, by Food Stamp Participation: Comparison of 1996-1999 and 1990-1992 Time Periods

	1996-1999			1990-1992		
	All (1)	Participating This Month (2)	Non-participating This Month (3)	All (4)	Participating This Month (5)	Non-participating This Month (6)
Among all adults in our study population:						
Food stamp recipient this month	0.075	1.000	0.000	0.133	1.000	0.000
Someone in HH employed this month	0.885	0.515	0.915	0.848	0.458	0.907
Among adults in working HH in our study population:						
Some, but not all adults in HH employed this month	0.407	0.519	0.402	0.462	0.719	0.443
All adults in HH employed this month, but not everyone is working full-time	0.456	0.464	0.456	0.400	0.276	0.410
All adults in HH employed this month and everyone is working full-time	0.136	0.017	0.142	0.138	0.005	0.148
Among adults in fully employed HH[1]						
Some, but not all adults in HH are working traditional daytime hours this month	0.539	0.470	0.542	0.669	0.666	0.670
All adults in HH are working traditional daytime hours this month	0.262	0.189	0.265	0.136	0.021	0.144
Number of jobs held in HH this month	1.699	1.317	1.716	1.637	1.302	1.663
Number of hours HH worked this month	129.057	87.046	130.969	131.312	79.733	135.290
Number of employer changes for the HH, q-1	0.522	0.662	0.516	0.323	0.374	0.319
Number of employer changes for the HH, q-2	0.474	0.556	0.470	0.266	0.285	0.264
Observations (person-months of ever low-income working aged adults)	903519	74825	828694	337559	47611	289948

[1]A household is categorized as fully employed if all adults in the household work full-time.

Table 2: Determinants of Food Stamp Program Participation: 1996-1999[1,2]

	Logit			Fixed Effect Logit		
	Coeff.	**SE**	**Odds Ratio**	**Coeff.**	**SE**	**Odds Ratio**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Employment Characteristics of HH						
Employment status (Omitted: No one employed)						
Some, but not all adults in HH employed, m-1	-0.498***	0.060	0.608	-0.509***	0.035	0.601
All adults in HH employed last month, but not everyone is working full-time, m-1	-0.684***	0.092	0.505	-0.766***	0.050	0.465
All adults in HH employed last month and everyone is working full-time, m-1	-1.921***	0.147	0.146	-1.520***	0.088	0.219
Worked traditional daytime hours and HH fully employed (omitted: HH fully employed and no one in HH worked traditional hours or HH not fully employed)[3]						
Some, but not all adults in HH are working traditional daytime hours, m-1	-0.435***	0.042	0.647	-0.221***	0.029	0.802
All adults in HH are working traditional daytime hours, m-1	-0.327***	0.055	0.721	-0.214***	0.040	0.807
Other employment characteristics						
Number of jobs held in HH, m-1	-0.314***	0.048	0.731	-0.155***	0.025	0.856
Number of hours HH worked, m-1	-0.003***	0.000	0.997	-0.004***	0.000	0.996
Number of employer changes for the HH, q-1	0.081***	0.008	1.084	0.053***	0.007	1.054
Number of employer changes for the HH, q-2	0.072***	0.009	1.074	0.023***	0.008	1.024
Income Measures						
Income volatility, y-1	0.039	0.025	1.040	0.062***	0.021	1.064
FSP Policies						
Proportion of working food stamp recipients with 1-3 month recertification period	0.007	0.073	1.007	0.061	0.074	1.063
Proportion of working food stamp recipients with 4-6 month recertification period	-0.228***	0.079	0.796	-0.266***	0.098	0.766
Electronic Benefit Transfer	-0.076	0.051	0.927	-0.012	0.037	0.988
Observations		903519			134780	
Log-Likelihood		-172817.36			-52732.231	

* significant at 10%; ** significant at 5%; *** significant at 1%.

[1] The time subscripts on variables denote the following: m-1 prior month, q-1 over prior quarter, y-1 over prior year. Variables with no time period noted are measured in the current month.

[2] Regressions also contain variables capturing, household composition, demographic characteristics, economic conditions, geographic characteristics, year dummies, and a seam bias dummy. The full regression is shown in Appendix Table A1.

[3] A household is categorized as fully employed if all adults in the household work full-time.

Table 3: Determinants of Food Stamp Program Participation: Comparison of 1996-1999 and 1990-1992 Time Periods[1,2]

	1996-1999 Fixed Effects Logit			1990-1992 Fixed Effects Logit		
	Coeff. (1)	**SE** (2)	**Odds Ratio** (3)	**Coeff.** (4)	**SE** (5)	**Odds Ratio** (6)
Employment Characteristics of HH						
Employment status (Omitted: No one employed)						
Some, but not all adults in HH employed, m-1	-0.539***	0.035	0.583	-0.654***	0.048	0.520
All adults in HH employed last month, but not everyone is working full-time, m-1	-0.787***	0.049	0.455	-1.209***	0.071	0.298
All adults in HH employed last month and everyone is working full-time, m-1	-1.540***	0.087	0.214	-2.435***	0.152	0.088
Other employment characteristics						
Number of jobs held in HH, m-1	-0.168***	0.024	0.845	-0.424***	0.030	0.654
Number of hours HH worked, m-1	-0.004***	0.000	0.996	-0.003***	0.000	0.997
Number of employer changes for the HH, q-1	0.053***	0.007	1.054	0.146***	0.017	1.157
Number of employer changes for the HH, q-2	0.023***	0.008	1.023	0.031*	0.018	1.031
Income Measures						
Income volatility, y-1	0.068***	0.022	1.070	0.318***	0.047	1.374
FSP Policies						
Proportion of working food stamp recipients with 1-3 month recertification period	0.065	0.074	1.067	-1.425***	0.172	0.241
Proportion of working food stamp recipients with 4-6 month recertification period	-0.259***	0.098	0.771	-0.771***	0.127	0.463
Electronic Benefit Transfer[3]	-0.003	0.037	0.997	--	--	--
Observations		134780			61252	
Log-Likelihood		-52765.527			-23655.761	

* significant at 10%; ** significant at 5%; *** significant at 1%.

[1] The time subscripts on variables denote the following: m-1 prior month, q-1 over prior quarter, y-1 over prior year. Variables with no time period noted are measured in the current month.

[2] Regressions also contain variables capturing, household composition, demographic characteristics, economic conditions, geographic characteristics, year dummies, and a seam bias dummy. The full regression is shown in Appendix Table A1.

[3] The variable capturing whether a state had an electronic benefit transfer (EBT) program in place is excluded from the 1990-1992 time period, because EBT was implemented in the first state in 1993.

Table A1: Determinants of Food Stamp Program Participation: 1996-1999—Full Model[1]

	Logit		Fixed Effects Logit	
	Coeff.	**SE**	**Coeff**	**SE**
Employment Characteristics of HH				
Employment status (Omitted: No one employed)				
Some, but not all adults in HH employed, m-1	-0.498***	0.060	-0.509***	0.035
All adults in HH employed last month, but not everyone is working full-time, m-1	-0.684***	0.092	-0.766***	0.050
All adults in HH employed last month and everyone is working full-time, m-1	-1.921***	0.147	-1.520***	0.088
Worked traditional daytime hours and HH fully employed (omitted: HH fully employed and no one in HH worked traditional hours or HH not fully employed) [2]				
Some, but not all adults in HH are working traditional daytime hours, m-1	-0.435***	0.042	-0.221***	0.029
All adults in HH are working traditional daytime hours, m-1	-0.327***	0.055	-0.214***	0.040
Other employment characteristics				
Number of jobs held in HH, m-1	-0.314***	0.048	-0.155***	0.025
Number of hours HH worked, m-1	-0.003***	0.000	-0.004***	0.000
Number of employer changes for the HH, q-1	0.081***	0.008	0.053***	0.007
Number of employer changes for the HH, q-2	0.072***	0.009	0.023***	0.008
Income Measures				
Income volatility, y-1	0.039	0.025	0.062***	0.021
FSP Policies				
Proportion of working food stamp recipients with 1-3 month recertification period	0.007	0.073	0.061	0.074
Proportion of working food stamp recipients with 4-6 month recertification period	-0.228***	0.079	-0.266***	0.098
Electronic Benefit Transfer	-0.076	0.051	-0.012	0.037
Household Composition				
Single female-headed HH	1.207***	0.053	1.262***	0.046
Single Male-headed HH	1.243***	0.073	0.718***	0.058
Able-bodied adult, age 18-50, living in a household without children, elderly, or disabled members	-1.161***	0.089	-0.926***	0.061
Number of adults in HH	-0.368***	0.040	-0.242***	0.022
Number of children in HH	0.322***	0.017	0.229***	0.016
Adult age 60 or over in HH	-0.203**	0.085	0.223***	0.065
Anyone in HH disabled	0.593***	0.040	0.126***	0.028

(Continued on the following page)

Table A1: Determinants of Food Stamp Program Participation: 1996-1999—Full Model[1]
(continued)

	Logit		Fixed Effects Logit	
	Coefficient	**SE**	**Coefficient**	**SE**
Demographic Characteristics				
Age: Omitted Group [46-59]				
Less than 25	0.213***	0.075		
Between 26 and 35	0.396***	0.062		
Between 36 and 45	0.253***	0.060		
Female	0.968***	0.050		
Race/Ethnicity: Omitted Group-White, non-Hispanic				
Black, non- Hispanic	0.515***	0.053		
Hispanic	0.363***	0.069		
Education: Omitted Group- less than high school				
Educational attainment equal to high school	-0.337***	0.049		
Educational attainment greater than high school	-0.789***	0.057		
Never married	-0.010	0.058		
U.S. Citizen	0.191**	0.082		
Economic Conditions				
Monthly state unemployment rate	0.121***	0.020	0.088***	0.014
Quarterly GDP	-0.000	0.000	-0.001***	0.000
Geographic Characteristics				
Region: Omitted Group-South				
Northeast	0.170***	0.065		
Midwest	0.198***	0.059		
West	-0.090	0.070		
MSA	-0.239***	0.049	-0.107***	0.041
Year				
1996	0.294***	0.061	0.399***	0.081
1997	0.147***	0.047	0.145**	0.058
1998	0.059*	0.031	-0.010	0.035
Seam bias dummy	0.003	0.004	-0.047***	0.017
Constant	-2.755***	0.731		
Observations	903519		134780	
Log-Likelihood	-172817.36		-52732.231	

* significant at 10%; ** significant at 5%; *** significant at 1%.
[1] The time subscripts on variables denote the following: m-1 prior month, q-1 over prior quarter, y-1 over prior year. Variables with no time period noted are measured in the current month.
[2] A household is categorized as fully employed if all adults in the household work full-time.

Table A2: Determinants of Food Stamp Program Participation with Income: 1996-1999 [1,2]

	Fixed Effects Logit	
	Coefficient	**SE**
Employment Characteristics of HH		
Employment status (Omitted: No one employed)		
Some, but not all adults in HH employed, m-1	-0.525***	0.035
All adults in HH employed last month, but not everyone is working full-time, m-1	-0.832***	0.050
All adults in HH employed last month and everyone is working full-time, m-1	-1.552***	0.088
Worked traditional daytime hours and HH fully employed (omitted: HH fully employed and no one in HH worked traditional hours or HH not fully employed) [3]		
Some, but not all adults in HH are working traditional daytime hours, m-1	-0.210***	0.029
All adults in HH are working traditional daytime hours, m-1	-0.215***	0.040
Other employment characteristics		
Number of jobs held in HH, m-1	0.004	0.026
Number of hours HH worked, m-1	-0.004***	0.000
Number of employer changes for the HH, q-1	0.048***	0.007
Number of employer changes for the HH, q-2	0.022***	0.008
Income Measures		
Income	-0.164***	0.008
Income volatility, y-1	0.074***	0.023
FSP Policies		
Proportion of working food stamp recipients with 1-3 month recertification period	0.072	0.074
Proportion of working food stamp recipients with 4-6 month recertification period	-0.266***	0.099
Electronic Benefit Transfer	-0.014	0.037
Observations	134780	
Log-Likelihood	-52516.6	

* significant at 10%; ** significant at 5%; *** significant at 1%.

[1] The time subscripts on variables denote the following: m-1 prior month, q-1 over prior quarter, y-1 over prior year. Variables with no time period noted are measured in the current month.

[2] Regressions also contain variables capturing, household composition, demographic characteristics, economic conditions, geographic characteristics, year dummies, and a seam bias dummy. The full list of covariates is shown in Appendix Table A1.

[3] A household is categorized as fully employed if all adults in the household work full-time.

Table A3: Determinants of Food Stamp Program Participation with Income: 1996-1999
Subpopulation of Adults Ever Observed Living in a Household
Below 130% of the Poverty Threshold [1,2]

	Fixed Effects Logit	
	Coefficient	**SE**
Employment Characteristics of HH		
Employment status (Omitted: No one employed)		
Some, but not all adults in HH employed, m-1	-0.615***	0.058
All adults in HH employed last month, but not everyone is working full-time, m-1	-0.717***	0.083
All adults in HH employed last month and everyone is working full-time, m-1	-1.810***	0.144
Worked traditional daytime hours and HH fully employed (omitted: HH fully employed and no one in HH worked traditional hours or HH not fully employed) [3]		
Some, but not all adults in HH are working traditional daytime hours, m-1	-0.266***	0.049
All adults in HH are working traditional daytime hours, m-1	-0.206***	0.068
Other employment characteristics		
Number of jobs held in HH, m-1	-0.180***	0.041
Number of hours HH worked, m-1	-0.004***	0.000
Number of employer changes for the HH, q-1	0.034***	0.012
Number of employer changes for the HH, q-2	0.017	0.013
Income Measures		
Income volatility, y-1	0.057*	0.034
FSP Policies		
Proportion of working food stamp recipients with 1-3 month recertification period	-0.009	0.123
Proportion of working food stamp recipients with 4-6 month recertification period	-0.540***	0.167
Electronic Benefit Transfer	0.156**	0.062
Observations	50214	
Log-Likelihood	-19614.352	

* significant at 10%; ** significant at 5%; *** significant at 1%.

[1] The time subscripts on variables denote the following: m-1 prior month, q-1 over prior quarter, y-1 over prior year. Variables with no time period noted are measured in the current month.

[2] Regressions also contain variables capturing, household composition, demographic characteristics, economic conditions, geographic characteristics, year dummies, and a seam bias dummy. The full list of covariates is shown in Appendix Table A1.

[3] A household is categorized as fully employed if all adults in the household work full-time