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

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.