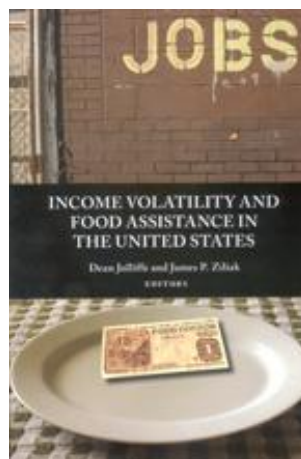

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There are several sound reasons to suppose that earnings volatility plays a role in program participation behavior; however, the results from previous empirical studies have been equivocal. To the extent that researchers have considered volatility, they have mostly focused on different types and definitions of this concept, such as short-term versus long-term shocks in earnings or the overall variability of earnings histories. Researchers have not considered how associations might develop for some groups but not for others. In this paper, we examine how the effects of earnings variability on program participation are likely to differ, depending on a household's position in the income distribution. Specifically, we posit that there will be asymmetries in these effects depending on whether the household is initially above or below an eligibility threshold.

There are many reasons why asymmetric effects might appear, including a simple "mechanical" explanation. Consider a household whose long-term trend earnings place it within the eligibility guidelines of the Food Stamp Program or some other assistance program. If earnings and other characteristics are completely stable so that there is no short-term variability, the household will remain eligible for the program over time and may participate, depending on how it values the program's benefits relative to its costs of enrollment and compliance (Moffitt 1983, 2003). If we instead allow for some earnings variability,

there is a chance that the household will lose eligibility from time to time, leading to a decrease in its opportunities and incentives to participate. Thus, among initially eligible households, there is a mechanical association in which greater variability reduces participation. These associations are reversed, however, when we consider households that are initially above the eligibility threshold. For these households, stable incomes lead to continuous periods of ineligibility and nonparticipation, while unstable incomes lead to temporary periods of eligibility and perhaps participation. We subsequently discuss additional conceptual reasons for the association between earnings volatility and program participation, but as this simple explanation shows, asymmetries in effects should be considered.

We examine the relationship between earnings volatility and food stamp participation using survey data from the Three-City Study that have been linked to administrative case records on program participation. The Three-City Study is a longitudinal survey of low-income families who were living in Boston, Chicago, and San Antonio. A distinct advantage of the Three-City Study for our purposes is that while it is a low-income sample and includes many food stamp recipients, it was not initially limited to program participants. Thus, the survey includes participating and nonparticipating households as well as eligible and near-eligible households. At each wave, the survey gathered information about people's work and earnings histories. These features facilitate our analyses of program participation, earnings volatility, and asymmetric effects.

Another advantage of the Three-City Study is that its survey responses have recently been linked to administrative data. Previous household-level research on participation in food assistance programs has usually relied on one or the other of these two types of data. Our approach of using combined survey and administrative data addresses some of the weaknesses of using only one or the other of these two sources. From the administrative data, we obtain more accurate and lengthy descriptions of participation histories than we could through surveys, overcoming the recall problems inherent in retrospective questionnaires. At the same time, the survey data help us to surmount some of the shortcomings of administrative data. Program records only describe behavior after people have applied to or joined a program and can only be used in limited ways to examine people's participation de-

cisions, especially their program entry decisions. Administrative data also typically lack important explanatory variables and covariates, such as measures of disability and health status.

We use these data to compare times spent on the Food Stamp Program for households with different circumstances, including different levels and histories of earnings. Our analyses further distinguish between households that appear to be eligible and those that appear to be ineligible for food stamps based on longer-run income data. We estimate longitudinal fixed-effect regression models of the times that households spend on food stamps; these models account for additional permanent, unmeasured characteristics of households that might be conflated with their earnings histories and program outcomes. Our multivariate results indicate that short-term earnings changes and earnings variability are each negatively associated with program participation for households with low levels of permanent income. These sources of volatility appear to be less strongly associated with participation for households with higher levels of permanent income.

CONCEPTUAL ANALYSIS OF EARNINGS VOLATILITY

A gap in program research, which this and other chapters in this volume address, concerns the role of previous earnings and program experiences. While numerous studies have examined the associations between people's short-term characteristics, such as their immediate monthly incomes, and their program behavior, only a few have considered the impacts of income histories, the variability of their incomes, or other longer-term characteristics, on participation (see, e.g., Farrell et al. 2003). There are reasons to believe that earnings histories and variability might be relevant in a number of ways.

First, as mentioned in the introductory section, increased earnings variability can lead to more frequent changes in eligibility. For households that are initially eligible, these changes would take the form of brief periods of ineligibility; for households that are initially ineligible, they would take the form of brief periods of eligibility. The changes in eligibility could in turn lead to changes in participation.

A second, related consideration is that, other things being held constant, higher rates of volatility will lead to shorter continuous spells of eligibility and potential participation. Because there are fixed costs associated with entering or reentering the Food Stamp Program (such as completing the application; supplying earnings records, a birth certificate, a Social Security card, and other documentation; and attending an interview), the reduction in potential spell lengths could deter participation in the first place.

Third, the program itself may place higher compliance demands on households with variable earnings. As Ribar and Edelhoch (2008) document in this volume, some states require more frequent recertification intervals for households with earnings or with unstable incomes than for other households. Within our sample, one state, Texas, requires households to immediately report any change in work status—change in job, change in pay rate, or loss of job—while the other two states, Illinois and Massachusetts, only require households to report changes in monthly earnings of \$100 or more. Higher compliance costs would again reduce the incentives for households to enter the program or to continue participating.

Fourth, while increased earnings volatility likely affects eligibility and compliance costs, it may also increase the value of food stamp participation to recipients. As a means-tested program, the Food Stamp Program provides a form of social insurance, issuing more generous benefits when incomes are low and less generous benefits when incomes are high. Thus, the Food Stamp Program helps to smooth consumption for families who lack assets or opportunities to borrow. Households with variable earnings would benefit more from this consumption-smoothing feature than would households with stable earnings, possibly contributing to a positive association between volatility and participation.

Fifth, we need to remember that households' observed earnings may not be entirely exogenous but may instead reflect behavioral elements, which may themselves be influenced by program behavior. Consider a household that receives an earnings shock in the form of a higher hourly wage rate, perhaps from an unexpected raise or a minimum wage increase. If the household's work hours remain fixed, this wage increase would translate into an earnings increase. However, if the household places a premium on its nonmarket time or just on maintaining its food stamp eligibility, it might cut back its work hours, leading to little

change in earnings. In this case, we would observe that stable earnings were associated with continued participation, but earnings would not be the causal factor. In our analyses, we address possible confounding influences between earnings and program participation by estimating longitudinal fixed-effect regression models that account for permanent unobserved characteristics of households. Additionally, our analyses will examine the association between current and past earnings outcomes, on the one hand, and future program outcomes, on the other, to remove any concurrent reverse effects of participation on earnings.

DATA SOURCES AND MEASURES

The data for our analyses consist of interview data from the Three-City Study linked to administrative case records for food stamp and Temporary Assistance for Needy Families (TANF) receipt. The Three-City Study is a longitudinal survey of 2,458 children and their caregivers who were initially living in low-income neighborhoods in Boston, Chicago, and San Antonio. At the time of the first interview in 1999, the families all had incomes below 200 percent of the poverty line. Although the survey includes many public assistance recipients, it was not specifically restricted to this group. Also, by design it includes both poor and near-poor families.

After the initial interviews, follow-up interviews were conducted in 2000–2001 and 2005. Retention rates were high, as 88 percent of the original sample participated in the second round and 80 percent participated in the third round. In each wave, interviews were conducted with both the focal child and the child's caregiver.¹ In cases where the child and caregiver had separated, both were subsequently followed and interviewed. For this paper, we rely on the information provided by the current and former caregivers, as they were in the best position to describe the households' economic circumstances, demographic composition, and other characteristics.

In the most recent (third) wave of the survey, the caregivers who participated in face-to-face interviews were asked to give permission for the research team to gather administrative information about them.² Caregivers who agreed to this provided names and Social Security

numbers, which were then used to search for food stamp and TANF records. Of the 1,980 caregivers who completed in-person interviews, 1,448 gave permission to be included in the administrative part of the study, and of this smaller number 1,286 were successfully matched to case files in Illinois, Massachusetts, or Texas.³

The administrative records from the state agencies cover the period from January 1997 to June 2006 and indicate the specific months in which the caregiver was a member of an assistance unit that received food stamps, TANF, or both. We use these data to form counts of the months that the caregiver received food stamp assistance in the quarter and half-year following each of the three interviews. These are the primary outcome measures for our analyses.

Besides the food stamp outcome measures, we also use the administrative data to construct measures of the number of months out of the previous 12 that a caregiver received food stamp assistance or TANF. We use the measures of prior receipt as conditioning variables in our analyses.

The interview data from the Three-City Study provide us with most of our other explanatory variables. We are especially interested in the earnings of the caregivers. To measure current earnings, we use a constructed variable (supplied with the public-use version of the survey) of the caregiver's labor earnings in her primary job during the month leading up to the interview; the measure includes her wages and salary along with possible commissions and tips.

The survey also includes retrospective questions regarding the caregiver's primary jobs for up to two years prior to each interview. From these questions, we form several summary measures of the caregiver's earnings over the preceding 12-month interval, including an indicator for whether there were any earnings during the period, the average monthly level of earnings, the maximum amount of earnings reported in any of the months, and the coefficient of variation for earnings. Because a nontrivial portion of the histories is incomplete (about 8 percent), we also include a dummy variable for whether summary measures could be formed. All of the earnings variables are adjusted for inflation using the Consumer Price Index for Urban Wage Earners (CPI-U) and expressed in 2005 values. We interpret the 12-month average of earnings as being an indicator of the long-term or persistent level of earnings, and we interpret the maximum monthly amount over this period as being an

indicator of earnings capacity. The coefficient of variation is used as a measure of earnings variability. In a regression that conditions on the earnings history, the current earnings variable can be interpreted as an indicator for short-term changes in earnings.

While the retrospective earnings data are useful, there are some weaknesses in the measures. First, they only describe the earnings of the caregiver and omit other household members. Second, the data are limited to primary jobs and do not cover all sources of earnings. Finally, the measures are limited to usual earnings for a given job and only change when there is a switch in jobs or employment status; the measures do not vary within a job spell.

A unique element of our analyses is that they distinguish between households that appear to be eligible for food stamps based on their long-term incomes and households that appear to be either ineligible or marginally eligible. There are three primary tests for food stamp eligibility: 1) a household's income must be below 130 percent of the poverty threshold (the gross income test), 2) a household's income after adjusting for program deductions and exemptions must be below 100 percent of the poverty threshold (the net income test), and 3) a household's assets must be below a certain value (the asset test). Because we lack detailed information on likely deductions and exemptions and on the level of assets, we focus on the gross income test. In each wave of the Three-City Study, caregivers were asked about all of the sources of income from all household members in the previous month. The public-use version of the survey contains a measure of the income-to-needs ratio that incorporates the available information on total incomes and household composition. We fit household-specific trend lines through the 1999, 2000–2001, and 2005 income-to-needs measures and use the values along these trend lines as our indicators of long-term income-to-needs. Households whose trend values in a given wave are below 1.3 are classified as gross-income-eligible on the basis of their long-term circumstances, while households whose trend values are above 1.3 are classified as gross-income-ineligible. About 75 percent of the wave-specific observations in our analysis sample are classified as being eligible under this definition, and 90 percent of the caregivers are categorized as eligible in at least one wave.

The Three-City Study also asked caregivers about other economic circumstances of their households. We use responses to several differ-

ent questions to measure access to capital and possible financial difficulties. One direct measure of access to capital is a binary indicator for whether anyone in the caregiver's household had a bank account, savings account, or other investment account. Another direct measure is an indicator of whether the household had any outstanding loans, including loans from family and friends. Our analyses also include separate indicators for whether the household owned a car or a home. Car and home ownership would not only reveal some previous financial where-withal but would also represent collateral against which the household might borrow. Finally, we include an index of recent financial strains, supplied with the public-use file, that is constructed from five questions on topics such as how frequently the household needed to borrow money to pay bills and whether it usually ended up with any money at the end of the month.

The interview data from the survey also provide us with demographic information about the caregiver and her household, including the caregiver's age, race/ethnicity, education, marital status, health status, and the numbers of children and adults in the household. These variables are routinely included in studies of benefit receipt. In all of our multivariate analyses, we also include controls for the year and month in which the interview took place to account for unmeasured changes in policies and economic conditions.

We limit our analysis to caregivers who participated in all three waves of the survey and who could be linked to administrative records. After omitting observations with item nonresponse and dropping a small number of separated caregivers who no longer had any children in their households, we are left with an analysis sample of 931 caregivers and 2,793 wave-specific observations. Geographically, the observations are split nearly equally across the three cities. Means and standard deviations for the analysis variables, calculated separately for each city, are reported in Table 3.1.

The analysis sample is clearly made up of those who are disadvantaged, having not only been initially selected on the basis of low incomes but also subsequently restricted to households appearing in the assistance program records for the three states. The statistics are consistent with this selection. On average, the households spent more than half of each quarter or half-year following their interviews on food stamps. Average inflation-adjusted monthly earnings just before the

interviews were \$648 in Boston, \$556 in Chicago, and \$502 in San Antonio. Average earnings for the prior year were somewhat lower in Boston and San Antonio but somewhat higher in Chicago. More than half of the caregivers reported no earnings at all in the preceding year. Just over a third of the households had some kind of financial account, with the average incidence varying substantially across cities. Roughly half of the households reported outstanding loans. While this latter statistic might appear to be favorable, it likely reflects a lack of access to credit for many of the families. Only about one out of eight of the households owned the homes they lived in, and just over half of the caregivers were without a car. Few of the caregivers were married, and less than two-thirds had completed or gone beyond high school. Most of the caregivers were black or Hispanic (98 percent in San Antonio). About one-sixth reported disabilities severe enough to interfere with work. Lastly, the average number of children was high, at just under three per household.

Descriptive Analysis

Food stamp and TANF receipt in the two cities were strongly associated with several economic characteristics of the caregivers. Table 3.2 shows the average months of each type of program receipt in the year following the interview, calculated separately for some of these characteristics. From top to bottom, the table is divided into three sections: the first section reports estimates for the general sample of households, the second section reports estimates for households with trend incomes below the gross-eligibility threshold, and the third section reports estimates for households with trend incomes above the gross-eligibility cutoff. From left to right, results are listed separately for Boston, Chicago, and San Antonio.

Near the top of the table, the estimates show the anticipated result that the months of subsequent food stamp participation generally fall with the level of current earnings. Among the caregivers from Boston, the gradient was especially steep, as the participation rates for caregivers without earnings was more than four times higher than the participation rates for caregivers with \$1,000 in monthly earnings. Moffitt and Winder (2003) and Frogner, Moffitt, and Ribar (2007) similarly found

Table 3.1 Characteristics of Analysis Sample

	Boston		Chicago		San Antonio	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Months on food stamps in next 3	1.57	(1.47)	1.64	(1.45)	1.92	(1.38)
Months on food stamps in next 6	3.13	(2.85)	3.24	(2.82)	3.81	(2.64)
Earnings in interview month (\$)	648.47	(878.46)	555.83	(747.09)	502.03	(677.20)
Any earnings in last year (0/1)	0.56	(0.50)	0.61	(0.49)	0.59	(0.49)
Average earnings in last year (\$)	614.39	(792.75)	579.44	(718.72)	494.35	(643.47)
Coefficient of variation for earnings in last year	0.39	(0.78)	0.42	(0.77)	0.46	(0.81)
Maximum earnings in last year (\$)	840.99	(936.03)	793.53	(849.55)	693.20	(761.58)
Prior year's earnings information missing (0/1)	0.09	(0.29)	0.07	(0.25)	0.09	(0.28)
Household income-to-needs	1.09	(0.70)	1.02	(0.63)	0.91	(0.57)
Bank, savings, or financial account (0/1)	0.52	(0.50)	0.29	(0.46)	0.35	(0.48)
Outstanding loans (0/1)	0.47	(0.50)	0.44	(0.50)	0.52	(0.50)
Owns home (0/1)	0.04	(0.19)	0.15	(0.36)	0.19	(0.39)
Owns vehicle (0/1)	0.38	(0.49)	0.37	(0.48)	0.57	(0.50)
Financial strain index	0.05	(0.73)	0.03	(0.73)	-0.01	(0.72)
Months on food stamps in last year	6.61	(5.43)	6.69	(5.31)	8.09	(4.87)
Months on TANF in last year	4.49	(5.35)	3.78	(5.16)	2.78	(4.42)
Non-Hispanic black (0/1)	0.32	(0.47)	0.55	(0.50)	0.39	(0.49)
Hispanic (0/1)	0.50	(0.50)	0.35	(0.48)	0.59	(0.49)
Age	35.07	(9.11)	33.76	(9.68)	31.80	(8.99)
Completed high school or GED (0/1)	0.47	(0.50)	0.33	(0.47)	0.35	(0.48)
Completed college (0/1)	0.22	(0.41)	0.22	(0.41)	0.22	(0.42)

Disability that prevents work (0/1)	0.23	(0.42)	0.16	(0.37)	0.17	(0.38)
Number of minors in household	2.50	(1.26)	2.88	(1.42)	2.72	(1.37)
Married, spouse present (0/1)	0.08	(0.28)	0.16	(0.37)	0.18	(0.38)
Number of adults in household	1.56	(0.80)	1.85	(0.96)	1.71	(0.82)
Number of caregivers		308		300		323
Number of observations		924		900		969

NOTE: Amounts in rows labeled as “(0/1)” represent binary variables.

SOURCE: Authors’ calculations, using interview data from the Three-City Study matched to administrative records.

Table 3.2 Months of Food Stamp Assistance Following the Interview for Different Types of Households

Characteristic	Boston			Chicago			San Antonio		
	N	Average months on food stamps in next...		N	Average months on food stamps in next...		N	Average months on food stamps in next...	
		3 months	6 months		3 months	6 months		3 months	6 months
All caregiver observations	924	1.6	3.1	900	1.6	3.2	969	1.9	3.8
Earnings in interview month ^a									
None	456	2.1	4.2	441	1.8	3.5	450	2.3	4.6
\$1,000 or less	140	1.7	3.5	172	1.8	3.7	225	2.0	3.8
More than \$1,000	245	0.5	1.0	225	1.1	2.2	210	1.0	1.9
Average earnings in last year ^a									
None	321	2.2	4.3	293	1.7	3.3	311	2.5	4.9
\$1,000 or less	269	1.9	3.8	314	2.0	4.0	374	2.0	4.0
More than \$1,000	251	0.5	1.0	231	1.0	2.0	200	0.8	1.7
Coefficient of variation of earnings in last year ^{a,b}									
Less than 0.5	325	0.9	1.8	332	1.3	2.6	318	1.3	2.6
0.5 or higher	195	1.8	3.5	213	1.9	3.9	256	1.9	3.9
Observations with trend income below gross eligibility threshold	671	1.8	3.7	702	1.9	3.7	795	2.2	4.3
Earnings in interview month ^a									
None	392	2.2	4.3	378	1.9	3.7	419	2.4	4.7
\$1,000 or less	119	1.8	3.6	151	2.0	3.9	198	2.1	4.1
More than \$1,000	104	0.6	1.3	120	1.5	3.0	103	1.5	2.8
Average earnings in last year ^a									
None	274	2.2	4.5	262	1.7	3.4	291	2.5	5.0

\$1,000 or less	227	2.0	4.0	261	2.2	4.3	319	2.1	4.2
More than \$1,000	114	0.6	1.2	126	1.4	2.7	110	1.3	2.6
Coefficient of variation of earnings in last year ^{a,b}									
Less than 0.5	187	1.1	2.3	210	1.7	3.4	209	1.8	3.5
0.5 or higher	154	2.0	3.9	177	2.1	4.2	220	2.1	4.1
Observations with trend income above gross eligibility threshold	253	0.9	1.7	198	0.9	1.7	174	0.8	1.6
Earnings in interview month ^a									
None	64	1.8	3.4	63	1.2	2.3	31	1.6	3.4
\$1,000 or less	21	1.3	2.6	21	1.1	2.2	27	0.8	1.3
More than \$1,000	141	0.4	0.8	105	0.6	1.2	107	0.5	1.0
Average earnings in last year ^a									
None	47	1.8	3.4	31	1.2	2.4	20	1.5	3.2
\$1,000 or less	42	1.4	2.7	53	1.1	2.2	55	1.3	2.5
More than \$1,000	137	0.4	0.8	105	0.6	1.2	90	0.3	0.6
Coefficient of variation of earnings in last year ^{a,b}									
Less than 0.5	138	0.5	1.0	122	0.7	1.3	109	0.4	0.9
0.5 or higher	41	1.1	2.0	36	1.1	2.3	36	1.3	2.6

SOURCE: Authors' calculations, using interview data from the Three-City Study matched to administrative records.

^a Excludes observations with missing earnings information.

^b Excludes observations with zero earnings.

that earnings and program receipt were negatively related when they examined self-reports of program participation in these data.

When we move to the next three rows of results, we see that average earnings over the preceding year are also negatively associated with food stamp participation. Although it is not entirely clear from the table, the association is slightly stronger for 12-month average earnings than for the current month's earnings. This result is consistent, since the 12-month figure is a longer-term measure.

The next two rows report 1) participation levels for households with positive earnings whose coefficient of variation was positive but below one-half and 2) participation levels for households with more variable earnings. In all three cities, more variable incomes were associated with higher levels of participation.

Households with trend incomes below the food stamp gross eligibility threshold have participation rates that are more than twice as high as households with larger trend incomes. Though the participation rates for the high-trend-income households are much smaller in relative terms, they are still appreciable. Differences in actual versus trend incomes account for much of the residual participation; differences in the timing of the income and participation reports also account for some of the residual.

Multivariate Analyses

The simple conditional means reported in Table 3.2 show gross associations and do not account for confounding influences from other variables. For example, the bivariate cross-program associations between caregivers' earnings variability and their subsequent food stamp participation may be an artifact of mutual correlations between these measures and the level of earnings. Alternatively, the association may reflect correlations with some other variable. To address these possible sources of mutual correlation, we estimate longitudinal fixed-effect regression models of the characteristics associated with the caregivers' food stamp receipt. The estimates from these models represent partial associations that hold the other observed characteristics constant.

Coefficient estimates and standard errors for the models of program receipt are reported in Table 3.3. The first two columns of Table 3.3 list results from models of food stamp participation in the quarter and

the half-year following the caregivers' interviews. In these models we constrain the effects of the earnings history variables so that they are the same for households with trend incomes above and below the gross eligibility threshold. The next two columns list results from models that allow the coefficients for the earnings history variables to differ depending on trend income. Explanatory variables are listed in the rows of the table. In addition to the variables found in the table, each of the models also includes an intercept and controls for age, education, missing earnings effects, and piecewise-linear trends, or linear splines, for the year and month of the interview. Each of the models in Table 3.3 pools data across the three cities.

As with the bivariate analyses, the regression results from the first two columns indicate that earnings in the month prior to the interview are negatively related to subsequent food stamp participation. The sizes of these associations, however, are modest. A \$1,000 increase in current earnings, holding all else constant, is estimated to reduce food stamp participation in the subsequent three months by just over a week. Recall that the fixed-effects regression controls for permanent characteristics of the households, such as their permanent incomes. So, the coefficient on current earnings must be interpreted as a change in this variable, holding permanent income and the other observed characteristics constant. In other words, the coefficient represents the association between food stamp receipt and a temporary (and permanent-income compensated) change in earnings.

In contrast to the bivariate estimates, the results from the first two models indicate that more variable earnings are negatively, albeit modestly, associated with subsequent food stamp participation. Again, these are estimates that hold permanent characteristics constant, including permanent incomes and permanent income variability. Thus, temporary positive earnings shocks and increased medium-term earnings variability both appear to modestly reduce food stamp receipt.

The estimates from the first two columns indicate that the association between prior and subsequent food stamp receipt is statistically and substantively large. For example, being on food stamps for the entire year before the interview increases the expected participation in the following quarter by 2.1 months and increases the expected participation in the follow half-year by 3.6 months.

Table 3.3 Fixed-Effects Regression Models of Food Stamp Receipt Following the Interview

	Models with uniform effects of earnings history—months receiving food stamps out of next...		Models with variable effects of earnings history—months receiving food stamps out of next...	
	3 months	6 months	3 months	6 months
Earnings (\$000) in interview month	-0.282** (0.048)	-0.516** (0.092)	-0.361** (0.060)	-0.675** (0.115)
Any earnings in last year	0.100 (0.091)	0.133 (0.175)	0.217** (0.106)	0.388* (0.204)
Average earnings (\$000) in last year	-0.019 (0.102)	-0.116 (0.196)	-0.025 (0.136)	-0.276 (0.261)
Coefficient of variation for earnings in last year	-0.098** (0.044)	-0.194** (0.084)	-0.115** (0.051)	-0.263** (0.097)
Maximum earnings (\$000) last year	0.051 (0.085)	0.132 (0.163)	-0.003 (0.106)	0.141 (0.204)
Trend HH inc. > gross elig. × earnings in interview month ^a			0.119 (0.092)	0.258 (0.176)
Trend HH inc. > gross elig. × any earnings in last year			-0.274 (0.179)	-0.671* (0.343)
Trend HH inc. > gross elig. × average earnings in last year			-0.035 (0.208)	0.305 (0.399)
Trend HH inc. > gross elig. × c.v. earnings in last year			0.009 (0.111)	0.147 (0.213)

Trend HH inc. > gross elig. × maximum earnings last year			0.166 (0.181)	0.025 (0.348)
Trend HH income-to-needs	0.035 (0.079)	-0.032 (0.152)	0.006 (0.084)	-0.071 (0.162)
Household income-to-needs	0.043 (0.063)	0.088 (0.122)	0.047 (0.063)	0.093 (0.122)
Months on food stamps in last year	0.172** (0.006)	0.299** (0.011)	0.172** (0.006)	0.300** (0.011)
Months on TANF in last year	0.004 (0.006)	0.013 (0.011)	0.003 (0.006)	0.011 (0.011)
Bank, savings, or financial account	-0.057 (0.053)	-0.116 (0.103)	-0.062 (0.053)	-0.129 (0.103)
Outstanding loans	0.034 (0.050)	0.054 (0.097)	0.035 (0.050)	0.054 (0.097)
Own home	0.010 (0.084)	-0.004 (0.162)	0.008 (0.085)	-0.011 (0.163)
Own vehicle	0.008 (0.056)	0.096 (0.107)	0.014 (0.056)	0.110 (0.108)
Financial strain index	0.031 (0.036)	0.108 (0.070)	0.031 (0.036)	0.107 (0.070)
Disability that limits work	0.098 (0.080)	0.119 (0.154)	0.092 (0.080)	0.104 (0.154)

(continued)

Table 3.3 (continued)

	Models with uniform effects of earnings history—months receiving food stamps out of next...		Models with variable effects of earnings history—months receiving food stamps out of next...	
	3 months	6 months	3 months	6 months
Number of minors in household	0.025 (0.025)	0.018 (0.048)	0.027 (0.025)	0.023 (0.048)
Married, spouse present	0.040 (0.080)	-0.023 (0.155)	0.049 (0.081)	-0.006 (0.155)
Number of adults in household	-0.065** (0.029)	-0.104* (0.056)	-0.063** (0.029)	-0.102* (0.056)
<i>R</i> ²	0.60	0.66	0.61	0.66

NOTE: Longitudinal fixed-effect regression models estimated using interview data from the Three-City Study matched to administrative records. Models also include intercepts, controls for age, education, missing earnings histories, and calendar time. Standard errors appear in parentheses. * significant at the 0.10 level (two-tailed test); ** significant at the 0.05 level (two-tailed test).

^a Trend household income being above the gross eligibility threshold is interacted (×) with the current monthly earnings variable.

SOURCE: Authors' estimations.

Increases in the number of adults are estimated to be negatively associated with food stamp receipt. None of the other estimated coefficients in the first two columns is statistically significant.

The next two columns in Table 3.3 report results from fixed-effect models that include interactions of the indicator for having a trend income above 130 percent of the poverty threshold and each of the earnings history measures. Except for these interactions, all of the other explanatory variables are identical to those in the previous two specifications.

The added interactions are jointly marginally significant (the p -values for joint significance for the three- and six-month outcome models are 0.17 and 0.12, respectively).⁴ Including the interactions does alter several of the uninteracted coefficients. In particular, the coefficient on the uninteracted current earnings variable becomes approximately one-third larger in magnitude compared to the previous specifications. The absolute value of the uninteracted earnings variability measure becomes 10 percent larger in the three-month model and one-third larger in the six-month model. Also, the uninteracted coefficient on having any earnings during the past year becomes significantly positive. The changes indicate that the program behavior of households with trend incomes below the gross income threshold is more sensitive to changes in earnings histories than that of higher-income households.

We reestimated each of the interacted models separately for each of the three cities. Recall from the discussion of conceptual issues that some states have policies that effectively increase the compliance costs for households with volatile incomes. By estimating separate models we can see whether our results come from a particular state or a particular policy environment. Results from the state-specific fixed-effects models are listed in Table 3.4.

From the table, we see that current earnings are consistently negatively related to food stamp participation among low-income households. In the three-month models, the point estimates indicate that a \$1,000 increase in earnings is associated with one to two fewer weeks of food stamp participation. In the six-month models, the effect size is on the order of two to three fewer weeks. The modest associations in each of the states are again consistent with the coefficients capturing temporary changes in earnings.

Table 3.4 Fixed-Effects Regression Models of Food Stamp Receipt Following Interview by City

	Boston		Chicago		San Antonio	
	Months receiving food stamps out of next...		Months receiving food stamps out of next...		Months receiving food stamps out of next...	
	3 months	6 months	3 months	6 months	3 months	6 months
Earnings (\$000) in interview month	-0.440** (0.096)	-0.765** (0.189)	-0.298** (0.108)	-0.561** (0.207)	-0.260** (0.110)	-0.500** (0.204)
Any earnings in last year	0.226 (0.205)	0.601 (0.403)	0.336* (0.190)	0.575 (0.363)	0.111 (0.172)	0.080 (0.321)
Average earnings (\$000) in last year	0.185 (0.232)	0.294 (0.455)	-0.351 (0.232)	-0.851* (0.443)	0.083 (0.256)	-0.268 (0.478)
Coefficient of variation for earnings in last year	-0.151 (0.092)	-0.360** (0.181)	-0.155* (0.089)	-0.314* (0.170)	-0.036 (0.085)	-0.088 (0.159)
Maximum earnings (\$000) last year	0.023 (0.189)	-0.118 (0.371)	0.127 (0.188)	0.449 (0.359)	-0.197 (0.181)	-0.053 (0.338)
Trend HH inc. > gross elig. × earnings in interview month ^a	0.074 (0.141)	0.120 (0.276)	0.042 (0.167)	0.086 (0.320)	0.253 (0.191)	0.555 (0.357)
Trend HH inc. > gross elig. × any earnings in last year	-0.213 (0.332)	-0.789 (0.653)	-0.226 (0.308)	-0.243 (0.587)	-0.650** (0.315)	-1.372** (0.587)
Trend HH inc. > gross elig. × average earnings in last year	-0.146 (0.341)	-0.017 (0.671)	0.322 (0.369)	0.740 (0.704)	-0.157 (0.394)	0.295 (0.735)
Trend HH inc. > gross elig. × c.v. earnings in last year	0.089 (0.188)	0.409 (0.370)	-0.096 (0.208)	-0.218 (0.397)	0.124 (0.188)	0.341 (0.350)

Trend HH inc. > gross elig. × maximum earnings last year	0.251 (0.293)	0.466 (0.576)	-0.051 (0.333)	-0.352 (0.636)	0.279 (0.335)	0.002 (0.625)
Trend HH income-to-needs	-0.119 (0.133)	-0.272 (0.260)	0.163 (0.159)	0.257 (0.304)	-0.033 (0.156)	-0.286 (0.290)
Household income-to-needs	0.037 (0.105)	0.049 (0.206)	0.069 (0.111)	0.143 (0.212)	0.093 (0.116)	0.216 (0.217)
Months on food stamps in last year	0.167** (0.011)	0.280** (0.021)	0.182** (0.010)	0.327** (0.020)	0.169** (0.010)	0.293** (0.019)
Months on TANF in last year	0.004 (0.011)	0.020 (0.022)	-0.013 (0.011)	-0.021 (0.021)	-0.0001 (0.011)	-0.004 (0.020)
Bank, savings, or financial account	0.005 (0.088)	0.189 (0.172)	-0.333** (0.116)	-0.639** (0.221)	0.071 (0.084)	-0.013 (0.157)
Outstanding loans	-0.130 (0.091)	-0.219 (0.179)	0.083 (0.090)	0.074 (0.171)	0.116 (0.085)	0.189 (0.159)
Own home	-0.120 (0.229)	-0.134 (0.450)	0.037 (0.141)	0.024 (0.268)	0.045 (0.122)	0.017 (0.228)
Own vehicle	0.143 (0.093)	0.293 (0.183)	-0.061 (0.110)	0.078 (0.209)	-0.089 (0.095)	-0.128 (0.177)
Financial strain index	0.095 (0.065)	0.233* (0.128)	0.058 (0.072)	0.125 (0.137)	-0.013 (0.057)	0.043 (0.107)
Disability that limits work	-0.023 (0.141)	-0.247 (0.276)	0.020 (0.158)	0.044 (0.301)	0.254** (0.126)	0.444* (0.236)
Number of minors in household	-0.119** (0.048)	-0.319** (0.094)	0.057 (0.044)	0.118 (0.084)	0.090** (0.041)	0.158** (0.076)

(continued)

Table 3.4 (continued)

	Boston		Chicago		San Antonio	
	Months receiving Food Stamps out of next...		Months receiving Food Stamps out of next...		Months receiving Food Stamps out of next...	
	3 months	6 months	3 months	6 months	3 months	6 months
Married, spouse present	-0.019 (0.156)	-0.026 (0.306)	0.041 (0.144)	-0.005 (0.275)	0.115 (0.130)	0.046 (0.242)
Number of adults in household	-0.124** (0.053)	-0.202* (0.105)	-0.036 (0.047)	-0.086 (0.090)	-0.035 (0.052)	-0.034 (0.096)
<i>R</i> ²	0.15	0.11	0.51	0.61	0.11	0.20

NOTE: Longitudinal fixed-effect regression models estimated using interview data from the Three-City Study matched to administrative records. Models also include intercepts, controls for age, education, missing earnings histories, and calendar time. Standard errors appear in parentheses. * significant at the 0.10 level (two-tailed test); ** significant at the 0.05 level. (two-tailed test).

^a Trend household income being above the gross eligibility threshold is interacted (×) with the current monthly earnings variable.

SOURCE: Authors' estimations.

Earnings variability among low-income households is also consistently negatively associated with food stamp participation; however, only three of the six coefficients are statistically significant. The significant negative associations between earnings variability and participation appear for Massachusetts and Illinois, but not for Texas. One difference in policies that could lead to greater sensitivity to income changes in the former two states is that they both have program waivers that allow them to change benefits within certification periods based on changes reported to other programs such as Medicaid; Texas does not coordinate in the same way. Texas, however, has more stringent income reporting requirements for its Food Stamp Program than do the other two states (Rosenbaum 2000), so we might have expected stronger associations there.

Among low-income households, food stamp participation is higher if the caregiver had any earnings at all during the preceding year, although only one of these associations is statistically significant. The positive associations could reflect the different treatment of work income in the benefit and eligibility formulas; specifically, low levels of earnings are not counted against the benefit formula, while earnings above the exemption amount are “taxed” at a lower rate than other income.

Among the other coefficients, prior food stamp receipt is consistently positively associated with subsequent food stamp receipt. Increases in financial assets are negatively associated with food stamp receipt in Illinois but not in the other two states. Disability is positively associated with food stamp receipt in Texas. Adding an adult or a child to the household is significantly negatively associated with food stamp receipt in Massachusetts; adding a child to a household is positively associated with food stamp receipt in Texas.

CONCLUSION

This chapter examines the relationship between earnings histories and program participation in a sample that matches administrative data on program outcomes with longitudinal survey information from the Three-City Study about earnings and other household characteristics. We conduct multivariate analyses, employing fixed-effect regression

models that account for time-invariant characteristics of households, such as their permanent incomes. A unique aspect of our analyses is that we separately consider households with long-term trend incomes that make them more or less likely to be eligible for food stamps.

The chapter finds strong evidence that higher levels of current monthly earnings reduce program participation. This result is expected, as increased earnings reduce the need for assistance and also affect the eligibility and benefits associated with food stamps. What may be more surprising is that the magnitudes of the estimated associations are all relatively modest. The small sizes of the associations are likely due to our use of longitudinal fixed-effect controls and numerous other economic controls. With these controls, the identifying variation in current earnings comes from temporary changes.

We also find evidence that medium-term earnings variability, measured by the coefficient of variation for the preceding year's earnings, is negatively associated with food stamp participation, at least among low-income households. There are several potential explanations for these results. For households that are initially below the eligibility threshold, variable earnings could lead to occasional periods of ineligibility and shorter eligibility spells. Program compliance costs may also increase with earnings variability. Other possible explanations for the negative association are that participation affects earnings, reducing variability, or that some other characteristic affects both earnings and variability. While we cannot rule out these other explanations, our empirical methodology, which controls for permanent unobserved characteristics and which relates past earnings variability to subsequent program participation, makes them less likely.

Additionally, the estimation results provide modest evidence that program behavior in households with low long-term incomes is more sensitive to changes in their earnings and earnings variability than behavior in households with higher long-term incomes. When interactions of the earnings-history variables and the long-term income indicator are included in our models, the estimated coefficients for the earnings and earnings-variability measures for the low-income segment of our sample each increase. The changes in the coefficients are consistent with earnings volatility reducing eligibility among low-income households but not among higher-income households.

Notes

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1. A single child in each family was followed through all three interviews.
2. Of the 2,056 current and former caregivers who participated in the third wave, 1,980 were interviewed in person and were asked for their permission to obtain administrative records.
3. Robert Goerge from the Chapin Hall Center at the University of Chicago supplied the records for Illinois, Daniel Shroeder from the Ray Marshall Center at the University of Texas supplied the records for Texas, and Jesse Valente from the Massachusetts Department of Transitional Assistance provided the records for that state.
4. Evidence of differences in behavior is considerably stronger in alternative specifications that omit the maximum earnings variable and in random effect specifications.

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