

Variable Effects of Earnings Volatility on Food Stamp Participation

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Abstract

This study examines how earnings variability affects Food Stamp Program participation and how the effects differ depending on a household's income position relative to the eligibility threshold. The study uses survey data from the Three-City Study, which is a longitudinal survey of low-income families with children living in Boston, Chicago, and San Antonio. The data in the Three-City Study have been linked to administrative case records on program participation. The study estimates longitudinal fixed-effect regression models of the times that households spend on food stamps and distinguishes between households that appear to be eligible or ineligible for food stamps based on longer run income data. Temporary earnings increases and higher annual earnings variability reduce participation for households with low levels of permanent income. Higher annual earnings variability also reduces program participation for higher income households, but the effect is smaller in magnitude.

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Introduction

There are several sound reasons to suppose that earnings volatility plays a role in Food Stamp Program participation and other types of assistance program behavior.¹ However, the results from previous empirical studies have been equivocal. To the extent that they have considered volatility, researchers 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 appear for some groups but not for others. In this report, we examine how the effects of earnings variability on program participation differ depending on a family's position in the income distribution. Specifically, we investigate whether there are asymmetries in these effects depending on whether the family is initially above or below an eligibility threshold.

There are many reasons why asymmetric effects might appear, including a simple "mechanical" explanation. Consider a family whose long-term, trend earnings places 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 family 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 family will lose eligibility from time to time, leading to a decrease in the opportunities and incentives to participate. Thus, among initially eligible households, we expect a mechanical association in which greater variability reduces participation. These expected 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 with children who were living in Boston, Chicago, and San Antonio. A distinct advantage of the Three-City Study 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 non-participating households as well as eligible and near-eligible households. At each wave, the survey also 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 the individual 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 decisions, 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 or 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. There is also evidence that these sources of volatility are negatively associated with participation for households with higher levels of permanent income, but these effects are smaller in magnitude and lower in statistical significance

Conceptual analysis of earnings volatility

A gap in program research, which this report addresses, 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 introduction, increased earnings variability can lead to more frequent changes in eligibility.² 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 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 re-entering the Food Stamp Program (e.g., completing the initial application; supplying earnings records, birth certificates, social security cards, and other documentation; and attending an interview), the reduction in potential spell lengths could deter participation in the first place. This effect should exist for both low-income and high-income households, and therefore could increase the negative effects of volatility on program participation among long-run eligibles and decrease the positive effects among long-run ineligibles.

Third, the program itself may place higher compliance demands on households with variable earnings. As Ribar and Edelhoch (2008) document, some states require more frequent recertification intervals for households with earnings or with unstable incomes than for other households. At the start of our study period, Massachusetts and Texas had shorter recertification intervals for non-elderly households with earnings than those without earnings. Near the end of the study, all three states had semi-annual recertification intervals for households with earnings, and two of the states, Illinois and Massachusetts had longer intervals for households without

earnings. States also differ in terms of their income reporting requirements within certification intervals. Within our sample, one state, Texas, required 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 only required households to report changes in monthly earnings of \$100 or more.³ Higher compliance costs associated with earnings or income changes would again reduce the incentives to enter the program or to continue participating. Further, as in the last case discussed, this effect should occur for low- and high-income households and should therefore tend to reduce participation for both.

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 mean-tested program, food stamps provide 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. This effect should occur equally for low-income and high-income households, although decreasing marginal utility of income would imply that it should be stronger for low-income households. This would therefore tend to dampen the negative effect of volatility on program participation for these households.

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 non-market 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.

As the preceding discussion indicates, there are several reasons why earnings volatility might be associated with program participation as well as reasons why the associations might vary with a household's level of income. Most of the factors we have discussed lead us to expect a negative relationship between volatility and program participation for low-income households, while the factors provide a more mixed reading of what we should expect for high-income households. It remains an empirical matter, however, to determine whether and for whom there are relationships.

Data sources and measures

The data for our analyses consist of interview data from the Three-City Study matched with administrative case records for food stamp and 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 2000-1 and 2005. Retention rates were high with 88 percent of the original sample participating in the second round and 80 percent of the original sample participating in the third round. In each wave, interviews were conducted with both a selected child (the study researchers refer to this child as the “focal child”) and that child’s caregiver. In cases where the child and caregiver separated, both were subsequently followed and interviewed. For this report, 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.⁴ 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.⁵

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. As outcome measures in our analyses, we use the administrative 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. Measuring food

stamp receipt over several months allows us to observe more variation in participation than measuring usage for just a single month. However, we must also consider that our earnings measures and other explanatory variables become less relevant to participation decisions farther from the interview date. We use measures of different lengths to see whether our results are sensitive to these issues.

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

The use of administrative case records is an essential feature of this analysis. As mentioned, the administrative data are likely to be more accurate than the retrospective reports of program participation. Also, the data allow us to measure program participation prospectively from the time of the interview while controlling for other self-reported characteristics contemporaneously or retrospectively from the time of the interview. The use of these records also has drawbacks. Most notably, we are only able to match survey responses for caregivers who ever participated in the Food Stamp Program or TANF program sometime between 1997 and 2006 in the three states. This results in an analysis sample is more disadvantaged along some dimensions than the Three-City sample as a whole (see Appendix A for a comparison of characteristics between the matched and unmatched samples). It also means that the analysis sample is choice-based with more food stamp participants and less participation variability than the larger Three-City sample.

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 non-trivial portion of the histories are incomplete (about eight 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 an indicator of the long-term or persistent level of earnings, and we interpret the maximum monthly amount over this period as an indicator of earnings capacity. The coefficient of variation is used as a measure of earnings variability. When we condition 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 notable 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 exclude other sources of income. Third, the measures are limited to usual monthly earnings for a given job; they do not vary within job spells and only change when there is a switch in jobs or employment status. Finally,

the reports are subject to recall error. We believe that several of these properties, especially the limitations to usual monthly figures for primary jobs, may contribute to the earnings histories understating earnings variability.

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. As mentioned, there are three primary tests for food stamp eligibility: a household's income must be below 130 percent of the poverty threshold (gross income test), a household's income after adjusting for program deductions and exemptions must be below 100 percent of the poverty threshold (net income test), and a household's assets must be below a certain value (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. 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, 2000-1, 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 three quarters 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 different 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 wherewithal 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 and 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 non-response 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 1.

The analysis sample is clearly disadvantaged, having not only been initially selected on the basis of low incomes but also subsequently being 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 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 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 cut-off. 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 and with average annual earnings. Participation rates for caregivers without earnings two and a half times higher than the participation rates for caregivers with \$1,000 or more in monthly earnings. Moffitt and Winder (2003) and Frogner et al. (2007) similarly found that earnings and program receipt were negatively related when they examined self-reports of program participation in these data.

The next rows report participation levels for households with positive earnings whose coefficient of variation was positive but below one-half and participation levels for households with more variable earnings. In the sample, 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.

The results from Table 2 provide some evidence of asymmetric associations between earnings volatility and food stamp participation. Among caregivers with trend incomes above the gross-income eligibility thresholds, we see that more variable earnings are strongly positively

associated with program participation. Also, differences in earnings are especially strongly associated with participation. Among caregivers with lower trend incomes, we see the same patterns, though the strength of the associations is muted. The positive association between earnings variability and participation for higher income households is consistent with the “mechanical” explanation that we offered earlier, but the positive association for lower income households is not.

Multivariate analyses

The simple conditional means reported in Table 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. The first two columns of Table 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 to be 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 for the year and month of the interview. Each of the models in Table 3 pools data across the three cities.

As with the descriptive 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 descriptive results, the estimates 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 following half-year by 3.6 months.

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 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 insignificant (the p -values for joint significance for the 3- and 6-month outcome models are 0.17 and 0.12, respectively).⁶ 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, which now measures the effect of variability for low-income households, becomes 10 percent larger in the 3-month model and one third larger in the 6-month model. Also, the uninteracted coefficient on having any earnings during the past year becomes significantly positive. The changes suggest 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.

The positive coefficients on the interaction term between the high-income variable and earnings variability in the 3- and 6-month outcome models imply that the effects of earnings variability on program participation are smaller for high-income households than for low-income

households. However, the estimated effects for high-income households are still negative, though statistically insignificant (the p -values in the 3- and 6-month models are .28 and .54, respectively). As we noted previously, the sign of the effect for high-income households could be negative if the factors leading to declines in participation in response to higher variability dominated those leading to increases.

We re-estimated 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 particular policy environment. Results from the state-specific fixed effects models are listed in Table 4.

From the table, current earnings are consistently negatively related with food stamp participation among low-income households. In the 3-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 6-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.

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 these 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; 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 in Texas is positively associated with food stamp receipt.

Conclusions

This report 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 report finds strong evidence that increases in current monthly earnings reduce program participation. This result is expected, as higher earnings reduce the needs for assistance and also impact the eligibility and benefits associated 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.

We also find a negative relationship between program participation and earnings variability for high-income households, but the effect is smaller in magnitude and weaker in statistical significance than for low-income households. We interpret this finding as indicating that the factors which discourage program participation among such households, such as the shorter expected program durations that come from higher volatility, dominate those which

encourage program participation, such as a greater number of periods of income eligibility.

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.

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Notes

¹ The Food Stamp Program was renamed the Supplemental Nutrition Assistance Program on October 1, 2008. Throughout this report, we refer to the Food Stamp Program, the name of the program during the period of the study.

² The Food Stamp Program is a means-tested program, with eligibility depending on a household's monthly income and level of assets or on its participation in another means-tested program, such as Temporary Assistance for Needy Families or Supplemental Security Income. Non-elderly, non-disabled households that are not otherwise "categorically eligible" have to satisfy three criteria for food stamp eligibility: have monthly gross incomes below 130 percent of the poverty threshold, have net/adjusted incomes below 100 percent of the poverty threshold, and have assets below \$2,000. Once a food stamp application is approved, a household is certified to receive benefits for at least one month but usually more. Eligibility is checked rigorously at the initial certification and at subsequent recertifications. Within a certification period, households are required to report some changes in income, depending on the state's rules. All households are required to report changes in gross income that would put them above the 130 percent threshold.

³ Recertification intervals were obtained from the *Food Stamp Program Rules Database* (Finegold et al. 2007), while the reporting requirements were obtained from the *Food Stamp Program State Options Report* (USDA 2005).

⁴ Of the 2,056 current and former caregivers who participated in the third wave, 1,980 were interviewed in person and asked permission to obtain administrative records.

⁵ Robert Goerge at 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.

⁶ Evidence of differences in behavior is considerably stronger in alternative specifications that omit the maximum earnings variable and in random effect specifications.

Table 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	0.56	(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	0.09	(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	0.52	(0.50)	0.29	(0.46)	0.35	(0.48)
Outstanding loans	0.47	(0.50)	0.44	(0.50)	0.52	(0.50)
Owens home	0.04	(0.19)	0.15	(0.36)	0.19	(0.39)
Owens vehicle	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	0.32	(0.47)	0.55	(0.50)	0.39	(0.49)
Hispanic	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	0.47	(0.50)	0.33	(0.47)	0.35	(0.48)
Completed college	0.22	(0.41)	0.22	(0.41)	0.22	(0.42)
Disability that prevents work	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	0.08	(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: Statistics calculated using interview data from the Three-City Study matched to administrative records.

Table 2. Months of food stamp assistance following the interview for households with different income and earnings characteristics

Characteristic	<i>N</i>	Average months on food stamps in next	
		3 months	6 months
All caregiver observations	2,793	1.7	3.4
Earnings in interview month ^a			
None	1,347	2.1	4.2
\$0 to \$1000	537	1.9	3.7
\$1000 or more	680	0.8	1.7
Average monthly earnings in last year ^a			
None	925	2.1	4.2
\$0 to \$1000	957	2.0	3.9
\$1000 or more	682	0.8	1.5
C.V. of earnings in last year ^{a,b}			
Less than .5	975	1.2	2.3
.5 or higher	664	1.9	3.8
Observations with trend income below gross eligibility threshold	2,168	2.0	3.9
Earnings in interview month ^a			
None	1,189	2.2	4.3
\$0 to \$1000	468	2.0	3.9
\$1000 or more	327	1.2	2.4
Average monthly earnings in last year ^a			
None	827	2.2	4.3
\$0 to \$1000	807	2.1	4.2
\$1000 or more	350	1.1	2.2
C.V. of earnings in last year ^{a,b}			
Less than .5	606	1.6	3.1
.5 or higher	551	2.1	4.1
Observations with trend income above gross eligibility threshold	625	0.8	1.7
Earnings in interview month ^a			

None	158	1.5	2.9
\$0 to \$1000	69	1.0	2.0
\$1000 or more	353	0.5	1.0
Average monthly earnings in last year ^a			
None	98	1.5	3.0
\$0 to \$1000	150	1.3	2.4
\$1000 or more	332	0.4	0.9
C.V. of earnings in last year ^{a,b}			
Less than .5	369	0.5	1.1
.5 or higher	113	1.2	2.3

Note: Statistics calculated 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.

Table 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)
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. X earnings in interview month			0.119 (0.092)	0.258 (0.176)
Trend HH inc. > gross elig. X any earnings in last year			-0.274 (0.179)	-0.671* (0.343)
Trend HH inc. > gross elig. X average earnings in last year			-0.035 (0.208)	0.305 (0.399)
Trend HH inc. > gross elig. X c.v. earnings in last year			0.009 (0.111)	0.147 (0.213)
Trend HH inc. > gross elig. X 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	0.119	0.092	0.104

	(0.080)	(0.154)	(0.080)	(0.154)
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)
R^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 .10 level.

** Significant at .05 level.

Table 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. X earnings in interview month	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. X 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. X 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. X 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. X 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	-0.247	0.020	0.044	0.254**	0.444*

	(0.141)	(0.276)	(0.158)	(0.301)	(0.126)	(0.236)
Number of minors in household	-0.119**	-0.319**	0.057	0.118	0.090**	0.158**
	(0.048)	(0.094)	(0.044)	(0.084)	(0.041)	(0.076)
Married, spouse present	-0.019	-0.026	0.041	-0.005	0.115	0.046
	(0.156)	(0.306)	(0.144)	(0.275)	(0.130)	(0.242)
Number of adults in household	-0.124**	-0.202*	-0.036	-0.086	-0.035	-0.034
	(0.053)	(0.105)	(0.047)	(0.090)	(0.052)	(0.096)
R^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 .10 level.

** Significant at .05 level.

Appendix A. Characteristics of analysis and excluded samples

	Analysis sample		Excluded sample		<i>p</i> -value for
	Mean	(Std. dev.)	Mean	(Std. dev.)	equality of means
Earnings in interview month	567.81	(773.00)	580.48	(789.18)	0.63
Any earnings in last year	0.59	(0.49)	0.56	(0.50)	0.11
Average earnings in last year	561.48	(721.27)	563.56	(755.76)	0.93
Coefficient of variation for earnings in last year	0.42	(0.79)	0.37	(0.75)	0.06*
Maximum earnings in last year	774.42	(852.64)	760.47	(876.21)	0.64
Prior year's earnings information missing	0.08	(0.27)	0.10	(0.30)	0.06*
Household income-to-needs	1.00	(0.64)	0.99	(0.65)	0.47
Bank, savings or financial account	0.39	(0.49)	0.40	(0.49)	0.48
Outstanding loans	0.48	(0.50)	0.47	(0.50)	0.48
Owns home	0.13	(0.33)	0.16	(0.37)	<0.01**
Owns vehicle	0.44	(0.50)	0.51	(0.50)	<0.01**
Financial strain index	0.02	(0.73)	-0.06	(0.72)	<0.01**
Non-hispanic black	0.42	(0.49)	0.39	(0.49)	0.13
Hispanic	0.48	(0.50)	0.53	(0.50)	0.01*
Age	33.51	(9.35)	34.03	(9.55)	0.11
Completed high school or GED	0.38	(0.49)	0.36	(0.48)	0.11
Completed college	0.22	(0.41)	0.25	(0.43)	0.03*
Disability that prevents work	0.19	(0.39)	0.13	(0.33)	<0.01**
Number of minors in household	2.70	(1.36)	2.59	(1.38)	0.02*
Married, spouse present	0.14	(0.35)	0.22	(0.41)	<0.01**
Number of adults in household	1.71	(0.87)	1.74	(0.91)	0.20
Boston	0.33	(0.47)	0.46	(0.50)	<0.01**
Chicago	0.32	(0.47)	0.30	(0.46)	0.21
Reported receiving food stamps in interview month	0.62	(0.48)	0.47	(0.50)	<0.01**
Number of observations	2,793		1,254		

Note: Statistics calculated using interview data from the Three-City Study. "Analysis sample" contains longitudinal survey observations matched to administrative records; "excluded sample" contains longitudinal survey observations that could not be matched to administrative records.