Applying for and Staying on the Supplemental Nutrition Assistance Program in South Carolina

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Abstract

This study used administrative records for 50,067 applications and 34,914 benefit spells in South Carolina for the period October 1996-November 2007 to examine households' applications to and participation in the Supplemental Nutrition Assistance Program (SNAP). We modeled application resolutions where the possible outcomes were acceptance, denial due to income ineligibility, denial due to a failure to provide sufficient information, and denial for other reasons. For cases with successful applications, we modeled the durations of participation spells to distinguish among exits that result from missed recertifications, financial ineligibility, incomplete or missing information, and other reasons. The results indicate that a household's application and participation history affect its subsequent application success and program tenure. Applicants with recent SNAP program experience are more likely to have their applications accepted than other applicants. Among the applicants with recent program experience, the way in which a previous spell ends helps to predict how their next application will be resolved and how their next participation spell will end. Households face an increased risk of having a SNAP participation spell end for financial ineligibility if an earlier participation spell ended for that reason. Similarly, households face an increased risk of having their applications denied or participation spells end for information deficiencies if an earlier spell ended that way.

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Executive Summary:

In this report we examine the processes associated with households applying to and maintaining participation in the Supplemental Nutrition Assistance Program (SNAP; formerly, the Food Stamp Program) using case records from South Carolina. Program take-up is a major issue for the SNAP and other assistance programs. Currently, only two-thirds of the households that appear to be financially eligible for the SNAP actually participate. Previous analyses of SNAP participation using household-level administrative data have focused on the length of spells of benefit receipt once households have joined the program. However, these studies have overlooked the processes by which households begin receiving benefits. This report addresses this problem and extends the existing literature by jointly examining how applications to the SNAP in South Carolina are resolved (i.e., whether applications are accepted and whether rejected households re-apply), the length of subsequent participation spells for accepted cases, and the reasons why participation spells end.

We examine electronic case management records from South Carolina covering the period from October 1996 until November 2007. The records contain case-level data on the dates and resolutions of applications, the start and end dates of participation spells, reasons for spell closures as well as demographic characteristics and geographic locations of households. The analysis data set contains information for 50,067 applications and 34,914 SNAP spells.

In our sample of SNAP applications, approximately one third were rejected or otherwise unsuccessful. Some of the rejected applications came from households that were determined to be financially ineligible, but many more (about five out of every nine applications that were rejected) were turned down because of incomplete or insufficient information. Similarly, when we examine why SNAP participation spells end, roughly half of households stop receiving benefits because they fail to complete periodic recertifications and another sixth of households lose benefits because of incomplete or insufficient information. Only a fifth of households that stop receiving benefits do so because of a formal determination of financial ineligibility.

To examine characteristics that lead to these outcomes, we estimate joint models of 1) SNAP application resolutions and 2) subsequent participation spells for those with accepted applications. Jointly modeling these processes allows for the possibility that successful applications constitute a non-random sample of all applications. The model of application resolutions is specified as a multinomial logit model where the possible resolutions are acceptance, denial due to income ineligibility, denial due to a failure to provide sufficient information, or denial for other reasons. Each outcome depends on the past application behavior and other observable case characteristics. For cases with successful applications, the resulting participation spell is modeled using a discrete-time, competing-risk hazard model. We distinguish among SNAP exits that are the result of missed recertifications, financial ineligibility, incomplete or missing information, or other reasons. The hazard for each type of exit depends on the duration of the spell, past application behavior, and observed characteristics.

The estimation results indicate that a household's application and participation history affect its subsequent application success and program tenure. We find that applicants who have recently completed a participation spell are more likely to be successful in their applications than other applicants. Among the applicants with recent program experience, the way in which a previous spell ends partly predicts how their next application will be resolved and how their next participation spell will end. Households face an increased risk of having a SNAP participation spell end for financial ineligibility if an earlier participation spell ended for that reason. Similarly, households face an increased risk of having their applications denied or participation spells end for information deficiencies if an earlier spell ended that way.

Estimates from the models also indicate that households' resources and needs are associated with both application resolutions and subsequent participation spells, mostly in ways that we would expect. Households with higher levels of earnings are more likely to have their SNAP applications rejected and their SNAP spells end than households with lower levels of earnings. The rejections and closures are especially likely to occur because a determination of financial ineligibility. At the same time, households with greater needs are less likely to have their applications rejected and to have SNAP spells end. Program benefits are also associated with program tenures and the reasons for case closures. SNAP participants with higher benefits are less likely than other households to miss their recertifications, to provide incomplete or insufficient information, or have spells end for other reasons.

Additionally, the results indicate that unobserved characteristics that affect application resolutions also affect subsequent participation spells. The results are mostly consistent with "positive selection" in the sense that characteristics that increase the risk of an application being turned down for a given reason also increase the risk of a household exiting the program for that same reason.

Applying for and Staying on the Supplemental Nutrition Assistance Program in South Carolina

1. Introduction

Policymakers and program officials have long recognized that administrative procedures and practices are important determinants of households' movements into and out of the Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program).[1] The federal and state governments are partners in the SNAP, with the federal government setting general rules for the program, paying the entire cost of benefits and about 50 percent of state administrative costs and the states administering the program. In their role as administrators, states have considerable latitude in a number of areas including establishing and running SNAP offices, developing and reviewing initial applications, and setting recertification intervals. States may also obtain waivers from the federal government to alter other features of their programs.

Research has begun to quantify the impacts of these policies and procedures. For instance, Bartlett et al. (2004) found that a host of factors including office hours and policies, supervisor attitudes, fingerprinting requirements, and Able-Bodied Adults Without Dependents (ABAWD) work requirements and time limits affected application behavior. Ribar et al. (2008, forthcoming) and Staveley et al. (2002) found that exits from the SNAP occur mainly at recertification due dates, and Ribar and Edelhoch (2008) found that exits for administrative reasons, including missed recertifications and documentation problems, accounted for two-thirds of SNAP exits.

Burdens associated with administrative procedures are often discussed as a reason why some economically disadvantaged (otherwise eligible) households fail to take advantage of

[1] The Food Stamp Program was renamed the Supplemental Nutrition Assistance Program on October 1, 2008. Throughout this report, we refer to the SNAP, although the former name applied during the period of the study.

available program assistance.[2] Cunningham and Castner (2009) estimate that only two-thirds of households that were financially eligible for the SNAP participated in 2007. Although administrative procedures are important for program integrity and for making sure that only truly needy families receive assistance, they may hinder program performance if they discourage eligible households from participating. Along the same lines, analyses of these procedures are valuable because they can highlight areas where program performance might be improved.

This report investigates the processes by which households enter and leave the SNAP. Unlike most research on SNAP behavior, we examine potential SNAP cases at the time that they apply and investigate the resolution of those applications. Among households with successful applications, we then examine how long the subsequent SNAP participation spells last and the reasons why those spells end. We investigate these issues, using electronic case management records for households with children from South Carolina covering the period from October 1996 until November 2007. The records contain case-level data on the dates and resolutions of applications, the start and end dates of participation spells, the reasons for spell closures as well as demographic characteristics and geographic locations of households. The analysis data set contains information for 50,067 SNAP applications and 34,914 program spells.

We estimate joint models of SNAP application resolutions and subsequent participation spells. Jointly modeling these processes allows for the possibility that successful applications constitute a non-random sample of all applications. The model of application resolutions distinguishes among applications that were accepted, denied because of financial ineligibility, denied because a failure to provide sufficient information, or denied or withdrawn for other reasons. We consider the roles that past application and program behavior play in these outcomes. For households with successful applications, we model the resulting SNAP

[2] Moffitt (1983) also discusses how stigma might reduce program participation.

participation spells, using a discrete-time, competing-risk hazard framework. Our model measures how long households remain on the SNAP and distinguishes among exits that result from missed recertifications, financial ineligibility, incomplete or missing information, or other reasons. As with the application outcomes, we also consider how previous application and program experiences affect program spells.

The estimates from our descriptive and multivariate analyses reveal that households' SNAP application and participation experiences are predictive of their subsequent experiences. For example, SNAP applicants who have recently completed a participation spell (i.e., with recent program experience) are more likely to be successful with their applications than those who have not recently participated. Among the applicants who do have recent program experience, however, the way in which their previous spell ended helps to predict the reasons why their application might be denied and the reasons why their next participation spell ends. Applicants face an increased risk of having their application denied for financial ineligibility or having a SNAP participation spell end for financial ineligibility if an earlier participation spell ended for that reason. Similarly, applicants face an increased risk of having their applications denied or participation spells end for information deficiencies if an earlier spell ended that way. These findings may be especially valuable to program managers and caseworkers because they all involve characteristics that can be ascertained from case files. In addition, results from our multivariate models indicate that unobservable characteristics account for some of these associations; however, the results also indicate that there are direct associations even after accounting for observable and unobservable characteristics.

The remainder of this report is organized as follows. In Section 2, we review the research that has examined SNAP policies, focusing on the small set of studies that have investigated

entry and exit processes. In section 3, we discuss the electronic case records that are the source of our empirical analyses; we also describe how we constructed an analysis data set from these records. We report results from descriptive analyses of the data in Section 4. In Section 5, we describe our multivariate statistical methodology. Results from the multivariate models are reported in Section 6, and conclusions are offered in Section 7.

2. Background

SNAP participation and ultimately SNAP caseloads are determined by a series of processes and events. As a first step, a needy household must apply for benefits, which usually entails completing an application with roughly the same level of detail as a simplified tax form and providing supporting documentation.[3] Once an application is submitted, the state agency that administers the SNAP reviews it and typically requires an in-person interview with a caseworker. Based on the application, supporting materials, and interview, the state agency determines whether the household qualifies for benefits and can participate in the program. If the application is rejected because of incomplete information or for some other procedural reason, the household may reapply. If the application is approved, the household begins participating and receiving benefits. Thereafter, the household must comply with the program's rules and remain eligible to continue receiving benefits. If the household stops complying with program rules, decides to stop receiving benefits, or loses eligibility because of a change in its economic circumstances or living arrangements, its SNAP case is closed, and the household returns to the pool of non-applicants. From this overview, we can immediately see that there are many steps in the process, that each step involves interactions of household and program characteristics, and that the steps can be repeated within and across spells of benefit receipt.

[3] South Carolina and some other states allow disabled adults to use their application for disability assistance as their application for the SNAP. South Carolina also offers simplified applications to households with elderly members.

Little of this structure is reflected in food stamp or SNAP caseload research. Many caseload studies simply examine the incidence of program participation, either by modeling the aggregate number of people or households receiving benefits (Danielson & Klerman 2006, Kabbani & Wilde 2003, Kornfeld 2002, Wallace & Blank 1999, Wilde et al. 2000, Ziliak et al. 2003) or by modeling the incidence of receipt among individual households (Currie & Grogger 2001, Farrell et al. 2003, Fraker & Moffitt 1988, Haider et al. 2003, Keane & Moffitt 1998). These studies generally abstract from the program details and further fail to distinguish between entry and exit processes.

Another line of research does consider program entry separately from program exit but examines these processes as simple bivariate outcomes or as rates and spells (Blank & Ruggles 1996, Cody et al. 2005, Gleason et al. 1998, Hofferth 2003, Mills et al. 2001, Ribar et al. 2008, forthcoming, Staveley et al. 2002). These studies have been able to consider more program characteristics and other details. For example, Blank and Ruggles (1996) modeled eligibility spells. Gleason et al. (1998) considered "trigger events," such as the loss of a job or a change in income that could change program status. Cody et al. (2005) examined entry (replacement) and exit rates among different types of households before and after welfare reform in the 1990s. Ribar et al. (2008, forthcoming) considered recertification intervals and program time limits.

Only a few studies have carefully investigated component processes. For instance, Bartlett et al. (2004) documented policies and practices in local food stamp offices, measured perceptions of these policies and practices among households that appeared to be eligible for assistance, and examined how these perceptions affected participation behavior. They found that many non-participating households believed themselves to be ineligible and that many households had misperceptions about program rules. Of the many rules and office characteristics

that they documented, Bartlett et al. found that five mattered for getting people to complete applications: the operating hours of program offices, positive attitudes of office supervisors, fingerprinting of clients, arrangements for children while parents applied, and ABAWD time limits.

Ribar and Edelhoch (2008) investigated the different reasons why people left the SNAP. As with the present research, they used program records from South Carolina that included the administrative reasons for program exits, which they grouped into five broad categories: missed recertifications, financial ineligibility, failures to provide verifiable information, other losses of eligibility, and voluntary exits. They found that half of program exits were associated with missed recertifications and that another sixth were associated with problems in supplying information. Some of these "paperwork" exits occurred among households that were likely to be found ineligible; however, some of the exits also occurred among households in very unstable and distressed circumstances.

Our report extends these previous process studies. As with the study by Bartlett et al. (2004), we carefully examine how SNAP applications are resolved. In particular, we examine whether applications are approved or rejected for reasons of financial ineligibility, incomplete information, or other reasons. As with the study by Ribar and Edelhoch (2008), we also use administrative data to examine participants' program spells and reasons for exiting the SNAP. We extend these earlier studies, however, by modeling application and subsequent participation behavior jointly (thereby addressing potential selectivity among participants) and by examining how earlier application and participation outcomes affect subsequent outcomes. For example, we consider whether "paperwork" problems in the application stage predict subsequent paperwork problems as households continue their participation.

3. Data

The data for our empirical analyses of SNAP applications and participation come from electronic case management records from South Carolina covering the period from October 1996 until November 2007.[4] The records cover the universe of households that applied to the state's SNAP over the period. They contain a wealth of household- and person-level information, including the dates and resolutions of applications, the starting and ending dates of participation spells, demographic characteristics of households, geographic identifiers, and benefit and reported income amounts during each month of program receipt. We use these records to form an analysis file with observations of 1) applications and their resolutions and 2) participation spells for the approved applications.

Due to the large number of SNAP cases in South Carolina and the amount of information in the case histories, we reduced the analysis extract by initially drawing a 1-in-11 random sample of longitudinal cases. Cases are groups of people, typically households, that together receive SNAP benefits. The state of South Carolina constructs internal identifiers that allow such cases to be tracked over time, including across different episodes of application and benefit receipt. Thus, our extract represents a random sample of available histories, including all of the applications and program spells associated with a household over the study period.[5]

We then make four additional restrictions to the data. First, we limit the analysis to households where children are present at the time of application and in which the case head was

[4] The records were provided on a confidential basis through agreements with South Carolina's Department of Social Services and Office of Research and Statistics. Records included internal identifiers but excluded external identifiers such as names, social security numbers, addresses, or phone numbers.

[5] The size of our random sample was constrained primarily by our computing and data transfer capabilities. Reviewers have noted that the analytic properties of our extract could be improved by using a stratified sampling approach. However, because of the structure of the South Carolina data files, this approach requires pre-processing several enormous files, a task that was beyond our computing capabilities.

between the ages of 18 and 59 and no other adults were over the age of 59.[6] Second, we restrict the analysis to households in which the head of the case was white or black. Only five percent of cases were identified as being of another race or ethnicity, leaving us with too few cases to examine these groups. Third, we drop observations with missing, incomplete, or inconsistent information about participation, household characteristics, or case-head characteristics. In terms of the longitudinal case histories, we effectively right-censor the history at the first instance of problematic data. Fourth, we drop observations from the longitudinal history for a case if there is a change in the identified case head, a procedure that also effectively right-censors the longitudinal history. Our final analysis data set contains 50,067 SNAP applications and 460,931 monthly observations from 34,914 spells of benefit receipt.

Applications. The data contain information on 28,495 applications by blacks and 21,572 for whites. The approval rate is approximately 69 percent for both groups. For every application that is denied or withdrawn, the administrative records give a reason. There are 27 detailed codes that are used at least once in our records.[7] We grouped the codes into three broad categories: applications that were unsuccessful

- because the household was determined to be ineligible because its income or assets were too high,
- because the household failed to provide information or provide verifiable information, or
- because of some other reason, including voluntary withdrawal.

[6] Adult-only cases and cases with elderly recipients face different rules than other cases so restricting the data to households with children and with all adults younger than 59 years old allows us to focus on a single set of policies without having to attempt to control for policies specific to these other groups.

[7] The SC Department of Social Services policy manual indicates that applications are resolved in one of four primary ways: approval by the caseworker, denial by the caseworker, denial by the administrative computer system, or withdrawal by the applicant. Caseworkers deny an application if the applicant fails to meet any of the eligibility criteria, fails to provide necessary information or participate in an interview, or cannot be located. Thus, our categorizations correspond to the broad categorizations in the policy manual. In situations where applicants fail to meet multiple criteria, only one code is entered by the caseworker even though other codes might also apply. Our multivariate analyses account for these "competing risks" of failure.

The detailed codes, our categorizations, and the relevant frequencies are reported in Appendix A.

The tabulations of the reasons for denial reveal that just under one third of the denials—32 percent among applications submitted by blacks and 30 percent among applications submitted by whites—occurred because the households reported or were found to have income or resources that made them ineligible. Over half of the denials (53 percent for blacks and 56 percent for whites) occurred because the household failed to provide sufficient or reliable information. Approximately 14 percent of the unsuccessful applications were denied on other grounds or were voluntarily withdrawn.

Figure 1 shows trends in application resolutions for our sample. We have adjusted the totals so that the counts of cases in Figure 1 represent the number of applications in South Carolina among households with adults 18-59 years of age and with children at the time of application. Although there is considerable seasonal variability, the number of successful applications to South Carolina's SNAP generally trended downward over the last part of the 1990s; this is consistent with the falling SNAP caseload in the state over the same period. Starting in the second half of 2000, applications began to increase as the economy in South Carolina deteriorated. After the economy stabilized in 2002, the number of applications fell slightly but remained above the levels from the late 1990s. Over time, there also appears to have been a modest increase in the acceptance rate of applications.

SNAP participation spells. From the accepted applications, we examine the subsequent spells of SNAP participation, which we measure in discrete, monthly intervals. SNAP participation spells in South Carolina can begin anytime during a month. However, once a spell begins, benefits are only paid once a month. Also, when a case is terminated, the official closing date almost always occurs at the end of the month. The timing of payments and case closings

lead us to treat the participation spells as a series of discrete, monthly observations, with the initial and terminal observations for each spell corresponding to the first and last months of benefit receipt, respectively.

Our data begin in October 1996. However, because our multivariate models condition on application and program experience during the preceding year, our analysis begins in October 1997. Accordingly, we drop spells that are on-going, or left-censored, in October 1997 and only consider applications and new spells that begin on or after this date. The spells themselves should refer to continuous months of benefit receipt. However, the administrative records sometimes contain short breaks. In processing the data for each household, we smooth the information by combining spells of program participation that are separated by a month or less (that is, by ignoring short breaks). This kind of smoothing is common in event-history studies and is intended to eliminate artificial transitions associated with administrative "churning." This treatment is also consistent with state policies that consider program receipt spells that resume within one month of a previous spell to be continuations of the earlier spells.

Reasons for exit. As with denied applications, the administrative records give a reason for closure of an on-going case. There are 33 detailed codes that are used at least once in our records.[8] We grouped the codes into four broad categories: cases that ended because the household

- missed its recertification,
- lost eligibility because its income or assets were too high,
- failed to provide information or provide reliable information, or

[8] As with the application denial codes, case closing codes can be generated automatically by failing to meet some time critical deadline (most often a recertification) or verification check, by caseworkers who detect some eligibility issue or encounter missing, incomplete or unverifiable paperwork, or by a voluntary withdrawal of the application. Multiple case closing codes could apply to a given spell exit, but only one will be recorded in the administrative system.

- lost eligibility because of some other reason or voluntarily quit.

The detailed codes, our categorizations, and the relevant frequencies are reported in Appendix B.

The tabulations of the reasons for exit reveal that 52 percent of cases headed by blacks and 54 percent of cases headed by whites ended because the cases let their certification periods lapse without submitting any paperwork for a new certification. This replicates the findings of Ribar and Edelhoch (2008) that recertification is an important element in SNAP exits. The tabulations also indicate that about one fifth of the exits—22 percent among cases headed by blacks and 16 percent among cases headed by whites—occurred because the households either reported or were found to have a change in income or resources that made them ineligible. Approximately one sixth of cases ended because the household failed to provide sufficient or reliable information. Ten percent of cases headed by blacks and 13 percent of cases headed by whites lost their eligibility for some other reason including voluntary withdrawal.

Figure 2 shows trends in the numbers and types of exits for SNAP households in South Carolina with children and no elderly adults.[9] As opposed to applications, there was no initial downward trend in exits. Aside from seasonal variation, the numbers and types of exits were very similar from the beginning of our observation period until the middle of 2002. However, after South Carolina increased its recertification intervals for households with earnings in 2002, there was a marked decrease in exits associated with missed recertifications. In 2005, South Carolina shortened the recertification intervals for households without earnings. At that point, exits associated with missed recertifications increased. Over time, exits associated with determinations of financial ineligibility appear to have increased. Exits associated with information problems increased after 2002 but fell after 2005.

Participation History. The administrative records for South Carolina maintain the same

[9] Figure 2 includes exits among spells that were on-going in October 1997.

identifiers for households across applications and program spells, allowing us to link program experiences longitudinally and thereby account for households' application and participation histories. These histories may affect the outcome of application decisions and program spells. To account for past experience with the SNAP, we construct variables indicating whether the household applied within the past year and, if there were an application, the outcome and the number of months since the application. Additionally, we construct variables measuring the number of months since the most recent spell closure (if it occurred within the past year) and the reason for the closure.

Control Variables. From the information on demographic characteristics, we construct measures of the number and age composition of the case members. We also construct variables for the age, sex, race, educational attainment, and marital status of the household member heading the case.

Unlike the demographic characteristics, data on income and earnings are not available for denied applications. Consequently, we merge in quarterly earnings data from South Carolina's Unemployment Insurance (UI) system. The UI database contains earnings information for most private, non-agricultural employers. However, it overlooks government employment and some types of private-sector jobs, such as agricultural and domestic work. It also misses employment by people who commute out of the state to work. To make the units of the UI earnings data comparable to the income data from SNAP administrative data, we divide the quarterly UI earnings amounts by three.

For each month that a case continues, the records indicate the benefits that the household received as well as all of the economic information that enters the benefit calculation, including gross reported earned and unearned income amounts. We use several of these variables in our

descriptive and multivariate analyses, adjusting all dollar amounts to 2005 levels using the Consumer Price Index for All Urban Consumers.

The records also indicate the county of residence for the household, which allows us to link the administrative data to measures of the county unemployment rate to control for local economic conditions and measures of the population density to control for the level of urbanization.

Several SNAP policies in South Carolina changed during the observation period of our study. One set of policies involved the recertification intervals for different types of cases. Prior to October 2002, cases with variable incomes (usually earnings) had to recertify their eligibility quarterly, while cases with fixed incomes such as TANF, disability payments, or retirement had to recertify annually. Starting in October 2002, South Carolina increased the recertification intervals for cases with variable earnings to six months, and starting in February 2005, the state reduced the recertification intervals for households with fixed incomes to six months. Our multivariate analyses of participation spells include controls for these policies.

South Carolina changed several other policies. For example, the state effectively exempted all vehicles from the calculation of household assets in fiscal year 2002. The state also adopted simplified income reporting requirements and simplified definitions of income. To account for these and other policy changes, the multivariate analyses include general sets of time controls.[10]

4. Descriptive analysis

Tables 1b and 1w list statistics describing the characteristics of SNAP cases from South

[10] South Carolina also changed policies that were relevant to its adult-only caseload, including exempting some adults from work requirements and time limits and adopting simplified applications for elderly adults. Ribar and Edelhoch (forthcoming) examine the policies for and behavior of adult-only cases.

Carolina at the time of application for different application outcomes. Table 1b lists statistics for cases headed by blacks, while Table 1w lists statistics for whites. In each table, averages of the characteristics are calculated conditionally, depending on how the application was resolved.

The first rows present information about income. Because not all applications are complete, information on income from the case records is limited. Consequently, we use the sum of UI earnings recorded for all household members from the current quarter as an indicator for household earned income. As mentioned, to improve the comparability of the different income measures, we divide the quarterly UI earnings amounts by three to arrive at an approximate monthly equivalent. We also include a dummy variable that equals one if no earnings were recorded. As one would expect, applications that were denied for income reasons had relatively high UI earnings compared to other applications. Somewhat surprisingly, however, cases whose applications were denied for information reasons had lower average UI earnings than cases whose applications were approved.

The second set of variables describes households' application and program experiences over the year preceding the current application. The decision to focus on the most recent year was made in part to recognize that, like human capital, more recent experience is likely to play a larger role in current behavior than more dated experience. The empirical implication of the one year window is that individuals whose last closure or denial occurred one or more years ago are treated as if they have no experience with the FSP. The one-year window was selected after some initial specification analyses that indicated that longer window lengths did not add much explanatory power.

The statistics for the program experience measures indicate that black applicants were a little more likely to have been recent SNAP participants (i.e., to have experienced a case closure)

than white applicants. Within each racial group, successful (approved) applicants were more likely to have participated in the SNAP during the last year than unsuccessful applicants. Among successful applicants with recent program experience, the distribution of case closure reasons is very similar to the overall distribution of closures from Appendix A. Applications that were denied for financial reasons were more likely than other applications to follow a case closure for similar reasons. Application resolutions do not appear to be strongly associated with other reasons for case closures.

The statistics for prior application experiences reveal that modest, yet nontrivial, proportions of applicant households had unsuccessful applications in the previous year. Such households were at slightly higher risk of having their current applications denied. The reasons for denials were predictive of subsequent denials. Households that were rejected for financial reasons had the highest incidence of prior financial rejections; households that were rejected for information reasons had the highest incidence of prior information rejections, and so on. These descriptive results suggest that prior application and program experiences are associated with current application success.

Tables 2b and 2w list statistics describing the characteristics of SNAP participation spells that ended for different reasons or that were right-censored (not observed to end). Table 2b lists statistics for cases headed by blacks conditionally by spell ending, while Table 2w lists similar statistics for cases headed by whites.

The rows at the top of each table describe economic circumstances of the cases, including the level of SNAP benefits and reported levels of earned and unearned income, at the beginning of the month in which the spell was last observed (that is, immediately preceding the spell termination). Consistent with the results reported by Ribar and Edelhoch (2008), these economic

variables are associated with the reasons for exit. As we would expect, cases that were terminated for reasons of financial eligibility tended to have the lowest benefits and the highest reported incomes. Cases that failed to recertify also had relatively low benefits and relatively high incomes. These results suggest that these cases may have had lower incentives than other cases to comply with program rules and that some may stopped complying because they were financially ineligible. While low in a relative sense, the benefits for cases that failed to recertify were still substantial, which suggests that at least some cases were "leaving money on the table" and may have encountered high costs of program compliance. Cases that ended because they failed to provide sufficient information and cases that lost eligibility for other reasons had the highest benefits and lowest incomes on average, indicating that these cases were especially disadvantaged.

The next rows list statistics associated with the cases' program and application experiences in the year preceding the start of their current SNAP participation spells. The statistics indicate that each type of closure experience put households at an increased risk of repeating that closure experience. Cases that failed to recertify had relatively high rates of earlier failing to recertify; cases that closed for financial reasons had the most experience with this type of outcome, and so on.

The statistics for histories of unsuccessful applications indicate that such experiences were more common among SNAP cases that eventually closed because of missed recertifications, financial ineligibility, and information problems and less common among cases that eventually ended for other reasons. Experiences with applications that were turned down because of information problems were especially prevalent among cases that subsequently closed because of information problems and missed recertifications. Experiences with applications that

were rejected for financial eligibility were most prevalent for cases that subsequently closed for this same reason. Once again, the descriptive evidence is consistent with previous program and application experiences predicting subsequent program behavior.

5. Multivariate models

The descriptive analyses reveal that economic conditions, program variables, and application and program experiences are all unconditionally associated subsequent application and program behavior. To better isolate the independent influences of the different characteristics, we jointly estimate multivariate models of SNAP application resolutions and of subsequent participation behavior. We specify the model of application resolution outcomes as a multinomial logit. Let $p_j(t)$ be the probability of resolution outcome j (= 0, 1, 2, 3) for an application made by a household at time t where the outcomes are the application being accepted, denied for financial ineligibility, denied for a failure to provide information, and denied for other reasons, respectively. We assume that the resolution probability depends on a set of observed and possibly time-varying household characteristics, $X(t)$, and a time-invariant unobserved household characteristic, η. Because we are estimating probabilities of resolution, actual resolution outcomes also implicitly depend on additional time-varying unobserved characteristics. We model the probability for the household's application resolution as

$$p_j(t) = \frac{\exp\left(\delta_j X(t) + \pi_j \eta\right)}{1 + \sum_{s=1}^{3} \exp\left(\delta_s X(t) + \pi_s \eta\right)} \tag{1}$$

where δ_i, i = 1,…,3 is a kx1 vector of coefficients to be estimated and π_i, i = 1,…,3 is a scalar parameter to be estimated.

Conditional on an application being approved, we observe a participation spell for the household. We estimate discrete-time competing-risk hazard models of different types of SNAP

exits (see Allison 1982). The hazard rate, which refers to the probability that a spell of remaining in one situation ends at a given point in time conditional on the spell having lasted up to that time, is a standard tool for analyzing program behavior. Hazard models are especially useful in this regard because they account for the fact that some spells of program participation are not observed to their ends, because they either continue past the analyst's observation window (in this case past November 2007) or are missing information at some point during their duration. The competing-risk framework further accounts for the fact that there are several reasons why a spell might end but that only one of those reasons is actually observed. For example, a spell that ended because of a missed recertification might have soon ended anyway for eligibility reasons.

We specify the discrete-time, competing-risk hazard model as a multinomial logit model with the different reasons for exit in any month as the explicit outcomes and with continuation in the spell as the omitted outcome. We model exits for four reasons: missed recertifications, losses of eligibility for income or resource reasons, failures to provide information, and all other reasons. Let $h_k(t)$ be the hazard of the household leaving the SNAP for reason k (= 1, 2, 3, 4) (and let $h_0(t)$ be the conditional probability of continuing on the program). The hazard for a particular type of exit depends on characteristics of the duration of the spell, $T(t)$, as well as other observed and unobserved characteristics and is modeled as

$$h_k(t) = \frac{\exp\left(\alpha_k T(t) + \beta_k X(t) + \lambda_k \eta\right)}{1 + \sum_{m=1}^{4} \exp\left(\alpha_m T(t) + \beta_m X(t) + \lambda_m \eta\right)} \tag{2}$$

where α_k, β_k, and λ_k are vectors of parameters to be estimated.

As mentioned, the application resolution and participation models are estimated jointly. Besides the observed explanatory variables, the models share a common unobserved component,

η. The presence of this component allows for correlations across the models and for serial correlation in the unobserved determinants of the repeated outcomes for a model. In this way, we simultaneously account for selection from unobservables in application outcomes and for spurious duration dependence from unobservables in the participation analysis. We assume that η follows a discrete distribution with a finite number of potential outcomes. Our software estimates the points of support and probabilities for this distribution.

6. Multivariate estimation results

We estimate our models separately for white and black households. Coefficient estimates from our principal specifications for application resolutions appear in Tables 3b and 3w, and coefficient estimates from our principal specifications for program spells appear in Tables 4b and 4w. As the row headings in the tables indicate, the explanatory variables in the application and competing-risk hazard models include measures of household economic resources, household demographic characteristics, and local economic and population characteristics. The competing-risk models of program tenures also include controls for SNAP benefits and quarterly, semi-annual, and annual spell duration indicators that correspond to the likely ends of certification periods.

In addition to these measures, the models include other explanatory measures and controls, although we do not report detailed results.[11] In particular, our application and program tenure models include dummy variable controls (fixed effects) for the applicant's county of residence and for the fiscal year of the observation. The county and fiscal year indicators are included to control for area and time differences in policies, procedures, economic conditions, attitudes, and other characteristics. The competing-risk models of program tenure also include

[11] Complete, detailed results are available upon request.

36 monthly dummy variables that cover the first three years of a spell duration and four semi-annual dummy variables that cover the next two years; thus, we essentially adopt a semi-parametric specification for the spell duration, akin to a Cox proportional hazard model. The models for black and white households are estimated using a discrete distribution for the unobserved component, η, with four points of support. Specification tests support the inclusion of county and fiscal year fixed effects, general controls for the baseline duration pattern, and the control for a common unobserved component.

The estimates in the first two rows of Tables 3b and 3w indicate that households are at increased risk of having an unsuccessful application if they have high levels of UI-covered earnings or if they have no record of UI-covered earnings at all. The former result is consistent with households being less likely to be financially eligible for SNAP benefits and thus less likely to have their applications accepted. The latter result, regarding no UI earnings, may be indicative of less stable economic circumstances or of employment that is harder to verify. These results are similar across black and white households.

The estimates in the next five rows of Tables 3b and 3w describe the associations between households' program experiences in the preceding 12 months and their application resolutions. For the most part, the estimates indicate that households that are attempting to rejoin the SNAP after a short absence are more likely to be successful than households attempting to rejoin after longer absences or with no program experience in the last 12 months.[12] The lone exception to this pattern of results is for white applicants who experienced case closures for

[12] The coefficient estimates for the program experience variables are difficult to interpret because they involve interactions between the "months since closure" and "reason for closure" coefficients. Consider a black household that experienced a closure because of a missed recertification three months before its current application. Its risk index for a financial denial would decrease by 0.668 (= (3 · 0.080) – 0.908) relative to a household that had not experienced a case closure in the last 12 months. The risk index for an information-related denial for the same household would decrease by 0.166, and the risk index for other types of unsuccessful resolutions would decrease by 0.761.

financial reasons – these applicants face increased risks of information-related denials but reduced risks of financially-related denials and "other" denials.

Among the households that had experienced closures in the last 12 months, closures for particular reasons generally increased the risks of denials for the same reasons. The pattern is especially noticeable for black households. For black households, experiences with financially-related closures raised the odds of financially-related application denials; experiences with information-related closures raised the odds of information-related denials, and "other" closures raised the odds of "other" denials and withdrawals.[13] For white households, these same associations appeared for financially-related closures and "other" closures but not for information-related closures. In general, the associations between closure reasons and application resolutions match those from the descriptive analyses.

The associations between previous and current application outcomes are both weaker and more varied than the associations between previous closures and current application outcomes. For example, a previous application denial for information reasons significantly reduces the chances of an information-based denial for whites, and previous experiences with "other" denials and withdrawals significantly reduce the chances of a current financial or information related denial for blacks or an information related denial for whites.

Demographic characteristics are also associated with application resolutions. Very young applicants have relatively high risks of information-related denials and "other" denials. The risks of an information-related denial generally decrease with age up to age 40 then increase with age thereafter. Additional years of elementary and secondary schooling reduce the chances of an unsuccessful application; however, earning a high school diploma or general equivalency degree

[13] These interpretations are based on the respective coefficients being the least negative of the "reason for closure" coefficients.

increases those chances. Married blacks are more likely to have their applications denied than never-married blacks. Married whites are also more likely to have applications denied for financial reasons but less likely to have applications denied for information or "other" reasons. Black and white households with more children, especially young children, are less likely to have applications denied, but households with more adults are more likely to have applications denied.

Patterns of application resolutions also differ depending local conditions. Black and white households in areas with high unemployment are less likely than households in other areas to withdraw their applications or have them denied for "other" reasons. Black households that apply to the SNAP in less densely-populated (rural) counties are less successful than those who apply in more populated (urban) counties. Whites living in rural counties also face an increased risk of denial for information reasons. Higher denial rates for information problems may reflect challenges faced by rural applicants in producing documents that verify income or other eligibility criteria.

The last rows of Tables 3b and 3w present estimates of the coefficients (factor loadings) for the time-invariant unobserved household characteristic, η. Recall that η enters both the application resolution model (1) and competing-risk model of SNAP participation/exits (2). Identification of the coefficients on η in the two models requires that one coefficient in one of the models be set equal to one. We normalized the coefficients in terms of characteristics that cause households to leave the SNAP because of missed recertifications (set λ_1 in model (2) equal to one). With this normalization, the estimates from Tables 3b and 3w indicate that unobserved characteristics that cause households to miss their recertifications are positively associated with households having their applications denied because of information problems but negatively

associated with having the applications denied for financial ineligibility. The estimates also provide some evidence that program spells are subject to selection on the basis of unobservables; in particular, unobservable characteristics that affect application resolutions also appear to affect participation outcomes.

We now turn to the estimates from the discrete-time, competing-risk hazard models of SNAP participation spells among successful applicants. MNL coefficient estimates are reported in Tables 4b and 4w. From left to right, the coefficients are from the MNL latent indices for exits due to missed recertifications (column 1), financial ineligibility (column 2), information problems (column 3), and other types of ineligibility and withdrawals (column 4).

The first five rows in each table list coefficients on the household benefit and income variables. For black households, higher SNAP benefits are estimated to reduce the risks of exit for all reasons and thus, unambiguously increase the length of SNAP participation spells. For white households, higher SNAP benefits are estimated to reduce the risks of exit for all reasons except financial ineligibility. The results are generally consistent with higher benefits providing incentives to comply with program rules and encouraging program participation. For black and white households, higher levels of earnings are estimated to increase the chances of missing a recertification or becoming financially ineligible but to decrease the chances of exiting for information problems or "other" reasons. Higher levels of unearned income have similar effects, except that they are estimated to reduce the risk of missing a recertification for whites and are estimated to have no effect for blacks. Households that begin their SNAP spells with no income whatsoever have higher rates of exit than other households, while households that have some earnings have lower risks of exit. The pattern of results for households with no income or with no earnings is similar to the pattern from the application model where the absence of resources

increased the risks of denial.

The next five rows of Tables 4b and 4w list coefficients for households' program experiences during the year preceding their current SNAP spell. Black households that had recently had a SNAP case closed for financial ineligibility are estimated to be at increased risk of having their current cases closed for the same reason. However, black households that had earlier SNAP cases closed because of missed recertifications, information problems, or other problems are at lower risk of having their current cases closed for financial reasons. For black households, a similar pattern appears for "other" closures—a recent experience with the same type of closure increases the risks of an "other" closure, but a recent experience with a missed recertification, a loss of financial eligibility, or an information problem decreases the risks. Estimates reveal these same general patterns for white households, with an exception that earlier experiences with financial closures are not predictive of current financial closures for whites. Estimates for white households also indicate that recent experiences with missed recertifications and closures for other reasons predict closures for information reasons in the current spell.

The next four rows of Tables 4b and 4w list coefficients for households' application experiences prior to the application that led to their current spells. Black households that had earlier applications turned down because of financial ineligibility are estimated to face higher risks of having their cases closed for financial reasons but are estimated to face lower risks of having their cases closed for "other" reasons. Among white households, having an earlier application denied for financial reasons increases the chances that the current spell will end for the same reasons. However, having an application rejected because of information problems reduces the chances that a spell will end for those same (information) reasons.

The next 10 rows in Tables 4b and 4w list coefficient estimates on the controls for likely

recertification months within spells—three- and 12-month intervals before October 2002, six- and 12-month intervals from October 2002 until January 2005, and six-month intervals thereafter—for households with and without earnings at the start of their certification periods. As with the findings of Ribar and Edelhoch (2008), the estimates indicate that households were more likely to leave the SNAP in months when recertifications were due than in other months. Households with earnings were especially likely to leave at the short interval dates (quarterly before October 2002 and semi-annually after that), while households without earnings were especially likely to leave at the long interval dates (annually before February 2005). At their recertification dates, households were at a substantially higher risk of leaving the SNAP because of a missed recertification but also at increased risk of leaving for other reasons, including financial ineligibility.

The estimates from Tables 4b and 4w also reveal that demographic and household characteristics are related to SNAP exits. Cases headed by women were generally less likely to exit than cases headed by men. For blacks, high school completion and more post-secondary years of schooling increased the chances of a SNAP spell ending because of a missed recertification or financial ineligibility, and college completion increased the chances of a spell ending for "other" reasons. For whites, high school completion and years of post-secondary education were also positively associated with exits for financial ineligibility. Increases in the number of children were generally negatively related to exits for missed recertifications and financial ineligibility but positively related to "other" exits. Greater numbers of adults were positively related to most types of exits. Married-couple and ever-married households were also more likely to leave the SNAP than never-married households.

The last rows in Tables 4b and 4w list coefficients on the unobserved factor, η. The

estimates indicate that unobserved characteristics that increase the chances of a missed recertification also increase the chances of a case closure for information problems or of a closure for other reasons. However, for blacks, these same characteristics decrease the chances of a closure for financial ineligibility. The patterns of coefficients from these models and the application resolution models are consistent with positive selection. Specifically, unobserved characteristics that contribute to information problems in applications also contribute to information problems in subsequent participation spells, while unobserved characteristics that contribute to financial ineligibility rejections for applications also contribute to financial ineligibility closures in subsequent participation spells.

7. Conclusion

In this report, we have used longitudinal, household-level program records from South Carolina's Supplemental Nutrition Assistance Program to investigate two key processes that affect program participation. The first process is how applications to the SNAP are resolved, and the second is how resulting program participation spells end. Application resolutions have been mostly overlooked by previous studies, and no study has jointly examined application outcomes and participation spells together.

Nationally, only about two-thirds of households that appear to be eligible for the SNAP on the basis of their incomes and household sizes actually receive benefits under the program. Difficulties completing applications, supplying accompanying documentation, and providing continuing information—that is, difficulties with paperwork—could account for a substantial portion of this lack of take-up. In our sample of SNAP applications, approximately one third were rejected or otherwise unsuccessful. Some of the rejected applications came from households that were determined to be financially ineligible, but many more (about five out of

every nine applications that were rejected) were turned down because of incomplete or insufficient information. Similarly, when we examine why SNAP participation spells end, roughly half of households stop receiving benefits because they fail to complete periodic recertifications and another sixth of households lose benefits because of incomplete or insufficient information. Only a fifth of households that stop receiving benefits do so because of a formal determination of financial ineligibility.

Completing paperwork takes some effort and motivation. For South Carolina's SNAP, the necessary paperwork is similar to that of a simplified federal tax form. Undoubtedly, the reason why some households fail to complete applications, miss recertifications, and fail to supply other documentation is that they recognize or suspect that they are financially ineligible. However, it does not appear that financial ineligibility was the root cause of all of these outcomes. Indeed, households that had applications rejected for incomplete information had substantially lower amounts of UI-covered earnings than households with successful applications. Along the same lines, households that had their SNAP participation spells closed because of information deficiencies had higher average program benefits and lower average income levels than other households. These statistics suggest that the households had stronger financial incentives to comply with paperwork requirements, not weaker incentives.

Our report estimates multivariate models to identify the characteristics that are associated with successful applications and the reasons for application denials. We also estimate models that identify characteristics that are associated with program tenures and the reasons of case closures. Our models include standard economic measures—earnings, non-labor incomes, household sizes, and program benefits—that affect eligibility, the incentives to participate, or both and that have appeared in previous studies of caseload behavior. However, the models also

include measures of households' previous application and program experiences to help us see whether these characteristics are associated with households' current application and program outcomes. We also estimate our models jointly in a way that allows us to control for unobservable characteristics that could mutually influence these outcomes.

Estimates from the models indicate that households' resources and needs are associated with both application resolutions and subsequent participation spells, mostly in ways that we would expect. Other things held constant, households that we observe with higher levels of earnings are more likely to have their SNAP applications rejected than households with lower levels of earnings. The rejections are especially likely to occur because a determination of financial ineligibility. At the same time, households with more children (greater needs) are less likely to have their applications rejected. SNAP participants with higher levels of earnings are more likely than other participants to have their cases closed because of financial ineligibility and missed recertifications. However, higher earnings are associated with lower rates of exit for information problems and other reasons. Having more children in the household reduces the risk of a participation spell ending for eligibility reasons but increases the risk of a spell ending for some other reasons.

Program benefits are also associated with program tenures and the reasons for case closures. SNAP participants with higher benefits are less likely than other households to miss their recertifications, to provide incomplete or insufficient information, or have spells end for other reasons. These associations appear even after controlling for resources and needs, suggesting that the benefit itself provides an incentive to comply with program rules.

The more novel elements of our report involve examining how households' application and participation histories are associated with their application and program spell outcomes. We

do find evidence of these associations. Estimates from the multivariate models indicate that unobservable characteristics account for some of these associations. Thus, statistical controls for selection bias appear to be warranted. In particular, the results are consistent with positive selection in the sense that unobserved characteristics that contribute to one type of outcome at one time, such as an information problem with an application or participation spell, contribute to similar problems at other times. The estimates also indicate that unobserved characteristics that are positively associated with information problems and missed recertifications are negatively associated with financial ineligibility.

However, we also find that households' earlier SNAP application and participation experiences are predictive of their later experiences, even after controlling for other observable and unobservable characteristics. We find that applicants that have recently completed a participation spell are more likely to be successful in their applications than other applicants. This direct association could come about if households gain experience and familiarity with SNAP rules and procedures through the process of program participation.

Among the applicants with recent program experience, the way in which a previous spell ends partly predicts how their next application will be resolved and how their next participation spell will end. Households face an increased risk of having a SNAP participation spell end for financial ineligibility if an earlier participation spell ended for that reason. Similarly, households face an increased risk of having their applications denied or participation spells end for information deficiencies if an earlier spell ended that way. Thus, while application and program experience may provide some general information about procedures, specific aspects of these procedures still appear to cause some clients repeated problems.

Our findings regarding program experiences indicate that there are opportunities for

SNAP administrators and caseworkers to better target their assistance to applicants and clients. New applicants and clients seem to be especially prone to application denials and case closures. Also, applicants and clients who have experienced particular types of denials and case closures appear to be at high risk of repeating those behaviors. These aspects of program experience are available through automated records and could, in principle, be shown to caseworkers as soon as a household applies. Households that appear to be at high risk for an unsuccessful program outcome could receive more information, more assistance at in-take, more follow up opportunities, or a combination of all of these.

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Table 1b: Characteristics of applicants by application outcome: cases headed by blacks

	Approved	Income or assets too high	Failed to provide information	Other denial or voluntary withdrawal
Case Income				
UI Earnings	708.7	1333.7	437.8	683.3
UI Earnings Missing (%)	30.5	29.6	64.0	54.2
Previous Year Program History				
Spell Closure in Past Year (%)	33.1	22.7	27.1	19.7
Months since Closure if positive	5.1	5.9	5.3	5.6
Spell Closed for Certification (%)	17.3	9.9	15.0	9.3
Spell Closed for Income (%)	7.6	9.8	4.2	4.3
Spell Closed for Information (%)	5.6	2.3	5.5	3.1
Spell Closed for Other/voluntary (%)	2.7	0.8	2.4	3.0
Denial in Past Year (%)	15.7	15.5	18.8	15.1
Months since Denial if positive	4.5	5.0	4.9	4.5
App. Denied for Income (%)	4.0	8.1	3.5	3.9
App. Denied for Information (%)	9.0	6.5	12.9	8.2
App. Denied for Other/voluntary (%)	2.7	0.8	2.4	3.0
PI Characteristics				
Female (%)	94.4	92.4	93.9	94.1
Age	32.1	34.1	30.0	30.8
Education	11.7	11.8	11.5	11.3
Currently Married (%)	12.2	23.3	12.5	16.0
Formerly Married (%)	26.6	27.5	20.8	20.9
Case Composition				
Number in case	3.4	3.5	3.3	3.3
Number of children	2.0	1.9	1.8	1.8
Number of Adults	1.4	1.6	1.5	1.5
Geographic Characteristics				
County Unemployment Rate	6.1	6.1	5.5	6.0
County Population Density	2.1	2.0	2.3	2.0
Number of Applications	19,773	2,859	4,602	1,261

Notes: Authors' calculations from South Carolina SNAP administrative records.

Table 1w: Characteristics of applicants by application outcome: cases headed by whites

	Approved	Income or assets too high	Failed to provide information	Other denial or voluntary withdrawal
Case Income				
UI Earnings	606.8	1080.9	380.9	644.8
UI Earnings Missing (%)	40.2	45.4	70.0	59.6
Previous Year Program History				
Closure in Past Year (%)	28.3	16.8	25.1	16.0
Months since Closure if positive	5.2	5.8	5.4	5.7
Spell Closed for Certification (%)	15.6	8.5	14.5	8.3
Spell Closed for Income (%)	4.4	5.2	3.7	2.6
Spell Closed for Information (%)	5.5	2.3	4.7	2.7
Spell Closed for Other/voluntary (%)	2.7	0.8	2.2	2.4
Denial in Past Year (%)	13.4	12.5	15.7	13.7
Months since Denial if positive	4.6	5.0	5.3	4.9
App. Denied for Income (%)	3.0	5.8	3.2	4.0
App. Denied for Information (%)	7.7	6.0	10.3	7.3
App. Denied for Other/voluntary (%)	2.7	0.8	2.2	2.4
PI Characteristics				
Female (%)	88.9	86.9	90.0	88.8
Age	31.7	32.7	30.1	30.5
Education	11.2	11.3	10.9	10.8
Currently Married (%)	33.7	47.8	32.4	33.0
Formerly Married (%)	39.4	29.8	33.0	29.0
Case Composition				
Number in case	3.5	3.6	3.4	3.2
Number of children	1.9	1.8	1.8	1.6
Number of Adults	1.6	1.8	1.6	1.6
Geographic Characteristics				
County Unemployment Rate	5.8	5.7	5.4	5.7
County Population Density	2.1	2.2	2.2	2.1
Number of applications	15,141	1,958	3,628	845

Notes: Authors' calculations from South Carolina SNAP administrative records.

Table 2b: Characteristics at spell exit by reason for exit: cases headed by blacks

	Missed recertifi-cation	Income or assets too high	Failed to provide information	Other loss of elig. or vol. exit	Censored Spell
Case Income and Benefits					
Benefits	248.2	219.3	296.4	289.5	299.0
Reported earned income	605.3	725.7	330.1	282.9	441.1
Reported unearned income	288.7	368.3	283.4	306.5	279.5
Any earnings start of spell (%)	53.6	59.3	39.8	30.7	45.4
No income start of spell (%)	16.5	11.4	27.2	32.1	21.5
Previous year program history[a]					
Months since closure if pos.	5.1	5.3	5.0	5.2	4.9
Spell closed for certification	20.6	11.1	16.0	13.0	18.4
Spell closed for income	5.9	13.5	5.7	4.9	8.2
Spell closed for information	5.9	4.2	7.5	4.0	5.5
Spell closed for other/voluntary	2.5	1.6	2.7	6.2	2.6
Months since denial if positive	4.5	4.7	4.4	4.5	4.6
App. denied for Income	3.5	7.0	3.3	2.5	4.4
App. denied for Information	10.8	7.1	11.3	8.2	8.7
App. denied for other/voluntary	2.5	1.6	2.7	6.2	2.6
Duration (months)	12.0	11.9	12.4	12.0	23.8
PI characteristics					
Female (%)	94.5	94.3	93.5	93.3	95.2
Age	32.7	35.0	31.7	32.6	34.1
Education	11.8	12.0	11.7	11.7	11.9
Currently married (%)	11.2	19.1	10.2	11.9	8.5
Formerly married (%)	28.2	28.8	26.0	30.5	26.2
Case composition					
Number of children	2.0	1.9	2.0	2.0	2.0
Number of adults	1.4	1.6	1.4	1.4	1.5
Geographic characteristics					
County unemployment rate	6.0	6.5	6.1	6.4	6.6
County population density	2.1	2.0	2.2	1.9	2.2
Number of exits	8,174	3,515	2,540	1,543	4,001

Notes: Authors' calculations from South Carolina SNAP administrative records.
[a] Unless otherwise indicated, all program history variables are percents.

Table 2w: Characteristics at spell exit by reason for exit: cases headed by whites

	Missed recertifi-cation	Income or assets too high	Failed to provide information	Other loss of elig. or vol. exit	Censored Spell
Case Income and Benefits					
Benefits	280.4	253.6	316.5	307.6	314.0
Reported earned income	593.6	753.3	317.9	297.8	453.1
Reported unearned income	256.7	323.3	253.2	268.9	270.2
Any earnings start of spell (%)	51.5	59.0	35.1	31.2	45.7
No income start of spell (%)	20.8	14.1	33.3	35.1	23.8
Previous year program history[a]					
Months since closure if pos.	5.3	5.5	4.9	5.2	5.0
Spell closed for certification	17.6	9.4	15.6	11.3	17.7
Spell closed for income	3.7	7.5	3.2	3.7	5.2
Spell closed for information	5.6	3.9	7.4	5.1	5.2
Spell closed for other/voluntary	2.6	1.4	3.4	5.0	2.2
Months since denial if positive	4.6	4.6	4.7	4.6	4.5
App. denied for Income	2.7	5.4	2.9	2.2	3.0
App. denied for Information	9.2	6.4	8.5	7.1	7.4
App. denied for other/voluntary	2.6	1.4	3.4	5.0	2.2
Duration (months)	10.8	9.3	9.2	8.9	18.5
PI characteristics					
Female (%)	88.3	88.3	89.1	90.3	90.0
Age	32.4	33.7	31.3	31.8	33.4
Education	11.2	11.5	11.2	11.1	11.2
Currently married (%)	34.2	45.7	30.0	28.6	28.6
Formerly married (%)	41.6	34.7	43.2	43.9	40.4
Case composition					
Number of children	1.9	1.9	1.9	1.9	1.9
Number of adults	1.6	1.7	1.6	1.5	1.6
Geographic characteristics					
County unemployment rate	5.8	6.0	5.9	6.1	6.2
County population density	2.1	2.1	2.2	2.1	2.3
Number of exits	6,641	2,016	2,120	1,575	2,789

Notes: Authors' calculations from South Carolina SNAP administrative records.
[a] Unless otherwise indicated, all program history variables are percents.

Table 3b: Results from Multinomial Logit Application Model: Cases Headed by Blacks

	Income or assets too high	Failed to provide info.	Other ineligibility/ voluntary exit
Case income			
UI earnings	0.104***	0.041***	0.073***
UI earnings missing	1.355***	1.932***	1.788***
Previous year program history			
Months since closure	0.080***	0.029**	0.066**
Spell closed for certification	-0.908***	-0.253***	-0.959***
Spell closed for income	-0.533***	-0.377***	-0.838***
Spell closed for information	-1.154***	-0.113	-0.941***
Spell closed for other/voluntary	-1.582***	-0.349**	-0.461**
Months since denial	0.022	0.044***	-0.018
App. denied for income	0.172	-0.036	0.125
App. denied for information	-0.189	-0.133	-0.205
App. denied for other/voluntary	-0.489**	-0.530***	0.073
PI characteristics			
Female	0.079	-0.038	0.210
Age spline, 18-21 years	0.206***	-0.146***	-0.422***
Age spline, 22-40 years	0.004	-0.043***	-0.030***
Age spline, 41+ years	-0.002	-0.011	0.035***
Education spline, 0-12 years	-0.119***	-0.057***	-0.072***
Education spline, 12+ years	-0.003	-0.054	0.026
Completed high school or GED	0.596***	0.236***	0.036
Completed college	-0.294	-0.202	-0.222
Currently married	0.416***	0.029	0.297***
Formerly married	0.149**	-0.080	-0.054
Case composition			
Number of children 0-2	-0.430***	-0.252***	-0.283***
Number of children 3-5	-0.270***	-0.192***	-0.227***
Number of children 6-11	-0.289***	-0.156***	-0.188***
Number of children 12-14	-0.215***	-0.090**	-0.223***
Number of children 15-17	-0.325***	0.039	0.001
Number of adults	0.110***	0.243***	0.105**
Geographic characteristics			
County unemployment rate	0.019	-0.020	-0.082**
County population density	-0.451*	-0.796***	-0.703**
π_i (coefficients on unobserved factor, η)	-0.472***	0.464***	0.133

Notes: The columns report estimated coefficients from a multinomial logit model of application resolutions that was estimated jointly with a competing-risk hazard model of SNAP exits (see text for details). In addition to the listed controls, the application resolution model included controls for fiscal year and county of residence. It was estimated using administrative records from South Carolina.

* Significant at .10 level. ** Significant at .05 level. *** Significant at .01 level.

Table 3w: Results from Multinomial Logit Application Model: Cases Headed by Whites

	Income or assets too high	Failed to provide info.	Other ineligibility/ voluntary exit
Case income			
UI earnings	0.091***	0.037***	0.076***
UI earnings missing	1.502***	1.852***	1.735***
Previous year program history			
Months since closure	0.065**	0.018	0.060*
Spell closed for certification	-0.957***	-0.085	-0.877***
Spell closed for income	-0.513***	0.177	-0.782***
Spell closed for information	-1.168***	-0.217*	-1.038***
Spell closed for other/voluntary	-1.556***	-0.264	-0.530
Months since denial	0.017	0.060***	0.014
App. denied for income	0.233	0.035	0.213
App. denied for information	-0.214	-0.222*	-0.138
App. denied for other/voluntary	-0.231	-0.412**	0.392
PI characteristics			
Female	0.087	0.083	0.071
Age spline, 18-21 years	0.030	-0.163***	-0.275***
Age spline, 22-40 years	-0.007	-0.037***	-0.030***
Age spline, 41+ years	0.026**	-0.001	0.065***
Education spline, 0-12 years	-0.072***	-0.029*	-0.063***
Education spline, 12+ years	-0.018	-0.134**	-0.307**
Completed high school or GED	0.602***	0.166***	0.329***
Completed college	0.188	0.406	1.161*
Currently married	0.186**	-0.205***	-0.244**
Formerly married	-0.094	-0.279***	-0.425***
Case composition			
Number of children 0-2	-0.244***	-0.334***	-0.509***
Number of children 3-5	-0.268***	-0.183***	-0.352***
Number of children 6-11	-0.218***	-0.165***	-0.311***
Number of children 12-14	-0.150***	-0.092*	-0.227**
Number of children 15-17	-0.144**	0.016	-0.323***
Number of adults	0.232***	0.220***	0.056
Geographic characteristics			
County unemployment rate	0.020	-0.023	-0.104**
County population density	0.309	-0.693**	0.642
π_i (coefficients on unobserved factor, η)	-0.470***	0.655***	-0.151

Notes: The columns report estimated coefficients from a multinomial logit model of application resolutions that was estimated jointly with a competing-risk hazard model of SNAP exits (see text for details). In addition to the listed controls, the application resolution model included controls for fiscal year and county of residence. It was estimated using administrative records from South Carolina.

* Significant at .10 level. ** Significant at .05 level. *** Significant at .01 level.

Table 4b: Results from Discrete-Time Competing Risk Hazard Model of Food Stamp Exit for Specific Reason: Cases Headed by Blacks

	Missed recertification	Income or assets too high	Failed to provide Information	Other ineligibility/ voluntary exit
Case income and benefits				
Benefits	-0.237***	-0.045**	-0.074***	-0.159***
Reported earned income	0.017***	0.084***	-0.036***	-0.051***
Reported unearned income	-0.001	0.094***	-0.024***	-0.037***
No income at start of spell	0.079*	0.023	0.337***	0.420***
Any earnings at start of cert. period	-0.291***	-0.287***	-0.284***	-0.445***
Previous year program history				
Months since closure	0.020**	0.023*	0.007	0.020
Spell closed for certification	0.029	-0.444***	-0.111	-0.364***
Spell closed for income	-0.131*	0.180**	-0.035	-0.324**
Spell closed for information	-0.035	-0.264**	0.081	-0.513***
Spell closed for other/voluntary	-0.035	-0.466***	-0.032	0.514***
Months since denial	-0.004	-0.001	-0.012	0.006
App. denied for income	0.046	0.298***	0.094	-0.370*
App. denied for information	0.032	-0.056	0.061	-0.250*
App. denied for other/voluntary	-0.173	0.131	0.089	0.126
Recertification months				
Quarterly (before Oct. 2002)	2.220***	0.560***	0.286**	0.136
Semi-annual (Oct. 2002–Jan. 2005)	1.289***	0.357**	0.829***	0.296
Semi-annual (after Jan. 2005)	3.498***	1.452***	1.441***	0.095
Annual (before Oct. 2002)	1.075***	0.041	0.467**	-0.929**
Annual (Oct. 2002–Jan. 2005)	2.133***	0.858***	-0.412*	-0.124
Earnings x quarterly (before Oct. 2002)	0.772***	0.825***	0.318**	0.084
Earnings x semi-ann. (Oct. 2002–2005)	2.169***	1.468***	0.391	0.449
Earnings x semi-ann. (after Jan. 2005)	0.361***	0.914***	0.635***	0.799***
Earnings x annual (before Oct. 2002)	-0.782***	-0.159	0.419**	0.895
Earnings x annual (Oct. 2002–2005)	-1.815***	-0.934***	0.306	-0.667
PI characteristics				
Female	-0.457***	-0.056	-0.529***	-0.253**
Age spline, 18-21 years	-0.065	0.277***	-0.056	-0.215***
Age spline, 22-40 years	-0.018***	0.012***	-0.027***	-0.008
Age spline, 41+ years	-0.028***	-0.011*	-0.030***	-0.016
Education spline, 0-12 years	-0.026	-0.046*	-0.020	0.002
Education spline, 12+ years	0.090***	0.134***	0.034	0.030
Completed high school or GED	0.103**	0.490***	0.069	-0.084
Completed college	-0.023	0.087	-0.521	0.671**
Currently married	0.138**	0.346***	0.138	0.470***
Formerly married	0.091**	0.001	0.082	0.286***
Case composition				
Number of children 0-2	-0.093***	-0.252***	0.008	0.198***

Number of children 3-5	-0.060**	-0.334***	-0.011	0.180***
Number of children 6-11	-0.011	-0.318***	-0.002	0.137***
Number of children 12-14	-0.049*	-0.271***	-0.060	0.063
Number of children 15-17	0.019	-0.273***	0.029	0.016
Number of adults	0.080***	0.043	0.180***	0.075*
Geographic characteristics				
County unemployment rate	-0.026	-0.041*	-0.032	-0.024
County population density	-0.096	0.039	-0.396	-0.018
λ_i (coefficients on unobserved factor, η)	1.000	-0.153***	0.631***	0.183

Notes: The columns report estimated coefficients from a multinomial logit competing-risk hazard model of SNAP exits that was estimated jointly with a model of SNAP application resolutions (see text for details). In addition to the listed controls, the competing-risk hazard model included controls for the spell duration, fiscal year and county of residence. It was estimated using administrative records from South Carolina.
* Significant at .10 level. ** Significant at .05 level. *** Significant at .01 level.

Table 4w: Results from Discrete-Time Competing Risk Hazard Model of Food Stamp Exit for Specific Reason: Cases Headed by Whites

	Missed recertification	Income or assets too high	Failed to provide Information	Other ineligibility/ voluntary exit
Case income and benefits				
Benefits	-0.187***	0.035	-0.048*	-0.175***
Reported earned income	0.010**	0.086***	-0.036***	-0.055***
Reported unearned income	-0.018***	0.089***	-0.032***	-0.050***
No income at start of spell	0.157***	0.054	0.332***	0.293***
Any earnings at start of cert. period	-0.506***	-0.221***	-0.432***	-0.361***
Previous year program history				
Months since closure	0.028**	0.049**	-0.034**	-0.001
Spell closed for certification	-0.082	-0.794***	0.217**	-0.349**
Spell closed for income	-0.195*	-0.118	0.083	-0.042
Spell closed for information	-0.088	-0.560***	0.198	-0.228
Spell closed for other/voluntary	-0.141	-0.825***	0.300*	0.328*
Months since denial	0.008	0.001	0.030	-0.005
App. denied for income	-0.005	0.332**	0.048	-0.165
App. denied for information	-0.124	-0.171	-0.300**	-0.224
App. denied for other/voluntary	-0.124	0.260	0.083	-0.042
Recertification months				
Quarterly (before Oct. 2002)	2.589***	0.421***	0.289*	0.104
Semi-annual (Oct. 2002–Jan. 2005)	1.273***	-0.241	0.236	0.205
Semi-annual (after Jan. 2005)	3.849***	1.429***	1.023***	0.395
Annual (before Oct. 2002)	1.122***	-0.195	0.259	-0.956
Annual (Oct. 2002–Jan. 2005)	2.607***	1.246***	0.020	-0.663
Earnings x quarterly (before Oct. 2002)	1.062***	0.790***	0.583***	0.398**
Earnings x semi-ann. (Oct. 2002–2005)	2.678***	1.663***	0.617**	0.308
Earnings x semi-ann. (after Jan. 2005)	0.564***	0.844***	0.896***	0.616**
Earnings x annual (before Oct. 2002)	-0.876***	0.038	0.031	-0.119
Earnings x annual (Oct. 2002–2005)	-2.272***	-0.905**	0.202	0.366
PI characteristics				
Female	-0.348***	0.110	-0.267***	0.014
Age spline, 18-21 years	-0.154***	0.149*	-0.125**	-0.077
Age spline, 22-40 years	-0.028***	0.001	-0.028***	-0.018**
Age spline, 41+ years	-0.023***	-0.007	-0.053***	-0.016
Education spline, 0-12 years	-0.002	-0.010	0.033	-0.042*
Education spline, 12+ years	0.026	0.152***	-0.065	0.070
Completed high school or GED	-0.037	0.321***	0.006	0.055
Completed college	0.059	-0.038	0.381	0.332
Currently married	0.227***	0.291***	0.145*	0.181**
Formerly married	0.170***	0.009	0.191***	0.129*
Case composition				
Number of children 0-2	-0.199***	-0.374***	0.015	0.192***

Number of children 3-5	-0.021	-0.362***	-0.096*	0.146**
Number of children 6-11	-0.022	-0.303***	-0.024	0.175***
Number of children 12-14	0.049	-0.379***	-0.016	0.080
Number of children 15-17	0.114***	-0.226***	-0.023	0.110
Number of adults	0.050*	0.050	0.134***	0.011
Geographic characteristics				
County unemployment rate	-0.036*	-0.022	-0.048	0.047
County population density	-0.253	0.244	0.201	-0.894**
λ_i (coefficients on unobserved factor, η)	1.000	-0.018	0.843***	0.336**

Notes: The columns report estimated coefficients from a multinomial logit competing-risk hazard model of SNAP exits that was estimated jointly with a model of SNAP application resolutions (see text for details). In addition to the listed controls, the competing-risk hazard model included controls for the spell duration, fiscal year and county of residence. It was estimated using administrative records from South Carolina.
* Significant at .10 level. ** Significant at .05 level. *** Significant at .01 level.

Figure 1 - Number of Applications by Resolution

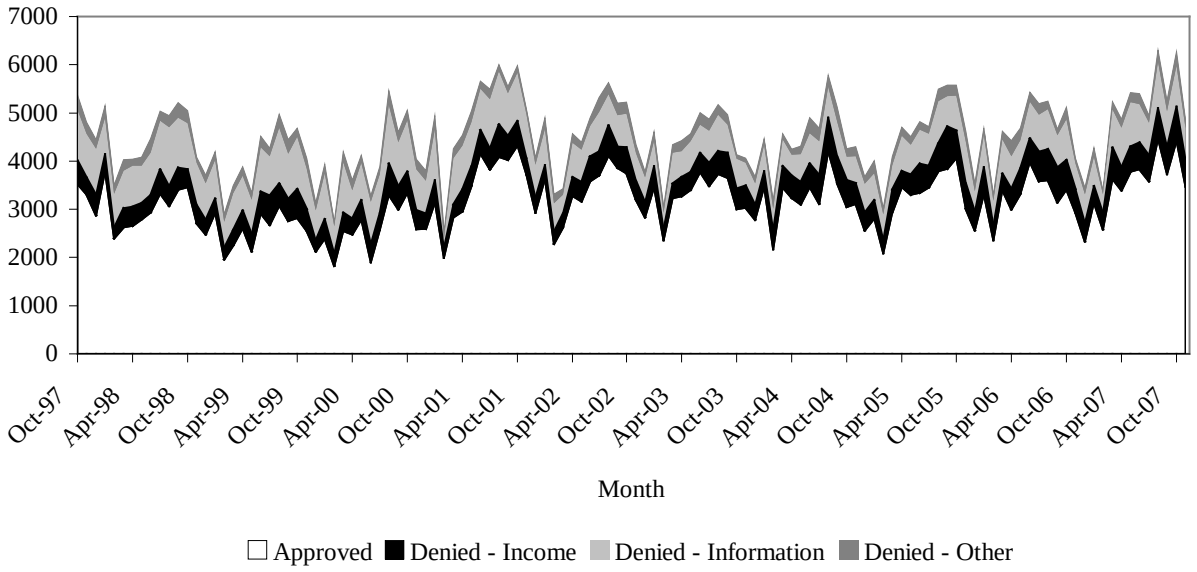
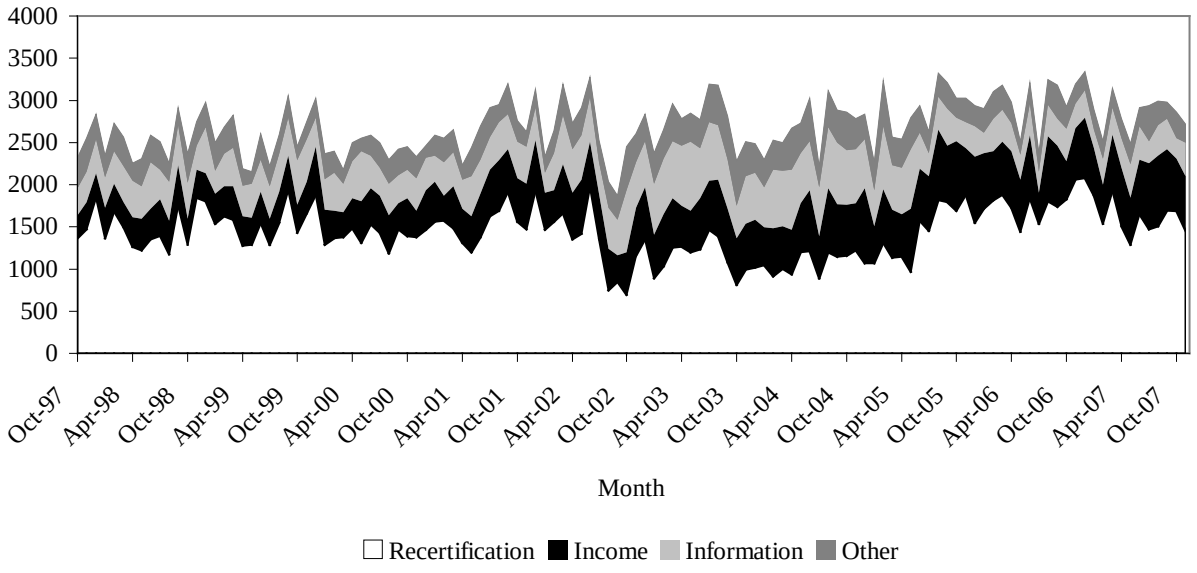


Figure 2 - Number of Exits by Type of Exit



Appendix A. Detailed reasons for food stamp application denial by race of case head

Reason for denial	Blacks Number	Blacks *Percent*	Whites Number	Whites *Percent*
Income or assets too high	2,859	*32.78*	1,958	*30.44*
IN: Income (net) meets/exceeds req.	2,139	*24.52*	1,482	*23.04*
IE: Increase–earned income	409	*4.69*	270	*4.20*
RE: Resources	237	*2.72*	155	*2.41*
IU: Unearned income exceeds limits	74	*0.85*	51	*0.79*
Failed to provide reliable information	4,602	*52.75*	3,628	*56.41*
FP: Failed to provide info. (S-Gen)	2,799	*32.09*	2,237	*34.78*
FC: Failed to complete interview (S-Gen)	1,578	*18.09*	1,268	*19.72*
FI: Failed to furnish information	208	*2.38*	99	*1.54*
VR: Verification–failed to provide	17	*0.19*	24	*0.37*
Other loss of eligibility	1,261	*14.43*	844	*13.15*
VW: Voluntary withdrawal	855	*9.80*	621	*9.66*
HH: No eligible household members	139	*1.59*	58	*0.90*
AE: Application opened in error	77	*0.88*	45	*0.70*
VQ: Voluntary quit	52	*0.60*	25	*0.39*
SH: Not separate FS household	50	*0.57*	31	*0.48*
NR: Nonresident	38	*0.44*	33	*0.51*
CL: Cannot locate	10	*0.11*	19	*0.30*
CC: Opened/closed case with claim	12	*0.14*	3	*0.05*
CH: Change in law/policy	6	*0.07*	1	*0.01*
CD: Drug conviction	10	*0.11*	4	*0.06*
WR: Work req.–refused/failed to comply	1	*0.01*	1	*0.02*
DF: HH disqualified for fraud	3	*0.03*	0	*0.00*
AB: ABAWD time limit expired	3	*0.03*	0	*0.00*
ET: Failure to comply with E&T req.	3	*0.03*	0	*0.00*
SP: Strike participation	1	*0.01*	0	*0.00*
UA: Undocumented alien	1	*0.01*	0	*0.00*
FE: Fail to accept reim. comp.–FS E&T	0	*0.00*	1	*0.02*
DR: Disqualified–misrep. residency/ID	0	*0.00*	1	*0.02*
FF: Fleeing felon–probation parole	0	*0.00*	1	*0.02*

Source: Authors' calculations from South Carolina SNAP administrative records.

Appendix B. Detailed reasons for food stamp exits by race of case head

Reason for exit	Blacks Number	Blacks *Percent*	Whites Number	Whites *Percent*
Missed recertification	8,174	*51.83*	6,641	*61.53*
MR: Failed to file MR	5,159	*32.71*	4,233	*39.22*
CE: Closed–certification end (S-Gen)	3,015	*19.12*	2,408	*22.31*
Income or assets too high	3,515	*22.29*	2,016	*18.68*
IN: Income (net) meets/exceeds req.	2,679	*16.99*	1,577	*14.61*
IE: Increase–earned income	634	*4.02*	321	*2.97*
IU: Unearned income exceeds limits	149	*0.94*	87	*0.81*
RE: Resources	51	*0.32*	31	*0.29*
LS: Lump sum ineligibility	2	*0.01*	0	*0.00*
Failed to provide reliable information	2,540	*16.10*	2,120	*19.64*
FI: Failed to furnish information	1,468	*9.31*	1,347	*12.48*
FP: Failed to provide info. (S-Gen)	692	*4.39*	417	*3.86*
VR: Verification–failed to provide	162	*1.03*	217	*2.01*
FC: Failed to complete interview (S-Gen)	168	*1.07*	103	*0.95*
IM: Incompletely Verified MR	50	*0.32*	36	*0.33*
Other loss of eligibility	1,543	*9.78*	1,575	*14.59*
NR: Nonresident	516	*3.27*	552	*5.11*
VW: Voluntary withdrawal	393	*2.49*	433	*4.01*
CL: Cannot locate	273	*1.73*	323	*2.99*
HH: No eligible household members	128	*0.81*	107	*0.99*
WR: Work req.–refused/failed to comply	15	*0.10*	8	*0.07*
VQ: Voluntary quit	27	*0.17*	16	*0.15*
ET: Failure to comply with E&T req.	41	*0.26*	23	*0.21*
AE: Application opened in error	47	*0.30*	40	*0.37*
AB: ABAWD time limit expired	17	*0.11*	4	*0.04*
DE: Death	30	*0.19*	17	*0.16*
CC: Opened/closed case with claim	24	*0.15*	18	*0.17*
SH: Not separate FS household	13	*0.08*	15	*0.14*
QC: Refused to cooperate with QC	8	*0.05*	2	*0.02*
CH: Change in law/policy	9	*0.05*	1	*0.01*
DF: HH disqualified for fraud	2	*0.01*	1	*0.01*
FE: Fail to accept reim. comp.–FS E&T	3	*0.02*	7	*0.06*
SS: SSN–refused/failed to furnish/apply	1	*0.01*	0	*0.00*
CD: Drug conviction	0	*0.00*	3	*0.03*
DR: Disqualified–misrep. residency/ID	0	*0.00*	1	*0.01*
FF: Fleeing felon–probation parole	0	*0.00*	3	*0.03*
RJ: Refused to accept a job	0	*0.00*	1	*0.01*

Source: Authors' calculations from South Carolina SNAP administrative records.