

If at first you don't succeed: applying for and staying on the Supplemental Nutrition Assistance Program

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Abstract:

We examine households' applications to and participation in the Supplemental Nutrition Assistance Program using administrative records from South Carolina. We model application resolutions with multinomial logit (MNL) specifications where the possible outcomes are acceptance, denial due to income ineligibility, denial due to a failure to provide sufficient information and denial due to other reasons. For cases with successful applications, we model the durations of participation spells using competing risk hazard specifications that distinguish among exits that result from missed recertifications, financial ineligibility, incomplete or missing information and other reasons. The application and hazard outcomes depend on past programme behaviour and observed characteristics. The results indicate that a household's application and participation history affect its subsequent application success and programme tenure.

Keywords: food stamps | SNAP | programme take-up | competing risks

Article:

I. Introduction

The Supplemental Nutrition Assistance Program (SNAP) is intended to help low-income people obtain more nutritious diets than they could otherwise afford.¹ In order for the SNAP to fulfil this vital objective, eligible people must enrol and participate in the programme. Regrettably, many eligible people do not take-up benefits. Eslami *et al.* (2012) estimated that only 75% of people who were eligible to receive SNAP benefits in fiscal year 2010 actually participated. The incomplete take-up of SNAP (and other assistance programme) benefits is an important concern for policymakers and has motivated many research studies (see Currie, 2004).

Participation in the SNAP involves two distinct sets of processes, namely entry into the programme and continuation in the programme. Only a subset of SNAP studies consider programme entry separately from programme continuation and exit, and even fewer studies consider these processes in any programmatic detail. For example, Bartlett *et al.* (2004), Daponte *et al.* (1999) and Heflin *et al.* (2012) examined how different policies and actions affected households decisions to apply to the SNAP, but no study has examined how applications are *resolved* – that is, whether applications are accepted or rejected. Our understanding of programme continuation and exit is better. Ribaret *al.* (2008, 2010) and Staveley *et al.* (2002) found that SNAP exits occur mainly at recertification due dates (times when people have to reapply for benefits). Ribar and Edelhoch (2008) found that exits due to missed recertifications and documentation problems accounted for two thirds of the SNAP exits. However, none of these studies accounted for SNAP spells being selected from successful applications.

We address these gaps by investigating potential SNAP cases at the time they apply and examining the resolution of those applications. Among households with successful applications, we then examine how long the subsequent participation spells last and the reasons why those spells end. We investigate these issues using case management records for households with children from South Carolina (SC), from October 1996 until November 2007.

Our principal analyses use these data to estimate joint multivariate models of SNAP application resolutions and subsequent participation spells. Jointly modelling these processes allows for the possibility that successful applications constitute a nonrandom sample of all applications. The model of application resolutions distinguishes among applications that were accepted, denied because of financial ineligibility, denied because of a failure to provide sufficient information or denied or withdrawn for other reasons. We consider the roles that past application and programme behaviour play in these outcomes. For households with successful applications, we model the durations of the resulting participation spells using a competing risk hazard framework that distinguishes among programme exits that occur because of missed recertifications, financial ineligibility, incomplete or missing information and other reasons. As with the application outcomes, we also consider how previous application and programme experiences affect programme spells.

The estimates from our 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 are more likely to be successful with their applications than those who have not recently participated. Among the applicants who do have recent programme experience, however, the way in which their previous spell ended helps to predict the reasons why their application might be denied and why their next participation spell ends. For example, 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. These findings may be valuable especially to

programme managers and caseworkers because they all involve characteristics that can be ascertained from case files.

II. Background

SNAP participation is 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 and providing supporting documentation. Once an application is submitted, the state agency that administers the SNAP reviews it and often requires an in-person interview. The state agency then determines whether the household qualifies for benefits and can participate. If the application is rejected because of incomplete information or another procedural reason, the household may reapply. If the household is rejected because of ineligibility, it may reapply if the household's circumstances change. If the application is approved, the household begins participating and receiving benefits. Thereafter, the household must follow the programme's rules and remain eligible to continue receiving benefits. If the household stops complying with the programme rules, decides to stop receiving benefits or loses eligibility because of a change in its economic circumstances or living arrangements, the household's case is closed, and it returns to the pool of nonapplicants.

Although the general structure of these processes is common across the United States, many specific features vary from place to place. The federal and state governments are partners in the SNAP, with the federal government setting general rules, paying the full cost of benefits and paying about half of state administrative costs and with the states administering the programme. In their role as administrators, states have latitude in a number of areas including establishing and running SNAP offices, developing and reviewing initial applications and setting recertification intervals. This administrative flexibility allows states to tailor parts of the SNAP to fit with local objectives and circumstances, but it also has implications for take-up behaviour.

Currie (2004) has reviewed research on the take-up of public assistance programmes and has grouped the explanations for incomplete take-up into three general categories. First, households are unlikely to participate in programmes if they lack information about the programmes or their own eligibility. For example, Daponte *et al.* (1999) conducted a random-assignment field experiment with food pantry clients who were financially eligible for SNAP but not participating in the programme. They found that giving households information about their eligibility increased their likelihood of applying. Second, as Moffitt (1983) proposed, stigma associated with programme receipt might impose psychic costs on households that reduce their participation. Third, households may be deterred from participating due to the time and hassle associated with the administrative procedures.

Some of these explanations are more relevant for some SNAP processes than for others. Stigma might be a factor in households' initial decisions to apply for the SNAP but seems less likely to influence their continuation behaviour. Similarly, information might be a barrier to households'

application and initial participation behaviour; however, information should increase as participation continues. Some types of administrative procedures, such as complicated application forms or initial document requirements, would be relevant when households enter the SNAP, while other procedures, such as recertification and income reporting requirements, would be relevant for programme continuation.

Little of this structure is reflected in SNAP caseload research. Many caseload studies simply examine the incidence of programme participation, by modelling either the aggregate number of people or households receiving benefits (Wallace and Blank, 1999; Wilde *et al.*, 2000; Kornfeld, 2002; Kabbani and Wilde, 2003; Ziliak *et al.*, 2003; Mabli and Ferrerosa, 2010; Klerman and Danielson, 2011) or the incidence of receipt among individual households (Fraker and Moffitt, 1988; Keane and Moffitt, 1998; Currie and Grogger, 2001; Farrell *et al.*, 2003; Haider *et al.*, 2003; Huffman and Jensen, 2005; Hanratty, 2006; Ratcliffe *et al.*, 2008). Other research considers programme entry separately from programme exit but examines these processes as simple bivariate outcomes (Blank and Ruggles, 1996; Gleason *et al.*, 1998; Mills *et al.*, 2001; Staveley *et al.*, 2002; Cody *et al.*, 2005; Ribar *et al.*, 2008, 2010; Mabli *et al.*, 2011).

Only a few studies have carefully investigated component processes. Bartlett *et al.* (2004) documented policies and practices in local SNAP offices, measured perceptions of these policies and practices among households that appeared to be eligible for assistance and examined how these perceptions affected participation behaviour. They found that many nonparticipating households believed themselves to be ineligible and that many households had misperceptions about programme rules. They further found that the operating hours of the programme offices, positive attitudes of office supervisors, fingerprinting of clients, arrangements for children while parents applied and the time limits for able-bodied adults without dependents affected people's chances of completing the applications.

Heflin *et al.* (2012) interviewed Florida SNAP applicants following that state's switch to an Internet- and call-centre-based application system. Although some applicants liked the switch, others complained about problems reaching the call centres, difficulties submitting documents electronically and a general lack of help with applications.

Using programme records from SC, Ribar and Edelhoch (2008) investigated the reasons why people left the SNAP. They found that half of the 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, exits also occurred among households in very unstable and distressed circumstances.

Our article extends these studies. As with the studies by Bartlett *et al.* (2004) and Heflin *et al.* (2012), we carefully examine SNAP application behaviour but additionally consider how applications are resolved. In particular, we examine whether applications are approved or

rejected for financial ineligibility, incomplete information or other reasons. As with the study by Ribar and Edelhoch (2008), we also use administrative data to examine participants' programme spells and reasons for exiting the SNAP. We extend these earlier studies, however, by modelling application and subsequent participation behaviour jointly and by examining how earlier application and participation outcomes affect subsequent outcomes.

III. Data

The data for our empirical analyses come from SNAP case management records from SC, covering the period from October 1996 until November 2007. The records contain a wealth of information, including the dates and resolutions of applications, the dates of participation spells, demographic characteristics of households, geographic identifiers and benefit and reported income amounts during each month of programme 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 vast number of SC SNAP cases, 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. SC 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 programme spells associated with a household over the study period.

We make three 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 between the age of 18 and 59 and no other adults were over the age of 59.² Second, 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 right censor the history at the first instance of problematic data. Third, we drop observations from a case's longitudinal history if there is a change in the identified case head, a procedure that also right censors the longitudinal history. Our final data set contains 50 826 SNAP applications and 35 448 spells (466 258 months) of benefit receipt.

The application approval rate in our sample is 70%. For every application that is denied or withdrawn, the administrative records give a reason. There are 29 detailed codes that are used at least once in our records. We grouped the codes into three broad categories based on the denials because of

- ineligibility because the household's income or assets were too high,

- failure to provide information or verifiable information and
- other reasons, including voluntary withdrawal.

The detailed codes and frequencies are reported in Ribar and Swann (2011, Appendix A).

From the accepted applications, we examine the subsequent spells of SNAP participation, which we measure in discrete, monthly intervals. SC SNAP spells 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 occurs at the end of the month.

Our data begin in October 1996. However, because our multivariate models condition on application and programme experience during the preceding year, our analysis begins in October 1997. We drop spells that are ongoing 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, some records sometimes contain short breaks. We smooth the information by combining spells of programme participation that are separated by a month or less to eliminate artificial transitions associated with administrative churning. This treatment is consistent with the state policies that consider programme spells that resume within 1 month of a previous spell to be continuations of the earlier spells.

As with denied applications, the administrative records give a reason for closure of each case. There are 33 detailed codes that are used at least once in our records. We grouped the codes into four broad categories based on the cases that ended because the household

- missed its recertification,
- lost eligibility as its income or assets were too high,
- failed to provide information or provide reliable information or
- lost eligibility because of some other reason or voluntarily quit.

The detailed codes and frequencies are reported in Ribar and Swann (2011, Appendix B).

The longitudinal identifiers in the data allow us to link applications and programme spells over time and control for households' application and participation histories. To account for the past experience with the SNAP, we construct variables indicating whether the household applied within the past year and, if there was 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.

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 SC's Unemployment Insurance (UI) system. The UI database contains earnings information for most private, nonagricultural employers. However, it misses some jobs (e.g., agricultural and domestic work) and misses employment by people who work out of state.

For each month of SNAP participation, the records indicate the benefits that the household received and the information that enters the benefit calculation, including gross reported earned and unearned income amounts. We use these variables in our 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 records to measures of the county unemployment rate and population density. SC also delegates much of the day-to-day administration of its SNAP to counties. To account for the differences in operational procedures across counties and other geographic differences, the multivariate analyses include dummy variables for each county.

Several SC SNAP policies 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 welfare, disability payments, or retirement had to recertify annually. Starting in October 2002, SC increased the recertification intervals for cases with variable earnings to 6 months; and starting in February 2005, it reduced the recertification intervals for households with fixed incomes to 6 months. Our multivariate analyses of participation spells include controls for these policies. SC changed several other policies, such as exempting all vehicles from the calculation of household assets in fiscal year 2002 and adopting simplified income reporting requirements and definitions of income. To account for these and other changes, the multivariate analyses include general sets of time controls.

Table 1 lists means of the income, programme history, head, household and geographic contextual variables calculated conditionally depending on different application outcomes. Table 2 lists means of characteristics of SNAP participation spells that ended for different reasons or that were right censored.

Table 1. Means of applicant characteristics by application outcome

	Approved	Income or assets too high	Failed to provide information	Other denial/voluntary withdrawal
Case income				
UI earnings	660.6	1225.2**	409.4**	663.5
UI earnings missing (%)	35.1	36.3	66.9**	56.7**
Previous year programme history				
Spell closure in past year (%)	30.9	20.3**	26.1**	17.9**
Months since closure, if positive	5.1	5.9**	5.4**	5.7**
Spell closed for certification (%)	16.5	9.4**	14.7**	8.7**
Spell closed for income (%)	6.2	7.9**	4.0**	3.5**
Spell closed for information (%)	5.5	2.3**	5.1	2.9**
Spell closed for other/voluntary (%)	2.7	0.8**	2.3*	2.7
Denial in past year (%)	14.6	14.3	17.4**	14.5
Months since denial, if positive	4.5	5.0**	5.1**	4.7
App. denied for income (%)	3.5	7.2**	3.3	3.9
App. denied for information (%)	8.4	6.3**	11.7**	7.8
App. denied for	2.7	0.8**	2.3*	2.7

other/voluntary (%)				
Head, household characteristics				
Female (%)	91.9	90.1**	92.2	91.7
Age	31.9	33.5**	30.1**	30.7**
Education	11.4	11.6**	11.2**	11.1**
Currently married (%)	21.7	33.4**	21.5	23.0
Formerly married (%)	32.1	28.4**	26.0**	24.0**
Black (%)	55.8	58.5**	55.1	58.9**
Other race (%)	1.5	1.4	1.5	1.6
Number of children	2.0	1.9**	1.8**	1.7**
Number of adults	1.5	1.7**	1.5**	1.5**
Geographic characteristics				
County unemployment rate	6.0	5.9	5.5**	5.9
County population density	2.1	2.1	2.2**	2.1
Number of applications	35 448	4885	8352	2142

Notes: UI: Unemployment Insurance; App.: application; SC: South Carolina. Authors' calculations from SC administrative records. The asterisks indicate significant differences between means of applicant characteristics whose applications were approved from those whose applications were not.

*Differences significant at 0.05 level.

**Differences are significant at 0.01 level.

Table 2. Characteristics at spell end by reason for exit

	Missed recertification	Income or assets too high	Failed to provide information	Other loss of elig. or vol. exit	Censored spell
Case income and benefits					
Benefits	262.2**	231.9**	305.3	299.1	305.2
Reported earned income	600.8**	736.3**	325.5**	292.2**	446.3
Reported unearned income	271.3	350.7**	268.5	283.6	275.0
Any earnings start of spell (%)	52.8**	59.0**	37.7**	30.8**	45.5
No income start of spell (%)	18.6**	12.6**	29.9**	33.9**	22.5
Previous year programme history					
Months since closure if pos.	5.2**	5.3**	5.0	5.2*	5.0
Spell closed for certification (%)	19.2	10.4**	15.8**	12.0**	18.1
Spell closed for income (%)	4.8**	11.3**	4.5**	4.2**	7.0
Spell closed for information (%)	5.8	4.1**	7.4**	4.4**	5.3
Spell closed for other/vol. (%)	2.5	1.5**	3.0	5.5**	2.5
Months since denial if positive	4.5	4.6	4.5	4.5	4.5
App. denied for	3.1*	6.4**	3.1*	2.3**	3.8

income (%)					
App. denied for information (%)	10.0**	6.8**	10.0**	7.7	8.1
App. denied for other/vol. (%)	2.5	1.5**	3.0	5.5**	2.5
Duration (months)	11.5**	10.9**	11.0**	10.4**	21.6
Head, household characteristics					
Female (%)	91.6**	92.0*	91.4**	91.7**	92.9
Age	32.6**	34.5**	31.5**	32.2**	33.8
Education	11.5**	11.8**	11.4**	11.3**	11.6
Currently married (%)	21.9**	28.9**	19.5**	20.5**	16.9
Formerly married (%)	34.0**	31.0	33.8*	37.1**	32.0
Black (%)	54.2**	62.7**	53.7**	48.2**	58.6
Other race (%)	1.8**	1.3**	1.4**	2.6**	0.6
Number of children	2.0	1.9	1.9	1.9	2.0
Number of adults	1.5	1.6**	1.5**	1.5**	1.5
Geographic characteristics					
County unemployment rate	5.9**	6.3**	6.0**	6.2**	6.4
County population density	2.1**	2.0**	2.2**	2.0**	2.3

Number of exits	15 085	5604	4728	3201	6830
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Notes: App.: application; SC: South Carolina; elig.: eligibility; vol.: voluntary withdrawal. Authors' calculations from SC administrative records. The asterisks indicate significant differences between means in characteristics of participants whose spells were censored from those whose spells terminated.

*Differences significant at 0.05 level.

**Differences significant at 0.01 level.

IV. Multivariate Models

To isolate the independent influences of the different characteristics on programme outcomes, we jointly estimate the multivariate models of SNAP application resolutions and of subsequent participation behaviour. We specify the model of application resolution outcomes as a multinomial logit (MNL). Let $p_j(t)$ be the probability of resolution outcome j for an application made by a household at time t , where the outcomes include the application being accepted ($j = 0$), denied for financial ineligibility ($j = 1$), denied for a failure to provide information ($j = 2$) and denied for other reasons ($j = 3$). We assume that the resolution probability depends on a set of observed and possibly time-varying characteristics, $X(t)$, and a time-invariant unobserved household characteristic, η . Because we are estimating probabilities of resolution, actual resolution outcomes also depend on additional time-varying unobserved characteristics. We model the probability for the application resolution as:

$$p_j(t) = \frac{\exp(\delta_j X(t) + \pi_j \eta)}{1 + \sum_{k=1}^3 \exp(\delta_k X(t) + \pi_k \eta)} \quad (1)$$

(1)

where δ_j and π_j are sets of parameters to be estimated.

Conditional on an application being approved, we observe a participation spell. We estimate a discrete time, competing risk hazard model (Allison, 1982) of four types of SNAP exits, namely missed recertifications, loss of eligibility for income or resource reasons, failure to provide information and all other reasons. Let $h_k(t)$ be the hazard of the household leaving the SNAP for reason k ($= 1, 4$), which depends on the duration of the spell, $T(t)$, as well as other observed and unobserved characteristics such that

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

(2)

where ω_k , β_k , and λ_k represent sets of parameters to be estimated.

The application resolution and participation models are estimated jointly. Besides the observed explanatory variables, the models share an unobserved component, η , which allows for correlations across the models and for serial correlation in the unobserved determinants of the models. 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 and estimate the points of support and probabilities for this distribution (Heckman and Singer, 1984).

Coefficient estimates from our principal specification for application resolutions are given in Table 3, and coefficient estimates from our principal specification for programme spells are given in Table 4. 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 programme tenures also include controls for SNAP benefits and quarterly, semi-annual and annual spell duration indicators that correspond to the likely ends of the certification periods. In addition to these measures, the models include other explanatory measures and controls, although we do not report detailed results.³ In particular, our application and programme tenure models include dummy variable controls for the applicant's county of residence and for the fiscal year of the observation. The competing risk models of programme tenure also include 36 monthly dummy variables that cover the first 3 years of a spell duration and four semi-annual dummy variables that cover the next 2 years. The models 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.

Table 3. MNL application model results

	Income or assets too high	Failed to provide information	Other denial/vol. withdrawal
Case income			
UI earnings	0.098** (0.003)	0.039** (0.003)	0.074** (0.004)
UI earnings missing	1.399** (0.058)	1.892** (0.046)	1.762** (0.074)
Previous year programme history			
Months since closure	0.078** (0.012)	0.026** (0.009)	0.065** (0.018)

Spell closed for certification	-0.934** (0.094)	-0.189** (0.062)	-0.958** (0.128)
Spell closed for income	-0.524** (0.099)	-0.180* (0.081)	-0.848** (0.172)
Spell closed for information	-1.184** (0.128)	-0.175* (0.080)	-1.010** (0.167)
Spell closed for other/voluntary	-1.604** (0.200)	-0.312** (0.107)	-0.520** (0.182)
Months since denial	0.025 (0.015)	0.052** (0.011)	0.001 (0.020)
App. denied for income	0.182 (0.110)	-0.017 (0.092)	0.116 (0.158)
App. denied for information	-0.213* (0.101)	-0.147* (0.072)	-0.201 (0.130)
App. denied for other/voluntary	-0.461** (0.157)	-0.492** (0.115)	0.199 (0.154)
Head, household characteristics			
Female	0.089 (0.061)	-0.037 (0.052)	0.109 (0.086)
Age spline, 18–21 years	0.100* (0.043)	-0.156** (0.024)	-0.378** (0.035)
Age spline, 22–40 years	-0.001 (0.004)	-0.041** (0.003)	-0.029** (0.006)
Age spline, 41+ years	0.009 (0.007)	-0.004 (0.006)	0.049** (0.009)
Education spline, 0–12 years	-0.082** (0.014)	-0.030** (0.010)	-0.062** (0.016)
Education spline, 12+ years	-0.007 (0.034)	-0.076* (0.030)	-0.070 (0.053)
Completed high school	0.576** (0.058)	0.171** (0.041)	0.156 (0.069)
Completed college	-0.121 (0.208)	-0.029 (0.190)	0.233 (0.311)
Currently married	0.312** (0.052)	0.092* (0.042)	0.008 (0.073)
Formerly married	0.051 (0.047)	-0.156** (0.038)	-0.199** (0.067)

Black	0.242** (0.043)	0.027 (0.033)	0.212** (0.058)
Other race	-0.103 (0.151)	-0.349** (0.115)	-0.134 (0.183)
Number of children 0–2	-0.352** (0.037)	-0.290** (0.028)	-0.355** (0.053)
Number of children 3–5	-0.264** (0.033)	-0.198** (0.026)	-0.266** (0.049)
Number of children 6–11	-0.255** (0.025)	-0.165** (0.019)	-0.224** (0.036)
Number of children 12–14	-0.186** (0.035)	-0.083* (0.029)	-0.203** (0.053)
Number of children 15–17	-0.245** (0.039)	0.027 (0.031)	-0.096 (0.058)
Number of adults	0.159** (0.025)	0.238** (0.020)	0.099** (0.036)
Geographic characteristics			
County unemployment rate	0.021 (0.019)	-0.024 (0.016)	-0.090** (0.026)
County population density	-0.428* (0.194)	-0.753** (0.158)	-0.477 (0.272)
π_i (coefficients on unobserved factor, η)	-0.521** (0.124)	0.529** (0.086)	-0.023 (0.135)

Notes: SNAP: Supplemental Nutrition Assistance Program; UI: Unemployment Insurance; Appl.: application; SC: South Carolina; vol.: voluntary. The columns report estimated coefficients from a MNL model of application resolutions that was estimated jointly with a competing risk hazard model of SNAP exits, using SC administrative records. In addition to the listed controls, the application resolution model included controls for fiscal year and county of residence. Huber–White SEs appear in parentheses.

*Significant at 0.05 level.

**Significant at 0.01 level.

Table 4. Competing risk SNAP exit hazard model results

	Missed recertification	Income or assets too high	Failed to provide information	Other ineligibility/voluntary exit
Case income and				

benefits				
Benefits	-0.216** (0.013)	-0.005 (0.019)	-0.064** (0.018)	-0.154** (0.021)
Reported earned income	0.013** (0.003)	0.087** (0.005)	-0.036** (0.005)	-0.049** (0.006)
Reported unearned income	-0.009* (0.004)	0.087** (0.005)	-0.028** (0.006)	-0.041** (0.007)
No income at start of spell	0.124** (0.031)	0.053 (0.048)	0.332** (0.043)	0.344** (0.049)
Any earnings at start of cert. period	-0.365** (0.057)	-0.273** (0.051)	-0.356** (0.056)	-0.423** (0.060)
Previous year programme history				
Months since closure	0.023** (0.006)	0.028** (0.009)	-0.008 (0.010)	0.012 (0.012)
Spell closed for certification	-0.010 (0.045)	-0.553** (0.069)	0.018 (0.067)	-0.383** (0.085)
Spell closed for income	-0.166 (0.063)	0.135 (0.073)	0.011 (0.095)	-0.243* (0.113)
Spell closed for information	-0.059 (0.060)	-0.352** (0.084)	0.125 (0.079)	-0.392** (0.108)
Spell closed for other/voluntary	-0.096 (0.081)	-0.567** (0.128)	0.110 (0.109)	0.418** (0.111)
Months since denial	0.001 (0.009)	0.001 (0.012)	0.006 (0.013)	0.001 (0.017)
App. denied for income	0.047 (0.078)	0.327** (0.079)	0.097 (0.107)	-0.253 (0.138)
App. denied for information	-0.028 (0.057)	-0.104 (0.076)	-0.095 (0.078)	-0.212 (0.103)
App. denied for	-0.147 (0.092)	0.135	0.061 (0.120)	0.069 (0.135)

other/voluntary		(0.110)		
Recertification months				
Quarterly (before October 2002)	2.334** (0.085)	0.517** (0.087)	0.304** (0.091)	0.114 (0.098)
Semi-annual (October 2002–January 2005)	1.275** (0.112)	0.152 (0.147)	0.579** (0.152)	0.206 (0.158)
Semi-annual (after January 2005)	3.661** (0.075)	1.461** (0.089)	1.289** (0.118)	0.199 (0.149)
Annual (before October 2002)	1.089** (0.067)	−0.059 (0.192)	0.378** (0.144)	−0.873** (0.327)
Annual (October 2002–January 2005)	2.367** (0.103)	1.011** (0.180)	−0.199 (0.162)	−0.275 (0.261)
Earnings × quarterly (before October 2002)	0.885** (0.067)	0.804** (0.079)	0.428** (0.104)	0.225 (0.116)
Earnings × semi-ann. (October 2002–2005)	2.396** (0.108)	1.538** (0.147)	0.572** (0.176)	0.393 (0.208)
Earnings × semi-ann. (after January 2005)	0.439** (0.063)	0.895** (0.077)	0.751** (0.094)	0.682** (0.165)
Earnings × annual (before October 2002)	−0.816** (0.077)	−0.087 (0.224)	0.299* (0.147)	0.521 (0.425)
Earnings × annual (October 2002–2005)	−2.049** (0.116)	−0.939** (0.204)	0.194 (0.210)	−0.305 (0.401)
Head, household characteristics				
Female	−0.368** (0.043)	0.046 (0.056)	−0.364** (0.060)	−0.084 (0.072)
Age spline, 18–21 years	−0.104** (0.029)	0.221** (0.056)	−0.076* (0.037)	−0.145** (0.043)
Age spline, 22–40 years	−0.021** (0.003)	0.008* (0.003)	−0.028** (0.004)	−0.013** (0.005)

Age spline, 41+ years	-0.027** (0.004)	-0.007 (0.005)	-0.038** (0.007)	-0.014 (0.008)
Education spline, 0–12 years	-0.021* (0.011)	-0.021 (0.017)	0.011 (0.017)	-0.020 (0.015)
Education spline, 12+ years	0.070** (0.022)	0.133** (0.025)	0.000 (0.033)	0.041 (0.038)
Completed high school	0.042 (0.035)	0.388** (0.054)	0.023 (0.051)	-0.023 (0.056)
Completed college	-0.076 (0.136)	0.060 (0.136)	-0.143 (0.221)	0.495* (0.205)
Currently married	0.164** (0.036)	0.309** (0.044)	0.114* (0.052)	0.279** (0.064)
Formerly married	0.118** (0.030)	0.017 (0.038)	0.141** (0.042)	0.238** (0.050)
Black	-0.364** (0.028)	0.151** (0.036)	-0.230** (0.039)	-0.419** (0.046)
Other race	0.227** (0.085)	0.327** (0.125)	-0.058 (0.141)	0.184 (0.134)
Number of children 0–2	-0.140** (0.025)	-0.308** (0.035)	0.007 (0.035)	0.182** (0.040)
Number of children 3–5	-0.045* (0.023)	-0.360** (0.034)	-0.058 (0.033)	0.159** (0.038)
Number of children 6–11	-0.014 (0.018)	-0.321** (0.027)	-0.014 (0.027)	0.149** (0.030)
Number of children 12–14	-0.009 (0.023)	-0.325** (0.032)	-0.046 (0.036)	0.057 (0.041)
Number of children 15–17	0.054* (0.024)	-0.272** (0.033)	0.010 (0.038)	0.054 (0.047)
Number of adults	0.072** (0.017)	0.039 (0.023)	0.162** (0.025)	0.049 (0.032)

Geographic characteristics				
County unemployment rate	-0.030** (0.011)	-0.036* (0.016)	-0.042* (0.019)	0.012 (0.021)
County population density	-0.135 (0.121)	0.027 (0.171)	-0.365 (0.204)	-0.416 (0.225)
λ_i (coefficients on unobserved factor, η)	1.000	-0.076 (0.083)	0.743** (0.098)	0.258 (0.146)

Notes: SNAP: Supplemental Nutrition Assistance Program; App.: application; cert.: certified; ann.: annual; SC: South Carolina. The columns report estimated coefficients from a MNL competing risk hazard model of SNAP exits that was estimated jointly with a model of application resolutions, using SC administrative records. In addition to the listed controls, the competing risk hazard model included controls for the spell duration, fiscal year and county of residence. Huber–White SEs appear in parentheses.

*Significant at 0.05 level.

**Significant at 0.01 level.

The estimates given in the first two rows of Table 3 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.

The estimates in the next five rows of Table 3 describe the associations between households' programme experiences in the preceding year and their application resolutions. The estimates indicate that households that are attempting to rejoin the SNAP after a short absence are more successful than households attempting to rejoin after longer absences or with no programme experience in the last year. Among the households that had experienced closures in the last year, closures for particular reasons were associated with application denials.

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 due to financial eligibility reasons significantly increases the chances of a subsequent financial ineligibility denial, but previous denials due to information reasons decrease the chances of such a denial reoccurring.

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 40 years. Additional years of elementary and secondary schooling reduce the chances of an unsuccessful application; however, earning a high school diploma or general equivalency degree increases those chances. Married applicants are more likely to have their applications denied for financial and information reasons. 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.

Application resolutions also differ depending on local conditions. Households in counties with high unemployment are less likely than households in other areas to withdraw their applications or have them denied for ‘other’ reasons, and households that apply from more densely populated counties are more successful than those who apply from less populated counties.

The last row of Table 3 lists the estimates of the coefficients (factor loadings) for the time-invariant unobserved household characteristic, η , which enters both the application resolution model and the competing risk hazard model. Identification of the coefficients on η 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 Equation 2 equal to 1). The estimates from Table 3 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 households having the applications denied for financial ineligibility. The estimates also provide some evidence that programme spells are subject to selection on the basis of unobservables.

MNL coefficient estimates from the discrete time, competing risk hazard models of SNAP participation spells are reported in Table 4. From left to right, the coefficients are from the MNL latent indices for exits due to missed recertifications, financial ineligibility, information problems, and other types of ineligibility and withdrawals.

The first five rows list coefficients on the household benefit and income variables. Higher SNAP benefits are estimated to reduce the risks of exit due to recertifications, information reasons and other/voluntary reasons. The results are generally consistent with higher benefits providing incentives to comply with programme rules and encouraging programme participation. 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. Households that begin their SNAP spells with no income whatsoever have higher rates of exit compared to other households, while households that have some earnings have lower risks of exit.

The next five rows list coefficients for households’ programme experiences during the year preceding their current SNAP spell. Households that 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, and 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. 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.

The next four rows list coefficients for prior application experiences. 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. Other application experiences are not significantly associated with programme tenure.

The next 10 rows list coefficient estimates for the controls regarding likely recertification months within spells for households with and without earnings at the start of their certification periods. 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 and also at increased risk of leaving for other reasons, including financial ineligibility.

The estimates from Table 4 also reveal that cases headed by women were generally less likely to exit than cases headed by men. The risks of missing a recertification or failing to provide information decreased with the household head’s age, but the risks of exiting due to financial reasons increased. Being currently or formally married generally increased the risks of exiting the SNAP. 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.

The last row in Table 4 lists 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. 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.

V. Conclusion

In this article, we have used longitudinal, household-level records from SC’s SNAP to investigate how applications to the programme are resolved and how resulting participation

spells end. Application resolutions have been mostly overlooked by previous studies, and no study has jointly examined application outcomes and participation spells.

Nationally, only about three quarters of households that appear to be eligible for the SNAP actually receive benefits under the programme. Difficulties completing applications, supplying documentation and providing continuing information could contribute to 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 most (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 spells end, roughly half of households stop receiving benefits because they fail to recertify and another sixth lose benefits because of incomplete or insufficient information. Only a fifth of households stop receiving benefits because of a formal determination of financial ineligibility.

Completing paperwork takes some effort and motivation. Undoubtedly, some households fail to undertake these efforts because they recognize 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 programme benefits and lower average income levels than other households.

Estimates from our multivariate 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, we observe that households with higher earnings are more likely to have their SNAP applications rejected than households with lower earnings, especially for reasons 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.

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 the programme rules.

The novel elements of our article involve examining and finding evidence of how households' application and participation histories are associated with their application and programme spell outcomes. Estimates from the multivariate models indicate that unobservable characteristics account for some of these associations. 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. 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 participating households gain experience and familiarity with SNAP rules and procedures.

Among the applicants with recent programme 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 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 programme experience may provide some general information about procedures, specific aspects of these procedures still cause some clients repeated problems.

These findings suggest ways that SNAP administrators and caseworkers might better target their assistance. New applicants 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 behaviours. These aspects of programme 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 programme outcome could receive more information, more assistance at intake and more follow-up opportunities.

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Notes

¹ The Food Stamp Program was renamed the Supplemental Nutrition Assistance Program on 1 October 2008.

² Adult-only cases and cases with elderly recipients face different rules than other cases.

Notes: UI: Unemployment Insurance; App.: application; SC: South Carolina. Authors' calculations from SC administrative records. The asterisks indicate significant differences between means of applicant characteristics whose applications were approved from those whose applications were not.

*Differences significant at 0.05 level.

**Differences are significant at 0.01 level.

Notes: App.: application; SC: South Carolina; elig.: eligibility; vol.: voluntary withdrawal. Authors' calculations from SC administrative records. The asterisks indicate significant differences between means in characteristics of participants whose spells were censored from those whose spells terminated.

*Differences significant at 0.05 level.

**Differences significant at 0.01 level.

³ Complete, detailed results are available upon request.

Notes: SNAP: Supplemental Nutrition Assistance Program; UI: Unemployment Insurance; Appl.: application; SC: South Carolina; vol.: voluntary. The columns report estimated coefficients from a MNL model of application resolutions that was estimated jointly with a competing risk hazard model of SNAP exits, using SC administrative records. In addition to the listed controls, the application resolution model included controls for fiscal year and county of residence. Huber–White SEs appear in parentheses.

*Significant at 0.05 level.

**Significant at 0.01 level.

Notes: SNAP: Supplemental Nutrition Assistance Program; App.: application; cert.: certified; ann.: annual; SC: South Carolina. The columns report estimated coefficients from a MNL competing risk hazard model of SNAP exits that was estimated jointly with a model of

application resolutions, using SC administrative records. In addition to the listed controls, the competing risk hazard model included controls for the spell duration, fiscal year and county of residence. Huber–White SEs appear in parentheses.

*Significant at 0.05 level.

**Significant at 0.01 level.

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