Downloading Benefits: The Impact of Online Food Stamp Applications on Participation

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Abstract

Over the last 40 years, participation in the food stamp program, now known as the Supplemental Nutrition Assistance Program or SNAP, has grown by nearly tenfold. In 1970, there were 4.4 million people on the program; by 2010, participation had grown to over 40 million people, an increase that accelerated during the course of the most recent severe recession. As part of federal legislation in 2002, many states implemented an online SNAP application procedure, which made the process easier for applicants and eased the administrative burden for state SNAP agencies. By the end of 2010, 26 states accepted online applications, up from 1 state in 2002. These states ranged in size and geography and accounted for over 70 percent of total SNAP benefits in fiscal year 2010. Using data at the state-month level from 1998 through mid-2010, this analysis shows that accounting for other demographic and economic characteristics of each state, states with online SNAP applications had per capita participation that was about 5 percent to 6 percent higher than states that did not have online applications. Separate regression analysis that examines how online applications affect participation differently over time suggests that participation rose by less than one percent in each of the first three years states accepted applications online, but rose to over 1 percent per year beginning in the fourth year after implementation.

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Over the last 40 years, participation in the food stamp program, now known as the Supplemental Nutrition Assistance Program or SNAP, has grown by nearly tenfold. In 1970, there were 4.4 million people on the program; by 2010, participation had grown to over 40 million people, an increase that accelerated during the course of the most recent severe recession. Between 1970 and the early 2000s, participation in SNAP generally tracked the unemployment rate. However, during the 2000s, as the unemployment rate rose, fell, and then rose again, SNAP participation continued to grow. Understanding the sources of that growth is important for state and federal budgeting purposes, as well as improved targeting of the program to those in need. In this paper, I am interested in quantifying how expanded use of submitting SNAP applications through state agency's websites has contributed to the increased participation rate over the last decade.

The Food Security and Rural Investment Act of 2002 (2002 Farm Bill) made major changes to the food stamp program. Among a number of other things, the 2002 Farm Bill expanded eligibility to certain immigrants who had been ineligible since welfare reform in 1996, changed a number of components of the tests that determine eligibility, increased benefits for certain groups, and simplified some of the calculations used to determine the benefit amount. The 2002 Farm Bill also imposed a variety of program-improvement mandates and state performance improvement incentives. In particular, the Farm Bill offered a total pool of $48 million in bonus money to states for issuance accuracy, it appropriated funds for a number of program improvements, and it mandated that states that already had a webpage for the department that administers SNAP make available the SNAP application as part of that website. Over the course of

the years that followed, many states that did not have an online presence implemented online SNAP application procedures, which made the procedure easier for applicants and eased the administrative burden for state agencies. Anecdotal evidence from conversations with state agencies suggests that the movement to online application systems increased participation and, after an adjustment period, reduced errors related to benefit issuance.

By the end of 2010, 26 states offered SNAP applicants the opportunity to apply for benefits online up from 1 state in 2002. States varied in the year in which they implemented their online programs, from Washington in 2002 to Michigan, North Dakota, and South Carolina in 2010. Altogether, these states varied in size and geography and accounted for over 70 percent of total SNAP benefits paid in fiscal year 2010.

Using data at the state-month level from 1998 through mid-2010, this analysis shows that, accounting for demographic and economic characteristics of each state, as well as other food stamp policies, states that offered online SNAP applications had per capita participation that was about 5 percent to 6 percent higher than states that did not have online applications. The impact of online application systems is estimated to grow over time: the results suggest that state per capita participation rose by less than one percent in each of the first three years states accepted applications online, but increased by more than 1 percent per year beginning in the fourth year after implementation. The analysis suggests that the Electronic Benefit Transfer (EBT) card (an electronic card that works like a bank debit card) has little impact on current participation rates; since the EBT card was implemented virtually in every state by 2002, this is not surprising. I also

show that another food stamp policy, simplified reporting (longer reporting intervals), had a large impact on participation. The results appear to be roughly consistent with the literature, but the monthly-level data and more recent time series lead to some results that differ in magnitude from previous research.

Background to the Food Stamps Program

Formerly known as the Food Stamp Program, the Supplemental Nutrition Assistance Program (SNAP) helps low-income individuals and families purchase food. Participation has grown by almost tenfold over the last 40 years. In 1970, about 4.4 million people participated in the program and by 2010, over 40 million people were on the program at some point during the year and received, on average, about $134 per month. The SNAP program is now one of the United States' largest support programs: Total program costs (benefits and federal administrative costs) were $70 billion in fiscal year 2010, nearly as much as spending on the refundable portions of the earned income and child tax credits ($77 billion), and more than spending on Temporary Aid to Needy Families (TANF; $17 billion) and Supplemental Security Income (SSI; $47 billion) combined (Congressional Budget Office, 2011).

Between 1969 and 2000, food stamp participation roughly lagged the pattern in the unemployment rate; participation typically begins to rise slightly before the unemployment rate and begins to decline sometime after the unemployment rate begins its descent (see figure 1). Each spike in the unemployment rate was accompanied by a closely-associated spike in participation. Beginning in 2000, however, as SNAP

participation began a steady climb upward, reaching 40.3 million people in 2010, the unemployment rate cycled up, then down, then up again. As perhaps one of the major changes in SNAP over that time, this paper tries to examine whether the advent of online applications can explain a significant part of this increase in food stamp participation.

The current version of the food stamp program was passed by Congress in the Food Stamp Act of 1964. Since that time, a variety of legislative actions have changed different elements of the program, including how eligibility is determined, how benefits are calculated, and how benefits are delivered to program participants.[1] The federal government pays the full cost of food stamp benefits and splits the costs of administering the program with the states. State agencies follow federal rules to determine eligibility and calculate and distribute benefits.

Following federal changes to the low-income support program that were passed as part of welfare reform in 1996, incremental changes to the food stamp program were made at the state and local levels. Those policies included expansions to food stamp office hours, streamlined application and recertification processes, joint application procedures across programs (e.g., Medicaid and food stamps), and the elimination of physical food stamps in favor of electronic debit-like cards. Changes to the food stamp program at the federal level in the 2000s (in 2002 and 2008) were essentially a codification of strategies that some state agencies had already undertaken to improve the program.

Large components of recent SNAP legislation have served to expand outreach to eligible participants.[3] Examples of outreach include simplifying application and

recertification procedures (including EBT cards and online applications), implementing a period of transitional benefits from other forms of support (e.g., TANF), interactions between state agencies and local community groups (e.g., food banks, non-profit organization, etc.), and television and radio advertisements (Ratcliffe, McKernan, and Finegold, 1997; Barlett et al, 2004; Dickert-Conlin et al, 2010).[4] Legislation has also provided incentives to states to reduce the rate of errors in awards and for "outstanding and timely customer service in providing SNAP benefits."[5] In my conversations with state agencies, SNAP program officers have told me that bonus award money has enabled them to improve customer service, program efficiency, and issuance accuracy.[6] Program data support those claims: On average, the combined error rate (percent of overpayments plus percent of underpayments) declined slowly during the 1980s and 1990s, from about 12 percent in 1981 to almost 11 percent in 1998; since then, however, error rates have declined rapidly, falling from 8.3 percent in 2002 to 4.4 percent in 2009.

In the body of empirical research, a number of studies have found large effects of policy expansions on SNAP participation. Some have found that welfare reform accounted for only a small share of the changes in SNAP caseloads (Figlio, Gundersen, and Ziliak, 2000; Wallace and Blank, 1999) while others, using larger sets of covariates, found larger effects (Kornfeld, 2002; Currie and Grogger, 2001). Kabbani and Wilde (2003) found that a 10 percentage point increase in the frequency of short recertification periods lowered the number of SNAP participants by nearly 3 percent; Genser (1999) found that eligibility restrictions for legal immigrants passed as part of welfare reform in 1996 led to a large drop in food stamp participation among this group between 1994 and

1997. Danielson and Klerman (2006) made somewhat broader conclusions and found that welfare reform and the improvement in the overall economy explained the entire decline in SNAP caseloads during the late 1990s. They also found that policies aimed at increasing access to SNAP and the weakening economy explained about half of the SNAP caseload increase in the early 2000s. Ratcliffe, McKernan, and Finegold (2007) found that a range of SNAP policies—including recertification periods, reporting requirements, eligibility rules, and the introduction of EBT cards—had strong effects on SNAP caseloads between 1996 and 2003. Leininger et al (2011) showed that there is significant spillover between income-support programs in Wisconsin's online "ACCESS" program, which allows users to apply for such programs as Medicaid and food stamps concurrently.

Perhaps closest to this paper is the recent work by Dickert-Conlin, Fitzpatrick and Tiehen (2010), which used similar data to explore changes in SNAP participation. Examining participation patterns between January 1990 and October 2007 the authors found that increased outreach (such as federal TV and radio advertisement campaigns) and more simplified application processes (such as allowing online applications) served to increase state SNAP caseloads. In many ways, this paper is complementary to their work in that I use a longer time series and a slightly different covariate set.

Barriers to SNAP Entry

People may not enter government-sponsored income-support programs for any number of reasons, including lack of awareness of the program, stigma, reluctance to accept

government assistance, or costs associated with applying and staying on such programs. Whether online application procedures can address some of the reasons why eligible people do not apply for benefits depends on the reasons why people do not try to take up those benefits. As evidence, Bartlett and Burstein (2004) conducted a survey of about 1,400 eligible SNAP households and found a variety of reasons people chose not to apply for SNAP benefits. After a desire for *personal independence* (91 percent of respondents), 61 percent of respondents reported that the *cost of application or participation* was the most common reason not to participation in SNAP. Among that group, there were a variety of explanations:

- respondents felt that they would have to answer questions that were too personal (25 percent);
- the application process required too much paperwork (40 percent), too much time away from work (22 percent), or too much time away from home and child care or elder care responsibilities (15 percent);
- it was too difficult to get to the food stamp office (13 percent);
- the work requirements were too difficult (7 percent); and
- the program participation requirements were too difficult (16 percent).

SNAP applicants also incur some costs for application. On average, survey respondents estimated that they would need 2.4 visits to the SNAP office totaling nearly 4 hours to apply for benefits.[7] Most applicants anticipated costs associated with those visits such as missing work and arranging for dependent care. Applying for benefits online, though not entirely costless, may help applicants to avoid some of these potential costs. And it does

appear to be the case that people in the bottom part of the earnings distribution widely use the internet: Using the October 2009 Current Population Survey, I find that 80 percent of people in the first quintile of the distribution of weekly earnings report that they use the internet, compared with 97 percent of people in the top quintile.

Recent changes to the program have also made it easier for people to stay on the program. The introduction of the Electronic Benefit Transfer (EBT) card, simplified reporting, and greater outreach by state agencies have reduced stigma and have encouraged people to stay on the program and made it easier for them to do so. Danielson and Klerman (2006), for example, show that as program rules become less onerous participation in the program becomes more attractive and enrollment rises.

Data and Methods

To evaluate the importance of an online SNAP application process to overall participation, I combine a variety of data sources between 1998 and 2010, most measured at the state-month level.[8] To avoid much of the change associated with the 1996 welfare reform the regression analysis begins in January 1998 and ends in July 2010, the most recent month for which all of the data are available. I estimate two separate regression models: one that uses the log of each state's SNAP caseload as a percentage of the state's population as the dependent variable, and another that uses the log of each state's SNAP caseload divided by its population below 150 percent of the federal poverty rate. These outcomes are correlated with three broad groups of covariates: SNAP policy,

macroeconomic factors, and demographic characteristics of each state. More details and source notes for each variable are described in Appendix A and Appendix B.

Dependent Variable

Two dependent variables are used in separate regressions below. The first, per capita SNAP participation, is constructed by dividing the total number of SNAP recipients in each state and month (provided by the Department of Agriculture's Food and Nutrition Service (FNS)) by the population in each state (from the Census Bureau). The Census Bureau produces state population estimates in July of each year; I use a linear interpolation for the remaining 11 months of the year. The second dependent variable is each state's SNAP caseload divided by the each state's population below 150 percent of the federal poverty line. The population below 150 percent of the federal poverty line is calculated from the March Current Population Survey; linear interpolation is used for the remaining 11 months of the year.[10] Following the existing literature, I take the natural logarithm of each variable.

The first of these two dependent variables is used throughout the literature on the relationship between SNAP policies and participation. The purpose of the second dependent variable is to try to better capture the effect of online applications on the population potentially eligible for SNAP. Overall, however, the results between the two sets of regressions only differ by about one to two percentage points.

Independent Variables

Determinants of SNAP participation are categorized into three broad groups: policy, economic, and demographic. The models also include fixed effects for state and month and, in some specifications, include an interaction between state dummy variables and a linear time trend.

Policy Variables. The first SNAP policy variable used in the analysis is the month and year in which each state implemented their online application process. According to the data collected, by the end of 2010, 26 states offered SNAP applicants the opportunity to apply for benefits online. Many states bundle the online application process across a variety of different transfer programs, including TANF, Medicaid, and other nutrition programs. The year in which online applications were implemented varied from 2003 (West Virginia) to 2010 (Michigan, North Dakota, and South Carolina). Overall, preliminary fiscal year 2010 data shows that the 26 states that currently offer online applications vary in size and geography and account for 72 percent of total SNAP benefits paid (see map 1).[11]

States that offered online applications experienced slightly faster growth in per capita SNAP participation beginning in 2002 than did states that did not offer online applications. Annual growth in per capita participation rates in states that had implemented an online application process by 2010 (26 states) was faster than states that did not have an online application process by 2010 (25 states) (see figure 2). Between 1997 and 2002, annual per capita participation growth among states that by 2009 accepted online applications was between 0 and 5 percentage points slower than among states that by 2010 did not accept online applications. Beginning with the per capita

participation growth between 2002 and 2003—a period that included passage of the 2002 Farm Bill—average annual growth was between about 1 and 4 percentage points *faster* among online states than among non-online states.[12]

Two other SNAP policy variables—date of electronic benefit transfer (EBT) card implementation and simplified reporting—are also included in the regression model. As part of the 1996 welfare reform, every state was required to move from paper food stamps to EBT cards by 2002; because some states received waivers to the requirement, all 51 states were using EBT cards by 2004. Dates (month and year) of EBT implementation and when which each state began simplified reporting—states that allow recipients to report income or asset changes every three months—are from Danielson and Klerman (2006, Table A.1).[13, 14]

Economic Variables. As evident in the data and a variety of previous research, there is a strong historical relationship between SNAP participation and the unemployment rate. I include the contemporaneous seasonally-adjusted state unemployment rate and one-year and two-year lags to control for the state economic climate.[15] Lags in the unemployment rate were found to be important predictors of SNAP participation in previous work, including Wallace and Blank (1999) who attributed about 30 percent of the food stamp caseload decline between 1994 and 1996 to the unemployment rate, Figlio et al (2000) who found a similar 35 percent relationship between caseloads and the unemployment rate between 1994 and 1998, and Kornfeld (2002) who attributed 19 percent of the caseload decline between 1994 and 1999 to the unemployment rate. In addition, to account for the tremendous increase in SNAP

caseloads owing to Hurricane Katrina, I include a single dummy variable in September, October, and November 2005 for five affected states—Alabama, Florida, Mississippi, Louisiana, and Texas.

Demographic Variables. To account for the demographic profile of each state, I include three covariates: the percent of the state population age 65 or older, the percent of each state that is not a citizen, and the percent of prime age workers (ages 25 to 54) that have at most a high school degree. The share of each state's population that is elderly captures the general demographic make-up of the state. The 2002 Farm Bill reinstated SNAP eligibility for certain groups of noncitizens; they are included here both to account for that policy change and as a demographic control of the foreign-born population in each state. The percent of people with at most a high school degree is included as a proxy for the characteristics of the low-income population.[16] All of these variables are calculated from person-weighted tabulations of repeated March Current Population Survey data.[17]

Summary Statistics

Basic statistics for the entire data set spanning the January 1998 to July 2010 period are shown in table 1. About 8.5 percent of state residents received SNAP benefits over this time period and ranged from 1.6 (Alaska, October 2003) to 49.8 (Louisiana, September 2008). This latter entry is primarily due to Hurricanes Ike and Gustav and government support policies implemented in response to those storms. The Gulf Coast states also had high per capita participation rates following Hurricane Katrina in the fall of 2005. Aside

from spikes in participation owing to these hurricanes, Mississippi, Tennessee, Washington, DC, and West Virginia, tend to have SNAP per capita participation rates around 20 percent. Overall, about 15 percent of all state-months offered online applications during the sample period and over half (53 percent) had simplified reporting. The EBT card was largely in place by 2004, so over 82 percent of all state-month observations were using the debit card system. Averaged over the entire period, the unemployment rate was 5.2 percent and ranged from 2.1 percent (September, October 2000) to 14.9 percent (Nevada, April-December 2010). About 12 percent of state residents were at least 65 years old during the period and about 42 percent had at most a high school degree. Fewer than 5 percent of state residents were not citizens during the period.

Regression Model

The econometric approach seeks to explain per capita SNAP participation as a function of state-specific SNAP policies, and the economic and demographic characteristics of the state. All models are estimated via OLS and standard errors are clustered by state.

Equation #1: Single-Effect Model

$$ln(P_{stm}) = \alpha + X_{stm}\beta + EBT_{stm}\tau + Simplified_{stm}\sigma + Online_{stm}\rho + \delta_s + \varphi_s(\delta_s \times Trend_s) + \mu_m + \varepsilon_{stm}$$

Equation #2: Phase-In Effect Model

$$\ln(P_{stm}) = \alpha + X_{stm}\beta + EBT_{stm}\tau + Simplified_{stm}\sigma + \sum_{t=1}^{6}(D_{stm}^{online} \times M_m)\rho_t + \delta_s + \varphi_s(\delta_s \times Trend_s) + \mu_m + \varepsilon_{stm}$$

In both equations, *P* denotes per capita participation, *X* denotes state demographic and economic characteristics, τ is the coefficient on the EBT card variable, σ is the coefficient on the Simplified Reporting variable, δ denotes the state fixed effect, μ denotes a month of the year fixed effect, ε denotes an error term, and φ_s is a set of coefficients of the interaction between each state dummy variable and a state-specific time trend ($Trend_s$).[18] The coefficient on the *Online* variable, ρ, in the *Single-Effect Model* (equation #1) is interpreted as the percent increase (or decrease) in per capita participation in states with online applications versus participation in states without online applications. In the *Phase-In Effect Model* (equation #2) the impact of online applications on SNAP participation is allowed to phase-in over time where D_{stm}^{online} is an indicator of acceptance of online applications in state *s* in a particular month where *M* is the month of the year (1, 2, ….. 12). The coefficients on these "phase-in" variables (ρ_1, ρ_2,… ρ_6) show the effect of the interaction between online applications and month of the year for each year in the data.[19]

Results

States that accept online applications for SNAP are estimated to have per capita participation that is about 5 percent to 6 percent higher than do states that do not accept

applications online. Overall, applications raise per capita participation by less than one percent in each of the first three years states accepted applications online, but rose to over 1 percent per year beginning in the fourth year after implementation. Two sets of sensitivity analyses are shown in Appendix Tables 1 and 2 and are discussed briefly below.[20]

Results from the Single-Effect Model

Table 2 shows the main results of the empirical specification outlined in the *Single-Effect Model* (equation #1) where online applications are interpreted as a single effect. The results in the first column suggest that states that accept applications online have about 5.7 percent higher per capita participation than other states. The point estimate in column (3) suggests that the increase in per capita participation among persons below 150 percent of the federal poverty line is about 6 percent, but the estimate is not statistically different from zero. In columns (2) and (4), which add month fixed effects to state fixed effects and state-monthly trend interaction terms, the estimates differ only slightly and imply an increase in per capita SNAP participation of about 5.6 percent due to online applications; again, the analogous estimate among the group of people below 150 percent of the federal poverty line is not statistically different from zero.

Point estimates on the other covariates tend to be large and statistically significant. The impact of the EBT card, percent elderly, and percent noncitizen are generally not statistically significant, however. The point estimate on the simplified reporting policy option is about 3 percent in the first two columns; the estimate is neither

large nor statistically significant in columns (3) and (4). The impact of the unemployment rate (and its one- and two-year lag) on per capita participation is large and statistically significant; in the first two columns the contemporary unemployment rate is estimated to push per capita participation higher by about 4.4 percent. The two-year lag has an even larger effect on per capita participation and is nearly on par with the estimate on the online application variable. Finally, the control for Hurricane Katrina is extremely large and statistically significant in both models. A more detailed discussion about the impact of these controls can be found below.

Results from the Online Implementation Phase-In Model

The results in table 3 show the relationship between online applications and per capita participation using the *Phase-In Effect Model*. The regressions in the first two columns use per capita participation as the dependent variable; the second set of columns use participation as a share of the eligible population as the dependent variable. The first column of each set of regressions includes state fixed effects and state-trend interaction terms; the second column includes month fixed effects as well.

For each of the four regressions in table 3 the effect of online applications on SNAP participation starts small—less than a percentage point—and then rises in years four and five; beginning in year 6, the effect of online applications on participation begins to decline. For example, in column 2, per capita participation does not change in the first two years of online applications. Over the next three years, participation grows by 0.73 percent, 1.1 percent, and 1.3 percent. Beginning in the sixth year, participation

continues to grow, but at a slightly slower 0.96 percent. Similar patterns are evident when participation as a share of the eligible population is used, though the magnitude of the point estimates in years three through six are somewhat larger. Altogether, the estimates suggest that online applications pushed per capita participation up by nearly 5 percent over the observed period and the eligible population by about 6 percent. The one-time effect estimates (table 2) are about one percentage points larger than the sum of the phased-in effects shown in table 3.

The year in which each state introduced its EBT card and the year in which each state began simplified reporting are included as the other two controls for how SNAP policy can impact participation. There does not appear to be a statistically significant difference in per capita participation between states that use an EBT card and those that do not; by 2004 however, all states were using EBT cards and thus it is perhaps not surprising that there is not an large and statistically significant effect over the 1998 to 2010 time period. States with simplified reporting—and all but two states had simplified reporting by the midpoint of 2009—appear to have per capita participation that is about 4 percent higher than in states without simplified reporting. Thus, the total effect of simplified reporting appears to have about the same effect on per capita participation as does the total effect of online applications. As with online applications, the simplified reporting effect is not statistically different from zero, however, when participation is measured as a share of the eligible population (columns 3 and 4).[21] The absolute and relative magnitudes of the two policy controls are generally consistent across the various regression models.

The estimates show that the contemporary unemployment rate has about a 2 percent to 4 percent impact on per capita participation over the 1998 to 2010 period; the two-year lag in the unemployment rate has a larger effect (about 5.5 percent), similar to the findings in the *Single-Effect Model*. These points estimates are significantly smaller than estimates in previous research (see Wallace and Blank (1999), Figlio et al (2000) and Kornfeldd (2002)), which may reflect modeling or data differences, or may provide further evidence of a change in the relationship between the two series over the last decade (see again figure 1). As with the policy variables, the unemployment rate appears to have similar impacts on per capita participation in the different sensitivity tests that follow.

Finally, state demographic factors have smaller effects on participation than the policy variables or unemployment rate. The percent of the state population age 65 or older does not have a statistically significant effect on participation. Controlling for all other factors, states with higher rates of noncitizenship tend to have lower SNAP participation, which might be suggestive of legislative changes in foreign-born eligibility that have not translated into participation. Finally, states that tend to have a higher share of people with at most a high school degree have per capita participation rates that are about 0.5 percent higher than other states with more highly educated populations. The distribution of educational attainment has no measurable effect on participation per eligible person in the state. The coefficient on the dummy variable for Hurricane Katrina is very large and statistically significant.

Sensitivity Analysis Results from the Phase-In Model

Finally, I estimate two sets of sensitivity analyses to test flexibility of the model in the face of different sample periods and sources of data for when a state implemented online application procedures. The estimates in Appendix Table 1 vary the years included in the sample by excluding 2008, 2009, and 2010 to avoid possible contamination from the large increase in SNAP participation during the severe recession in those years and changes to the program as part of the American Recovery and Reinvestment Act of 2009. Those estimates suggest a slightly higher elasticity of online applications—between about 6 percent and 12 percent—which implies that the dramatic growth in SNAP participation during the severe recession does not appear to drive the effect of online applications on participation. In Appendix Table 2, I vary the data source of when each state began accepting applications online; for example, in one set of estimates I use online implementation dates directly from the FNS microdata (and not edited in any way).[22] Those estimates again differ only slightly from the baseline estimates and, depending on the exact data source use, vary from a total effect of between 4.1 percent and 5.2 percent.

Conclusion

SNAP has undergone a number of significant changes over the last decade. As federal and state governments modify rules about eligibility, time-limits, and benefit levels and growth, perhaps the most important reasons for participation growth are the more nuanced changes to the program. By allowing and encouraging eligible households to

apply for SNAP benefits online, potential participants may find it easier to apply for the program and then, having entered the program, recertify for benefits in the future.

In this paper, I have found that the implementation of online applications has served to increase state participation in SNAP by nearly 5 percent over the course of a six-year period. Going forward, as more states introduce online application procedures, participation in the program should continue to grow while at the same time helping to ease the administrative burdens on state agencies responsible for the program.

Appendix A. Source Data

SNAP Participation: personal correspondence with FNS.

Population: U.S. Census Bureau: http://www.census.gov/popest/estbygeo.html. Monthly estimates linearly interpolated between subsequent July estimates.

Population under 150 percent of the federal poverty line: Weighted tabulations from the 1999-2010 March Current Population Surveys. Monthly estimates linearly interpolated between subsequent March estimates. Population estimates for April 2010 through July 2010 are calculated by assuming the growth rate between March 2010 and March 2011 extends to the period between March 2011 and March 2012.

Unemployment Rate: U.S. Bureau of Labor Statistics: http://www.bls.gov/lau/ (seasonally-adjusted).

Percent Elderly: defined as percent of state population 65 and older; person-weighted tabulations from the 1999-2009 March Current Population Surveys. Values in 2010 are assumed to equal those in 2009.

Percent noncitizen: person-weighted tabulations from the 1999-2009 March Current Population Surveys. Values in 2010 are assumed to equal those in 2009.

Percent low educated: percent of prime-age (25 to 54 years old) state population with at most a high school degree; person-weighted tabulations from the 1999-2009 March Current Population Surveys. Values in 2010 are assumed to equal those in 2009.

EBT dates: Danielson and Klerman, 2006, Table A.1.

Simplified Reporting: Danielson and Klerman, 2006, Table A.1. Updates for Hawaii (http://hawaii.gov/dhs/main/har/har_current/%28S%2917-649.pdf), Minnesota (http://www.dhs.state.mn.us/main/groups/publications/documents/pub/dhs16_143846.pdf), North Dakota (http://www.state.nd.us/humanservices/policymanuals/foodstamps-archive/430_05_67_05_ml3072.htm), and Utah (http://www.rules.utah.gov/publicat/bulletin/2006/20060615/28761.htm).

Date of online application implementation: Various. See Appendix B.

Appendix B. Online SNAP application start dates

I combine three main sources of data to define the month and year in which each state implemented its own online SNAP application process. The first is from a survey conducted by FNS and published in two June 2010 volumes (Rowe et al, *Enhancing Supplemental Nutrition Assistance Program (SNAP) Certification: SNAP Modernization Efforts, Final Report, Volumes 1 and 2*). Data from the survey were published results in the two volumes and information about the 14 case studies serve as supporting documentation. Due to some missing data, some editing of the survey data is required. The second source of data come from the annual *State Options Reports* published by FNS in September 2004, August 2005, October 2006, November 2007, June 2009, and August 2011. The third data source is the August 2010 *Food Stamps On-Line: A Review of State Government Food Stamp Websites* from the Center on Budget and Policy Priorities. I have also visited the websites of each state to confirm whether the state accepts applications online; two states (Idaho and New Hampshire) that are recorded in the *State Options Report* as accepting online applications do not currently appear to do so. In this Appendix, I discuss the challenges associated with each data source and the manner in which I arrive at the final date of online implementation.

Enhancing Supplemental Nutrition Assistance Program (SNAP) Certification. The two volumes published by FNS (Rowe et al, 2010a and 2010b) include a national survey of state food stamp offices conducted between May and December 2008, as well as specific case studies of 14 different states (Colorado, District of Columbia, Idaho, Illinois, Indiana, Kansas, Massachusetts, Mississippi, North Carolina, Pennsylvania, Texas, Utah, Washington, and Wisconsin). The survey asked each program office the specific date at which the state electronic application process was implemented. The specific case studies (*Volume 2*) also go into more detail about when each state went online and the implementation of other policy changes.

Editing of the date of online implementation is required for 8 states. First, 3 states (New Jersey, Texas, and Washington) did not report the month in which their online application process began. In the primary regressions, I assume that the states went online in January; sensitivity analysis varied that assumption (to June or December) and showed little sensitivity to that decision (see Appendix Table 2). Second, for 5 states (Florida, Iowa, Kansas, Tennessee, and Wisconsin), the entry date in the Excel file appears as, for example, "5-Apr" and when one clicks in that cell the date is listed is "4/5/2008". However, for each of these five states, the *State Options Reports* (see below) suggest a much earlier year of implementation. Thus, I assume that the month is correct as entered in the survey data, but that the year of implementation matches the year in which the state first appeared in one of the *State Options Reports*.

State Options Reports. Each year, FNS asks each state to submit information about its specific policies regarding SNAP administration. In each report, FNS lists the states that

have electronic application filing, whether that program is in a pilot program phase or fully implemented, and whether applicants is allowed to submit the application with an electronic signature (or "e-signature"). In the June 2009 report, 25 states are listed as accepting online applications; Louisiana, Michigan, Ohio, South Carolina, and Vermont are also listed on the FNS website as accepting online applications and Idaho and New Hampshire are not, yielding an FNS estimate that 28 states currently accepting applications online. For purposes of this analysis, Ohio and Vermont are assumed to have begun their online application systems sometime after the data end in July 2010, and Idaho and New Hampshire were not found to have an online application system, which yields 26 states that accept online applications by the end of 2010 used in the analysis.

There are three states (Arizona, Georgia, and Nebraska) that appear for the first time with an online application process in the June 2009 *State Options Report*. Three other states (Michigan, North Dakota, and South Carolina) are not listed in the FNS survey or any of the *State Options Reports*, but appear with an online application system in the August 2010 *Food Stamps On-Line: A Review of State Government Food Stamp Websites* from the Center on Budget and Policy. For all six of these states, I assume that the state went online in the month and year in which the state first appears as accepting online applications in the relevant report. Michigan, North Dakota, and South Carolina, who are assigned an implementation date of August 2010 will not appear in the data with online applications because the sample ends in July 2010. In sensitivity analysis (see Appendix Table 2), I vary these assumptions by changing the month (to January for Arizona, Georgia, and Nebraska; and to January or June for Michigan, North Dakota, and South Carolina) in which these states went online.

For four other states, I make a variety of different modifications.

- In the FNS survey data, Illinois reported having "Express Stamps" in October 2006; in *Volume 2* of the report, Illinois is described as having implemented an online application process in January 2009 and first appears in the June 2009 *State Options Report*. Therefore, that later date is used in the regression analysis.
- Pennsylvania reports an implementation date of October 2001; however, the text in *Volume 2* suggests that online applications for SNAP started sometime later: "The first program available on the [online] application was healthcare for children; SNAP, TANF and other healthcare programs were subsequently added." Further, Table 4.6 in *Volume 1* lists an online application implementation date in 2006 in Pennsylvania; thus, I assume an implementation date of October 2006.
- Virginia reports having an online application system in place in April 2006 in the FNS survey, but they first appear in the August 2005 *State Options* Report; thus, I use the combination of the two pieces of information and assume the state started accepting applications in April 2005.
- Finally, the survey data states that New York began accepting online applications in June 2008 while the September 2004 *State Options Reports* suggests that New York had a pilot program that began in 2004 or earlier; I then assume New York began accepting applications online in June 2004.

It should also be noted that California, Indiana, New York, and Texas currently accept online applications from only a select number of counties; the models above make no further control for this characteristic aside from the state fixed effects.

Finally, two states (Idaho and New Hampshire) each report accepting online applications. Idaho has reported that it has had a pilot program in place since the October 2006 *State Options Report*; however, no online application currently exists on the Idaho food stamp website and thus I assume no program is in place. New Hampshire reported that it had a pilot program in place in the November 2007 *State Options Report* and that the program had gone statewide in the June 2009 *State Options Report*; however, no process currently exist online and thus I assume no program is in place in that state.

Summary. In sum, although FNS lists 28 states accept online applications as of January 2011, two of those states (Idaho and New Hampshire) do not appear to do so. Of the remaining 26 states, the date of implementation is taken directly from the FNS survey data for 9 of them; the year but not the month is reported for 3 of them (and January assumed); the date appears to be an Excel formatting error for 5 of them (and the FNS *State Options Reports* offers additional evidence); the date is assumed to be the date of release from the first occurrence in a *State Options Report* for 3 of them (June 2009); the date is assumed to be the date of release from the CBPP *Food Stamps On-Line: A Review of State Government Food Stamp Websites* for 3 of them (August 2010)[23]; and some combination of FNS and *State Options Reports* are used for 4 states. A list of the implementation dates and concise notes are shown in Appendix Table 3.

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[1] For a summary of the legislative history, see http://www.fns.usda.gov/snap/rules/Legislation/default.htm.

[3] The American Recovery and Reinvestment Act of 2009 provided a SNAP benefit increase and some additional monies to states to administer the program, but did not explicitly expand outreach.

[4] Outreach spending can be federal and/or state spending dedicated to reaching the eligible population. Such activities can include community presentations; flyer, posters, and brochures; toll-free numbers or hotlines; newspaper articles; or direct mailings (see Chapter 7 in Bartlett et al, 2004). It might also be measured as federal and/or state spending transferred to eligible nonprofit organizations (see Appendix B in Ratcliffe and McKernan, 1997).

[5] See "Agriculture Secretary Announces Bonus Awards for States Achieving Outstanding, Timely Nutritional Assistance" (September 23, 2010) at http://www.fns.usda.gov/cga/PressReleases/2010/0482.htm. Awards ranged from about $300,000 to almost $4 million.

[6] The author is indebted to program officers in Florida, Ohio, Washington, DC, and Wisconsin for discussing a broad range of policy patterns and experiences in their states.

[7] Bartlett, Burstein, and Hamilton (2004) find that applicants actually made 2.4 trips to the food stamp off and spent, on average, 6.1 hours completing the application process including 3.9 hours at the office and 2.2 hours traveling between their home and the SNAP office.

[8] For ease of exposition, I refer to the 51 states in the text to include the District of Columbia.

[10] The most recent available March CPS is in calendar year 2010. In order to make the direct comparison between models that use the Census data and the CPS data, I extend the population estimates from March 2010 to July 2010 by assuming the growth rate in population between 2011 and 2010 is the same as it was between 2010 and 2009.

[11] Exact and current information on when states introduced online applications is not widely available or easy to obtain. See Appendix B for a detailed description of the data collection and editing process.

[12] The only exception to this pattern was in 2004-2005 when Hurricane Katrina resulted in huge growth in SNAP participation in Louisiana and Mississippi that drove the total growth rate for the non-online states.

[13] Additional information for four states (Hawaii, Minnesota, North Dakota, and Utah) that did not have simplified reporting at the beginning of 2006 are added by a search through each state's website and consultation with the FNS *State Options Reports*; see Appendix A for more details.

[14] Combined error rates—the rate at which states overpay or underpay SNAP recipient—for each state and year were provided by FNS, but not used in the analysis. Although used a couple of related papers (Kornfeld, 2002 and Ziliak et al, 2003) as a proxy for state policies, Kabbani and Wilde (2003) argue that the error rate is itself endogenous in participation models because it depends directly on the participation level of households within the state. I therefore do not include the variable for two reasons: First, there is a risk of endogeneity, and second, it is measured at the annual, not month level. In some sensitivity checks however, I did include the 1-year or 12-month lag of the combined error rate and found that the point estimate was very small (under 0.001), not statistically significant, and had no discernable impact on the other covariates. A range of other policy variables were also not included, generally due to reasons of data availability. Those variables include include transitional benefits (Danielson and Klerman, 2006), combined error rates (Danielson and Klerman, 2006; Ziliak et al, 2003), political balance of each state's legislature or governor (Kabbani and Wilde, 2003; Figlio et al, 2000), eligibility and recertification periods (Ratcliffe and McKernan, 2007), states that use biometric technology (fingerprinting) as part of application process (Burstein et al, 2009) and ABAWD or welfare waivers (Ziliak et al, 2003).

[15] The main estimates are little changed when the model is estimated using non-seasonally adjusted unemployment rates.

[16] Earlier versions of this paper also included the number of per capita TANF recipients (from the Administration for Children and Families) in each state. However, because TANF and SNAP are so closely related in eligible populations and application processes, it is likely this variable is endogenous and is thus dropped from the analysis. A number of previous papers have found a strong relationship between TANF and SNAP receipt, but by beginning the analysis in January 1998, I hope to avoid some of the potentially

confounding effects of the transition from Aid to Families with Dependent Children (AFDC) to TANF that began in 1997.

[17] CPS data for calendar year 2010 did not yet exist at the time of estimation. Updates to this paper will include the most recent CPS data as well as the most current information on online applications available from FNS.

[18] State-specific trends are included instead of separate year fixed effects because the pattern of interest is the change in per capita participation before and after each state implemented its online application process.

[19] The coefficient on the final term, ρ_6, extends through the end of the sample period. Danielson and Klerman (2004, 2006) used annual data and modeled some SNAP policy innovations over three years.

[20] In results not reported, the data are converted from state-month to state-year using value in July of each year (in order to use only the published number by the Census Bureau). The estimated impact of online applications on per capita participation is much larger in the *Single-Effect Model*. The estimated impact of online applications in the *Phased-In Effect Model*, which uses three one-year terms, is also significantly larger than in the monthly model. Both sets of larger effects are most likely due to aggregation from changes in monthly participation to changes in annual participation. However, the differences might also reflect monthly seasonality in the underlying population numbers from the linear interpolation or concerns raised by Ziliak et al (2003) that the monthly data are often measured with more error and that the household food stamp take-up decision is a long-run pattern that is better picked up with annual data.

[21] In addition to phasing-in the effect on online applications, alternative regressions phased-in the EBT cards and simplified reporting policies in three separate year patterns (one-year, two-year, and three-years or more). Those estimates suggested slight long-term positive effects of EBT cards and simplified reporting on participation (less than 0.5 percent). These estimates are contrary to those reported by Danielson and Klerman (2006) who found that initial EBT implementation led to a 1.9 percent increase in per capita participation and a 2.8 percent effect of simplified reporting in years 2 and 3. The differences could be due to the level of observation (monthly here and semi-annual in Danielson and Klerman), time period (1998 to 2010 versus 1989 to 2004), or other modeling decisions.

[22] In addition to states that did not have online application systems, only those states that implemented their online application procedure according to the listed data source are included in the regressions. That is, in column (1) for example, the sample includes 25 states without online applications and 9 states that had implemented their online application process according to the FNS survey; the remaining 17 states that accepted online applications according to other sources are not included in this regression.

[23] It bears emphasizing that these three states will not appear as accepting online applications in the main results and will only do so in columns (6) and (7) of Appendix Table 2 where the sensitivity of the month of online application implementation is tested.

Table 1. Summary Statistics, Monthly Data

(Percent)

	Mean	Standard Deviation
SNAP Participation Per Capita	8.5	3.6
Log(SNAP Participation Per Capita)	2.1	0.4
SNAP Participation Per Person Below 150% Poverty	35.6	11.0
Log(SNAP Participation Per Person Below 150% Poverty)	3.5	0.3
Policy Variables		
Online Applications	14.5	35.2
EBT card	82.5	38.0
Simplified Reporting	53.4	49.9
Economic Variables		
Unemployment Rate	5.2	1.9
Unemployment Rate (1-year lag)	4.9	1.5
Unemployment Rate (2-year lag)	4.7	1.2
Demographic Variables		
Elderly	12.4	1.9
Noncitizen	4.7	3.5
Low Education	41.6	5.9
Hurricane Katrina	0.2	4.4
Population (thousands)	5,733	6,380
Population below 150% poverty (thousands)	1,391	1,731
Number of Observations	7,701	

Notes:

Sample consists of 51 state-month observations from January 1998 to July 2010.

Sources:

Author's calculations using data from the Bureau of Labor Statistics (unemployment rate); USDA Food and Nutrition Service (online application; EBT dummy); Danielson and Lerman (2006) (simplified reporting); March CPS (% elderly, % noncitizen, % low education, number people below 150% poverty); Administration for Children and Families (TANF recipients); and U.S. Census Bureau (population). See Appendixes A and B for details.

Table 2. Determinants of SNAP Participation, Single-Effect Model, 1998-2010

	(1)	(2)	(3)	(4)
Dependent Variable:	**Participation Per Capita**		**Participation Per Person Below 150%**	
Years in Sample:	**1998-2010**	**1998-2010**	**1998-2010**	**1998-2010**
Online Application	0.0565**	0.0558*	0.0628	0.0622
	(0.028)	(0.028)	(0.040)	(0.040)
EBT Dummy	-0.0359	-0.0342	-0.0303	-0.0287
	(0.025)	(0.025)	(0.035)	(0.035)
Simplified Reporting	0.0346*	0.0335*	0.0119	0.0109
	(0.018)	(0.018)	(0.026)	(0.026)
Unemployment Rate	0.0438***	0.0440***	0.0249***	0.0252***
	(0.003)	(0.003)	(0.004)	(0.004)
Unemployment Rate (1-year lag)	0.0206***	0.0201***	0.0147***	0.0142***
	(0.002)	(0.002)	(0.005)	(0.005)
Unemployment Rate (2-year lag)	0.0526***	0.0534***	0.0521***	0.0529***
	(0.006)	(0.006)	(0.010)	(0.010)
Percent Elderly (age 65+)	0.0055	0.0051	0.0036	0.0033
	(0.005)	(0.005)	(0.007)	(0.007)
Percent Noncitizen	-0.0131	-0.0136*	-0.0237*	-0.0242**
	(0.008)	(0.008)	(0.012)	(0.012)
Percent with High School Degree or Less	0.0054***	0.0057***	-0.0013	-0.0011
	(0.002)	(0.002)	(0.003)	(0.003)
Hurricane Katrina Dummy	0.3296***	0.3368***	0.3856***	0.3923***
	(0.078)	(0.078)	(0.115)	(0.115)
Constant	1.3896***	1.3911***	3.1765***	3.1774***
	(0.136)	(0.134)	(0.193)	(0.193)
Observations	7,701	7,701	7,701	7,701
R-squared	0.965	0.965	0.873	0.873
State Dummies	X	X	X	X
State*Trend Dummies	X	X	X	X
Month Dummies		X		X

Notes:
Huber-White standard errors, clustered by state, are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Dependent variable is natural log of per capita SNAP participation in each month. 'Online Application', 'EBT Dummy', and 'Simplified Reporting' variables set equal to one beginning in month in which state begins policy.
Sources:
Author's calculations using data from the Bureau of Labor Statistics (unemployment rate); USDA Food and Nutrition Service (online application; EBT dummy); Danielson and Lerman (2006) (simplified reporting); March CPS (% elderly, % noncitizen, % low education, number people below 150% poverty); and U.S. Census Bureau (population). See Appendixes A and B for details.

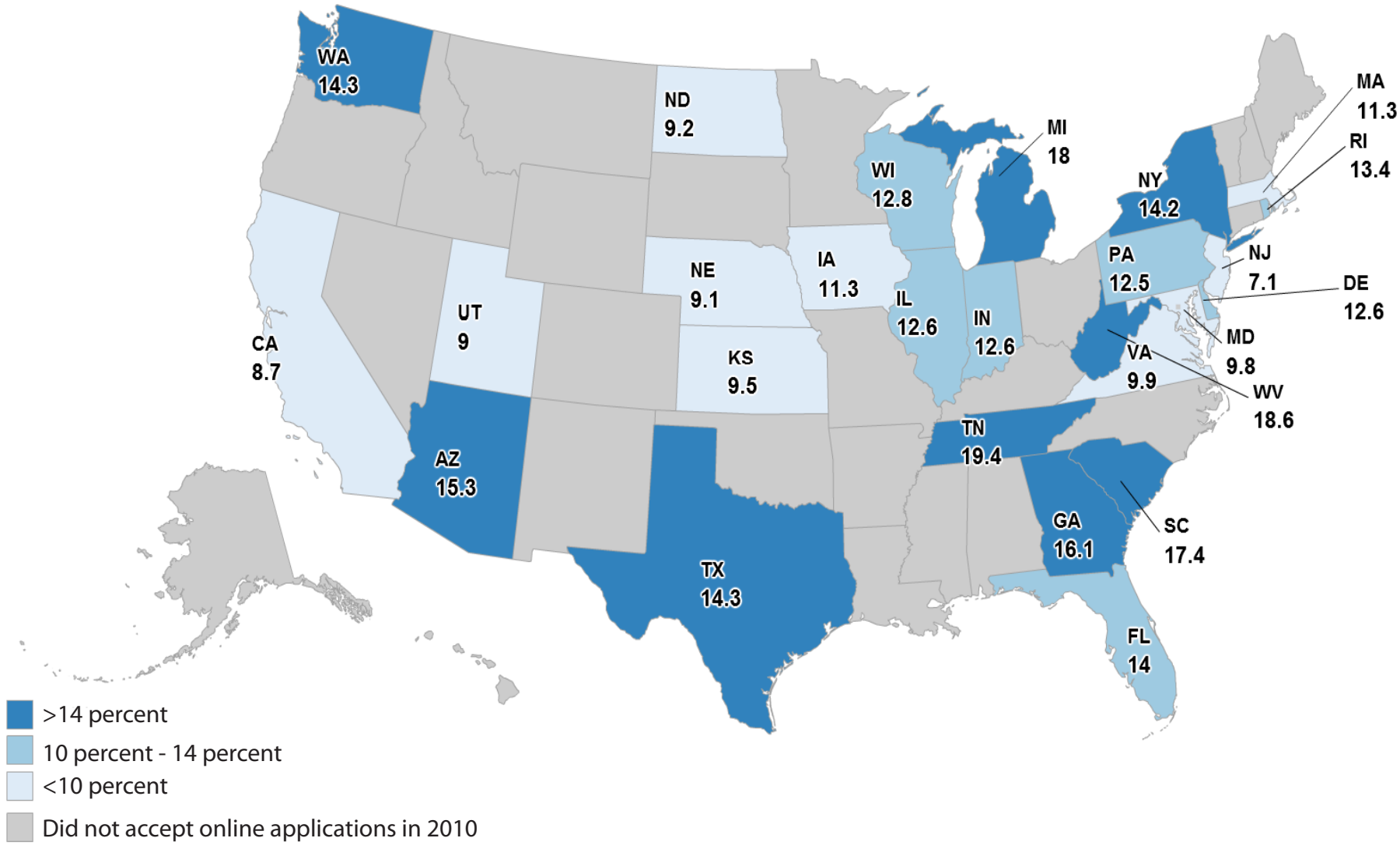
Table 3. Determinants of SNAP Participation, Phase-In Effects Model, 1998-2010

	(1)	(2)	(3)	(4)
Dependent Variable:	**Participation Per Capita**		**Participation Per Person Below 150%**	
Years in Sample:	**1998-2010**	**1998-2010**	**1998-2010**	**1998-2010**
Online Application, Months 1-12	0.0021	0.0020	0.0013	0.0012
	(0.002)	(0.002)	(0.003)	(0.003)
Online Application, Months 13-24	0.0036	0.0035	0.0052	0.0051
	(0.002)	(0.002)	(0.004)	(0.004)
Online Application, Months 25-36	0.0073***	0.0071***	0.0080**	0.0078**
	(0.003)	(0.003)	(0.003)	(0.004)
Online Application, Months 37-48	0.0114***	0.0112***	0.0137***	0.0135***
	(0.002)	(0.003)	(0.004)	(0.004)
Online Application, Months 49-60	0.0125***	0.0123***	0.0173***	0.0171***
	(0.002)	(0.002)	(0.005)	(0.005)
Online Application, Months 61+	0.0097***	0.0096***	0.0127***	0.0126***
	(0.002)	(0.002)	(0.002)	(0.003)
Sum of Online Application Coefficients	*0.0466*	*0.0457*	*0.0582*	*0.0573*
EBT Dummy	-0.0277	-0.0260	-0.0189	-0.0173
	(0.022)	(0.021)	(0.029)	(0.028)
Simplified Reporting	0.0401**	0.0391**	0.0197	0.0187
	(0.017)	(0.017)	(0.026)	(0.026)
Unemployment Rate	0.0431***	0.0434***	0.0238***	0.0240***
	(0.003)	(0.003)	(0.004)	(0.004)
Unemployment Rate (1-year lag)	0.0191***	0.0185***	0.0128**	0.0123**
	(0.003)	(0.003)	(0.005)	(0.005)
Unemployment Rate (2-year lag)	0.0548***	0.0556***	0.0549***	0.0556***
	(0.006)	(0.006)	(0.010)	(0.010)
Percent Elderly (age 65+)	0.0049	0.0046	0.0028	0.0025
	(0.005)	(0.005)	(0.007)	(0.007)
Percent Noncitizen	-0.0145*	-0.0150*	-0.0254**	-0.0259**
	(0.008)	(0.008)	(0.012)	(0.012)
Percent with High School Degree or Less	0.0054***	0.0057***	-0.0012	-0.0010
	(0.002)	(0.002)	(0.003)	(0.003)
Hurricane Katrina Dummy	0.3409***	0.3485***	0.4030***	0.4101***
	(0.076)	(0.076)	(0.113)	(0.113)
Constant	1.3861***	1.3879***	3.1732***	3.1744***
	(0.134)	(0.133)	(0.191)	(0.190)
Observations	7,701	7,701	7,701	7,701
R-squared	0.965	0.966	0.875	0.876
State Dummies	X	X	X	X
State*Trend Dummies	X	X	X	X
Month Dummies		X		X

Notes:
Huber-White standard errors, clustered by state, are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Dependent variable is natural log of per capita SNAP participation in each month. 'Online Application', 'EBT Dummy', and 'Simplified Reporting' variables set equal to one beginning in month in which state begins policy.
Sources:
Author's calculations using data from the Bureau of Labor Statistics (unemployment rate); USDA Food and Nutrition Service (online application; EBT dummy); Danielson and Lerman (2006) (simplified reporting); March CPS (% elderly, % noncitizen, % low education, number people below 150% poverty); and U.S. Census Bureau (population). See Appendixes A and B for details.

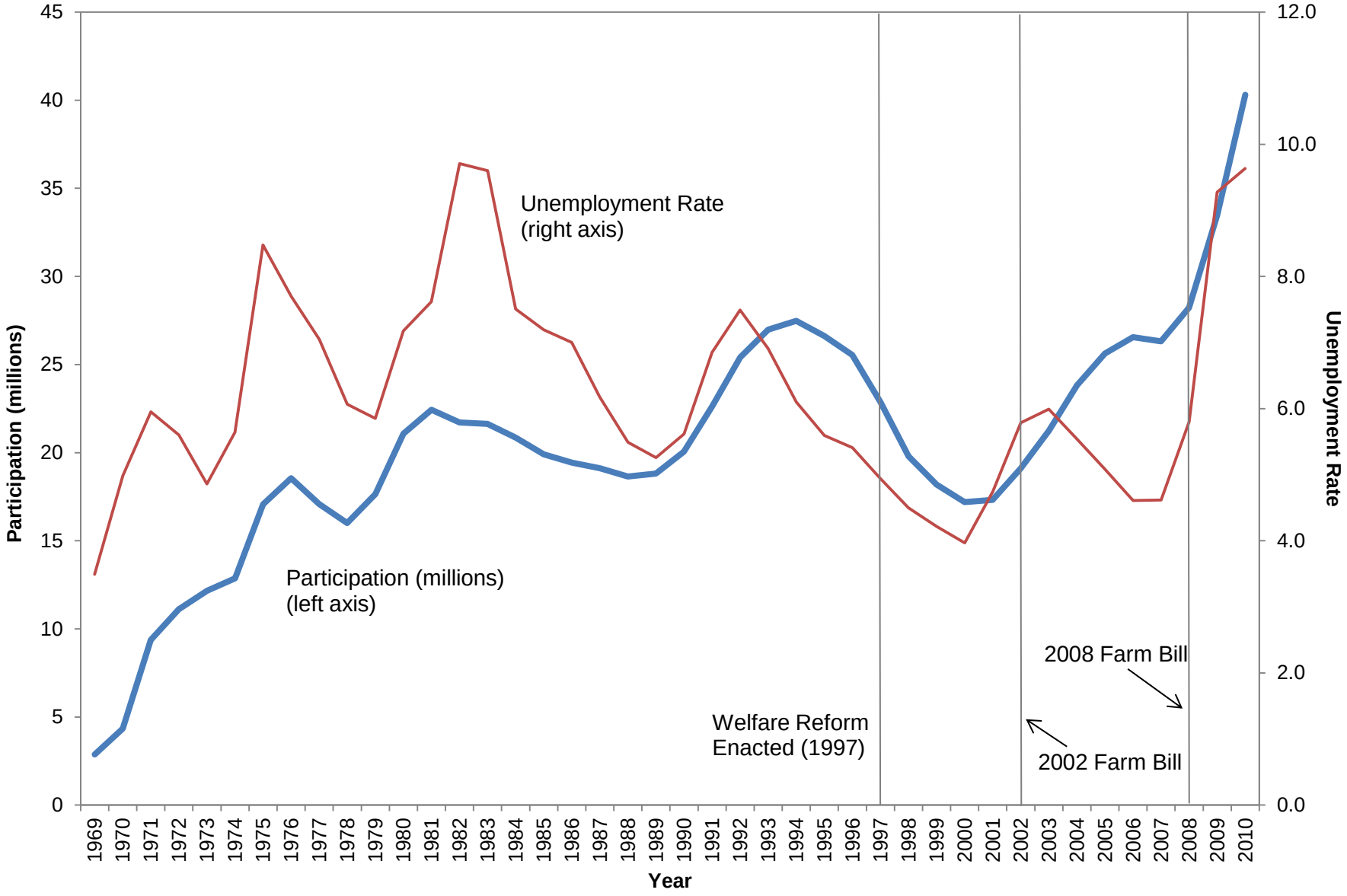
Map 1. Per Capita SNAP Participation in 2010 among the 26 States that Accepted Online Applications in 2010

(Percent)



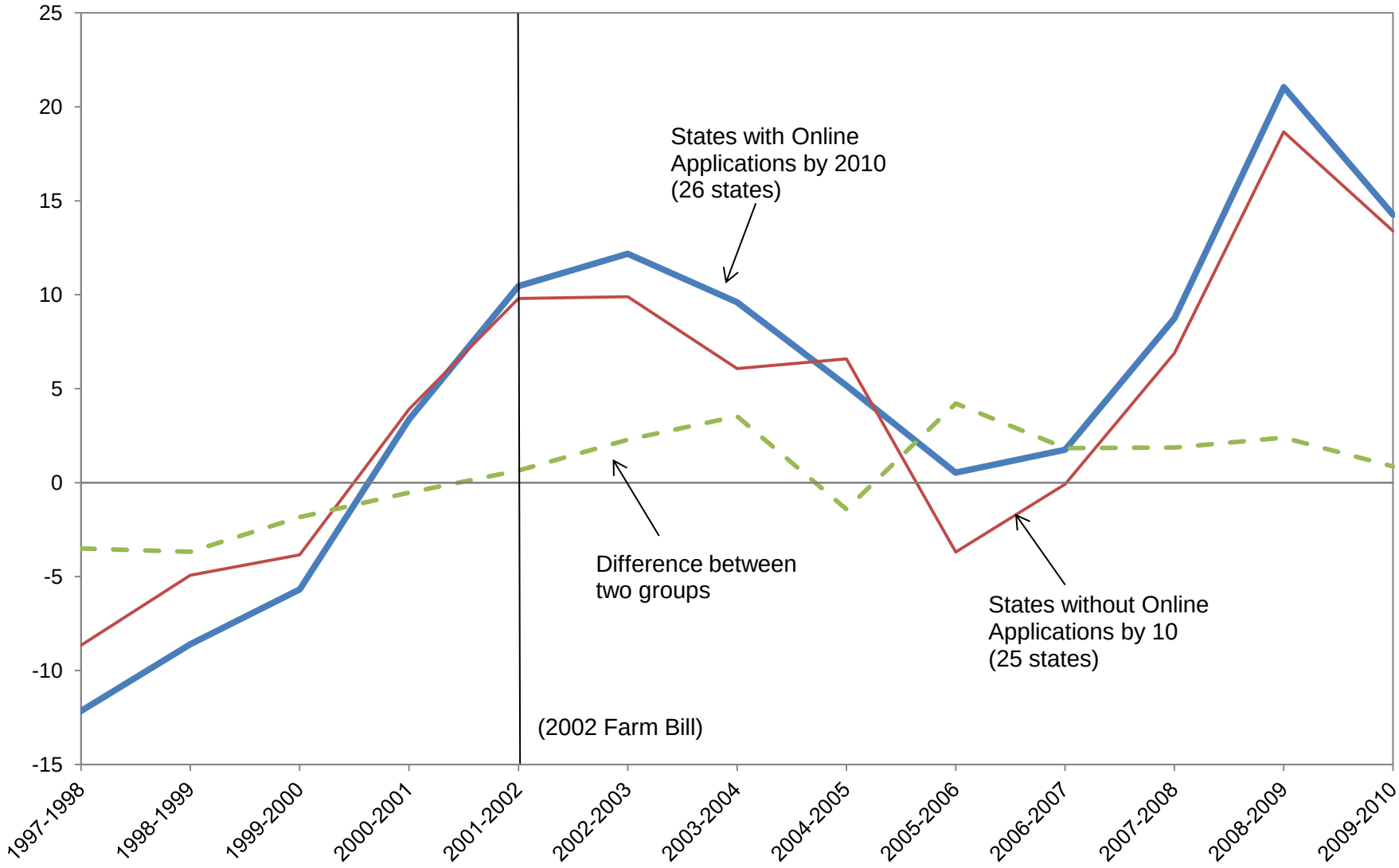
Sources: Authors calculations, various sources; StatPlanet

Figure 1. U.S. SNAP Participation and Unemployment Rate, 1969 to 2010



Sources: Author's calculations from data from the Bureau of Labor Statistics and the Food and Nutrition Service.

Figure 2. Year-to-Year Percent Change in Per Capita SNAP Participation, States with and without Online SNAP Applications



Source: Author's calculations from FNS data on SNAP participation and FNS and CBPP information on online status.

Appendix Table 1. Determinants of SNAP Participation, Separate Phase-In Effects, Different Years in Sample

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	**Participation Per Capita**			**Participation Per Person Below 150% Poverty**		
Years in Sample:	**1998-2009**	**1998-2008**	**1998-2007**	**1998-2009**	**1998-2008**	**1998-2007**
Online Application, Months 1-12	0.0025	0.0049**	0.0051*	0.0022	0.0052	0.0044
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Online Application, Months 13-24	0.0055**	0.0067**	0.0052*	0.0073*	0.0067	0.0024
	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.005)
Online Application, Months 25-36	0.0096***	0.0096***	0.0120***	0.0091**	0.0057	0.0077*
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Online Application, Months 37-48	0.0122***	0.0156***	0.0180***	0.0138***	0.0164***	0.0197**
	(0.003)	(0.004)	(0.006)	(0.004)	(0.004)	(0.007)
Online Application, Months 49-60	0.0163***	0.0205***	0.0308***	0.0208***	0.0232***	0.0460***
	(0.003)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Online Application, Months 61+	0.0131***	0.0187***	0.0390***	0.0170***	0.0207***	0.0456***
	(0.002)	(0.003)	(0.006)	(0.002)	(0.003)	(0.006)
Sum of Online Application Coefficients	*0.0592*	*0.076*	*0.1101*	*0.0702*	*0.0779*	*0.1258*
Observations	7344	6732	6120	7344	6732	6120
R-squared	0.965	0.965	0.966	0.872	0.869	0.873
State Dummies	X	X	X	X	X	X
State*Trend Dummies	X	X	X	X	X	X
Month Dummies	X	X	X	X	X	X

Notes:

Huber-White standard errors, clustered by state, are in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Dependent variable is natural log of per capita SNAP participation in each month. 'Online Application', 'EBT Dummy', and 'Simplified Reporting' variables set equal to one beginning in month in which state begins policy.

Sources:

Author's calculations using data from the Bureau of Labor Statistics (unemployment rate); USDA Food and Nutrition Service (online application; EBT dummy); Danielson and Lerman (2006) (simplified reporting); March CPS (% elderly, % noncitizen, % low education, number people below 150% poverty); and U.S. Census Bureau (population). See Appendixes A and B for details.

Appendix Table 2. Determinants of SNAP Participation, Separate Phase-In Effects, 1998-2010, Sensitivity of Online Implementation Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Source Data of Online Implementation Date				Base	Modifications to Assumed Month of Online Implementation		
	Dependent Variable: Participation Per Capita							
Sum of Online Application Coefficients (p-value from joint F-test in parentheses)	0.0501*** (0.0001)	0.0519** (0.0376)	0.0411*** (0.0018)	0.0439*** (0.0016)	0.0457*** (0.0008.)	0.0462*** (0.0006)	0.0470*** (0.0005)	0.0484*** (0.0005)
Observations	4,983	5,436	6,191	7,097	7,701	7,701	7,701	7,701
R-squared	0.967	0.967	0.968	0.967	0.966	0.966	0.966	0.965
	Dependent Variable: Participation Per Person Below 150% Poverty							
Sum of Online Application Coefficients (p-value from joint F-test in parentheses)	0.0565*** (0.0000)	0.0641 (0.1698)	0.0549** (0.0124)	0.0573*** (0.0050)	0.0573*** (0.0031)	0.0600*** (0.0002)	0.0630*** (0.0020)	0.0659*** (0.0001)
Observations	4,983	5,436	6,191	7,097	7,701	7,701	7,701	7,701
R-squared	0.879	0.872	0.877	0.88	0.876	0.878	0.877	0.877
State Dummies	X	X	X	X	X	X	X	X
State*Trend Dummies	X	X	X	X	X	X	X	X
Month Dummies	X	X	X	X	X	X	X	X
Variation on Source (see Notes below)	S1	S1+S2	S1+S2+S3	S1+S2+ S3+S4	*All*	M1	M2	M3
Number of Online States	8	11	16	22	26	26	26	26

Notes:

*** p<0.01, ** p<0.05, * p<0.1

Dependent variable is natural log of per capita SNAP participation in each month. Set of covariates same as in Table 1.

Sources:

Author's calculations using data from the Bureau of Labor Statistics (unemployment rate); USDA Food and Nutrition Service (online application; EBT dummy); Danielson and Lerman (2006) (simplified reporting); March CPS (% elderly, % noncitizen, % low education, number people below 150% poverty); and U.S. Census Bureau (population). See Appendixes A and B for details.

S1: FNS survey data only.

S2: States in FNS microdata with edited month of implementation (assumed to be January)

S3: States for which the date of online implementation appears to be an Excel formatting error (and using the *State Options Reports* offers additions evidence).

S4: *State Options Report*s, Various Years.

S5: Combined sources; see Appendix.

M1: Change month of online implementation to January for states whose implementation dates were taken from the *State Options Reports*.

M2: Change month of online implementation to June for states that had the month missing in the FNS microdata (assumed to be January in the basic regressions) and for those states that had August online implementation dates derived from the *State Options Reports*.

M3: Change month of online implementation to December for states that had the month missing in the FNS survey data.

Appendix Table 3. Date States Implemented Online Application Process, Sources and Notes

State	Date Online Applications Implemented	Source	Comments
Arizona	June 2009	*State Options Report*	
California	October 2007	FNS survey	
Delaware	May 2005	FNS survey	
Florida	April 2005	FNS microdata (adjusted year)	Year formatting issue in survey; *State Options Report* year used
Georgia	June 2009	*State Options Report*	
Idaho			In State Options Reports, but no online application currently exists
Illinois	June 2009	FNS survey, FNS Vol. 2	FNS survey, combined with published report
Indiana	October 2008	FNS survey	
Iowa	May 2007	FNS microdata (adjusted year)	Year formatting issue in survey; *State Options Report* year used
Kansas	August 2003	FNS microdata (adjusted year)	Year formatting issue in survey; *State Options Report* year used
Maryland	December 2006	FNS survey	
Massachusetts	November 2007	FNS survey	
Michigan	August 2010	CBPP *Food Stamps On-Line*	
Nebraska	June 2009	*State Options Report*	
New Hampshire			In FNS survey but no online application currently exists
New Jersey	January 2004	FNS microdata (month n.a.)	Month not listed in survey; January assumed
New York	June 2004	Combined sources	FNS survey, combined with published report and *State Options Report*
North Dakota	August 2010	CBPP *Food Stamps On-Line*	
Pennsylvania	October 2006	FNS survey, FNS Vol. 2	FNS survey, combined with published report
Rhode Island	July 2007	FNS survey	
South Carolina	August 2010	CBPP *Food Stamps On-Line*	
Tennessee	October 2007	FNS microdata (adjusted year)	Year formatting issue in survey; *State Options Report* year used
Texas	January 2005	FNS microdata (month n.a.)	Month not listed in survey; January assumed
Utah	March 2008	FNS survey	
Virginia	April 2005	FNS survey, *State Options Report*	First appears in *State Options Report* in year before FNS survey lists implementation
Washington	January 2002	FNS microdata (month n.a.)	Month not listed in survey; January assumed
West Virginia	June 2003	FNS survey	
Wisconsin	June 2006	FNS microdata (adjusted year)	Year formatting issue in survey; *State Options Report* year used

Note: States without online application process, as of August 2010: Alabama, Alaska, Arkansas, Colorado,Connecticut, District of Columbia, Hawaii, Kentucky, Louisiana, Maine, Minnesota, Mississippi, Missouri, Montana, Nevada, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, South Dakota, Vermont, Wyoming.