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Assessing the Impact of a Modernized Application Process on Florida's Food Stamp Caseload

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Abstract

In 2005, Florida implemented an internet-based service delivery system for eligibility determination in public assistance programs, including the Food Stamp, Temporary Assistance for Needy Families (TANF), and the Medicaid programs. At the same time, Florida switched from a caseworker model to a technology-driven model and decreased staffing levels of employees involved in social service delivery. We conduct an evaluative case study of the effects of these policy changes on the Food Stamp caseload. In particular, we consider the impact on applications and the flows onto and off of the program. To answer these questions, we use administrative data from the Florida Department of Children and Families for the period from 2003 to 2008 to understand the policy impacts on caseload dynamics. Results suggest that modernization may have resulted in decreases in application and inflows to the Food Stamp program but with important differences for specific demographic groups. Simulations suggest that the strongest negative effects of modernization were observed among the elderly and African Americans. High earners, while still negatively affected by the staffing reductions, were observed to have gained modestly from modernization.

I. Introduction

The internet revolution of the last 10 years has brought rapid change in the way society is organized. Individuals now rely on the internet as a source for information, retail sales, and entertainment. One natural extension of web-based technology is to the governmental service sector where individuals could potentially receive information about and even apply for governmental services on-line. As private sector services such as banking increasingly move to on-line provision, it is hard to envision a future in which government services will continue to be administered through paper applications and face-to-face interviews.

Florida's Department of Children and Families (DCF) has been a leader in the modernization of its service delivery system, eliminating the need for an applicant to visit a state office and fill out an application. In 2004, Florida implemented a major modernization of its application process, replacing caseworkers with specialized staff who perform separate administrative tasks. In 2005, it adopted ACCESS (Automated Community Connection to Economic Self-Sufficiency), an internet-based service delivery system for eligibility determination in public assistance programs including the Temporary Assistance for Needy Families (TANF) program, the Food Stamps program, and the Medicaid program. Eligibility for multiple programs is processed through a single on-line application.

One of the main issues regarding modernization efforts such as those implemented in Florida is if they change the accessibility of services to eligible populations. Nationally, in FY2004 about 60 percent of eligible individuals were estimated to participate; for those with earnings the participation rate was even lower at 51 percent. Florida is one of a handful of states that are distinguished as having participation rates that are significantly below the national

average. In 2004, 55 percent of the eligible population and 42 percent of the working poor population participated in Food Stamps, earning Florida a national ranking of 39 (Cunningham et al. 2006). Studies of Food Stamp non-participation among eligible individuals often list factors such as “too many hassles” as reasons for non-participation (Daponte, Sanders, and Taylor 1999).

However, the ability of internet-based services to increase participation in social service programs is an untested proposition. Even as the internet and its uses continue to expand, there is persistent evidence that low-income or low-educated individuals are less likely to use the internet, what has been termed the “digital divide.” According to estimates from the 2007 Current Population Survey, while 61.7 percent of all American households had internet access, among households with less than a high school education this rate fell by more than half to 24 percent. In contrast, among households with a bachelor’s degree or higher, fully 84 percent had internet access. In terms of the age distribution, those over age 65 are the least likely to report internet access (34.9 percent) compared to other age groups. Finally, in terms of race/Hispanic origin, both Hispanic households (43.4 percent) and African-American households (45.3 percent) are less likely to report internet access than are Non-Hispanic white households (66.9 percent) or Asian households (67.8 percent). In Florida, approximately 70 percent of the population reported having internet access in 2007 (Current Population Survey, 2009).¹

Thus, modernization efforts such as Florida’s raise concerns about access to the social service system, since the client base is low-income by definition and disproportionately low education and non-white, all groups with lower levels of internet access. This concern is

¹ According to information available from the FCC, broadband access is available for purchase in areas containing 99 percent of the population across the state as of 2004 (FCC 2008).

amplified in Florida where modernization has been accompanied by a 43 percent reduction in staff and a 33 percent reduction in brick-and-mortar DCF offices throughout the state (Lange 2007). On the other hand, the reduction of transaction costs associated with use of the internet in applying for benefits (possible reductions in time, transportation costs, child care costs, and stigma) may well have increased access for some populations such as the working poor.² In the following section, we describe the basic contours of the federally funded Food Stamp Program, currently known as the Supplemental Nutrition Assistance Program or SNAP. Then, we describe the characteristics of the Food Stamp caseload in Florida. Next, we detail the process households go through to apply for Food Stamps under the old and new service delivery model. Using administrative data from the Florida DCF for 2003-2008, we examine applications for Food Stamps, as well as entry and exit from the program. We focus our analysis on three main policy changes: 1) the replacement of the caseworker model with a technology-driven social delivery system; 2) the ability to apply for benefits via the internet; and 3) the reduction in staffing for social service delivery positions. Results suggest these changes may have led to reductions in applications and inflows and increases in exits from the Food Stamp caseload. We discuss limitations of our findings and further directions of analysis in our conclusion.

² While a 2008 study by Cody and colleagues found that characteristics of the caseload in 2006 were almost identical to that in 2004, the descriptive analysis was performed within one year of implementation of ACCESS and did not attempt to model flows onto and off of the caseload.

I. A. Background on the Food Stamp Program

The Food Stamp Program is an integral component of the social safety net in the United States. Subject to passing the income and asset limits, which vary with family size, the program is an entitlement to needy families, and participation moves counter-cyclically with the state of the macroeconomy (Ziliak, Gundersen, and Figlio 2003). At its peak in 1994, over 27 million people received Food Stamp benefits at an expense of \$25 billion to the federal government. In fiscal year 2003, the Food Stamp Program had over 21 million participants and appropriations over \$21 billion. In some states with low TANF benefit levels, Food Stamp benefits can constitute more than 50 percent of the disposable income of TANF recipients. As of August 2003, over 95 percent of Food Stamp Program benefits were issued through Electronic Benefit Transfer (EBT) card for the purchase of food in authorized, privately-run retail food outlets (Food and Nutrition Service, 2003).³

Households have to meet three financial criteria to qualify for the Food Stamp Program: the gross income, net income, and asset tests. A household's gross income before taxes in the previous month must be at or below 130 percent of the poverty line. Households with disabled persons or headed by someone over the age of 60 are exempt from this test (although they must pass the net income test). After passing the gross income test, a household must have a net monthly income at or below the poverty line. Net income is obtained by applying a standard deduction and then itemized deductions for part of labor earnings, for child care and/or care for disabled dependents, medical expenses, and shelter expenses. Finally, net-income-eligible households must meet a liquid-asset test and vehicle-value test the details of which vary by state.

³ The remaining five percent were still using paper stamps.

The amount of Food Stamps a family receives is equal to the maximum Food Stamp benefit level minus 0.3 times its net income, so a family with zero net income will receive the maximum benefit level. Food Stamp recipients must recertify their continuing eligibility and the proper level of benefits at specified intervals. The frequency of recertification depends on program details established by the state of residence and it is normally tied to the source of a household's income.

I. B. Characteristics of the Food Stamp Caseload in Florida

The Department of Children and Families (DCF) in Florida serviced the fourth largest Food Stamp caseload in the country with 1.21 million participants in 617,000 households in FY2007. Florida accounted for 4.7 percent of the national caseload of 25.9 million participants and 5.3 percent of the nation's 11.6 million Food Stamp participating-households in FY2007. A larger share of the caseload in Florida was composed of elderly adults as compared to the national average (28.6 versus 17.9). In contrast, 41.4 of the caseload was made up of children, 23.2 percent disabled non-elderly adults, and 23.5 percent single adults with children, all below national figures. Approximately 7.5 percent of the caseload (46,000 individuals) were classified as non-elderly, non-disabled, childless households, often referred to as "ABAWDs" in the literature (Barrett 2006). Additionally, cash assistance through the TANF Program was provided to 31,00 individuals and Supplemental Security Income to 210,000 individuals in FY2007 (Wolkwitz and Leftin 2008).

Due to the history of population migration into the state, the Food Stamp caseload in Florida has a varied citizenship background. There were 115,000 naturalized citizens participating in Food Stamps in Florida in FY 2007 representing 15.3 percent of all naturalized

citizens on the Food Stamp caseload in the United States. Similarly, there were 16,000 refugees and 105,000 other non-citizens participating in Food Stamps in FY2007, representing 8.1 and 13.9 percent, respectively, of the national caseload for these populations (Wolkwitz and Leftin 2008).

Nationally, working households account for a significant fraction of the Food Stamp caseload, 29.8 percent in 2007, and their numbers grew rapidly from 2.0 million in 2000 to 3.4 million in 2007. Participation by households with earnings in Florida was below the national average, with an average earnings of \$899 for the 23.9 percent of households with positive earnings.⁴ Similarly, the share of the Food Stamp caseload reporting TANF and the value of the cash benefits was below the national average of 12.1 with 4.0 percent of participating households reporting income from this source. Households with income from SSI and Social Security accounted for a slightly larger share of the Florida Food Stamp caseload than the national average. SSI participants made up 34 percent of the Food Stamp caseload in Florida and averaged \$484 in income from this source, and, Social Security participants made up 28.9 percent of the caseload and averaged \$619 in income from this source. In terms of poverty status, about 35.5 percent of the caseload had gross countable income that was 50 percent or less of the federal poverty guideline (Wolkwitz and Leftin 2008).

The average Food Stamp benefit in Florida was \$184 for an average household size of 2.0 persons. This was slightly below the national average of \$212 for a slightly larger household size of 2.2 persons. The average recertification period was 11.4 months in Florida compared to the national average of 12.0 months (Wolkwitz and Leftin 2008).

⁴ The data on Florida's Food Stamp program here and in the subsequent paragraph refers to fiscal year 2005.

Thus, the Florida Food Stamp Program offers an interesting case to study. In many ways, it mirrors the national average. In other respects, Florida's caseload diverges, offering rich variation in terms of citizenship status, racial composition, and the presence of elderly participants. Importantly, the consistently low take-up rates for Food Stamp benefits among eligible populations suggest that barriers to access may have existed in the early 2000s.

I. C. Florida's Initiative to Modernize Service Delivery

In the traditional service delivery model, applications were only accepted at state offices, often after a long wait at a crowded office and a lengthy interview. Clients with traditional work schedules had to take off work to come in for appointments. The eligibility analyst would then be responsible for correctly entering data into a database as well as completing extensive paperwork. However, given the increased focus on employment across social service agencies, as well as the shrinking TANF caseload, Florida has made a conscious move toward creating a delivery system that would significantly reduce the administrative burden as a way to help individuals obtain self-sufficiency. The goals of the new self-service model were to simplify policy and procedures and so to reduce client and staff error, to reduce staff data entry, the need for face-to-face contact, and required travel time to DCF offices. The model designed by the DCF is now nationally recognized, having won several awards such as the USDA Food & Nutrition Service Director's Cup and the Sterling showcase award to the SunCoast Region. The reforms have three major components: 1) a change from the traditional caseworker model to a system that uses enhanced technologies; 2) the ability to apply for application via the internet; 3) a reduction in staffing of state offices (Lange 2007).

Perhaps the largest change to the administration of the Food Stamp program in Florida is the elimination of the traditional caseworker model. Instead of having a single point of contact throughout the application and eligibility determination process, individuals are asked to fill out applications on computers (even in a DCF Customer Service Center), call an 800 number to receive information about their application or case, and to use electronic scanners to transmit their verification information. As a part of the process of implementing this change in the system delivery model, program policies were reviewed and analyzed for all social service programs under the DCF jurisdiction at both the state and federal level, with a focus on identifying complex, burdensome and error-prone policies and inconsistencies between the programs. Then, policies were changed to the extent possible to attain consistency by modifying administrative rules and state statutes, with application for federal waivers as necessary.

The basic model was first implemented in Pinellas County in November 2003 and then in the SunCoast region (11 counties) in January 2004. The rest of the state phased in implementation from April 2004-December 2004. During this time, Florida service centers were being renovated to remove space used by caseworkers and to set-up computer terminals and machines for copying and scanning verification documents.

Second, in 2005, Florida implemented ACCESS (Automated Community Connection to Economic Self Sufficiency), an internet-based service delivery system for eligibility determination in public assistance programs including the Temporary Assistance for Needy Families (TANF) program, the Food Stamps program, and the Medicaid program. Eligibility for multiple programs is processed through a single on-line application. ACCESS was rolled out in spring 2005. By September 2005, 66 percent of all applications were being received on-line.

This number increased to 77 percent by February 2006 and has remained at 90 percent since March 2007 (Lange 2007; Winstead and Hudgens 2007; Lange 2008). Of the web-based applications received, only about 30 percent are filled out in computers located in state social service agencies; the remaining 70 percent are sent in from locations outside the traditional social service center such as community partners' sites and private homes. Individuals can use the automated benefit "screener" to help determine their potential eligibility for benefits, apply for benefits, or check on the status of an application from anywhere the internet is available (Lange 2007). Additionally, because very little data entry is required by the processor during the eligibility review under the new system, data entry errors and processing time are reduced.

Finally, the Florida DCF has absorbed a 43 percent reduction in staff with increases in caseloads over the FY2002 to FY2005 period. This decrease has been accompanied by a 33 percent reduction in the number of DCF offices accessible to clients (Lange 2007). In some rural counties, there are no longer any customer services offices available. According to Cody et al. (2008), one district reported that those living in the far reaches of the county may have to travel 2 hours each way to reach a customer service center. At the same time, community partners were established throughout the state to offer assistance with on-line applications and the transmission of electronic verification documents.

In order to make internet services widely available for low-income populations, DCF has established agreements with community partners to increase the number of sites available to apply for assistance using either paper or on-line services. As of December 2008, the agency had established agreements with over 3,300 community partners across the state. Community partners include hospitals, libraries, food banks, domestic violence centers, public health centers,

aging resource centers and faith-based organizations (Florida Department of Children and Families 2007). Although the community partner supplies the access point for the initial internet application, eligibility determination is still undertaken by a DCF merit employee who reviews the on-line data submitted by the applicant and undertakes the telephone interview.

Table 1. Summary of Application Procedure Changes

<i>Application Activity</i>	<i>Before Modernization</i>	<i>After Modernization</i>
First contact	Paper application	On-line application
Location	DCF Customer Service Center	Anywhere where there is a computer with internet access
Eligibility Interviews	Full one-hour interview for all Eligibility interview by phone uncommon	One 15 minute (or shorter) interview for most Eligibility interviews by phone are the norm
Documentation	Most expenses, assets, and income require documentation Need to submit documentation in person to DCF worker	Most expenses, assets, and some income, do not require documentation Self-service submission of documentation either in person or by fax

Source: Adapted from Cody et al. (2008: p. XXI)

During this period, Florida also implemented a number of other policy changes that complimented their main modernization efforts. DCF applied for and received a waiver to eliminate the face-to-face interview for cases that were deemed to be a low risk of error. This waiver, granted for the 11-county Suncoast region, and District 11 (Miami-Dade and Monroe Counties) initially, took effect throughout the state in late 2008. However, the exact timing and impact of this waiver is unclear since throughout the state the use of hardship exemptions increased, reducing the use of face-to-face interviews.

Coincident with the reduction in face-to-face interviews was the establishment of statewide call centers to substitute for direct personal contact. The Automated Response Unit

(ARU) within the Customer Call Center was added in May 2005, merging all calls through one statewide toll-free number supported by an automated recording and phone menus.

The Florida system is constantly evolving. Many changes occur at the administrative district level and often involving reassignment of staff or restructuring duties. Other initiatives, such as changes in the recertification process, were targeted on only specific counties. The extent and especially the timing of such changes is difficult to identify. It is important to acknowledge that while the social service system in Florida is a highly dynamic process, our main interest is in the effects of the state-wide changes to the social service delivery system, the decrease in staffing, and the introduction of the internet-based application.

While this model has received much praise, it has not been systematically evaluated in order to determine if the modernization efforts have worked equally well for everyone. It is possible that the switch from a caseworker model to a technology-based model may result in reduced access to some potential or former recipients, such as those with low levels of education, the elderly, or those with language barriers. On the other hand, the reduction in transaction costs might increase the marginal benefit of participation by those with jobs. As other states begin to modernize their own delivery of social services, there is special interest in an evaluation case study of Florida's efforts.

II. Research Methods

II. A. Data

Data on program participation and other program outcomes over the 2003-2008 time period come from administrative case records maintained by the Florida Department of Children and Families (DCF) in computer readable form. The information in these records includes the date and

method of application for benefits, disposition of application (denial/case opened), monthly benefit amounts, reported income amounts, as well as demographic and geographic characteristics of households. Data on employment and earnings come from quarterly earnings records from the Florida Unemployment Insurance system.

Our primary analysis will focus on counts of applications for Food Stamps, as well as flows onto and off of the Food Stamp caseload for each month by county or county group. The data available to us provide residence of Food Stamp recipients beginning in 2005, and for the county of the processing center for the entire period of our study. Unfortunately, there was only a rough correspondence between residence and processing center at any one time, and this relationship changed with administrative reforms, in some cases several times. Based on the 67 counties, we created 23 county groups for which this correspondence was strong throughout this period, and all analyses are based on these groups.

II. B. Methods

The impact of Florida's modernization efforts on the size of the caseload operates through flows onto and off of the program. If potential recipients find that applying for Food Stamps is facilitated by modernization, we expect that the number of individuals applying for benefits will increase and the number entering the program will grow; if current recipients find that recertification is easier, we expect that fewer people leave the program. We capture the policy impact with three measures. The first is the number of applications that are filed in a given month, reflecting individual decisions to apply for benefits. The second is the number of households that enter the caseload in a given month, and the third is the number leaving the caseload. In each case, the dependent variable is based on a flow count for 23 county groups in a

particular month over the period from January 2003 through May 2008. Denoting the dependent variable as Y_{it} , the basic structure of our models can be written as:

$$Y_{it} = X_{it} \beta + u_{it}, \tag{1}$$

where $u_{it} = \rho u_{i,t-1} + v_{it}$ is the assumed autoregressive structure, X_{it} identifies policy changes and control variables, β is a vector of estimated coefficients, ρ is the autocorrelation parameter, and v_{it} is an i.i.d. error term.

We choose to focus on inflows and outflows rather than caseload size both because this provides greater substantive detail and because we believe this structure better captures the underlying processes (cf. Heider and Klerman 2005). Our methods differ from studies that use program caseload as the dependent variable, which normally employ a lag dependent variable:

$$Y_{it} = \alpha Y_{i,t-1} + X_{it} \beta + u_{it}. \tag{2}$$

This structure is compelling, since the caseload in the current period is a direct function of prior caseload and factors causing entry or exits from the program in the intervening period. In the case at hand, however, where Y_{it} is based on the number of individuals entering or leaving the Food Stamp program, Y_{it} may be understood as a difference, and number of arrivals or exits in one period is not expected to have a direct impact on that number in a subsequent period. A positive correlation between prior and current values reflects unmeasured factors that are autocorrelated, consistent with the specification in (1). If (2) is estimated rather than (1), the estimate of β will therefore be biased.⁵

⁵ What is the bias if (2) is estimated when (1) is correct? If (1) is correct, then the lag dependent variable will be correlated both with the dependent variable (because of the error autocorrelation) and with the policy—insofar as policy changes infrequently as it does in our case. Inclusion of the lag dependent variable will cause the estimate of β to be inconsistent, with the bias toward zero. A very rough calculation based on (1) and using estimates corresponding to our data suggests that the expected value of the estimate of β from (2) would be biased toward zero by 15-25 percent. In fact, when we added a lagged dependent variable to our estimation models, we found that

We rewrite (1) in more detailed form as:

$$Y_{it} = A_{0i} + A_{1i}t + \sum_k A_{3,k} Month_{k,t} + \sum_k B_{0k} Unemp_{t-k,i} + B_1 Policy_{it} + u_{it}, \quad (3)$$

where $u_{it} = \rho u_{i,t-1} + v_{it}$. Y_{it} is one of the flow measures—applications, entries or exits—for county group i ($i=1, \dots, 23$) and month t ($t=1, \dots, 65$). A_{0i} identifies the county group fixed effect, which captures any stable factors affecting the Food Stamp caseload flows during the period, and A_{1i} provides for a trend in this area. The measures $Month_{k,t}$ ($k=1, \dots, 11$) are dummy variables for the months to captures seasonal differences over the year. Labor market strength in the county group is captured by the unemployment rate, $Unemp_{t-k,i}$, where $k \geq 0$ identifies the current and prior months. All results presented have been estimated using the Cochrane-Orcutt correction for AR(1) autocorrelation.

II. C. Measures

Dependent variables are defined as follows:

$(Applications_{it}/Population_{it}) \times 100$ The number of new applications for Food Stamps in county group i divided by estimated population in month t , expressed as a percentage. New applications are defined as those where the household is not recorded as receiving benefits in either of the prior two months. Multiple applications from the same case that are dated within the calendar month are counted as a single application. The population is based on the U.S. Census annual estimate of

estimates of program impacts were smaller (in absolute value), with differences in the expected range. With sufficiently rich data, it would be possible to determine whether (1) or (2) is correct. This involves estimating an equation that includes both X_{it} and $X_{i,t-1}$. In our data, it is not possible to estimate such a model with any precision since X_{it} and $X_{i,t-1}$ are very strongly correlated. It is therefore necessary to choose between (1) and (2) on the basis of an independent argument.

the population for the component counties, with each county's population interpolated to the month.

$(Inflows_{it}/Population_{it}) \times 100$ The number of new households receiving Food Stamps in county group i in month t divided by population in the month. New cases are defined as those that did not receive any Food Stamp benefits in either of the prior two months.

$(Outflows_{it}/Caseload_{it}) \times 100$ The number of cases receiving Food Stamp benefits in month t who receive no Food Stamp benefits in either of the following two months divided by the number receiving benefits, expressed as a percentage. The numerator is a count of households, and these are a strict subset of those in the denominator.

In order to identify inflows and outflows, we initially used the case number assigned to the household by DCF. However, we discovered that for selected counties in certain months unusually large numbers of cases with continuous household heads were assigned new case numbers, dramatically inflating our measures of inflow and outflow. We therefore chose to treat a case as a continuous Food Stamp recipient where either the case number was consistent or a household head Social Security Number remained the same. In only a small number of months was this adjustment of any importance.⁶

Independent variables include unemployment in the county, based on monthly estimates provide by the Bureau of Labor Standards. The current and prior month unemployment rates are controlled. In our preferred models, in addition to unemployment in the current month,

⁶ We were not able to implement this correction in the case of analyses that focus on applications, since application data could only be matched to Social Security Numbers through Food Stamp recipients. As a robustness check we reran the regression of applications shown in Table 2 omitting the 33 (months x county group) cells where the problem caused inflows or outflows to differ by at least 5 percent. Substantive conclusions were unaffected.

unemployment in each of the two prior months is included, as well as unemployment averaged across two earlier periods (the period three, four and five months before the reference month and the period six, seven and eight months before the reference month).

Variation in DFS staff is our first policy measure:

$AgencyEmp_{it}/Caseload_{i2003}$ is our measure of the number of DFC staff in county group i in month t . The denominator is the average 2003 Food Stamp caseload for county group i , and is chosen so that the scaling of the variable reflects the importance of staff relative to the caseload at the beginning of the period.⁷ We believe that agency staff may not be meaningful for the four county groups that include call centers (Hillsborough, Dade, and Duval Counties) or central administrative staff in the capital (Leon County). We have therefore included separate variables in the equation that identify agency employment in each of these counties (coded zero for all other counties), allowing employment to have a different effect in each of them. This means that the estimates for the primary variable identify impacts in the 19 other county groups, essentially removing the four counties from the estimation.

The remaining policy measures are coded as variables on a zero-to-one scale, where the code of one identifies a county where the policy is in effect for the specified month. In those cases where a policy was implemented over a period of time, we have used simple straight-line interpolation between the month prior to implementation (coded zero) and the month following completion of implementation (coded one). In order to obtain measures for our county groups, which are our units of analysis, we have calculated a weighted measure reflecting the policy in constituent counties, where the weights are the average caseload during 2003.

⁷ Since all equations are fitted including county fixed effects, this choice of scaling is of second-order importance. The caseload for 2003 is chosen as denominator so that the only source of variation in the measure is due to changes in the staffing level over time.

III. Results

III.A. Descriptive Data

Figure 1 presents the pattern of the Food Stamp caseload for Florida beginning in 2001, two years prior to the start of our study period, through 2008. The caseload increases from a level of about 450,000 in 2001, growing to just under 700,000 in 2006. It declines in 2007 but then increases to nearly 750,000 by 2008. The U.S. caseload increases almost exactly proportionally between 2001 and 2006, from a level of slightly under 8 million to about 11 million. Economic conditions in Florida do not appear to explain the caseload growth. From its 2002 level, the unemployment rate in Florida declines quite substantially to a low point in 2006. Between 2006 and 2008, unemployment nearly doubles, so only in the last year of the study is the growth in the Food Stamp caseload consistent with movement of the unemployment rate. U.S. unemployment follows a similar pattern, although the decline and subsequent increase are less dramatic. As is the case in Florida, it is clear that the U.S. caseload growth 2001-2006 cannot be explained by a deteriorating economy, at least insofar as this is reflected in the unemployment rate.

Flows into and out of the Food Stamp program may be more sensitive in the short run to the economic climate than is the caseload. Figure 2 provides counts of the monthly flow of new applicants to the Food Stamp program, as well as the monthly count of new recipients. A new applicant is defined as a household that files at least one application for Food Stamps in a given month and which is not identified as receiving Food Stamps in either of the prior two months, and a Food Stamp entry is defined as a household that did not receive Food Stamps in either of the prior two months. Although there is a fair bit of variation from one month to the next, we

see that the number of applicants shows little trend until the middle of 2005, after which there is substantial growth through 2007. If we compute a 12-month moving average, which removes seasonal effects and monthly variation, we observe an increase of approximately 50 percent in applicants during this two-year period. The number of entries (the lower line) shows little trend through 2007. In the last year of our coverage period, however, the number of entries grows by over 30 percent. This is consistent with the observed increase in the unemployment rate as well as observed changes in the approval rate of new applications, shown in Appendix Figure A1.⁸ Between 2003 and 2005, nearly 70 percent of applications were approved, but in 2005 that proportion began to decline. By the end of 2006, the average approval rate was down in the range of only 50 percent. Reductions in the approval rate would be expected if more applications were received from marginal cases.⁹

Figure 3 shows that the number of cases leaving Food Stamps has increased (upper line, value on left axis), but the chance that a given case leaves has remained almost unchanged (lower line, value on right axis). The 12-month moving average shows that between 5 percent and 6 percent of recipients leave the Food Stamp rolls per month, with essentially no trend over this period. Most households that leave the Food Stamp program do so in the month of recertification. However, the proportion of Food Stamp caseload submitting recertification applications declined substantially over this period. However, separate tabulations show that the approval rate for recertifications declined by 10 percentage points as well, as shown in Appendix

⁸ Appendix Figure A1 presents two approval rate measures. One is the proportion of new applications coded in the Florida system as “approved” (multiple applications in a month are considered) and the second is the ratio of new recipients in a given month to new applicants in the prior month. The two measures are not identical because the time lag between approval of an application and the first month of benefits is variable and because more than one application can be submitted for a given case. In practice, the averages for the two measures are very similar.

⁹ Separate tabulations show that the decline in acceptance rate is only partly a reflection of greater numbers of applications per case, with no more than a third of the decline tied to repeat applications.

Figure A2.¹⁰ Both of these patterns are what we would expect if implementation of new policies were permitting cases to continue on the rolls for longer periods between recertification: As the proportion of cases facing recertification in any one month declines, the longer period since a previous approval increases the likelihood of changes in eligibility. In fact, the average recertification period increased from 9.0 months in FY2005 to 11.4 months in 2007 (Barrett 2006; Wolkwitz and Leftin 2008).

Finally, Figure 4 graphs the three policy variables that are of particular interest. We see that the number of DFS employees has declined very dramatically over this period. The modernized delivery model was implemented in 2004 over a period of eight months. In contrast, the internet application system was implemented quickly in April 2005.

III.B. Multivariate Analysis Results

Table 2 presents coefficients from models that follow the structure described in section II.B above. Recall that applications and inflows are scaled by population to represent percentages of area total population, and outflows are scaled as a percentage of the Food Stamp caseload. In each case, we predict these measures during a given month for a given county group. County group fixed effects and linear time trends are controlled in all three models.

The unemployment rate has an overall estimated positive impact on applications as we expect, although the negative coefficient suggests that applications may reflect complex factors that we have not captured. The estimated effects of unemployment on inflows are fully consistent with expectations, with higher unemployment in prior months increasing inflows into

¹⁰ We define an application as a recertification if the case received Food Stamps in at least one of the two months prior to the month of the application.

the Food Stamp program. Outflows appear to be reduced by the unemployment rate 6-8 months earlier, the sort of lagged impact that we might expect given that many cases are not required to report changes in income until recertification.

Next we turn to the three main variables of interest—number of employees in Florida’s DCF working in the county group, the change in social service delivery system, and the introduction of application processing via the internet. If reductions in the number of offices staffed and employees available changes the accessibility of the Food Stamp program (and other social services), we would expect to find that staffing would be positively associated with applications and inflows. However, if the availability of community partners as a point of contact for benefits substitutes easily for DCF employees, then we might observe little or no effect of the number of agency employees on applications and inflows. It is less likely that the number of agency employees will have any effect on the outflows from the Food Stamp caseload.

We find a positive relationship between the number of state agency employees in the county group and both applications and inflows. This suggests that the observed decline in the number of agency employees over the period of our study has reduced both applications and inflows to the Food Stamp program. The reduction of DCF staff does appear to reduce ease of application to the Food Stamp program. Since we have no direct measure of the number of agreements with community partners, we cannot easily determine the degree to which the implementation of such agreements compensates for the loss of DCF staff.¹¹

¹¹ Coefficients for the three county groups containing call centers and for the county group containing the state capital are never statistically significant. This implies that we cannot reject the hypothesis that effects of agency staff are the same in these areas as in others. Since the power of this test is very low, we retain these separate

The switch from the traditional caseworker model to the modernized benefits application system could either increase or reduce the caseload. To the extent that households prefer the traditional caseworker model to the modern technology approach and experience difficulty navigating the modernized system, applications and inflows would be reduced and outflows increased. Specific examples of possible difficulties that were mentioned in our qualitative interviews include trouble reaching their assigned processor by phone to schedule or hold an eligibility interview and difficulty getting through to the Customer Call Center to verify the receipt of required documentation. However, the new system may also substantially reduce transaction costs (stigma, time, etc.) of applying for benefits. To the extent that the net costs of applying for benefits declines under the new system, we would observe increased applications, inflows and decreased outflows.

Results shown in Table 2 suggest that, on net, the difficulties of the new system dominate any reduction in transaction costs. Applications and inflows are found to decrease after the introduction of modernization, holding all else constant. However, the effect of modernization is much larger and stronger on applications than on inflows. The positive sign of the effect in the model predicting outflows, although not statistically significant, is consistent with the interpretation that the switch to modernization increased exits from the Food Stamp program.

The introduction of internet application processing for Food Stamp benefits may increase the accessibility of the program insofar as some potential applicants find it more convenient to apply via the internet at the time and place of their choosing than in the DCF office during standard business hours. If the composition of those applying for Food Stamps changes over

measures because our strong priors are that effects are likely to be different in these areas, so that omitting these measures will induce bias.

time, it may be possible to observe a change in inflows as well. For example, a reduction in the transaction costs may lead more people to apply who are closer to the eligibility cut-off for the minimum monthly benefit. On the other hand, to the extent that the “digital divide” means that the potential Food Stamp population is not likely to be computer savvy and have access to a computer with an internet connection, the increased emphasis on internet applications could discourage applicants from attempting to enroll in the program, leading to a decreases in applications and therefore inflows.

Our results suggest that introduction of the internet application is not observed to have any relationship on applications, inflows or outflows to the Food Stamp program. This suggests that, for the population as a whole, the ability to use the internet did not alter effective access to the Food Stamp program.

Because Florida implemented other policy changes over the observation period, we also examined models that include additional indicators for four other policies: 1) The introduction of the automated response unit (ARU) for the Customer Call Center; 2) A waiver to allow for the increased use of hardship exemptions for face-to-face interviews; 3) A waiver to allow for passive recertification (no interview of any type) for low-risk households at the six month recertification period and the substitution of telephone interviews for face-to-face interviews; and 4) A waiver for face-to-face interviews for elderly and disabled households. Our results for the three policies of interest remain largely unchanged as compared with those presented in Table 2, with the exception that modernization has a stronger negative effect on entries and a stronger positive effect of exits, and essentially no impact on applications.

The results of the additional policy variables are largely anomalous. Results are inconsistent across model specifications and often display the opposite sign to expectations. Since each of these policies was introduced only in selected counties (unlike the three upon which we focus our attention), it is likely that they are identifying specific variation in applications, inflows, and outflows correlated with the place and time of implementation.

III.C. Impacts on Trends in Food Stamp Applications and Flows

Based on models presented in Table 2, we have simulated how the number of applications, the program entries and the exit rate would have evolved if changes over time in selected variables had not occurred.¹² Figure 5 undertakes such simulations for new applications. The solid black line identifies the observed overall number of applications, adjusted only for seasonal variation, which is captured in the eleven month dummies. This series is very similar to the actual series, except that the regular month-to-month variation over the year has been removed. Each of the remaining lines shows what the pattern of applications would have looked like if the specified factor had been held at its average level in the first six months of the series. Each of these adjustments is applied cumulatively, so that the impact estimate for each measure is inferred by comparing each pair of lines.

For example, the dark dashed line uses the estimated coefficients for unemployment to adjust the series for changes in the unemployment rates over time, in addition to seasonal effects. Given that the impact of unemployment is somewhat inconsistent across the lags, there is little impact of maintaining unemployment at its initial level. The light dashed line, in addition to

¹² The predicted numbers of applicants, entries and exits for each month x county group cell are summed up to produce aggregate counts, which are reported in Figures 5-11.

adjusting for seasonal effects and unemployment, adjusts for the decline in agency employment. Again, there is very little impact on applications.

Finally, the solid grey line identifies the pattern of applications that would have occurred if the modernization and the web application process had not been implemented. Here the exercise suggests that the number of applications would have been appreciably higher in the absence of these innovations. This reflects the fact that growth in applications was relatively fast in the period prior to implementation of these policies, and that these policies are associated with a shift down in the number of applications.

Figure 6 shows analogous simulations for number of entries. Comparing the solid and dashed black lines, it is clear that the decline in unemployment has had an important effect on entries into Food Stamps. In the years 2006-2007, if unemployment had remained at its initially high level, entries onto Food Stamps would have been about one-third higher. Comparing the two dashed lines, it appears that if the reduction in agency employees had not occurred, the number of individuals entering onto the program would have been about 10 percent higher. Finally, there is only a small shift in entries corresponding with implementation of the modernized processing and web application implementations.

Figure 7 presents results for the exit rate. Here we see that the exit rate would have been appreciably lower in 2006-2007 if there had been no changes in these factors over the period of our study. Most important is the impact of unemployment. The black dashed line suggests that if unemployment had remained high rather than declining, exit rates would have fallen by about 1 percentage point, or about 15-20 percent. Although not as important, the impact of the

decline in agency employees also had an impact. The modernized processing and web application were of little importance.

III.D. Subgroup Results

The above discussion has focused on overall movement onto and off of the Food Stamp program. We may expect there to be important differences in the response to the economy and to other factors across various subgroups. Tables 3 and 4 present regressions following the same format as Table 2 but focusing on selected demographic groups. Our data do not allow us to identify the demographic characteristics of applicants who do not ultimately receive benefits, so we are unable to replicate the analysis of applicants for subgroups.

The elderly are expected to be less responsive to economic factors, and they may respond differently to policy. Consistent with our expectations, Table 3 shows smaller impacts of unemployment rates. The impact of agency employment is also smaller and not statistically significant. However, a large negative impact is observed for the modernized delivery model among the elderly. Given that the elderly have quite stable incomes and have the lowest rate of exit among all the subpopulations, it is not surprising that we observe no impacts on exits associated with either the modernized delivery model or the internet application system.

As might be expected, both African Americans and Hispanics are very responsive to the economy. Given concerns about the digital divide, we might expect that both groups to be less comfortable navigating the high technology environment of the modernized delivery system. Our expectations are confirmed for both African Americans and Hispanics: modernized delivery appears to reduce inflows. Impacts on outflows are not statistically significant for either group. The number of agency employees has an anomalous effect on Hispanic inflows, appearing to

reduce their numbers, whereas there is no effect for African Americans. Outflows for both groups appear to be reduced by agency staff, although effects only border on statistical significance.

Table 4 addresses the question of whether employment status is related to policy response. Employment status may provide a proxy for the human capital knowledge required to navigate the technology-driven system. Additionally, one of the benefits of the internet application system is that those who are working may find it more convenient to apply. Cases are divided into three categories based on their earnings in the quarter of program entry or exit. The first group had no earnings, the second had earnings, but at low enough levels that the total number of hours would be less than 35 hours even at the minimum wage. The third category consisted of cases with sufficient earnings such that total hours would exceed 35 hours at the minimum wage. We see several differences in the policy impacts for first and third groups. Although estimates lack precision, the patterns imply that modernization reduced inflows and increased outflows for households with no earnings, whereas the opposite effects are observed for our high earners. In fact, high earners are the only group for whom we find a positive effect of modernization on inflows and a negative effect on outflows. However, the effects of state agency employment, which provides a measure of access to brick and mortar services, are consistent with the view that agency employees induce higher inflows and lower outflows for all classes—although standard errors are large enough to hide possible differences. Consistent with our other findings, we find no effect of the internet application for each of the three earners groups.

Finally, we consider whether the impact of policy changes is the same in the urban and rural regions of the state. Because Florida is a largely urban state and our county groupings tend to combine rural and urban areas, our median county grouping is nearly 90 percent urban. As a result, when we estimated our models separately for counties above and below this cut point, we found essentially no substantive differences (results not show). Similarly, our use of alternative cut points found no significant differences.

We also consider graphs analogous to Figures 8 and 9 for each of the subgroups, based on the model estimates reported in Tables 3 and 4. While low unemployment, declines in agency staffing and modernization of the application process have all tended to reduce the Food Stamp caseload, important subgroup differences are apparent. For the elderly, shown in Figures 8A and 8B, consistent with expectations, the relative importance of unemployment is appreciably less in explaining inflows than for the full sample, with each of the other factors relatively more important. In the case of exits, the patterns are quite similar to that for the overall caseload, although the overall level of the exit rate is much lower.

When we simulate the change in inflows and outflows among African Americans and Hispanics, shown in Figures 9 and 10, interesting group differences are observed. Among African Americans, it is clear that low unemployment acted as a significant buffer to inflows throughout the period of study. It is possible to observe additional incremental differences in the inflows onto Food Stamps for both the reduction in agency employees and the modernization of the application process. For outflows, it appears that modernization did not affect exits. For Hispanics, the effect of the unemployment rate and agency employment dominates

modernization in terms of inflows. For outflows, however, neither agency employment nor modernization is of importance.

Figure 11 provides information for high earners, defined here as those with sufficient earnings such that total hours would exceed 35 if they were paid the minimum wage, the only group we have identified that appears to benefit from modernization. The figure shows that this group is, as expected, very sensitive to the unemployment rate; they appear moderately responsive to the number of agency employees in terms of both entry and exit from the Food Stamp program. However, in both the cases of inflows and outflows, our simulations suggest that modernization has acted to at least slightly compensate for these changes, facilitating Food Stamp access for this group. Shown in Figures 11A and 11B, the lines simulating the inflows and outflows if modernization had not occurred (shown with the solid grey line) is shifted towards the baseline relative to the line adjusting for all other factors. This is the only subgroup examined for which this result is observed. The beneficial effect for the high earners group may be a result of their higher levels of human capital which may be associated with greater comfort with the technology-driven system and lower transaction costs.

Conclusion

Using administrative data from the state of Florida for 2003-2008, we examine the time trend of applications, inflows and outflows to the Food Stamp program. Then, in models that control for the unemployment rate and county fixed effects, we estimate the effects of three main innovations on Food Stamp application, inflows, and outflows: 1) the switch from a caseworker model to a modernized application system; 2) the ability to apply for Food Stamps via the internet; and 3) the substantial reduction in the number of agency employees. We find that

modernization and the reduction in the agency staff have reduced both the number of applications and the level of inflows to the Food Stamp system. Effects of these policies on outflows were generally small and not statistically significant in the full sample. Simulations suggest that the strongest negative effects of modernization were observed among the elderly and African Americans. High earners, while still negatively affected by the staffing reductions, may have actually gained from modernization.

As always, several cautions are in order. We have attempted to capture the dynamic and chaotic process of organizational change with three distinct indicators—modernization, internet application, and staffing levels. In reality, the Florida system is constantly evolving. We have pinpointed the three largest points of change that were likely to be observed by the public throughout the state. Second, our operationalization of the policy changes imposes an additive structure. Given the temporal ordering of the policy changes, this approach seems like a reasonable starting place.

Given our current findings, the policy implications are clear. States that have an interest in facilitating greater access to Food Stamps for low-income populations should approach modernization efforts such as those undertaken in Florida with caution. Currently, at least five other states in addition to Florida have implemented a multi-program on-line application system (Pennsylvania, Kansas, Washington, West Virginia, and Wisconsin) (GAO 2007). While several recent papers have considered these systems, outlining recommended “best practices” (Schott and Parrott 2005; Hoffman 2006; Cody et al. 2008), to our knowledge ours is the first evaluative study to guide states on the effects of administrative reform, including on-line applications, on caseload dynamics.

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**Figure 1: Average Food Stamp Caseload and Unemployment Rate 2001-2008:
Florida and the Nation**

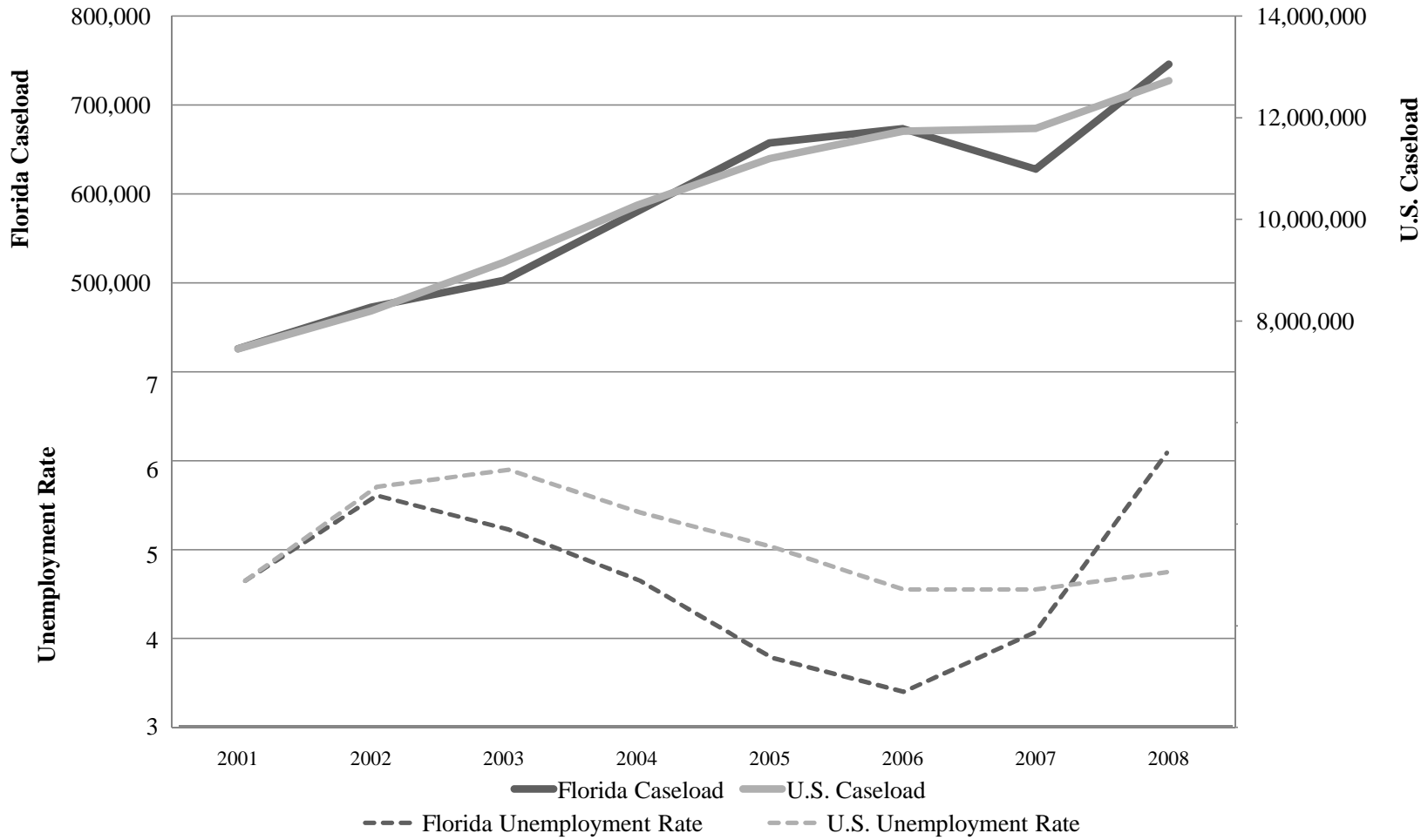


Figure 2: Food Stamp New Applications, Inflows and Unemployment Rate: Florida, Monthly Data 2003-2008

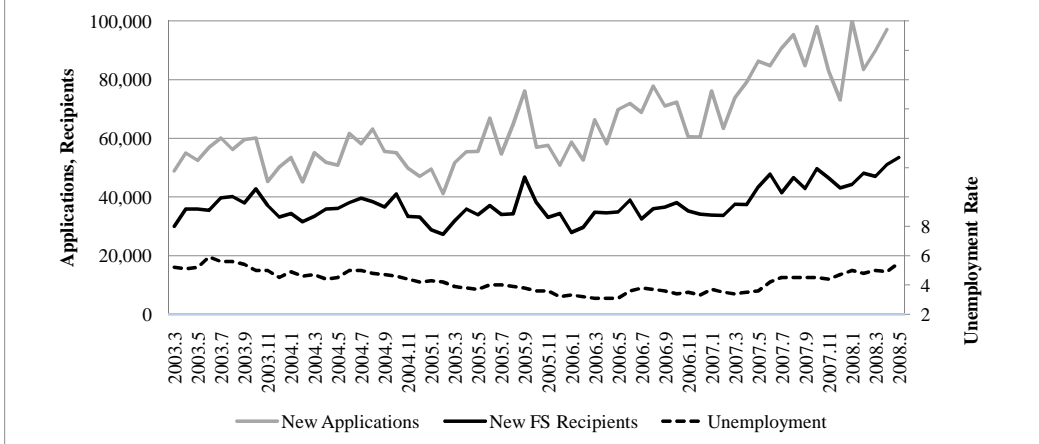


Figure 3: Food Stamp Outflows, Florida, Monthly Data 2003-2008

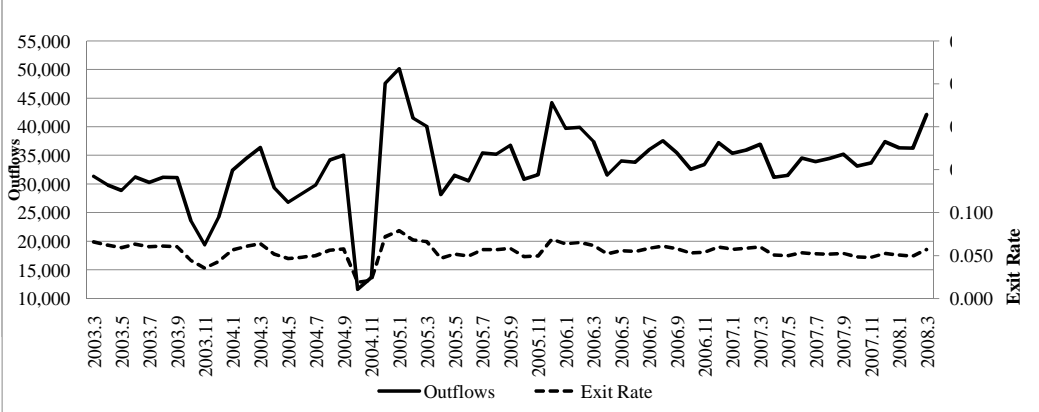


Figure 4: Primary Policy Interventions, Florida, Monthly Data 2003-2008

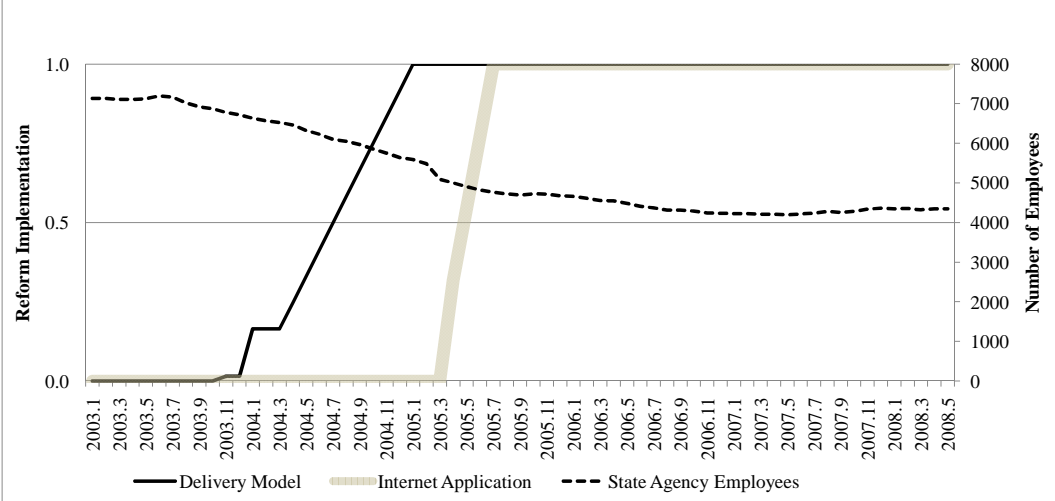


Figure 5: Food Stamp New Applications, Impacts of Controls : Florida, Monthly Data 2003-2008

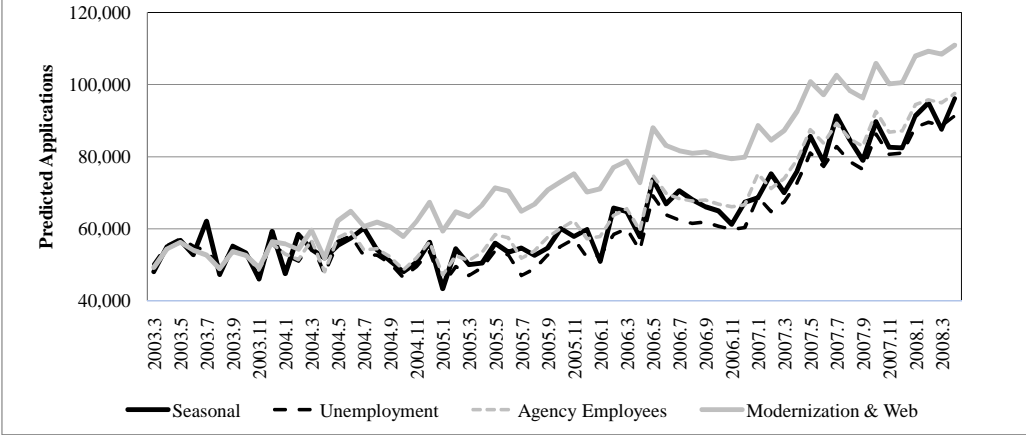


Figure 6: Food Stamp Entries, Impacts of Controls : Florida, Monthly Data 2003-2008

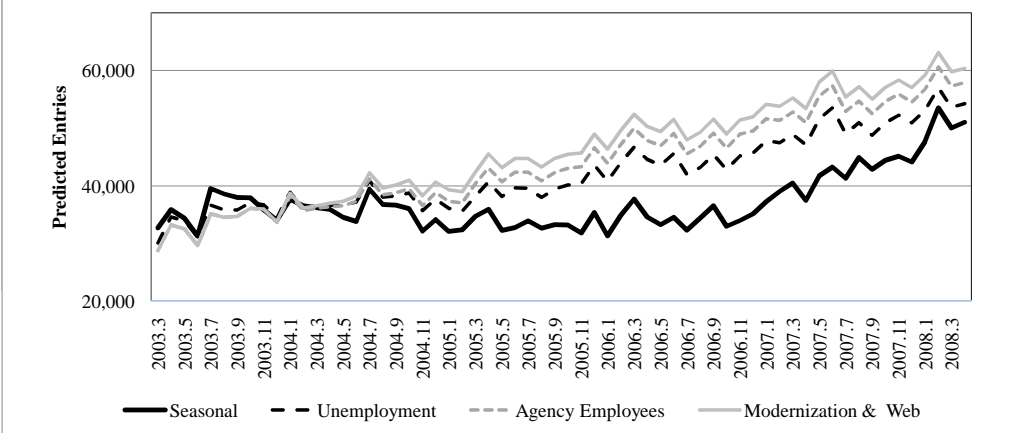
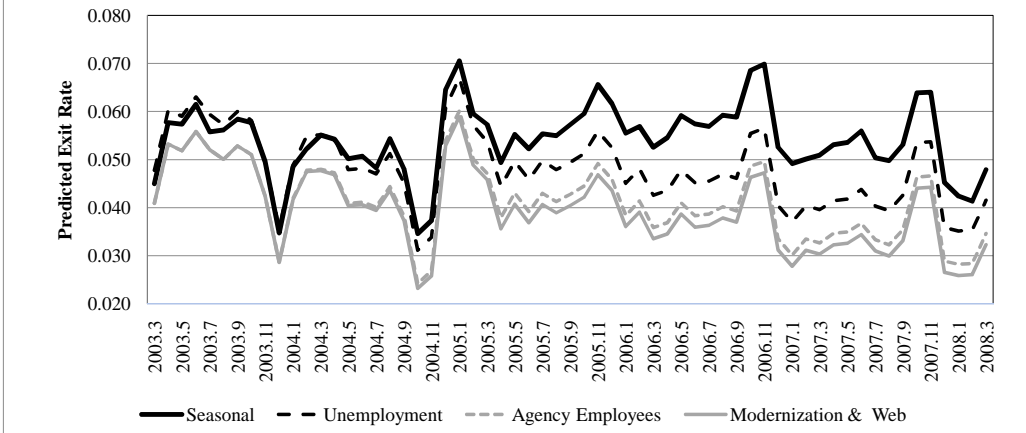
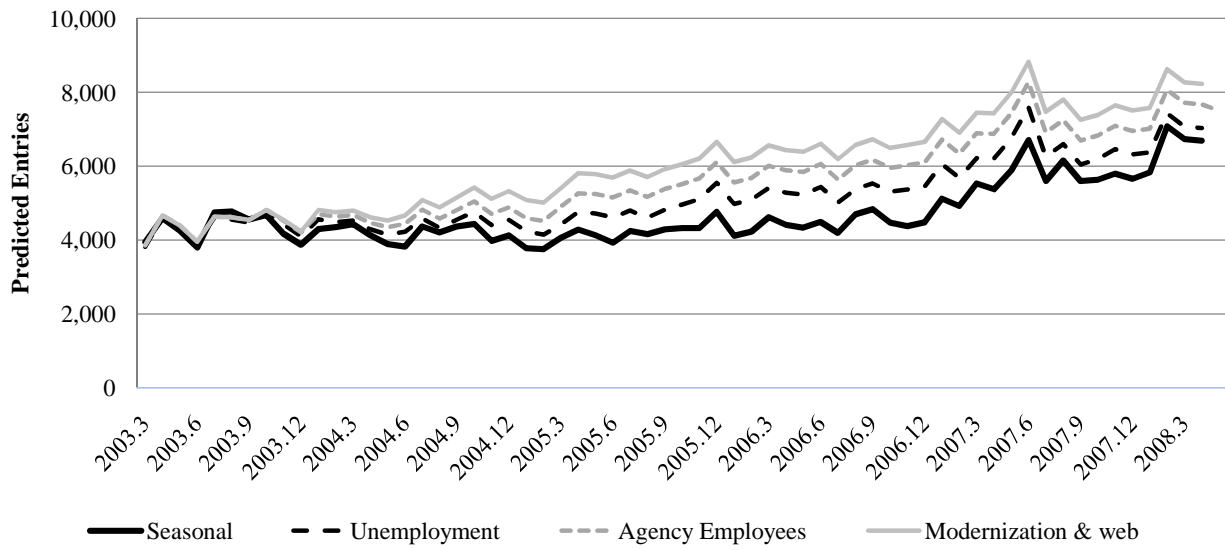


Figure 7: Food Stamp Exit Rates, Impacts of Controls : Florida, Monthly Data 2003-2008



**Figure 8A: Food Stamp New Elderly Entries, Impacts of Controls:
Florida, Monthly Data 2003-2008**



**Figure 8B: Food Stamp Elderly Exit Rates, Impacts of Controls: Florida,
Monthly Data 2003-2008**

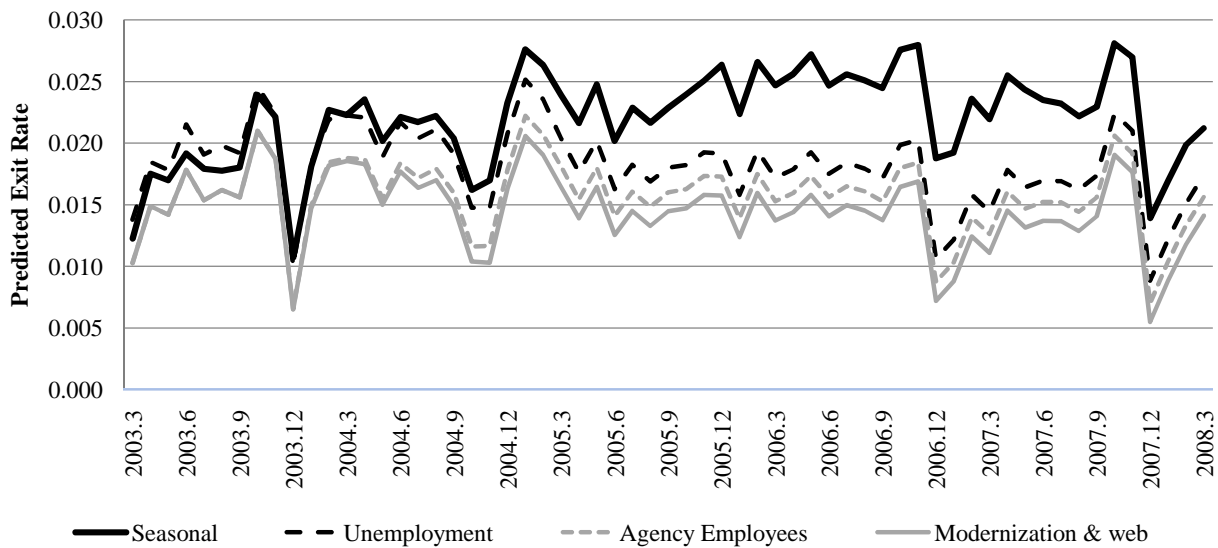


Figure 9A: Food Stamp New African-American Entries, Impacts of Controls: Florida, Monthly Data 2003-2008

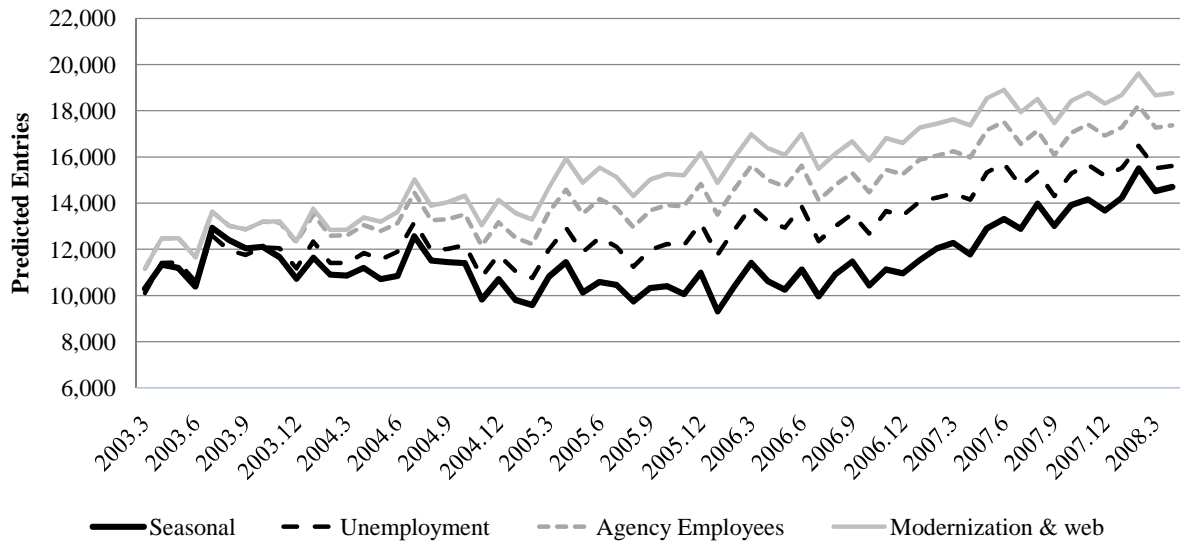
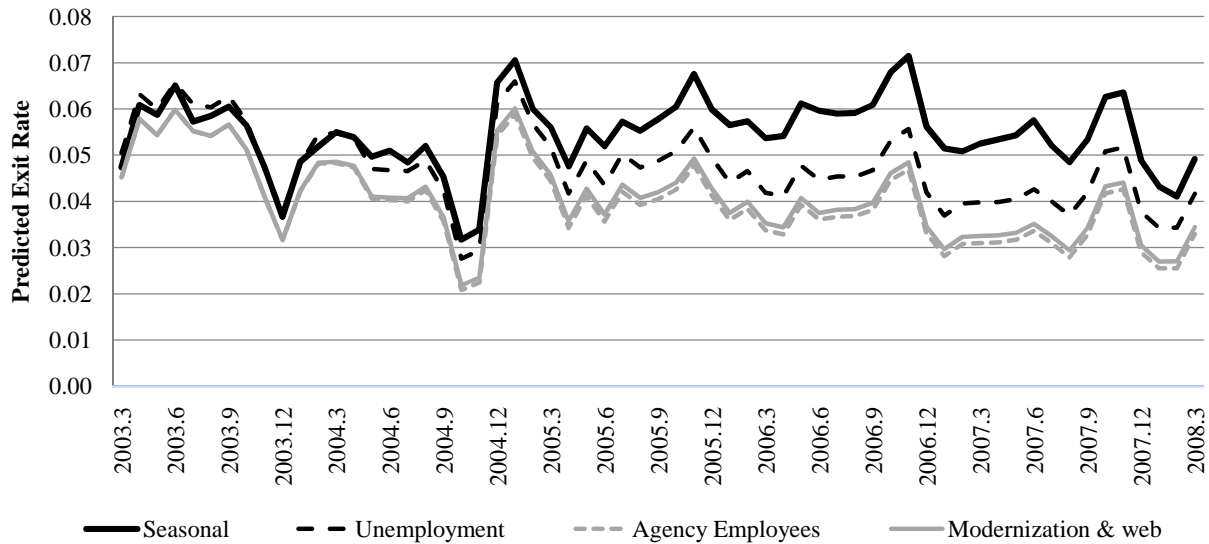
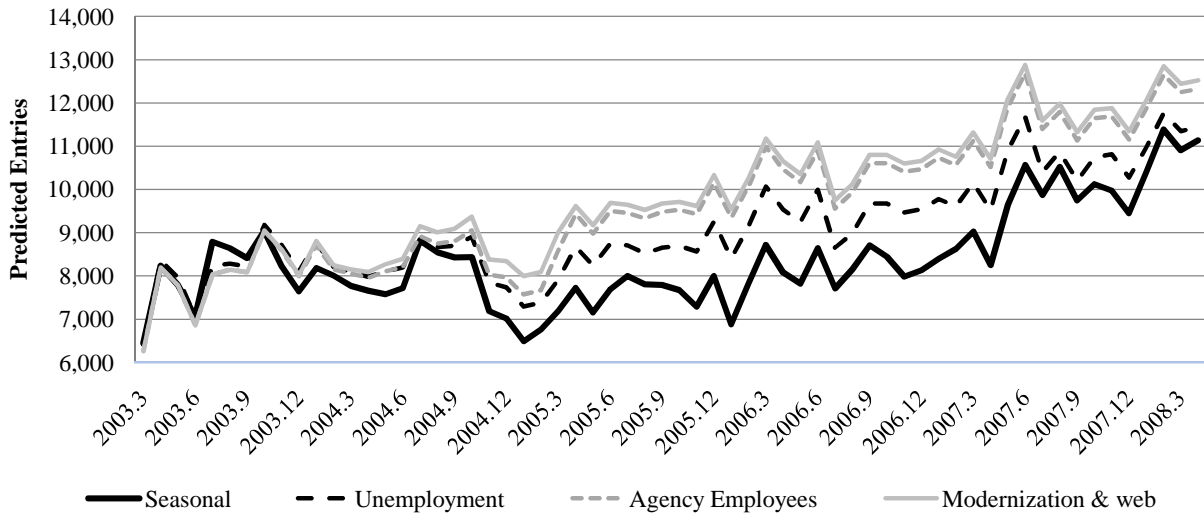


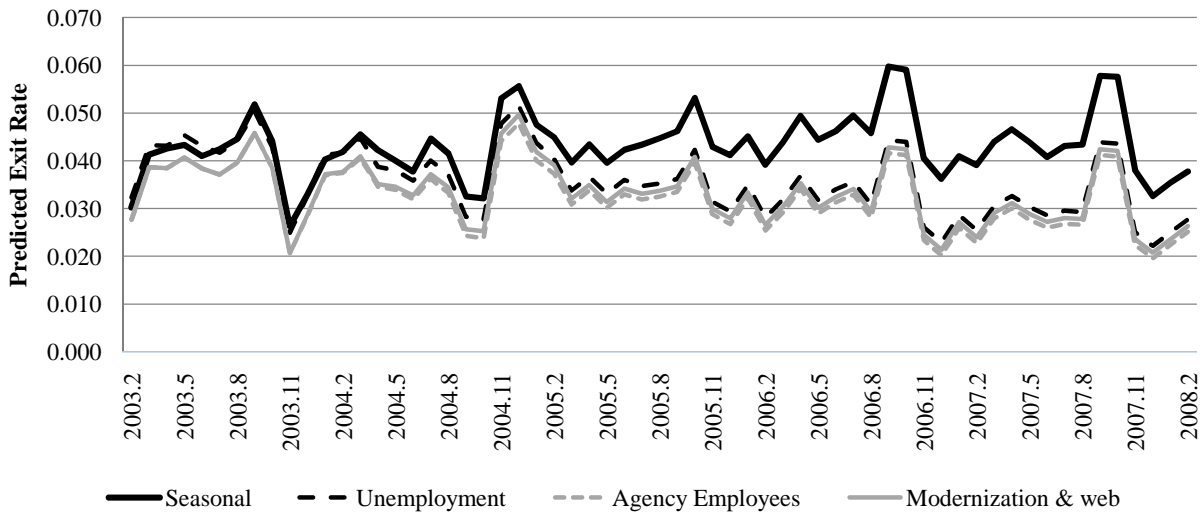
Figure 9B: Food Stamp African-American Exit Rates, Impacts of Controls: Florida, Monthly Data 2003-2008



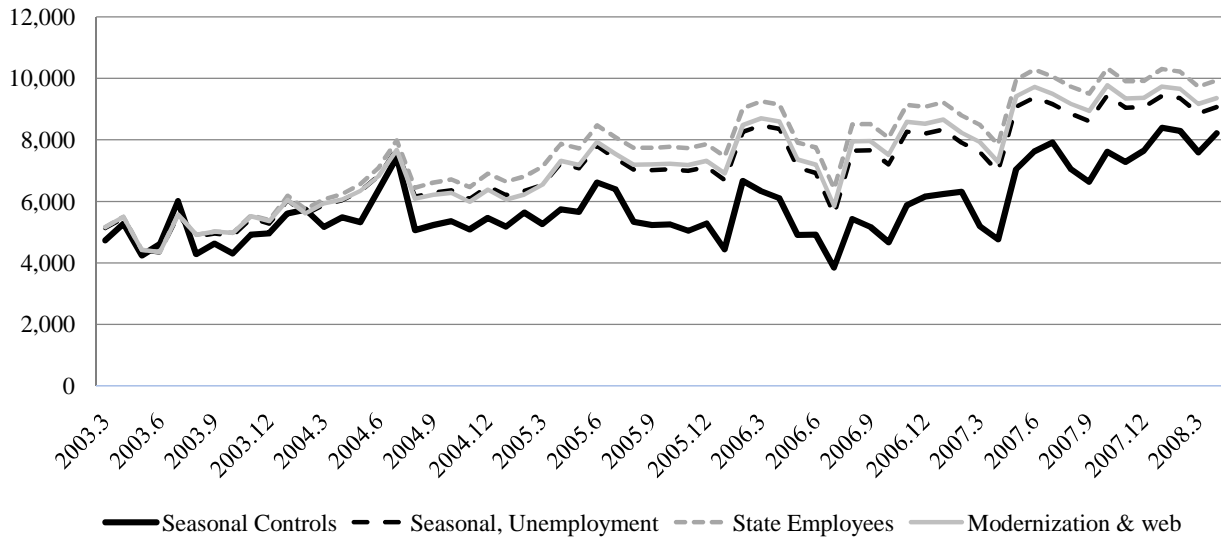
**Figure 10A: Food Stamp New Hispanic Entries, Impacts of Controls:
Florida, Monthly Data 2003-2008**



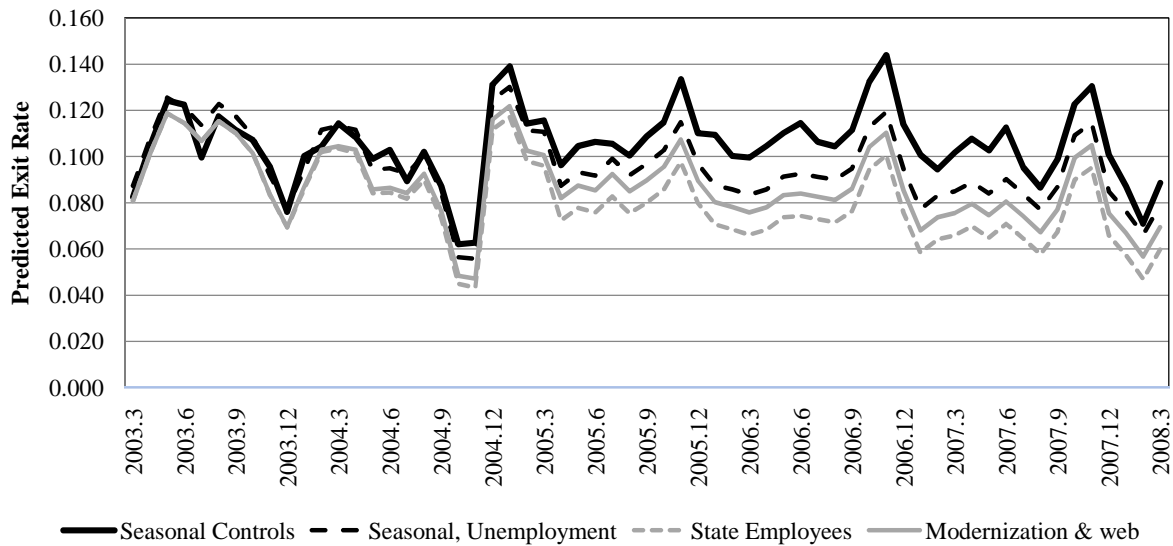
**Figure 10B: Food Stamp Hispanic Exit Rates, Impacts of Controls :
Florida, Monthly Data 2003-2008**



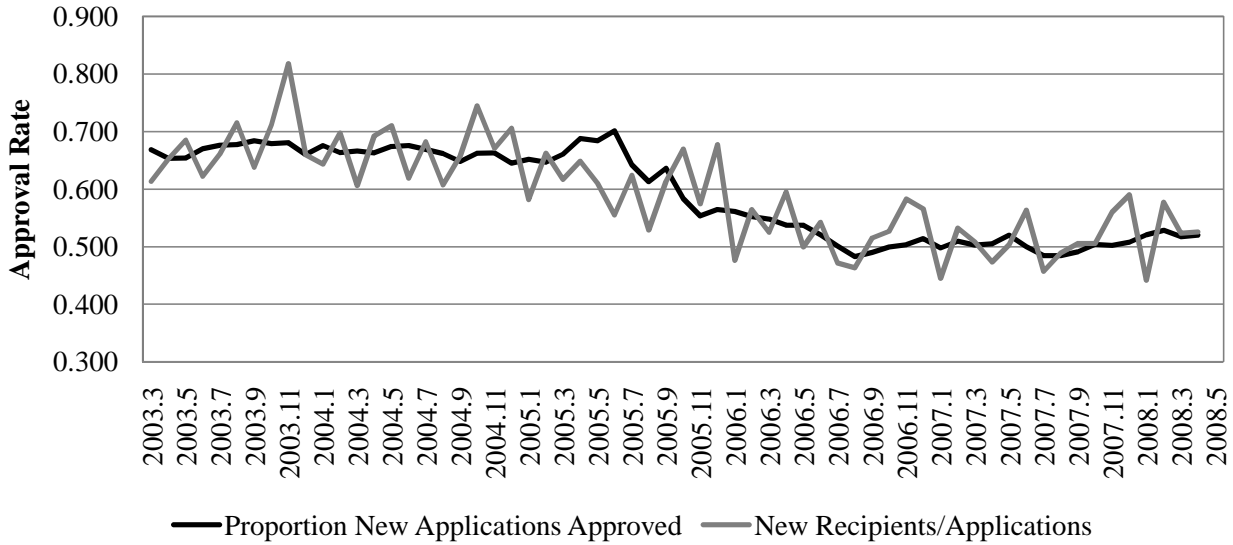
**Figure 11A: Food Stamp New High Earner Entries, Impacts of Controls:
Florida, Monthly Data 2003-2008**



**Figure 11B: Food Stamp High Earner Exit Rates, Impacts of Controls:
Florida, Monthly Data 2003-2008**



Appendix Figure A1: Approval Rate for New Food Stamp Applications: Florida, Monthly Data 2003-2008



Appendix Figure A2: Recertification Applications and Recertification Approval Rate: Florida, Monthly Date 2003-2008

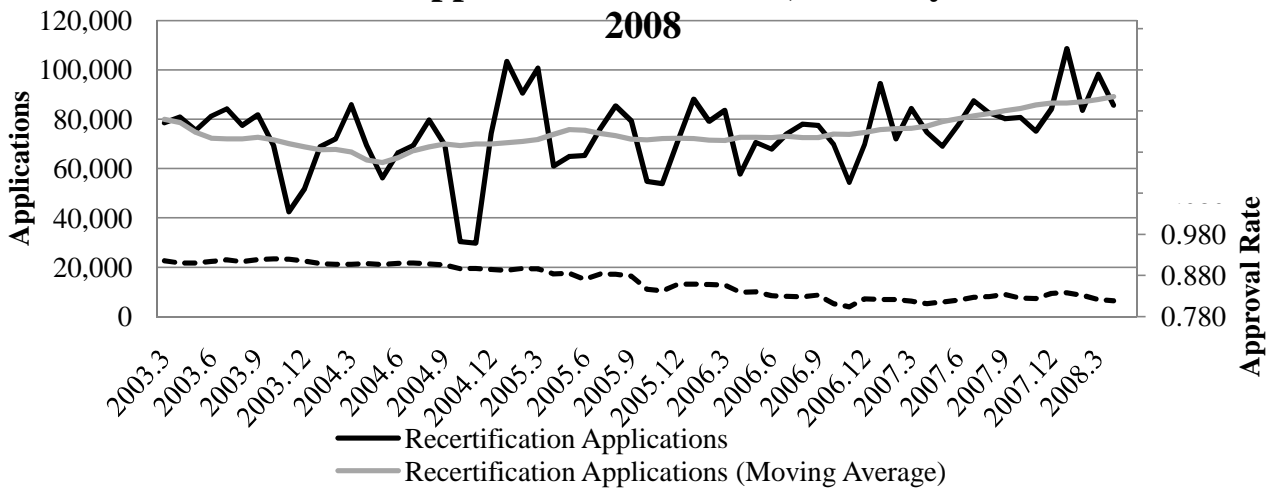


Table 2: Regressions of Food Stamp Applications, Inflows and Outflows on Economic and Basic Policy Variables: Monthly Counts for 23 County Groups, 2003-2008

	Applications	Inflows	Outflows
Unemployment rate, current month	-0.034 (0.007)	-0.002 (0.003)	-0.001 (0.183)
Unemployment rate, prior month	0.087 (0.008)	0.019 (0.003)	-0.335 (0.203)
Unemployment rate, 2 months prior	-0.063 (0.008)	0.006 (0.003)	0.214 (0.211)
Unemployment rate, mean 3-5 months prior	0.000 (0.009)	-0.007 (0.004)	-0.146 (0.224)
Unemployment rate, mean 6-8 months prior	-0.001 (0.007)	0.017 (0.003)	-0.428 (0.178)
State agency employment	5.661 (2.326)	3.211 (0.919)	-15.120 (54.553)
Modernized delivery model	-0.069 (0.010)	-0.011 (0.004)	0.127 (0.240)
Internet application	-0.005 (0.009)	-0.002 (0.004)	0.107 (0.209)
AR(1)	0.415	0.405	0.336
N	1426	1426	1426
R-square	0.5934	0.8285	0.3386
Adjusted R-square	0.5502	0.8103	0.2682

Controls: Month seasonal fixed effects, county group fixed effects, county group linear time trend, and state agency employment for three county groups containing call centers, and county group containing state capital.

Note: Coefficient standard errors are in parentheses. See text for details of variable coding.

Table 3: Regression of Food Stamp Program Inflows and Outflows on Economic and Basic Policy Variables for Demographic Subgroups: Monthly Counts for 23 County Groups, 2003-2008

	Elderly		African American		Hispanic	
	inflows	outflows	inflows	outflows	inflows	outflows
Unemployment rate, current month	-0.0001 (0.0005)	-0.2727 (0.1379)	0.0000 (0.0011)	0.1109 (0.1739)	0.0010 (0.0008)	-0.2459 (0.2605)
Unemployment rate, prior month	0.0016 (0.0006)	0.0992 (0.1685)	0.0041 (0.0013)	-0.4563 (0.1904)	0.0042 (0.0009)	-0.1716 (0.3138)
Unemployment rate, 2 months prior	0.0011 (0.0007)	-0.1089 (0.1674)	0.0023 (0.0014)	0.1097 (0.1988)	-0.0002 (0.0009)	0.3654 (0.3139)
Unemployment rate, mean 3-5 months prior	-0.0016 (0.0007)	-0.0393 (0.1558)	-0.0011 (0.0015)	-0.0640 (0.2173)	-0.0024 (0.0011)	-0.2266 (0.2981)
Unemployment rate, mean 6-8 months prior	0.0014 (0.0005)	-0.1175 (0.1160)	0.0017 (0.0011)	-0.5052 (0.1752)	0.0012 (0.0009)	-0.4026 (0.2248)
State agency employment	0.0703 (0.0402)	0.1436 (8.5313)	-0.0016 (0.0490)	-13.9652 (7.7288)	-0.0247 (0.0107)	-5.5550 (2.7069)
Modernized delivery model	-0.0028 (0.0007)	0.1645 (0.1507)	-0.0061 (0.0015)	-0.1317 (0.2273)	-0.0024 (0.0011)	-0.1792 (0.2689)
Internet application	-0.0003 (0.0006)	-0.0105 (0.1338)	-0.0015 (0.0014)	-0.0201 (0.2045)	0.0013 (0.0010)	0.0598 (0.2549)
AR(1)	0.293	0.129	0.320	0.378	0.423	0.157
N	1426	1426	1426	1426	1426	1426
R-square	0.7592	0.3459	0.5965	0.3408	0.3506	0.2457
Adjusted R-square	0.7336	0.2763	0.5536	0.2707	0.2815	0.1655

Controls: See Table 2.

Note: Coefficient standard errors are in parentheses. See text for details of variable coding.

Table 4: Regression of Food Stamp Program Inflows and Outflows on Economic and Basic Policy Variables for Income Subgroups: Monthly Counts for 23 County Groups, 2003-2008

	No household earnings		Less than 35 hours a		At least 35 hours a	
	inflows	outflows	inflows	outflows	inflows	outflows
Unemployment rate, current month	0.0097 (0.0027)	-0.0633 (0.1905)	0.0014 (0.0011)	0.2404 (0.2306)	0.0028 (0.0009)	0.5441 (0.2993)
Unemployment rate, prior month	0.0008 (0.0029)	-0.0469 (0.2229)	0.0010 (0.0012)	-0.7640 (0.2409)	0.0039 (0.0011)	-1.9319 (0.3228)
Unemployment rate, 2 months prior	0.0155 (0.0032)	0.1700 (0.2265)	0.0018 (0.0013)	0.6500 (0.2535)	-0.0068 (0.0011)	0.6095 (0.3383)
Unemployment rate, mean 3-5 months prior	-0.0103 (0.0036)	-0.4369 (0.2229)	0.0011 (0.0014)	-0.2120 (0.3031)	0.0034 (0.0011)	0.3963 (0.3787)
Unemployment rate, mean 6-8 months prior	0.0165 (0.0029)	-0.2302 (0.1703)	0.0032 (0.0011)	-0.7310 (0.2585)	0.0024 (0.0008)	-0.7730 (0.3098)
State agency employment	1.7569 (0.6944)	1.5621 (38.4666)	0.0554 (0.0473)	9.0919 (11.3892)	0.0507 (0.0233)	-19.8288 (8.8464)
Modernized delivery model	-0.0093 (0.0042)	0.1480 (0.2233)	0.0020 (0.0015)	-0.7306 (0.3682)	0.0033 (0.0011)	-0.4550 (0.4251)
Internet application	0.0000 (0.0036)	0.1865 (0.1976)	-0.0015 (0.0014)	0.1675 (0.3072)	-0.0002 (0.0010)	-0.5094 (0.3654)
AR(1)	0.447	0.216	0.381	0.522	0.254	0.418
N	1426	1426	1426	1426	1426	1426
R-square	0.8203	0.2570	0.6489	0.4185	0.6867	0.5000
Adjusted R-square	0.8012	0.1780	0.6045	0.3566	0.6471	0.4468

Controls: See Table 2.

Note: Coefficient standard errors are in parentheses. See text for details of variable coding.