Sources of Variation in State-Level Food Stamp Participation Rates

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Abstract

In 2003, about 56 percent of those eligible to participate in the Food Stamp Program actually participated. The participation rate varied substantially across States, ranging from a high of 83 percent in Oregon to a low of 43 percent in Massachusetts. Using data for 2003 from the Food Stamp Program Quality Control and Current Population Survey, this study examined factors that help to explain the variation. Results show that different population characteristics across States are a major factor because different types of eligible people tend to participate at different rates. States with a higher share of households headed by elderly people had lower rates, while those with a higher share of households without earnings and headed by nonelderly people had higher participation rates. Yet, substantial variation remained after "standardized" State participation rates were calculated that adjust for these compositional differences. Attempts to further explain these standardized rates by State policies and economic conditions were unsuccessful, perhaps due to the limited sample size and imprecise measures of policies.

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EXECUTIVE SUMMARY

The Food Stamp Program (FSP), the nation's largest food assistance program, is intended to provide a nutritional safety net for the millions of Americans who cannot afford to buy healthy food, or enough healthy food, for themselves and their families. For about 25 years, the extent to which the program meets this goal has been measured by the national "participation rate" – the rate at which FSP-eligible people actually participate in the program. More recently, USDA has developed estimates of state-level participation rates. These rates vary substantially from state to state, leading policymakers and researchers to wonder why proportionately more eligible participate in some states than other states.

In 2003, while 56 percent of the nation's eligible population participated in the FSP, 83 percent of eligibles in Oregon participated, compared with only 43 percent of eligibles in Massachusetts. The rates in 22 states were higher than the national rate, and in 16 states, were significantly lower.

This variation is likely to be a function of two factors: the composition of the FSP-eligible population in any given state and the characteristics unique to any given state—specifically, its policy decisions and economic conditions. We know from studies of national participation rates that some groups of eligibles (e.g., childless adults with earnings) are less likely to participate than others (e.g., single adults with children). A state may therefore have a low participation rate primarily because it has proportionately more childless adults with earnings and/or proportionately fewer single adults with children among its eligible population.

State policies governing the administration of the FSP and other means-tested programs may affect the rate at which eligible individuals participate. For example, policies that affect the burden associated with participation, such as income reporting requirements and certification

periods, may affect an eligible individual's willingness to participate. In addition, given that many households enroll in the FSP because they are also enrolling in other assistance programs, such as Temporary Assistance for Needy Families (TANF) and Medicaid, a state's eligibility rules for those programs can affect FSP participation rates. Finally, state economic conditions may also affect state participation rates.

In this study, we seek to determine why participation rates vary. We used a two-step process to examine several sources of variation in state FSP participation rates. First, we estimated "standardized" state participation rates, which adjust for the effects of compositional differences across states. Second, we estimated a state-level regression to determine the degree to which the remaining variation in the rates can be explained by state policies and economic conditions.

STEP 1: STANDARDIZED PARTICIPATION RATES

The standardization process, which is based on the difference between the composition of each state's FSP-eligible population and national FSP-eligible population, removes the effects of state-to-state differences in the composition of the FSP-eligible population. In other words, the process allows us to estimate the FSP participation rate a state would have if its eligible population were the same as the national eligible population. For example, given that the elderly participate in the FSP at a low rate, what would the participation rate be in Florida, a state with a high proportion of elderly residents, if it had the same proportion of elderly residents as the nation?

To compute the standardized state FSP participation rates, we used the 2003 data on the number of participants and the number of eligible households that is used to compute the national and official state FSP participation rates (Current Population Survey data for estimates

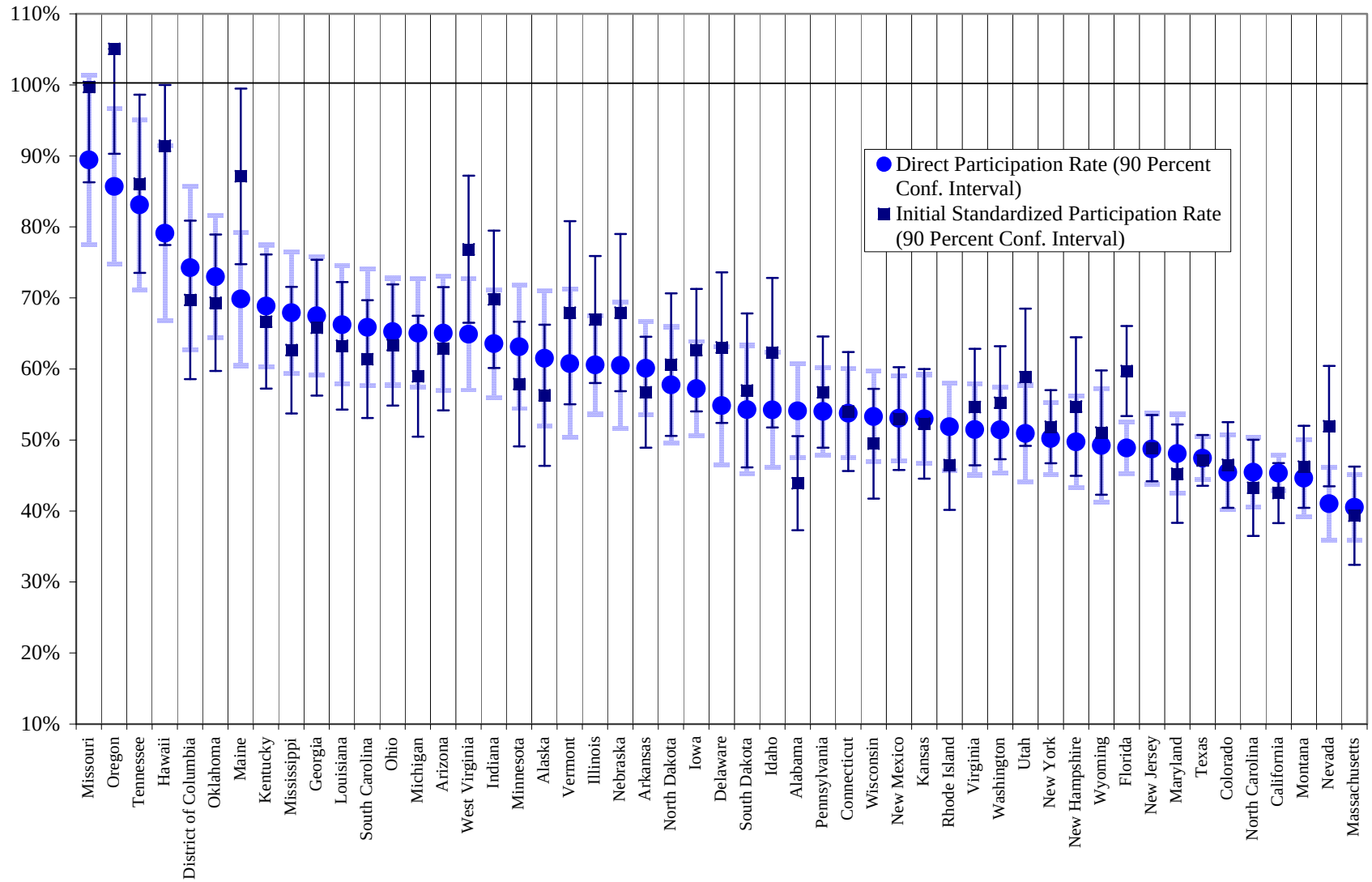
of eligible individuals and FSP administrative data for estimates of participants). We used a model that estimates the degree to which participation in the program is correlated with various household characteristics, including household composition—such as household size and the presence of children and elderly people—earnings as a percentage of the poverty line, and the size of the food stamp benefit for which the household would be eligible. We then used the coefficients from the model to adjust each state's participation rate on the basis of the composition of that state's FSP-eligible population relative to the national eligible population.

Figure 1 presents the standardized state FSP participation rates compared with the "direct" (that is, unstandardized) participation rate in each state. To reflect the uncertainty with which these rates are estimated, the figure also shows 90 percent confidence intervals. The difference between the standardized and the direct participation rates reflects the difference between the composition of the state and the national eligible populations. A standardized rate that is *higher* than the direct rate means that the state's eligible population is composed of households *less* likely to participate in the FSP. A standardized rate that is *lower* than the direct rate means that the state's eligible population consists of households *more* likely to participate in the FSP.

In 28 states, the standardized participation rate is higher than the direct rate, while the reverse is true for the remaining 22 states and the District of Columbia. The seven states in which the standardized rate falls farthest above the direct rate include Oregon (19 percentage points), Maine (17 percentage points), Hawaii and West Virginia (12 percentage points), Nevada and Florida (11 percentage points), and Missouri (10 percentage points). These states also tend to have have the highest standardized rates. The five states in which the standardized rate falls farthest below the direct rate include Alabama (10 percentage points), Michigan (6 percentage points), and Rhode Island, Alaska, Mississippi, Minnesota, Mississippi, the District of Columbia, and South Carolina (5 percentage points).

FIGURE 1

DIRECT AND INITIAL STANDARDIZED 2003 FSP PARTICIPATION RATES



To understand how household characteristics influence the variation in state participation rates, we decomposed the difference between each state's direct participation rate and the national participation rate (Figure 2). Factors that push a state's direct above the national rate are shown to the right of the line in the middle of the chart, and factors that push a state's direct rate below the national rate are shown to the left. The difference in the total "length" to the left and to the right of the line indicates the general size of the difference between the direct and national rates for each state.

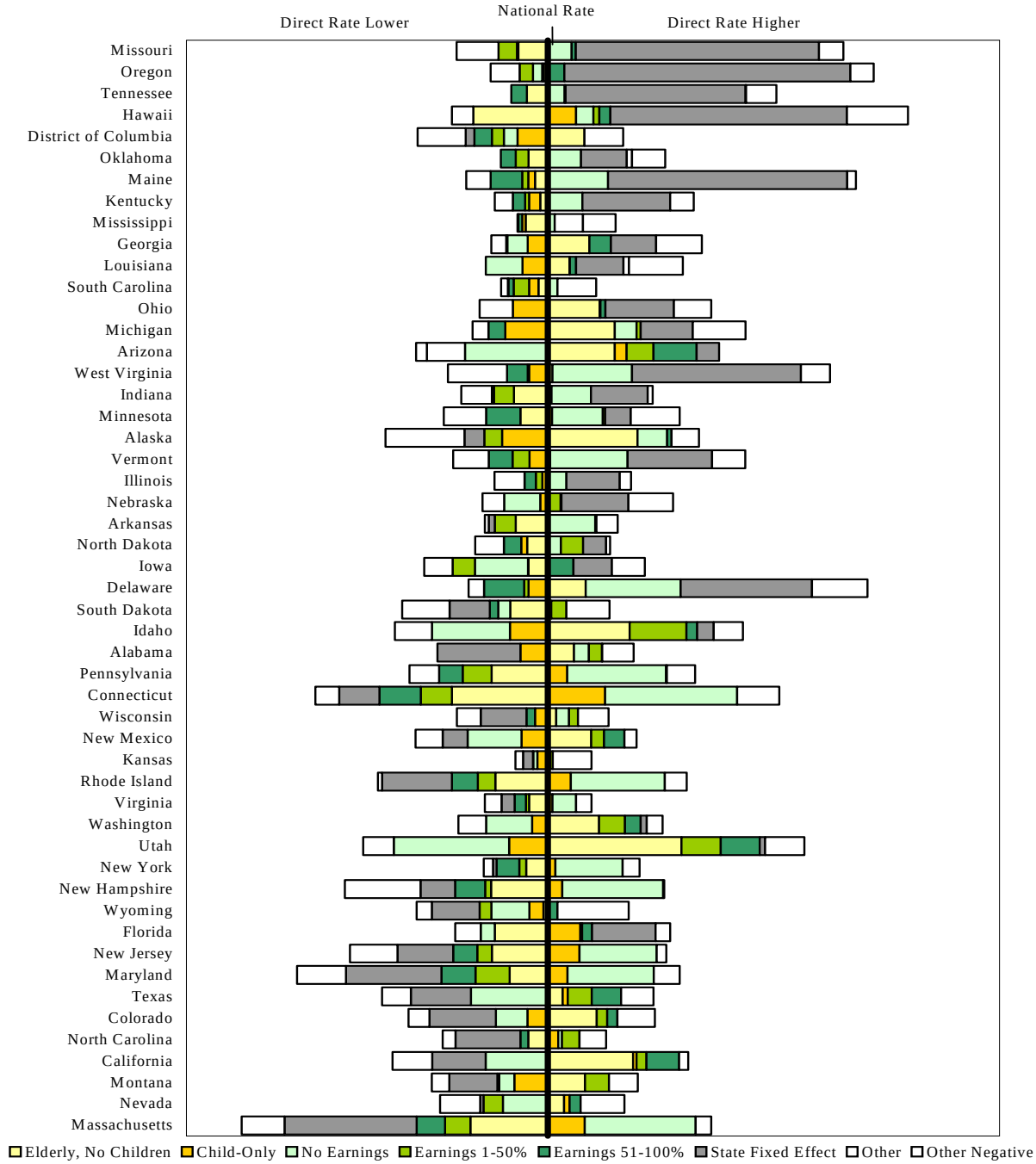
In all states, the two most influential household characteristics include the presence of elderly individuals (without children present), and the fact that a household has zero earnings. Because the elderly are less likely to participate, states with larger proportions of this population have higher standardized participation rates, all else being equal. Because households without earnings are more likely to participate, states with larger proportions of this population will have lower standardized participation rates, all else being equal. Other characteristics that have a relatively large impact on standardized participation rates include the proportion of households with earnings between one and 50 percent of poverty, the proportion of households with earnings from 51 to 100 percent of poverty, the proportion of child-only households, the proportion of households in which children or elderly people receive SSI benefits, and the proportion of households headed by an African American.

Of all states, Missouri has the highest direct participation rate. This high direct participation rate is driven by its "fixed effect." That is, there are factors other than the state's composition that explain Missouri's high direct participation rate. In addition to the fixed effect, the state's population with no earnings is proportionately larger than it is in the nation as a whole, and this contributes to the state's high direct participation rate because these individuals participate at high rates.

FIGURE 2

RELATIVE EFFECTS OF COMPOSITIONAL FACTORS ON THE DIFFERENCE BETWEEN EACH STATE'S DIRECT PARTICIPATION RATE AND THE NATIONAL PARTICIPATION RATE

Note: The figure depicts the composition differences (or fixed effects) that are generally driving the differences between the direct and standardized rates rather than the actual value of the difference between the direct and standardized rates. The direct and standardized rates are available in Table II.6



At the other end of the spectrum is Massachusetts, which has the lowest direct participation rate. This is driven by two factors: the age and the poverty level of the FSP-eligible population. The state's elderly population is a proportionately larger than the national elderly population, and its population of individuals from one to 50 percent of poverty, and from 51 to 100 percent of poverty is proportionally smaller than the percent of individuals in poverty in the national population.

The fact that, in many states, the fixed effect has the strongest influence on the difference between the direct and the national participation rate suggests that the highest direct participation rates are not due to the composition of those states' eligible populations but to other factors in those states. That is, if the FPS-eligible population in every state were composed of the same groups of individuals, the participation rates in these states would still be higher.

Some states have offsetting compositional characteristics. For example, in Connecticut, the factors that would pull the participation rate up—including a population of individuals with zero earnings that is proportionately larger than the national population with zero earnings and a population of child-only household that is proportionately larger than the national population of child-only households—are canceled out by the state's relatively large elderly population and relatively small populations of individuals from one to 50 percent and from 51 to 100 percent of poverty.

STEP 2: UNDERSTANDING VARIATION IN STANDARDIZED PARTICIPATION RATES

The standardization process did not eliminate the variation in participation rates; 2003 standardized participation rates still vary from state to state. This may reflect the influence of each state's economic and policy conditions on participation rates. To examine the relationship between the standardized rate and aggregate state characteristics, we estimated a model in which

the aggregate state characteristics include measures of state FSP policies (certification periods, reporting requirements, accessibility ratings, etc.), TANF policies (transitional FSP benefits, earned income disregards, work requirements, and other policies), Medicaid policies, and Supplemental Security Income (SSI) policies. The characteristics also include measures of the state's economy, such as the unemployment rate, employment growth, and wages.

The results from the model suggest that most of the variation is not explained by aggregate state characteristics. In other words, standardized participation rates are not, for the most part, correlated with most of the FSP and TANF policies we looked at. While there may be a relationship between a state's standardized participation rate and its policies on change reporting and program access, the evidence for such a relationship is weak. Moreover, the rates do not appear to be correlated with state economic conditions, which could influence an eligible individual's expectations of their future income.

While the results of this analysis fail to show a strong relationship between participation rates and policy/economic characteristics, it does not seem plausible that the variation in standardized rates could be explained by random factors alone. On the contrary, one would expect that policy and economic conditions would have some influence on the rate at which eligible people participate. The failure to identify significant relationships could be explained by several factors. First, the policy variables used in the analysis may not accurately reflect the policies that are actually in place. It is possible that two states that have adopted the same policy may implement it differently, or that the same policy may be implemented differently in different areas a state. In addition, sampling error in the participation rate estimates could mask meaningful variation in the true state participation rates. Finally, the small number of observations may obscure the individual effects of various policy and economic factors that may influence state participation rates. Thus, while the results of this analysis suggest that state

participation rates vary apart from state policy and economic conditions, states are still likely to have some control over their participation rates through the policies and the economic strategies they establish.

CONCLUSION

As USDA works to increase FSP participation rates, we need to understand why participation rates are higher in some states than in others. Part of these differences can be explained by differences in the composition of each state's eligible population. In particular, states whose eligible populations contain higher proportions of households with no earnings and households headed by African Americans would have higher participation rates, all else being equal, because these populations participate at higher rates. Likewise, states whose eligible populations consist of higher proportions of elderly individuals tend to have lower participation rates, all else being equal, because elderly individuals participate at lower rates.

However, the variation in state participation rates does not decrease once we account for the differences in the compositional differences of the state populations. The standardized participation rates vary as much from state to state as the unstandardized rates, with the standardized rates ranging from 43 percent in California and Wyoming to 89 percent in Oregon. After examining how much of this remaining variation is due to state policies and economic conditions, we find that much of this variation remains unexplained. It may be that our measures of policies or participation rates are too imprecise to capture the relationships between policies, economic conditions, and FSP participation rates. It may also be that limited degrees of freedom constrain the model's ability to identify policy and economic effects.

I. INTRODUCTION

The Food Stamp Program (FSP) is a safety net for millions of people every month, providing eligible low-income households with resources to obtain a more nutritious diet. It is the nation's largest food assistance program in terms of dollars spent. In fiscal year 2005, the program provided nearly $29 billion in benefits to a caseload that averaged 26 million people each month. Eligibility for the program is based largely on financial need—individuals must have income and assets below specified eligibility levels. The income levels and subsequent benefit calculations are set at the federal level, with little state-to-state variation, though the asset criteria do vary substantially across states.

The FSP participation rate reflects the percentage of eligible people that actually participate in the program. The participation rate has been a standard for assessing the performance of the program for about 25 years. In 2003, 56 percent of the nation's eligible population participated (Cunnyngham 2005). However, participation rates vary by state. In 2003, 83 percent of eligibles in Oregon participated, compared with only 43 percent of eligibles in Massachusetts (Castner and Schirm 2005). Twenty-two states had rates that were higher than the national participation rate and 16 states had rates that were significantly lower.

The goal of the U.S. Department of Agriculture, as expressed through performance targets in its fiscal year 2007 budget request, is to reach 68 percent of the eligible population by 2010. States will play a key role in helping raise participation rates. Although most program rules are set at the federal level, state and local governments share responsibility for administering the FSP, and thus share responsibility for increasing participation among the eligible population. For states to develop strategies to increase participation and target outreach efforts, they need to understand more about what causes the rates to vary across states.

Unfortunately, little is known about the sources of variation in state participation rates. We speculate that the variation is likely a function of two types of factors. First, the composition of the FSP eligible population in each state could affect its participation rate. We know from studies of national participation rates that some groups of eligibles (e.g., childless adults with earnings) are less likely to participate than others (e.g., single adults with children). Thus, a state may have a low participation rate primarily because it has proportionately more childless adults with earnings and/or proportionately fewer single adults with children among its eligible population. In other words, we might expect two different states to have different participation rates simply because different types of people comprise their respective eligible populations.

Second, state participation rates may be influenced by state characteristics, specifically policy decisions and economic conditions. State policies governing the administration of the FSP and other means-tested programs may affect the rate at which eligible individuals participate. For example, policies that affect the burden associated with participation, such as income reporting requirements and certification periods, may affect an eligible individual's willingness to participate. In addition, given that many households enroll in the FSP because they are also enrolling in other assistance programs, such as Temporary Assistance for Needy Families (TANF) and Medicaid, a state's eligibility rules for those programs can affect FSP participation rates. In addition, state economic conditions may also affect state participation rates. A low-income individual may be more inclined to participate in the FSP if the state economy is in recession and the individual senses little hope of increased income in the near term than if the state is experiencing an economic boom and the individual sees his or her current status as only temporary.

In this report, we seek to determine why participation rates vary. We examine several sources of variation in state FSP participation rates using a two-step process. First, we estimate "standardized" state participation rates that adjust for the effects of compositional differences across states. These standardized rates provide an estimate of what state participation rates would be if each state's eligible population resembled the nation as a whole. In the second step, we estimate a state-level regression to determine the degree to which the remaining variation in the rates can be explained by state economic circumstances and program policies.

In the remainder of this chapter, we provide an overview of the FSP, discuss the estimation of the existing national and state-level participation rates, and present this study's research objectives. In Chapter II, we discuss the standardized participation rates, the methodology used in their estimation, and the policy implications of the rates. In Chapter III, we examine the state variation in the standardized rates. Finally, in Chapter IV, we present our conclusions and suggestions for future research.

A. THE FOOD STAMP PROGRAM

The Food Stamp Act of 1977, as amended, establishes the eligibility criteria for the FSP:

- ***FSP Household Definition***. Under FSP rules, the FSP household is composed of the individuals in the same residential unit who purchase and prepare food together. In addition, spouses must apply together, and children under age 22 must file with their parents.
- ***Gross Income Screen***. The total income of the FSP household members must be at or below 130 percent of the federal poverty guidelines ($1,961 for a family of four in the continental United States in fiscal year 2003). Households with elderly or disabled members are not subject to the gross income screen.
- ***Net Income Screen***. The FSP allows income deductions for certain household expenses related to work, dependent care, medical needs, child support, and shelter. After the allowable expenses are deducted from gross income, the resulting net income must be at or below 100 percent of the federal poverty guidelines ($1,509 for a family of four in the continental United States in fiscal year 2003).

- ***Asset Screen***. Households may hold up to $2,000 in countable assets (or $3,000 in countable assets if at least one member is elderly or disabled). Countable assets include cash and assets that are easily converted to cash. In addition, the values of certain vehicles may be counted as assets. Some types of property, such as family homes, are not counted.

Certain households are considered categorically eligible for the FSP, and therefore are not subject to any of the income or asset screens. FSP households in which all members receive Supplemental Security Income (SSI) or cash benefits through TANF are categorically eligible for the FSP. In addition, some states have expanded categorical eligibility rules, wherein categorical eligibility is conferred based on the receipt of in-kind benefits from federally funded TANF programs.

Other individuals are categorically ineligible for the FSP, and therefore are not eligible to participate even if they meet the income and asset requirements. Most legal noncitizens who have lived in the United States for under five years are not eligible. In addition, nondisabled nonelderly adults living in households without children face time limits unless they work, participate in work-related activities (such as work, employment training, or job search), or meet one of several conditions that limit their ability or availability to work.

Once a household is authorized to participate, the monthly benefit is calculated based on a federal formula, with very little state variation. In 2003, most states provided benefits through an electronic benefit transfer (EBT) system. Benefits may be used at most grocery stores and many farmers' markets, and must be used to purchase food items only. Once participating, individuals must periodically recertify for benefits—a process similar to the initial application process. The certification period varies according to characteristics of the applicant, but generally ranges from 3 to 24 months.

B. PARTICIPATION RATE STUDIES

Participation rates measure the FSP program's effectiveness at reaching those who are eligible. Although rates for the FSP have been measured for the past 25 years, they became particularly important after the enactment of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996, which disqualified most noncitizens and placed time limits on many nondisabled nonelderly childless adults. The rates were used to determine how many individuals lost eligibility and how participation patterns changed among those who remained eligible, allowing policymakers to identify the groups most impacted by FSP and other assistance program changes. Currently, studies of participation rates help researchers identify specific groups of people for further analysis and help policymakers target outreach efforts.

National Participation Rates. Participation rates for the nation and key subgroups shed light on how participation varies by the demographic and economic characteristics of households. For example, in 2003, 56 percent of the total eligible population participated. However, 74 percent of eligible children participated, while 28 percent of eligible elderly individuals participated (Cunnyngham 2005). Similarly, 62 percent of individuals in households with no earnings participated, while 47 percent of individuals in households with earnings participated.

These national rates are derived directly from Current Population Survey (CPS) data, FSP Statistical Summary of Operations data, and Food Stamp Program Quality Control (FSPQC) data. The estimate of the number eligible is derived from a model that applies the FSP eligibility rules to the households in the Annual Social and Economic Supplement to the CPS.[1] The

[1] The CPS is a survey of approximately 77,000 households providing income and demographic information. The eligibility model distributes annual income amounts across months according to patterns observed in other data sources, determines the outcome of the gross income test, and then imputes both net income and the outcome of the asset test based on a variety of household characteristics (Cunnyngham 2005).

Statistical Summary of Operations data provide counts of individuals and households that were issued benefits as well as the total dollar value of the benefits in each month. The FSPQC data can be used to estimate the distribution of participants across subgroups.[2] The participation rates for 2003 do not include people who would fail the program's income tests but attain eligibility through participation in noncash public assistance programs (through the expanded categorical eligibility rules). These individuals have been excluded from both the estimates of the number eligible and the number participating.

State Participation Rates. While participation rates at the national level tell us how participation varies according to economic and demographic characteristics of the eligible population, participation rates at the state level tell us how participation varies according to geographic divisions. Castner and Schirm (2005) find substantial variation in participation rates from state to state. Although the participation rate for the nation was 56 percent in 2003, 38 states had rates that were significantly different from the national rate (22 were higher and 16 were lower).

The procedure used to estimate official state participation rates builds on the estimates of eligibles used for the national participation rates (Castner and Schirm 2006). However, because the CPS has very small sample sizes for most states, direct estimates of the number eligible in each state are imprecise (e.g., for Arkansas, a state with a typical level of imprecision, one could only be confident—at a 90 percent level of confidence—from the direct estimate that the participation rate in 2003 was between 50 and 64 percent). To improve precision, Castner and Schirm used empirical Bayes shrinkage methods to estimate state participation rates indirectly.

[2] The FSPQC sample data are collected by the U.S. Department of Agriculture to assist in determining issuance error rates. Included on the file are monthly-level income and demographic variables for all individuals in the sampled FSP household.

"Shrinkage" estimates of participation rates are derived by "borrowing strength," that is, by using data from other states or time periods. The assumption underlying shrinkage estimation for Arkansas in 2003, for example, is that what happened in other states in 2003 as well as what happened in Arkansas and other states in the past is relevant to what happened in Arkansas in 2003.

To construct the state participation rates for 2003, Castner and Schirm applied a four-step process:

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for both 2002 and 2003.
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data.
3. Using "shrinkage" methods, average the direct sample estimates and regression predictions to obtain preliminary shrinkage estimates of state food stamp participation rates.
4. Adjust the preliminary shrinkage estimates to align the state totals of eligible individuals with the national estimate of eligible individuals to obtain final shrinkage estimates of state food stamp participation rates.

On average, this four-step process improved the uncertainty by reducing the interval around the direct estimate to approximately three-fifths of its original size (e.g., in Arkansas, the interval of uncertainty was reduced so that the chances were 90 in 100 that the true rate was between 58 and 66 percent).

C. RESEARCH OBJECTIVES AND OVERVIEW OF APPROACH

The central objective of this report is to determine why state FSP participation rates vary. The overarching research questions addressed are:

- To what extent is the variation in state participation rates explained by differences in the composition of the FSP-eligible population in each state?

- How would states compare in terms of participation rates if we controlled for those factors beyond a state's control?
- To what extent is the variation explained by differences in state FSP, TANF, and Medicaid policies?
- To what extent is the variation explained by differences in state economic conditions?

Ultimately, we seek to provide federal and state policymakers with a clearer understanding of why participation rates vary as well as a method for comparing state participation rates in a way that controls for factors beyond each state's control.

To achieve these objectives, we employ a two-stage analysis. In the first stage, we estimate standardized state FSP participation rates. The standardization process is intended to make participation rates comparable across states by estimating what each state's participation rate would be if its FSP-eligible population resembled that of the nation as a whole. If differences in state participation rates were driven entirely by differences in state composition, then we would expect the standardized rates to be the same across states. Any variation in the standardized rates may therefore be explained by other factors specific to each state. The second stage of the analysis is a state-level model examining the degree to which differences in the standardized participation rates are explained by differences in state policy and economic characteristics.[3]

Our results suggest that differences in the composition of state eligible populations drives some of the variation in state participation rates. Key compositional factors include the proportion of the eligible population that is elderly and the proportion that has zero earnings.

[3] An alternative to the two-stage analysis conducted in this study would be to estimate a single hierarchical model that includes household and state components. In a hierarchical model, measures of the effects of state-level characteristics could be estimated with more precision. While such a model would be feasible, we adopt the two-stage approach for two reasons. First, a hierarchical model that does not explicitly control for the composition of each state can confound the within-state and between-state effects. With only 51 states, a hierarchical model in this context would not have sufficient degrees of freedom to adequately control for state composition. Second, the data used in this study are clustered and weighted (that is, they are not independent and identically distributed), and estimating hierarchical models with such data introduces significant complexities into the estimation procedures and analysis.

Our results also show that the variation in the standardized rates is uncorrelated with state policy and economic characteristics. This may suggest that state participation rates are driven by factors other than policy and economic conditions. However, it may also suggest that aggregate measures of these state characteristics do not capture the meaningful variation in these factors at the local level.

II. STANDARDIZED PARTICIPATION RATES

Differences in state FSP participation rates may result from differences in the types of households eligible for food stamps in each state or state policies and economic conditions. In this chapter we attempt to remove the first source of variation by answering the question, "To what extent do differences in the characteristics of a state's eligible population relative to the national eligible population lead to differences in the state's participation rate relative to the national participation rate?" To do this, we standardize the state participation rates based on the difference between the composition of each state's FSP-eligible population and the national FSP eligible population. The standardized rates enable us to compare participation rates across states without any differences that result from the observed characteristics of eligible individuals in the state.

Section A of this chapter examines previous research on standardization approaches that control for compositional differences as well as predictors of participation in the food stamp program. Section B describes the methods used to generate the standardized rates, including the data and statistical models. In Section C, we present the standardized rates and divide the differences in the direct (that is, unstandardized) and standardized rates into the components due to each of the household characteristics for which we standardize. Finally, Section D discusses policy implications of the standardized rates, especially as they relate to how well states enroll eligible individuals and lessons for how to increase participation rates. Chapter III uses these standardized rates to investigate the relationship between participation and state policies and economic conditions.

A. PREVIOUS RESEARCH

The idea of generating some measure of performance that removes compositional differences, as our standardized rates do, is not new. This idea has recently been applied in studies of health care quality, where the aim is to account for differences in patient characteristics that may also affect the outcome of interest when comparing physicians or hospitals. Similar issues also arise in education, where researchers are concerned with the students' background characteristics when trying to compare schools' performance.

In health care, the standardization is often called "case-mix adjustment." Case-mix adjustment is commonly done to account for differences in the patient characteristics that particular doctors or hospitals serve (Goldstein and Spiegelhalter 1996, Christiansen and Morris 1997). For example, when comparing the mortality rates at different hospitals, the health of the patients when they enter the hospital must be taken into account—hospitals that attract many critically ill patients may have higher mortality rates than other hospitals, regardless of the quality of care those patients receive. These ideas are also used in payment structures that pay hospitals (or physicians) amounts that reflect the types of patients they treat.

Zaslavsky (2001) describes a case-mix adjustment model similar to that used in this report. Zaslavsky models the predicted value of some outcome of interest (e.g., mortality) as the sum of two components: (1) that due to observed patient characteristics, and (2) that due to the unit (e.g., a hospital) at which the patient is treated. As described in more detail below, we use the same approach here, modeling FSP participation as a function of household characteristics as well as the state in which a household resides. Zaslavsky (2001) also discusses some of the statistical issues in using case-mix adjustment methods.

Several studies have examined which factors are correlated with high or low FSP participation rates—factors that are likely important when standardizing participation rates. According to Cunnyngham (2005), while overall, 56 percent of eligible individuals participated in the FSP, the participation rate varies considerably across different types of individuals. Over 75 percent of eligible children, individuals in the poorest households, and TANF recipients participated in the FSP program. In contrast, fewer than one-third of eligible elderly individuals and fewer than one-half of eligible individuals in households with earnings participated in the FSP. Eligible noncitizens and nondisabled childless adults subject to work registration were also relatively less likely to participate in the FSP.

Other studies have found similar patterns of participation. Gleason et al. (1998) provide a review of the literature on FSP participation, finding results generally consistent with Cunnyngham (2005). Gleason et al. report that FSP participation rates are "highest among nonwhite and nonelderly people, and people living in households that: are low income, include children, do not own their own home, are eligible for the highest FSP benefits, have a household head that is not well educated, [or] include members who participate in other welfare programs such as [Aid to Families with Dependent Children (AFDC)] or Medicaid."

Farrell et al. (2003) examine in more detail how FSP participation is related to monthly income and earnings. They find that many nonparticipating households have had a short-term drop in income while other nonparticipating households have low income over a longer time period. Farrell et al. conclude that households with long-term low income may not participate in the FSP because the same factors that limit income (e.g., low literacy or disability) may also hinder their FSP participation. In contrast, nonparticipating households with a short-term drop in

income may not participate in the FSP because those households may believe their drop in income is temporary.[4]

B. DATA AND METHODS

Our approach to standardizing state FSP participation rates involves three steps. First, we use a logistic regression model to predict FSP participation among eligible households as a function of household characteristics. The coefficients of that model reflect the likelihood that eligible households of a given type will participate in the FSP, controlling for other household characteristics. Second, using the estimated coefficients for each household characteristic, combined with estimates of how each state differs from the nation as a whole with respect to that characteristic, we compute initial standardized participation rates. Third, we use shrinkage estimation techniques to derive standardized state participation rates that are comparable to the official FSP participation rates.

This section describes the data and estimation techniques used to compute standardized FSP participation rates. We first describe the data sources and then discuss the predictors of FSP participation our model incorporates. We then discuss the logistic model used to estimate the relationship between individual and household characteristics and FSP participation. Finally, we describe the steps used to standardize the state FSP participation rates using the results of the logistic model.

1. Data

To compute the standardized state FSP participation rates, we use the same data from 2003 on the number of participants and the number of eligible households that is used to compute the

[4] Chapter III provides additional details on studies of the determinants of FSP participation.

national and official state FSP participation rates (Cunnyngham 2005; Castner and Schirm 2005).[5] Using CPS data, we simulate eligibles by comparing the income and other characteristics of each household with the FSP rules. Because the CPS does not capture all of the information needed to determine whether each sampled household would be eligible for the FSP, we estimate the probability that each household is eligible for the FSP, rather than classifying a household as eligible or ineligible. Additional details about these methods can be found in Cunnyngham (2005).

The number of participating individuals is derived from the FSPQC. Although the CPS inquires about FSP participation, there is substantial underreporting of program participation. The FSPQC is collected primarily to monitor FSP payment errors in each state. The data include a monthly random sample of active food stamp cases and contain detailed information on the income and characteristics of each household in the sample. The FSPQC sample is representative at the state level and is weighted to state population counts of program participants each month.

To standardize the state participation rates, we use the same two data sources. That is, we use CPS data to estimate the number of eligible households and FSPQC data for the number of participants. In order to estimate the logistic regression in a way that utilizes both data sets, we estimate the model using a "concatenated data set" that contains all observations of eligible households from the CPS and all observations from the FSPQC.[6] The model is estimated using variables that are similarly defined in both data sets, plus an additional variable indicating the data source (FSPQC or CPS).

[5] The data for 2003 was the latest set of data available while this study was conducted.

[6] To include all observations of eligible households from the CPS, we include all households with a predicted probability of food stamp eligibility greater than zero.

One requirement of using this approach of concatenating the two datasets is that the populations represented by the CPS and FSPQC need to be the same, other than the fact that the FSPQC contains just food stamp participants. The two files need to cover the same geographic area, time period, demographic groups, etc. This requirement is also the case when obtaining the "official" FSP participation rates that use the FSPQC and CPS (Cunnyngham 2005). Although we believe that the two data sources cover the same population overall, as we discuss further in Appendix B, there may be subtle differences in the coverage of particular types of households.

2. Predictors of FSP Participation

To standardize the state participation rates, we employ a model that estimates FSP participation as a function of various household characteristics. Our initial list of covariates (household characteristics) was developed after reviewing previous literature on factors associated with variation in FSP participation (Kornfeld 2002, Gleason et al. 1998) as well as by examining national participation rates (Cunnyngham 2005) to determine which characteristics have been associated with large differences in FSP participation rates.

The set of variables selected for the model of household-level FSP participation includes household composition—such as the presence of children or elderly household size—earnings as a percentage of the poverty line, and the size of the food stamp benefit for which the household would be eligible (expressed as a percentage of the maximum benefit). The full list of variables is shown in Table II.1.

Although TANF is highly predictive of food stamp participation (Cunnyngham 2005), we do not include information on TANF receipt in the model for two reasons. First, on a practical level, TANF eligibility—and thus TANF participation—varies across states, with states having

TABLE II.1

COVARIATES USED IN HOUSEHOLD-LEVEL MODEL

General Household Type
- Single Nonelderly Adult (Age 18-59) And One Or More Children, With At Least One Child Age 0-4
- Single Nonelderly Adult And One Or More Children, With No Children Age 0-4
- Multiple Nonelderly Adults And One Or More Children, With At Least One Child Age 0-4
- Multiple Nonelderly Adults And One Or More Children, With No Children Age 0-4
- One Or More Nonelderly Adults, Without Children Or Elderly
- One Or More Elderly, Without Children Or Nonelderly Adults
- One Or More Elderly, With Children Or Nonelderly Adults
- Children Only

Gender Mix Of Nonelderly Adults In Household
- No Nonelderly Adults In Household
- All Male
- All Female
- Mixed

Household Size

Race/Ethnicity Of Household Head
- Hispanic
- Black Non-Hispanic
- White Non-Hispanic
- Other (Includes Individuals Who Chose More Than One Race In The CPS)

Any Noncitizens In Household

Any SSI Payments
- SSI To Nonelderly Adult (Age 18-59)
- SSI To Child Or Elderly
- SSI To Both Nonelderly Adult And Child Or Elderly
- No SSI

Any Household Unemployment Compensation

Nondisabled Childless Adult Subject To Work Registration, With Earnings
Nondisabled Childless Adult Subject To Work Registration, Without Earnings

Household Earnings As Percent Of Poverty
- 0
- 1-50
- 51-100
- 101-130
- 131+

FSP Benefit As Percent Of Maximum
- 1-25
- 26-50
- 51-75
- 76-99
- 100

Household Consists Of Single Mother With Earnings < 150 Percent of Poverty And Her Children

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different requirements and rules. Thus, a household that receives TANF in one state may not necessarily receive TANF in another (for example, a household in Massachusetts may not receive TANF if it was located in Texas instead). In this way, the meaning and interpretation of the variable depends on the state. Because our model requires us to know what each household's characteristic would be in each state, we cannot include TANF receipt without at least a simulation of participation for each household in each state.

The second reason for excluding TANF receipt from the household-level model is more conceptual. Since TANF eligibility—and thus receipt—depends on state policies, TANF receipt could be affected by the key analysis variables in the state-level model discussed in Chapter III. If we were to standardize participation rates based on a household's TANF receipt, it would be difficult to interpret how state TANF policies affect state FSP participation rates. As a result, we estimate the household level model using household characteristics that are not directly influenced by the key policy variables examined in the subsequent state-level model.[7]

3. The Logistic Model

The standardization process is used to remove the effects of differences in the composition of FSP eligible populations across states. Intuitively, the standardization process estimates the FSP participation rate a state would have if its eligible population were the same as the national eligible population. For example, given that the elderly participate in the FSP at a low rate, would Florida's participation rate be higher if it had fewer elderly households in its FSP eligible population? This standardization is accomplished for each state by estimating the probability that each eligible household in the CPS would participate in the FSP if it was in that state.

[7] To address this issue, we also examined participation rates for a subgroup of households most likely to be eligible for TANF in all states: low-income single mothers. This group is defined by household characteristics with the same meaning across states and can be thought of as a proxy for TANF recipients. See Appendix B for more details.

The logic behind the standardization process can be seen by considering a simple example. Consider a setting where instead of having many household characteristics that affect participation, there were just two types of households that participate in the food stamp program, and that each state had at least some of these two types of eligible households. To compute standardized participation rates in that setting, we could simply compute the participation rate for each household type in each state and then, for each state, average across the household participation rates, weighting each household type by the proportions observed in the entire nation rather than just in the state. For example, suppose a state's eligible population was composed of 20 percent type 1 households and 80 percent type 2 households, but the national eligible population had 50 percent of each type. We would calculate the state's participation rate for the two types of households in that state (assume the rates are 30 percent and 60 percent for the two types, respectively). While the actual state participation rate is P(participate|type1)P(type1) + P(participate|type2)P(type2) = 0.3*0.2 + 0.6*0.8=0.54, to obtain the standardized rate we replace the P(type1) and P(type2) with the national averages and obtain 0.3*0.5 + 0.6*0.5=0.45. This 45 percent reflects the participation rate the state would have if its eligible population looked like the national eligible population, with 50 percent of households of each type. This type of standardization is "direct standardization."

In reality, there are many characteristics of households that affect participation rates, so the direct standardization method is infeasible. But the logic of the method we use remains the same. Instead of calculating a participation probability for each household type, we use "indirect standardization," fitting a logistic regression model that predicts household participation probabilities given a set of observed household characteristics. This helps smooth the estimated probabilities across the covariate values and is particularly helpful if there are small numbers of households of a particular type.

The logistic model predicts household-level food stamp participation given the set of household characteristics described in above. In particular, a weighted logistic regression model is run on the concatenated data set with all FSPQC observations (representing FSP participants) and all CPS observations (representing all FSP eligibles), with a "response variable" indicating whether each observation is from the FSPQC.[8] This model is expressed as:

$$\log(\frac{F_{is}}{1-F_{is}}) = H_{is}\phi + \gamma_s, \qquad (1)$$

where F_{is} is an indicator for being in the FSPQC, H_{is} are the characteristics of household *i* in state *s*, and the γ_s are state-specific "fixed effects," described below. The household characteristics term reflects the relationship between observed household characteristics and participation, while the state fixed effects reflect the different participation probabilities that households with the same characteristics would have in different states.[9] We assume that the relationship between each household characteristic and participation is the same across all states (i.e., we do not allow the coefficients of each household characteristic to vary across states).

As mentioned, this logistic regression is not estimating the probability that we would like. We would like to estimate the participation rate *R=P/E*, where *P* is the number of participating households—households represented by the FSPQC sample—and *E* is the number of eligible households—households represented by the CPS sample. However, using the concatenated data set with both FSPQC and CPS households, we define a "success" in the logistic regression as being in the FSPQC (being a participant). Because a participating household is represented

[8] For this household-level model, the weights for CPS households were equal to their CPS sampling weight times their probability of eligibility. The weights for FSPQC households were equal to their FSPQC sampling weights.

[9] To estimate the model we must have one "omitted" state for which we do not estimate a fixed effect; that state's implied fixed effect is 0.

twice in the concatenated data set—once as an eligible household in the CPS and once as a participating household in the FSPQC, the logistic regression is instead estimating *F=P/(E+P),* the number of participating households out of the number of eligible households *plus* the number of participating households.[10]

We can obtain the quantity that we would like using a simple transformation of the probabilities predicted from the logistic regression. The logistic regression yields a predicted probability for household *i* in state s of $\hat{F}_{is} = \frac{e^{H_{is}\hat{\phi}+\hat{\gamma}_s}}{1+e^{H_{is}\hat{\phi}+\hat{\gamma}_s}}$. To get that household's predicted probability of participation *(R),* we transform *F: R=g(F)=F/(1-F).* The formula for the participation probability R for household *i* in state s then reduces to $R_{is} = e^{H_{is}\hat{\phi}+\hat{\gamma}_s}$.

One additional complication of this transformation is that the resulting standardized participation rates may be greater than 100 percent. Although the probabilities obtained directly from the logistic regression *(F)* are constrained between 0 and 1, the participation rate we generate, *R,* does not have the same constraint, and in fact can be between 0 and infinity. This issue is discussed further below as well as in Appendix B, where we discuss an alternative model that constrains the rate *R* to between 0 and 1.

The next step after fitting the logistic regression model is to calculate the initial standardized participation rate for each state. The initial standardized participation rate reflects the predicted number of participating individuals over the number of eligible individuals. For each state, one at a time, the numerator—the predicted number of participating individuals—is obtained by calculating the probability that each household in the nation would participate, *if the household*

[10] If the FSPQC and CPS consisted of *all* participating and *all* eligible households, rather than samples of such households, it would be easy to see that the participating households are in both the FSPQC and the CPS and, thus, are in the concatenated data set twice. In reality, where the FSPQC and CPS are samples of participating and

was in that state, and adding those probabilities over all eligible households in the nation. For example, when calculating the initial standardized participation rate for New York, for each eligible household in the CPS (regardless of the household's home state), we calculate the quantity in Equation 1 with that household's values for H but New York's fixed effect (γ_s). We then add those probabilities across all eligible households in the CPS. The denominator, the number of eligible households, is the same for every state: the number of eligible households in the nation as a whole. Thus, across the states, the only difference in the initial standardized participation rates comes through differences in their fixed effects.

The initial standardized rate for state *s* can be expressed as:[11]

$$r_s^{'} = \frac{\sum_{s'=1}^{51} \sum_{i \in s'} w_{is'} e^{H_{is'}\hat{\phi}+\hat{\gamma}_s}}{\sum_{s'=1}^{51} \sum_{i \in s'} w_{is'}} \qquad (2)$$

The two summation signs in the numerator and denominator refer to adding up the probabilities across all households *(i)* in all states *(s')*. The numerator has two terms: $w_{is'}$ is the CPS weight, which includes the probability of eligibility, while the $e^{H_{is'}\hat{\phi}+\hat{\gamma}_s}$ term gives the probability that household *i* would participate if it was in state *s*. The only difference from a household's

(continued)
eligible households, it is unlikely that any individual household would be in both data sets. However, the participating households are *represented* twice, once in the FSPQC and once in the CPS.

[11] For each household i, the weight $w_{is'}$ is the sum of the CPS sampling weights for each individual in household i multiplied by the probability that household i is eligible for food stamps. This yields a standardized participation rate among eligible individuals. Note that this weight is different from that used in the logistic regression. The regression is estimated over eligible households since FSP participation is a household-decision. Therefore, the regression uses a household-level weight. Here, we apply the regression results uniformly to each individual in the household to generate a person-level participation rate similar to the official state participation rates, which also are person-level.

predicted probability in its own state *(s')* is the fixed effect, which instead is from state *s*. The sum across all households of the product of these two terms gives the predicted number of participating households in state *s*. The denominator is the sum of the weights across all households in all states and thus is the number of eligible households in the nation as a whole.

This process describes the derivation of household-level participation rates. Individual-level participation rates also are generated by multiplying each household's probability of participation by the household size. This gives each individual in a household the household's probability of participation.

4. Examples of the Standardization Process

To clarify this method we provide two illustrative examples. For simplicity, in all of these examples we assume that all eligible households are in the CPS and all participating households are in the FSPQC. In other words, we assume that the sampling weights for the FSPQC and CPS are 1 for all households.

Example 1. Two States and One Household Type. Consider a situation with two states and only one type of household (no covariates). Suppose all households in State 1 have a participation probability of 0.4 while all households in State 2 have a participation probability of 0.8, and that there are 400 eligible households in State 1 and 200 eligible households in State 2. There are thus 400*0.4=160 participating households in State 1, and 200*0.8=160 participating households in State 2. The concatenated data set will thus contain 400+200+160+160=920 observations: 600 eligible households from the CPS and 320 participating households from the FSPQC.

Since there are no covariates, the logistic regression has just an intercept and a fixed effect for State 2. State 1 is the omitted state in the sense that its fixed effect is set to 0: $\gamma_1 = 0$.

Estimating this model on all 920 cases in the concatenated data set, we obtain the following parameter estimates:

$$\log\left(\frac{H_{is}}{1-H_{is}}\right) = -0.9163 + 0.6931 * STATE2 .$$

The estimated fixed effect for State 2 is greater than 0, $\hat{\gamma}_2 > 0$, because State 2 has a higher participation rate than State 1. For each state, the initial standardized participation state participation rate is obtained using the following formula:

$$r'_s = \frac{\sum_{s'=1}^{2}\sum_{i\in s'} e^{H_{is'}\hat{\phi}+\hat{\gamma}_s}}{\sum_{s'=1}^{2}\sum_{i\in s'} 1},$$

which follows from the formula given above for the initial standardized participation rates, simplified for the case with two states and all weights equal 1. The sums are over all households in the CPS (that is, all eligible households) for each state. In this example, there are 400+200=600 such households. The direct (that is, unstandardized) and standardized rates are presented in Table II.2.

TABLE II.2

RATES FROM STANDARDIZED RATE EXAMPLE 1

State	Direct Rate	Standardized Rate
1	40%	40%
2	80%	80%

The direct rates are calculated by dividing the number of participating households in each state by the number of eligible households in that state. In this example, the standardized rates equal the direct rates; without any covariates, the distributions of households are observationally

the same across the two states and the population to which the rates are standardized is the same as the population within each state. Thus, there is no standardization required.

Example 2. Two States and Two Household Types. Now consider two states and two types of households. Assume that the proportions of Type 1 households in the population of eligible households is different between the states. Although the states have the same participation rates for each type of household, the unstandardized rates are different because of different compositions of the eligible households in the two states (Table II.3).

TABLE II.3

DISTRIBUTIONS FROM STANDARDIZED RATE EXAMPLE 2

	State 1	State 2
Number of eligible households	400	200
Percent of HH of Type 1 (Number)	20% (80)	80% (160)
HH Type 1: Participation Probability (Number of Participants)	40% (32)	40% (64)
HH Type 2: Participation Probability (Number of Participants)	70% (224)	70% (28)

In this case, the concatenated data set will have a total of 948 observations: 600 from the CPS, and 32+224+64+28=348 from the FSPQC. Fitting a logistic regression to the concatenated FSPQC and CPS data, the estimated model is:

$$\text{logit } F(H_{is}, s) = -0.9163 + 0.5596 * TYPE - 0 * STATE2 .$$

State 1 is again the omitted state, and thus γ_1 is set to 0. In this case, because both states have the same participation probabilities for the two household types, γ_2 is estimated to be 0.

The direct and standardized rates for the two states are presented in Table II.4. Even though the participation probabilities for each household type are the same in the two states, the different compositions of the eligible population in the two states make the direct participation rates quite

different. However, the standardized rates are equal, reflecting the fact that the state participation rates would be the same if the two states had the same eligible populations. We also note that if the "TYPE" variable is omitted from the model, the standardized rates will be equal to the direct rates because there would be no apparent difference between the distributions of households in the two states according to the model: the model does not account for differences that may exist between states in household characteristics that are not included in the model.

TABLE II.4

RATES FROM STANDARDIZED RATE EXAMPLE 2

State	Direct Rate	Standardized Rate
1	64%	58%
2	46%	58%

5. Shrinkage Estimation

So far, we have discussed how to estimate two sets of FSP participation rates:

(1) The **direct rates** are computed as the number of FSP participants divided by the estimated number of FSP-eligible individuals in each state, and

(2) The **initial standardized rates** reflect the direct rates adjusted for compositional differences (based on the results of the logistic model)

Two other sets of the state FSP participation rates are:

(1) The **official rates** obtained when Bayesian shrinkage estimation techniques are applied to the direct rates, and

(2) The **shrinkage standardized rates** obtained when Bayesian shrinkage estimation techniques are applied to the initial standardized rates.

The difference between the direct estimate of the FSP participation rate and the initial standardized estimate of the FSP participation rate for a state reflects the effects of adjusting for compositional differences in state FSP eligible populations. That is, a state's initial standardized rate may be higher than its direct participation rate because it has a proportionally large population of eligible individuals with a low propensity to participate in the FSP. However, comparing the initial standardized FSP participation rates to the official state participation rates published by USDA (Castner and Schirm 2005) could be misleading because the official rates are derived using Bayesian shrinkage methods to improve the precision of the estimated rates. To obtain standardized rates that are comparable to the official rates, we applied shrinkage estimation methods to the initial standardized participation rates.

To derive shrinkage estimates of standardized rates, we estimated a regression model to predict the standardized FSP participation rates as a function of state characteristics. Examples of characteristics included in the model are the poverty rates for key populations such as the elderly and children, average adjusted gross income (from tax return data), the percentage of households that rent their living quarters, and the percentage of households receiving unemployment compensation. We then use shrinkage estimation to average the standardized participation rates with the regression predictions. The shrinkage estimation gives more weight to those standardized rates with lower variance (that is, those rates where we have more confidence in the estimate).[12]

[12] See Castner and Schirm (2006) for more details on shrinkage estimation techniques.

The resulting shrinkage estimates of the standardized FSP participation rates are not only more comparable to the official state FSP participation rates, but also more precise in that they have narrower confidence intervals. The shrinkage techniques reduce the total variation in standardized participation rates by 37 percent.[13]

In the following section, we discuss all four types of participation rates. We present the direct and initial standardized rates for two reasons. First, we can only derive estimates of the effects of compositional differences on state participation rates by comparing the direct rates with the initial standardized rates. While we would prefer to distinguish the differences between the official participation rates and the shrinkage standardized rates, such a distinction would be misleading because of the statistical modeling used in applying shrinkage methods.[14] Second, for the same reason, we use the initial standardized participation rates in the state-level model (discussed in Chapter III). We present the official rates and the shrinkage standardized rates for two reasons. First, the shrinkage standardized rates are more comparable to the official participation rates, and second, the shrinkage standardized rates are more precise estimates of the standardized state participation rates.

C. RESULTS

This section presents the results of the standardization process. We first describe the results of the logistic model to identify predictors of FSP participation. We then present initial standardized participation rates and describe how state compositional factors affect participation

[13] See Section C, Table II.11 for more details.

[14] The shrinkage estimation process uses regression techniques to incorporate data from other states, time periods, and data sources. We do not use the shrinkage estimates of the direct rates as the basis for the standardized rates because the standardization process would be likely to simply uncover the adjustments made through the shrinkage estimation's regression. Similarly, we do not use the shrinkage estimates of the standardized rates as the basis for the state-level model because the state-level model would simply uncover the adjustments made through the shrinkage process.

rates. Finally, we present the shrinkage participation rates and compare them with the official participation rates.

1. Predictors of Participation

The logistic model allows us to examine the household characteristics that are associated with FSP participation. Table II.7 presents the coefficient values obtained from the logistic regression of participation on the set of household characteristics in Table II.1, indicating the characteristics that are associated with FSP participation. One caution in interpreting these coefficients is that this was a multivariate model and that the full set of characteristics are not mutually exclusive. Thus, for example, when determining the predicted participation rate for a household composed of a white single mother with one child under age 4, we would add the coefficients for household type 1, with all female adults, two people, white non-Hispanic household head, plus the appropriate coefficients for the household earnings and FSP benefit.

Nonetheless, the results are generally consistent with previous studies that examine the determinants of FSP participation, summarized in Section B. In Table II.5 we see that characteristics associated with higher levels of participation include having one or more children (particularly those between the ages of 0 and 4), having no nonelderly adults in the household or having only male or only female adults, having a child or elderly individual in the household receiving SSI, and having low household earnings (particularly below 100 percent of the poverty line). The primary factors associated with lower levels of participation include having an elderly person in the household and being a nondisabled childless adult subject to work registration.[15]

[15] The positive coefficient on the variable indicating that there is a noncitizen in the household—suggesting that households with noncitizens participate at higher rates than households without noncitizens—is counterintuitive. Conventional wisdom suggests that noncitizens are less likely to participate in the FSP. This may be explained by issues of survey "coverage" for the CPS; the CPS could have an undersample of noncitizens. If so, the CPS likely would yield an underestimate of the number of eligible households with noncitizens, which would artificially inflate

2. Initial Standardized State Participation Rates

Table II.6, Figure II.1, and Figure II.2 present the initial standardized state FSP participation rates (in Figure II.1 and Figure II.2, the states are sorted by the direct participation rate). The table and figures also show the direct FSP participation rates for each state, estimated as the number of participating households in the state (according to the FSPQC) divided by the number of eligible households in the state (according to CPS data). Both of these rates represent the percentage of eligible *individuals* participating in the FSP in each state. To reflect the uncertainty with which these rates are estimated, we also provide 90 percent confidence intervals.[16] For simplicity, Figure II.1 only shows the confidence intervals for the standardized rates; Figure II.2 presents the same participation rates as Figure II.1, but it also includes the confidence intervals for the direct participation rates.[17] All confidence intervals were derived using a jackknife procedure followed by smoothing using a generalized variance function (Wolter 1985).[18]

The standardized and direct participation rates presented here both effectively include the state fixed effects. That is, the standardized rates reflect what each state's participation rate would be if that state resembled the nation as a whole in terms of the composition of eligible households, but still had a state fixed effect. The differences between the standardized and the

(continued)
the implied participation rate for this group and lead our model to predict the presence of noncitizens as a factor that increases the probability of participation in the FSP.

[16] In actuality, the direct rates also have confidence intervals associated with them. For simplicity we present only the confidence intervals for the standardized rates.

[17] Formal tests of the significance of the difference between direct and standardized participation rates would need to account for the correlation between these rates.

[18] See Appendix A for more details on the variance estimation procedure.

direct participation rates, therefore, reflect the differences between the compositions of the state and national eligible populations.

TABLE II.5

COEFFICIENT ESTIMATES, LOGISTIC MODEL OF FSP PARTICIPATION

	Coefficient	Standard Error
Intercept	-4.0299	(0.0147)
General Household Type		
Single Nonelderly Adult (Age 18-59) And One Or More Children, With At Least One Child Age 0-4	Omitted	
Single Nonelderly Adult And One Or More Children, With No Children Age 0-4	-0.2444	(0.0017)
Multiple Nonelderly Adults And One Or More Children, With At Least One Child Age 0-4	0.6200	(0.0038)
Multiple Nonelderly Adults And One Or More Children, With No Children Age 0-4	0.2529	(0.0039)
One Or More Nonelderly Adults, Without Children Or Elderly	0.3512	(0.0041)
One Or More Elderly, Without Children Or Nonelderly Adults	-2.2898	(0.0076)
One Or More Elderly, With Children Or Nonelderly Adults	-1.6976	(0.0046)
Children Only	-0.4541	(0.0077)
Gender Mix Of Nonelderly Adults In Household		
No Nonelderly Adults In Household	1.1429	(0.0071)
All Male	0.2858	(0.0024)
All Female	0.3016	(0.0022)
Mixed	Omitted	
Household Size	-0.0519	(0.0005)
Race/Ethnicity Of Household Head		
Hispanic	-0.0341	(0.0015)
Black Non-Hispanic	0.2180	(0.0011)
White Non-Hispanic	Omitted	
Other	0.0902	(0.0023)
Any Noncitizens In Household	0.1320	(0.0021)
SSI Payments		
SSI To Nonelderly Adult (Age 18-59)	-0.0814	(0.0025)
SSI To Child Or Elderly	1.8735	(0.0019)
SSI To Both Nonelderly Adult And Child Or Elderly	1.4191	(0.0064)
No SSI	Omitted	
Any Household Unemployment Compensation	0.4082	(0.0031)
Nondisabled Childless Adult Subject To Work Registration, With Earnings	-0.8370	(0.0036)
Nondisabled Childless Adult Subject To Work Registration, Without Earnings	-0.5524	(0.003)
Household Earnings As % Of Poverty Line		
0	2.7805	(0.0139)
1-50	2.8413	(0.0140)
51-100	2.0805	(0.0140)
101-130	1.3732	(0.0141)
131+	Omitted	
FSP Benefit As % Of Maximum		
1-25	0.1132	(0.0016)
26-50	0.5153	(0.0016)
51-75	0.5442	(0.0016)
76-99	0.5201	(0.0015)
100	Omitted	
Household Consists Of Single Mother and Her Children, with Earnings < 150% Of Poverty Line	0.7087	(0.0031)

TABLE II.6

DIRECT AND INITIAL STANDARDIZED 2003 FSP PARTICIPATION RATES

	Direct Participation Rate	Initial Standardized Participation Rate	Lower Bound of Confidence Interval of Standardized Rate (90%)	Upper Bound of Confidence Interval of Standardized Rate (90%)
Alabama	54.1	43.9	37.3	50.5
Alaska	61.5	56.3	46.4	66.2
Arizona	65.0	62.8	54.2	71.5
Arkansas	60.1	56.7	48.9	64.6
California	45.3	42.5	38.3	46.8
Colorado	45.5	46.5	40.5	52.5
Connecticut	53.8	54.0	45.7	62.4
Delaware	54.8	63.0	52.4	73.6
District of Columbia	74.3	69.7	58.6	80.9
Florida	48.9	59.7	53.4	66.1
Georgia	67.5	65.8	56.3	75.4
Hawaii	79.1	91.4	77.5	100.0
Idaho	54.2	62.3	51.8	72.8
Illinois	60.6	67.0	58.0	75.9
Indiana	63.6	69.8	60.1	79.5
Iowa	57.2	62.6	54.0	71.3
Kansas	53.0	52.3	44.6	60.0
Kentucky	68.9	66.7	57.2	76.1
Louisiana	66.2	63.3	54.3	72.2
Maine	69.9	87.1	74.8	99.5
Maryland	48.1	45.3	38.3	52.2
Massachusetts	40.5	39.3	32.4	46.2
Michigan	65.1	59.0	50.5	67.5
Minnesota	63.1	57.9	49.1	66.7
Mississippi	67.9	62.7	53.7	71.6
Missouri	89.5	99.7	86.3	100.0
Montana	44.6	46.2	40.5	52.0
Nebraska	60.5	67.9	56.9	79.0
Nevada	41.0	52.0	43.5	60.4
New Hampshire	49.7	54.7	45.0	64.5
New Jersey	48.7	48.9	44.2	53.5
New Mexico	53.0	53.0	45.8	60.3
New York	50.2	51.9	46.7	57.0
North Carolina	45.4	43.3	36.5	50.0
North Dakota	57.8	60.6	50.6	70.7
Ohio	65.2	63.4	54.9	71.9
Oklahoma	73.0	69.3	59.7	78.9
Oregon	85.7	105.1	90.3	100.0
Pennsylvania	54.0	56.7	48.9	64.6
Rhode Island	51.9	46.5	40.2	52.7
South Carolina	65.9	61.4	53.1	69.7
South Dakota	54.3	57.0	46.1	67.8
Tennessee	83.1	86.1	73.5	98.6
Texas	47.4	47.1	43.5	50.7
Utah	50.9	58.8	49.2	68.5
Vermont	60.8	67.9	55.0	80.8
Virginia	51.5	54.6	46.4	62.8
Washington	51.4	55.2	47.3	63.2
West Virginia	64.9	76.9	66.5	87.2
Wisconsin	53.3	49.5	41.8	57.2
Wyoming	49.2	51.0	42.3	59.8

FIGURE II.1

DIRECT AND INITIAL STANDARDIZED 2003 FSP PARTICIPATION RATES
WITH 90 PERCENT CONFIDENCE INTERVALS FOR STANDARDIZED RATES

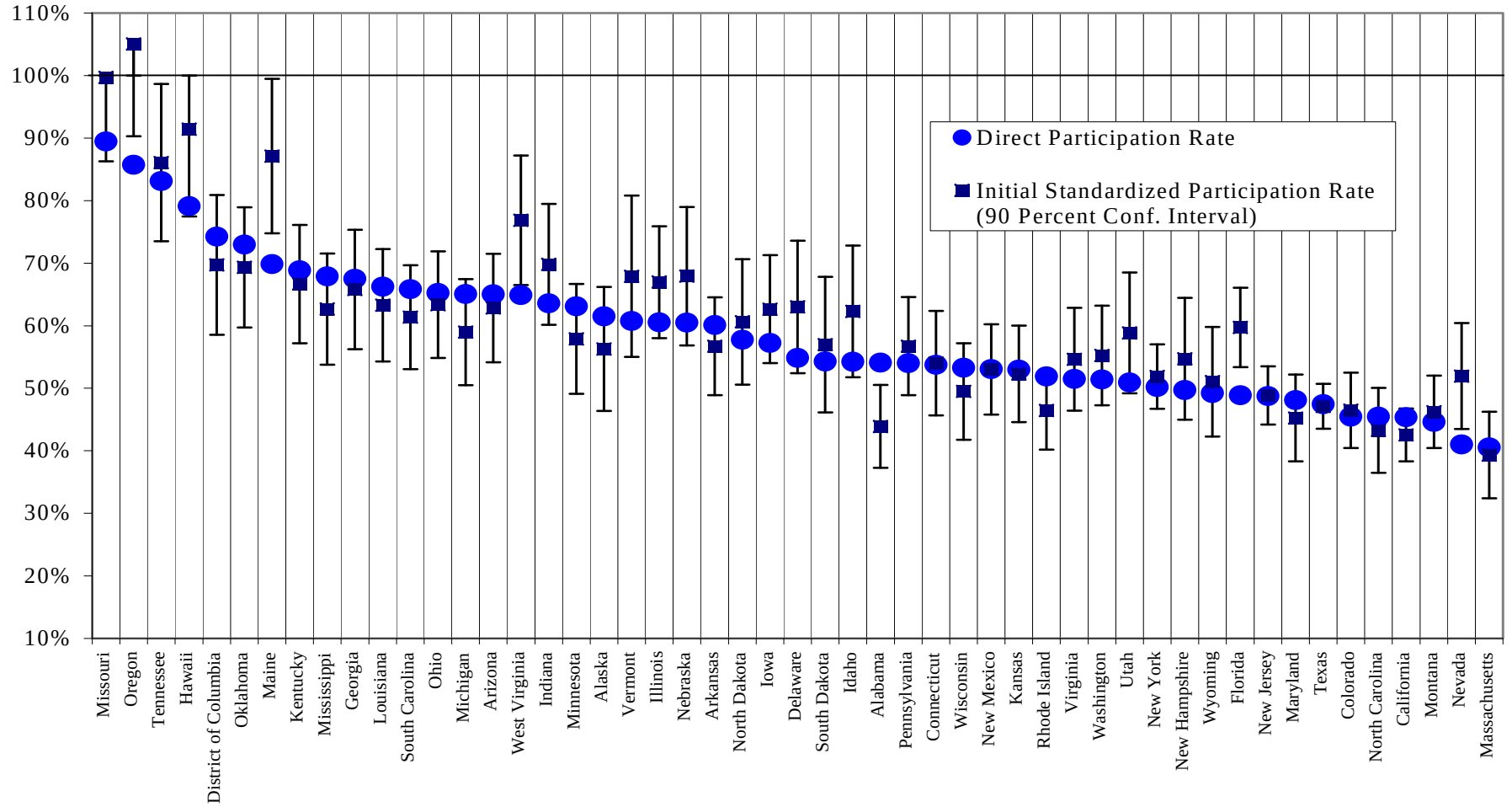
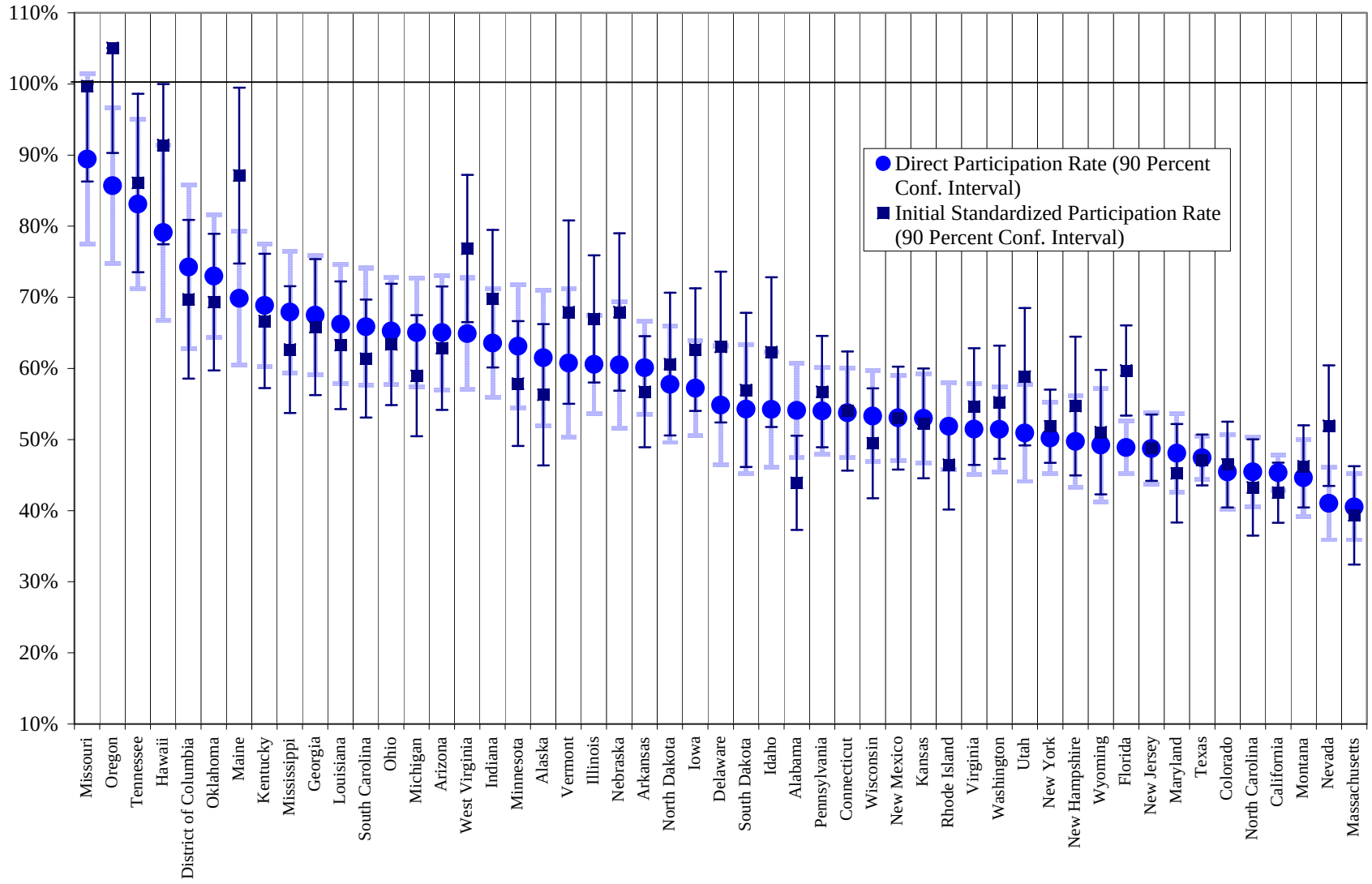


FIGURE II.2

DIRECT AND INITIAL STANDARDIZED 2003 FSP PARTICIPATION RATES
WITH 90 PERCENT CONFIDENCE INTERVALS FOR BOTH RATES



A standardized rate higher than the direct estimate means that the state has an eligible population composed of households less likely to participate in the FSP. For 28 states, the standardized participation rate is higher than their direct estimate, while the reverse is true for the remaining 23 states.[19] The states with the largest increases from direct participation rate to standardized participation rate include Oregon (19 percentage points), Maine (17 percentage points), Hawaii and West Virginia (12 percentage points), Nevada and Florida (11 percentage points), and Missouri (10 percentage points). The states with the highest direct rates tend to also have the highest standardized rates.

A standardized rate lower than the direct estimate means that the state has an eligible population composed of households more likely to participate in the FSP. The five states with the largest decreases from direct participation rate to standardized participation rate include Alabama (10 percentage points), Michigan (6 percentage points), and Rhode Island, Alaska, Mississippi, Minnesota, Mississippi, the District of Columbia, and South Carolina (5 percentage points).

3. Household Characteristics Associated with Changes in Rates

To understand how household characteristics influence the variation in state participation rates, we decompose the difference between each state's direct participation rate and a national participation rate. Using the coefficients from the logistic regression, combined with national values for the covariates, we derive the national participation rate implied by the model. For each state, we then compute a series of *n* incremental standardized rates (where *n* is the number of covariates in the logistic model) replacing the national mean for the each covariate with the

[19] Because the participation rates are standardized to the national population, and because different states have different sized populations, we would not expect the standardization process to lead to an equal number of increases and decreases in participation rates.

actual state value for that covariate. For example, we can compute one incremental standardized rate for Alabama using the national means for all covariates except household size, and a second rate using the national means for all covariates except the proportion of households headed by a Hispanic, etc.[20] The difference between the national rate and each incremental rate reflects the component effect for each state. Specifically, they show the factors that cause each state's direct rate to differ from the national participation rate.

The magnitude of the component effect is driven by two factors: (1) the size of the coefficient from the logistic model, and (2) the magnitude of the difference between the state value of the covariate and the national value of the covariate. Therefore, even if a state looks markedly different from the nation as a whole along a given covariate, the effect of that difference may be small if the coefficient for that covariate is small.

To interpret component effects, we must keep in mind the purpose of the standardization process. For each state, the standardization process estimates what the participation rate would be if the state eligible population was the same as the national population. As stated above, a state's standardized rate could be higher than the national rate because its population is composed of households less likely to participate in the FSP. This can happen in two ways: (1) relative to the nation as a whole, a state could have a larger proportion of households that participate at low rates, or (2) relative to the nation as a whole, a state could have a smaller proportion of households that participate at high rates. Households that participate at low rates are those with negative coefficients from the logistic model; households that participate at high rates are those with positive coefficients from the logistic model.

[20] This process included a national value of the state fixed effects, computed as the weighted average of the individual state fixed effects, where a state's weight was proportional to the size of its FSP eligible population.

Table II.7 summarizes the positive and negative coefficients from the logistic model.[21] Thus, a state with a larger than national proportion of households with multiple, nonelderly adults, one or more children at least one of whom is age 0 to 4 will have a higher direct participation rate, all else being equal. This higher direct participation rate will lead their standardized rate to be lower than their direct rate, all else being equal. Likewise, a state with a larger than national proportion of households with single, nonelderly adults, one or more children none of which are age 0 to 4 will have a lower direct participation rate, all else being equal. This lower participation rate will lead their standardized rate to be higher than their direct rate, all else being equal.

Although for this exercise we change each household characteristic one at a time, in reality households have a number of different characteristics and it would be impossible to change one aspect of the state's eligible population (e.g., the percentage of households composed of a single adult and multiple children) without also affecting the distribution of other eligible household characteristics (e.g., the earnings distribution). Nonetheless, these differentiations allow us to investigate generally which household characteristics drive the differences between direct and standardized rates.

The household characteristics that have the largest effect on the standardization are those where the difference between the state and national composition, combined with the coefficient, are the largest. The two most influential characteristics across all states are the proportion of households that have elderly individuals and no children and the proportion of households that have zero earnings. Because the elderly are less likely to participate (as evidenced by the negative coefficient on the proportion of households with elderly and no children) states with

[21] The coefficients presented in Table II.7 are the same as those presented in Table II.5. Note that for covariates that are part of a categorization (such as household composition and earnings), the size and direction of the covariate is a function of the omitted category. Omitted categories are identified in Table II.5.

TABLE II.7

POSITIVE AND NEGATIVE COMPONENT EFFECTS ON THE DIFFERENCE BETWEEN EACH STATE'S DIRECT PARTICIPATION RATE AND THE NATIONAL PARTICIPATION RATE

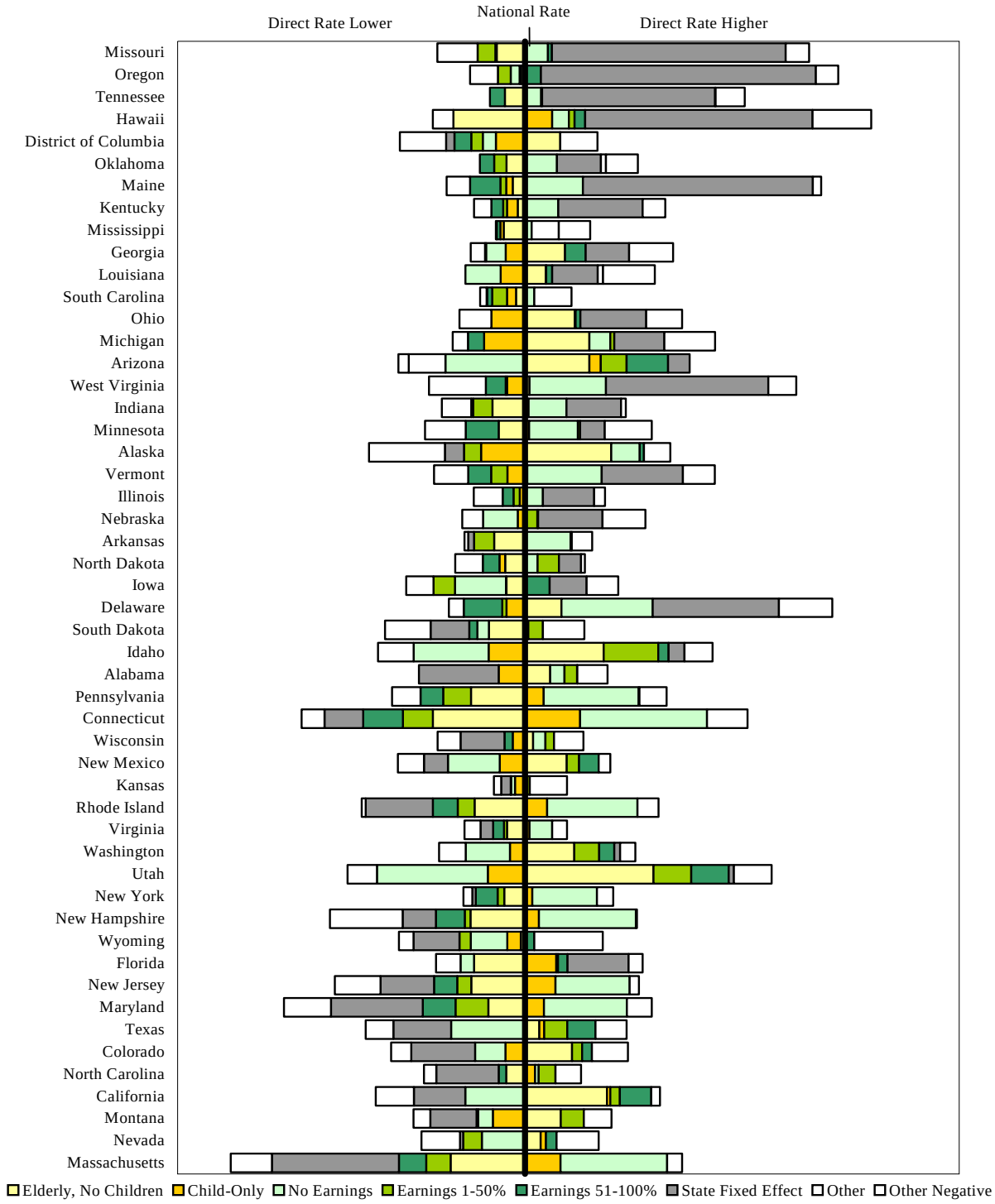
Positive Effects (Higher Proportions Lower Standardized Participation Rates)		Negative Effects (Higher Proportions Increase Standardized Participation Rates)	
Covariate	Coefficient	Covariate	Coefficient
Proportion of Households with Multiple Nonelderly Adults And One Or More Children, With At Least One Child Age 0-4	0.6200	Proportion of Households with Single Nonelderly Adult and One Or More Children, With No Children Age 0-4	-0.2444
Proportion of Households with Multiple Nonelderly Adults And One Or More Children, With No Children Age 0-4	0.2529	Proportion of Households with One Or More Elderly, Without Children Or Nonelderly Adults	-2.2898
Proportion of Households with One Or More Nonelderly Adults, Without Children Or Elderly	0.3512	Proportion of Households with One Or More Elderly, With Children Or Nonelderly Adults	-1.6976
Proportion of Households with No Nonelderly Adults In Household	1.1429	Proportion of Households with Children Only	-0.4541
Proportion of Households with All Adults Male	0.2858	Household Size	-0.0519
Proportion of Households with All Adult Female	0.3016	Proportion of Households Headed by an Hispanic	-0.0341
Proportion of Households Headed by a Black Non-Hispanic	0.2180	Proportion of Households with SSI To Nonelderly Adult (Age 18-59)	-0.0814
Proportion of Households Headed by Other Race	0.0902	Nondisabled Childless Adult Subject To Work Registration, Without Earnings	-0.5524
Any Noncitizens In Household	0.1320		
Proportion of Households with SSI to Child or Elderly	1.8735		
Proportion of Households with SSI To Both Nonelderly Adult And Child Or Elderly	1.4191		
Proportion of Households with Unemployment Compensation	0.4082		
Proportion of Households with Earnings at 0 Percent of Poverty	2.7805		
Proportion of Households with Earnings between 1-50 Percent of Poverty	2.8413		
Proportion of Households with Earnings between 51-100 Percent of Poverty	2.0805		
Proportion of Households with Earnings between 101-130 Percent of Poverty	1.3732		
Proportion of Households with FSP Benefit between 1-25 Percent of Maximum	0.1132		
Proportion of Households with FSP Benefit between 56-50 Percent of Maximum	0.5153		
Proportion of Households with FSP Benefit between 51-75 Percent of Maximum	0.5442		
Proportion of Households with FSP Benefit between 76-99 Percent of Maximum	0.5201		
Percentage of Households Consisting of Single Mother with Earnings < 150% Of Poverty	0.7087		

larger proportions of this population have higher standardized participation rates, all else being equal. Because households without earnings are more likely to participate (as evidenced by the positive coefficient on the proportion of households with earnings at zero percent of poverty), states with larger proportions of this population will have lower standardized participation rates, all else being equal. Other components with relatively large impacts on standardized participation rates include: the proportion of households with earnings between 1 and 50 percent of poverty, the proportion of households with earnings between 51 and 100 percent of poverty, the proportion of households that are child-only, the proportion of households with SSI for children or elderly, and the proportion of households headed by an African American.

Figure II.3 summarizes the component effects in each state by comparing the *direct* participation rate with the national participation rate. The relative effects in Figure II.3 reflect the change in the participation rate due to moving from the national mean to the state mean for each particular factor, holding all else constant (in Figure II.3, states are sorted by the direct participation rate). These relative impacts are shown for the proportion of households with elderly and no children, the proportion of households with no earnings, the proportion of households with earnings between 1 and 50 percent of poverty, the proportion of households with earnings between 51 and 100 percent of poverty, the proportion of households that are child-only, and the state fixed effects. For each state, the other component effects that have positive and negative impacts on the standardized rates are grouped together. Factors that lead a state's direct rate to be higher than the national rate are shown to the right of the line in the middle of the chart, and factors that lead a state's direct rate to be lower are shown to the left. The difference in the total length to the left and to the right of the line indicates the general size of the difference between the direct and national rates for each state.

FIGURE II.3

RELATIVE EFFECTS OF COMPOSITIONAL FACTORS ON THE DIFFERENCE BETWEEN EACH STATE'S DIRECT PARTICIPATION RATE AND THE NATIONAL PARTICIPATION RATE



Note: The figure depicts the composition differences (or fixed effects) that are generally driving the differences between the direct and standardized rates rather than the actual value of the difference between the direct and standardized rates. The direct and standardized rates are available in Table II.6

Missouri has the highest direct participation rate among all states. In Missouri, the state fixed effect is the driving component explaining why Missouri's rate is among the highest. That is, there are factors other than compositional components that explain Missouri's high participation rate. The state's population of individuals with no earnings, which is proportionately larger than the nation as a whole, also contributes to the state's high participation rate because these individuals participate at high rates.

On the other end of the spectrum is Massachusetts, which has the lowest direct participation rate. The rate in Massachusetts is lower than the nation as a whole in large part because of non-compositional factors specific to Massachusetts (that is, the state fixed effect). Additionally, the state has a proportionately larger-than-national population of elderly, and proportionately smaller-than-national populations of individuals between 1 and 50 percent and 51 and 100 percent of poverty.

For many states, the largest factor explaining the difference between the direct and national participation rates is the state fixed effect. This finding suggests that the highest participation rates are not due to compositional differences but to something unique about the state. That is, if every state had the same composition, the participation rates in these states would still be higher.

Some states have offsetting compositional characteristics. For example, in Connecticut, the factors leading to a higher participation rate, including a proportionately larger-than-national population of individuals with zero earnings, and a proportionately larger-than-national population of child-only households, which would pull the direct rate up, are canceled out by the state's relatively large elderly population and relatively small populations of individuals between 1 and 50 percent and 51 and 100 percent of poverty.

4. Shrinkage Standardized Participation Rates

Bayesian shrinkage techniques were used to improve our confidence in the estimated standardized participation rates and generate rates that are comparable to the official FSP participation rates. Table II.8 compares the shrinkage standardized rate with the direct and initial standardized participation rates. For several states, the shrinkage process leads to large changes in the estimate of the participation rate (as high as 17 percentage points in Missouri); on average, the shrinkage process leads to a 4 percentage point change (increase or decrease) in the estimate of the standardized participation rate.

The difference between the initial standardized participation rate and the shrinkage participation rate reflects the fact that the initial standardized participation rates carry a high degree of uncertainty. Missouri has a relatively high variance associated with its initial standardized participation rate; the 90 percent confidence interval on Missouri's initial standardized participation rate of 99.7 percent is +/-13 percentage points (the third largest confidence interval among all states). As a result, the shrinkage process gives more weight to the regression-predicted participation rate for Missouri.

The shrinkage standardized rates are substantially more precise than the initial standardized rates. For example, the 90 percent confidence interval on Missouri's shrinkage standardized participation rate of 82.7 percent is +/-7 percentage points, much less than the +/-13 percentage points associated with the initial standardized rate. Across all states, the average 90 percent confidence interval falls from +/-7 percentage points for the initial standardized rates to +/-5 percentage points for the shrinkage standardized rates. The smaller confidence intervals are apparent in Figure II.4, which compares the initial standardized participation rates (and their 90

TABLE II.8

SHRINKAGE STANDARDIZED 2003 FSP PARTICIPATION RATES

	Direct Participation Rate	Initial Standardized Participation Rate	Shrinkage Standardized Participation Rate	Difference between Initial and Shrinkage Standardized Rates
Alabama	54.1	43.9	48.5	+4.6
Alaska	61.5	56.3	55.4	-0.9
Arizona	65.0	62.8	66.6	+3.8
Arkansas	60.1	56.7	58.6	+1.9
California	45.3	42.5	43.3	+0.7
Colorado	45.5	46.5	50.4	+4.0
Connecticut	53.8	54.0	56.9	+2.9
Delaware	54.8	63.0	55.2	-7.8
District of Columbia	74.3	69.7	67.2	-2.5
Florida	48.9	59.7	57.6	-2.1
Georgia	67.5	65.8	63.0	-2.8
Hawaii	79.1	91.4	82.7	-8.8
Idaho	54.2	62.3	55.5	-6.8
Illinois	60.6	67.0	66.2	-0.8
Indiana	63.6	69.8	69.7	-0.1
Iowa	57.2	62.6	61.9	-0.7
Kansas	53.0	52.3	55.6	+3.4
Kentucky	68.9	66.7	68.8	+2.1
Louisiana	66.2	63.3	67.9	+4.6
Maine	69.9	87.1	82.6	-4.6
Maryland	48.1	45.3	51.8	+6.5
Massachusetts	40.5	39.3	44.1	+4.8
Michigan	65.1	59.0	63.5	+4.5
Minnesota	63.1	57.9	54.4	-3.5
Mississippi	67.9	62.7	57.3	-5.4
Missouri	89.5	99.7	82.7	-17.0
Montana	44.6	46.2	48.8	+2.6
Nebraska	60.5	67.9	60.7	-7.2
Nevada	41.0	52.0	50.5	-1.4
New Hampshire	49.7	54.7	56.9	+2.1
New Jersey	48.7	48.9	47.8	-1.0
New Mexico	53.0	53.0	51.5	-1.5
New York	50.2	51.9	50.9	-1.0
North Carolina	45.4	43.3	43.6	+0.4
North Dakota	57.8	60.6	50.3	-10.3
Ohio	65.2	63.4	64.4	+1.1
Oklahoma	73.0	69.3	71.7	+2.4
Oregon	85.7	105.1	88.6	-16.5
Pennsylvania	54.0	56.7	54.2	-2.5
Rhode Island	51.9	46.5	46.8	+0.3
South Carolina	65.9	61.4	63.3	+1.9
South Dakota	54.3	57.0	49.3	-7.7
Tennessee	83.1	86.1	87.0	+0.9
Texas	47.4	47.1	47.3	+0.2
Utah	50.9	58.8	59.5	+0.7
Vermont	60.8	67.9	59.3	-8.6
Virginia	51.5	54.6	54.6	-0.1
Washington	51.4	55.2	63.0	+7.8
West Virginia	64.9	76.9	80.4	+3.5
Wisconsin	53.3	49.5	49.1	-0.4
Wyoming	49.2	51.0	43.3	-7.8

Note: The standardization process does not restrict participation rates to be 100 percent or lower, and so, as is the case with the official participation rates, some estimated rates are over 100 percent. Appendix B details an alternative model that restricts participation rates to be less than 100 percent. Because that alternative model relies on unreasonable assumptions, we do not use it for the primary results.

percent confidence intervals) with the shrinkage standardized participation rates (and their 90 percent confidence intervals). (As with Figures II.1 and II.2, the states are sorted by their direct participation rates, which are not shown.)

Figure II.5 compares the state rankings and their 90 percent confidence intervals based on the official FSP participation rates and the shrinkage standardized participation rates. In general, states with high rankings according to the official rates tend to have high rankings according to the shrinkage standardized rates (and states with low rankings among the official rates tend to have low rankings among the shrinkage standardized rates). For most states, there is substantial overlap between the confidence intervals for the two rankings, suggesting that the standardization process does not substantially affect where a state's participation rate falls in respect to other states.[22] In 10 states, there is a difference in rank of more than 10 between the official and shrinkage standardized participation rates. The three states whose rankings are affected by the standardization process the most are Florida, Utah, and New Hampshire.

D. CONCLUSIONS

For most states, the standardized FSP participation rates are not substantially different from unstandardized estimates. Moreover, the state rankings are not substantially different when comparing rankings derived from the shrinkage standardized rates with the official participation rate rankings. This leads us to conclude that while standardization can adjust the participation rates for differences in the composition of each state's eligible population, it is factors other than the composition of the eligible population that explain why a state's rate differs from the national average. The next chapter explores whether the variation not explained by compositional differences can be explained by differences in state policies or economic conditions.

[22] A formal test of the difference between a state's ranking would need to account for the correlation between the rankings.

FIGURE II.4

INITIAL AND SHRINKAGE STANDARDIZED 2003 FSP PARTICIPATION RATES
WITH 90 PERCENT CONFIDENCE INTERVALS FOR BOTH RATES

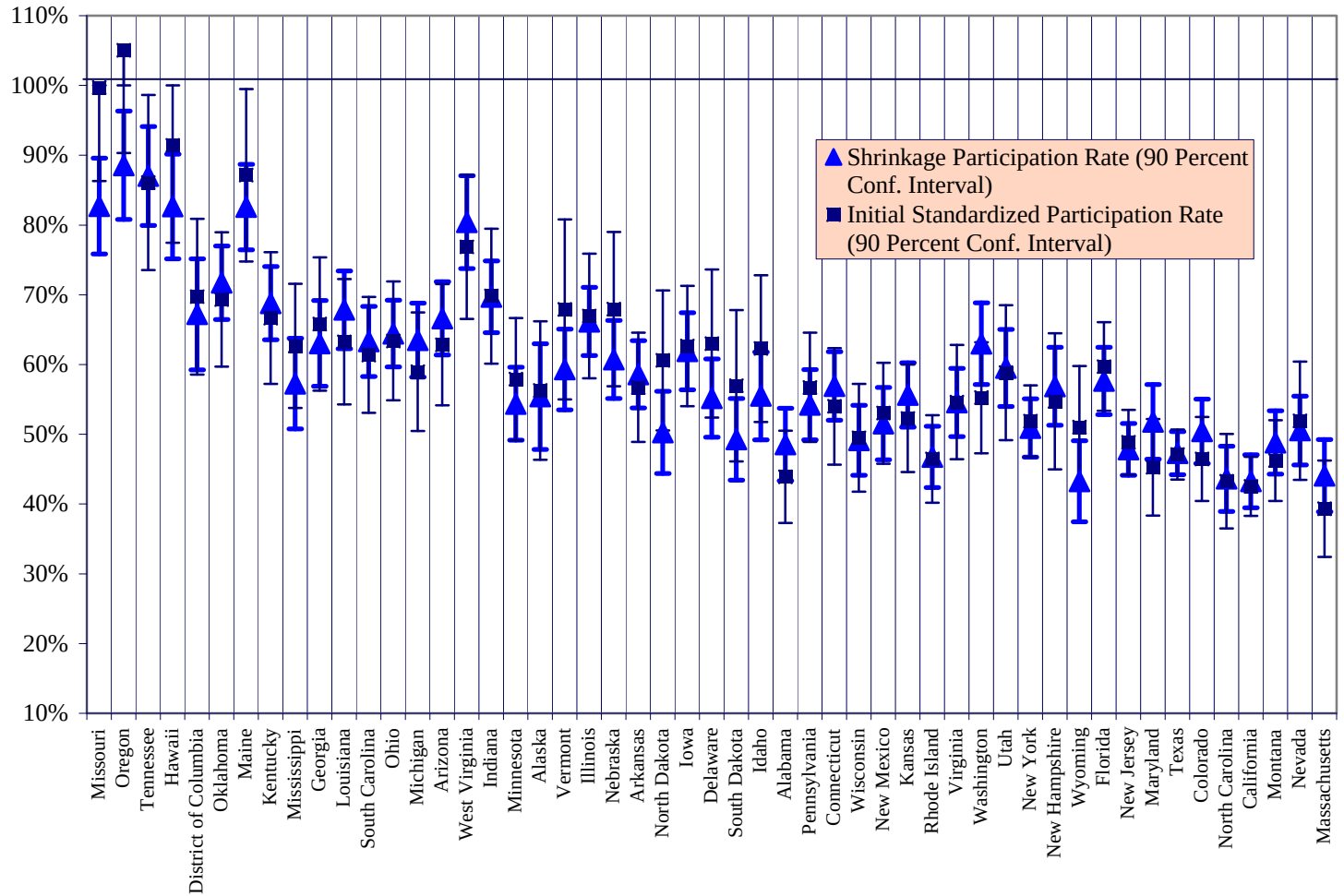
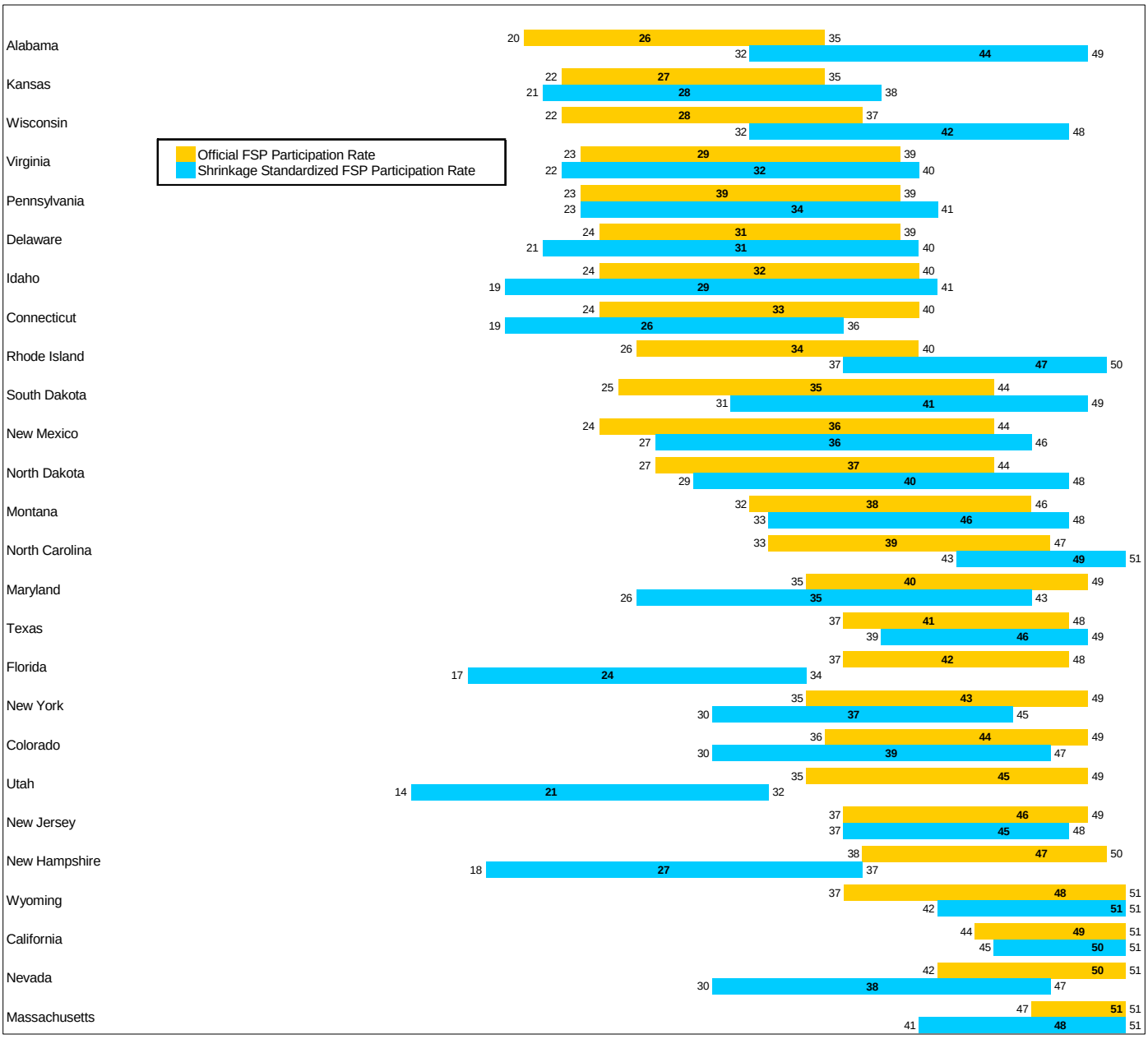


FIGURE II.5

COMPARISON OF STATE PARTICIPATION RATE RANKINGS OFFICIAL VERSUS SHRINKAGE STANDARDIZED PARTICIPATION RATES

Figure II.5 (continued)



Note: The numbers within the shaded regions reflect the states' ranking under that set of participation rates. The numbers at the beginning and end of the shaded regions reflect the endpoints of the 90 percent confidence intervals around the ranking.

The standardized participation rates presented here can help states better understand their direct participation rate. They can help states determine whether their rate is above or below the national average rate due to compositional factors or due to some other characteristics within the state. In an environment where USDA is encouraging states to increase participation rates, these results can help states identify which populations they can focus on to help raise their own rates. For instance, a state with a relatively large population of low income elderly—a population that participates at a low rate—may choose to focus outreach efforts on those households. Alternatively, states with relatively small populations of households with low earnings between 1 and 50 percent of poverty—a population that participates at a high rate—may choose to focus outreach efforts on other populations.

III. UNDERSTANDING VARIATION IN STANDARDIZED STATE PARTICIPATION RATES

The standardized participation rates for 2003 presented in Chapter II provide an estimate of what state participation rates would be if each state's eligible population resembled the nation as a whole. These standardized participation rates still vary from state to state, which may reflect the influence of each state's economic and policy conditions. That is, even if two states had eligible populations with identical characteristics, one state's economy or FSP policies may lead more eligible individuals to participate.

In this chapter, we explore the relationship between state economic and policy conditions and the standardized FSP participation rates. We examine whether states with stricter policies and/or stronger economies tend to have lower standardized participation rates, while states with more lenient policies or weaker economies tend to have higher standardized participation rates.

The results suggest that these policy and economic factors do not explain most of the variation in state participation rates—either standardized or unstandardized, which could provide evidence that participation is elastic relative to individual characteristics, but inelastic relative to policies and macroeconomic conditions. However, we also caution that the results are based only on 51 observations (for the 50 states and the District of Columbia). Given this small number of observations, policy and economic differences would need to lead to substantially large differences in standardized participation rates to be found significant by our model. Moreover, our results rest on our ability to accurately measure the strictness of a state's policy regime. Because it is difficult to measure how state policies are implemented at the local level, and because it is difficult to construct meaningful measures of state policies, our results may also suggest that better measurement of state policies is necessary.

Section A of this chapter explores the various policy and economic factors that may influence state FSP participation rates. Section B discusses options for measuring policies, while section C describes our methodological approach. Section D discusses the results of our analysis, and Section E provides some concluding remarks.

A. POLICY AND ECONOMIC FACTORS THAT MAY INFLUENCE PARTICIPATION RATES

An individual's decision to participate in the FSP can be affected by both policy and economic conditions. If a given state's policy regime increases the amount of effort needed for an eligible individual to enroll in the program, the individual may be less likely to apply for benefits. In a sense, the costs of applying outweigh the expected benefits. Similarly, if a state's economy is strong, the eligible individual's perceived need for benefits may be reduced; they may believe their future income will be sufficient and applying for benefits is unnecessary.

Numerous other studies have examined the role that economic and policy factors play in driving state FSP (as well as TANF) participation trends. Studies by Gleason et al. (2000) and Ziliak et al. (2000) conclude that levels of food stamp participation by state are strongly influenced by state economic conditions. Both studies concluded that economic growth at the state level drove almost 50 percent of the decline in the FSP caseload after 1996. Ziliak et al. estimate that a 1 percentage point increase in the unemployment rate will lead to a 2.3 percentage point increase in the FSP caseload after one year. Both studies find that changes in state AFDC/TANF policies have some power in explaining changes in the number of FSP participants. Wilde et al. (2000) also find that state economic factors contribute substantially to the decline in the FSP caseload, but they attribute a smaller portion of the decline (35 percent) to those factors. Kornfeld (2002) also examined factors explaining changes in FSP caseloads, finding that participation among several adult households with children is most sensitive to

economic changes. In addition, Kornfeld examined the role played by state FSP policies in determining participation levels and concluded that caseloads are sensitive to whether a state has high error rates, short certification periods, and electronic benefit transfer (EBT) systems.

Because these studies focus on the number of participants rather than on participation rates, they generally do not suggest whether a given economic or policy factor makes the number of participants in a given state higher (lower) because it creates more (fewer) eligible households or because it encourages (discourages) participation by eligible households. Nevertheless these studies provide good guidance on what state factors may influence FSP participation patterns.

We identified five broad state characteristics that could affect state FSP participation rates: (1) FSP policies, (2) TANF policies, (3) Medicaid/SSI policies, (4) Earned Income Tax Credit (EITC) policies, and (5) economic characteristics. Many studies have looked at the role that these factors play in driving participation in public assistance programs. Table III.1 summarizes which of these factors were found to significantly influence participation in the FSP and TANF programs.

In the remainder of this section, we discuss the state characteristics explored in this study. For most variables, we measure the variable such that lower values reflect more lenient policies (i.e., policies that would lead to higher participation rates, all else being equal), and higher values reflect stricter policies (i.e., policies that would lead to lower participation rates, all else being equal). Consistently measuring the variables allows us to consolidate policies using principal components analysis (discussed in Section B).[23]

[23] See Appendix D for state-level values of the variables included in the study.

TABLE III.1

STATE CHARACTERISTICS USED IN OTHER STUDIES

	FSP Studies					
	Kornfeld (2002)	Wilde et al (2000)	Currie et al (2001)[a]	Ziliak et al (2002)[a]	Bartlett et al (2004)	McKernan et al (2003)
Outcome	State per capita caseload	ln(state per capita caseload)	HH-level FSP participation	ln(state per capita caseload)	Probability HH completes application	HH-level FSP participation
1. FSP Policy						
EBT						
Presence of statewide EBT	✓*	✓*	✓	✓		✓
Certification Periods and Reporting Requirements						
FSP Error Rate	✓*			✓		
Certification Periods	✓*		✓		✓	✓*
Monthly/Quarterly Reporting required					✓	
ABAWDs						
Percent ABAWD Waived/subject to time limits		✓*		✓	✓*	
Other						
Fingerprinting required of all applicants					✓*	
Number of 3rd party verification forms required					✓	
E&T requirements for non-TANF households					✓	
2. TANF Policy						
FSP-Related Rules						
Transitional Benefits						
FSP Disqualifications/sanctions	✓*		✓		✓	
Eligibility						
Income Eligibility Threshold						
Earned Income Disregard	✓*			✓		
Treatment of In-Kind Income						
Asset Limits						
Eligibility Rule Stringency (Factor)						
Benefits						
Max TANF ben - family of 3 (sometimes ln of ben)		✓	✓	✓		
Benefit while working in Month 12, 24						
Accessibility						
Family Cap	✓*			✓		
Diversion Payments			✓		✓	
Job Search Requirement					✓	
Behavior Related rules (Factor)						
Time Limits and Work Requirements						
Time Limit	✓			✓		
Sanctions	✓*			✓		
Work Requirement						
3. Mediciad/SSI						
Medicaid						
Max Income for Medicaid among Age-Eligible Children						
Max Age for Medicaid among Income Eligible Children						
Whether num. Expansions adopted above national median						
Medicaid Eligibility Thres. By child age group						
Medicaid Eligibility for SSI Recipients						
Flag if Family's Youngest Child Eligible for Medicaid			✓			
SSI						
Maximum SSI Benefit (log)						
4. EITC						
Calculated state EITC						
Refundable State EICTC						
5. State Economy						
Unemployment Rate	✓*	✓*		✓	✓*	✓*
Employment Growth	✓	✓		✓		
Log Real Minimum Wage	✓					
Log 20th percentile wage	✓*					
Mean State Income						
Mean Wage Manufacturing Industry						
6. Other State Characteristics						
Political Affiliation of Governor	✓*	✓*		✓		
Political Affiliation of Legislature	✓*	✓*		✓		
Region					✓*	✓*

Table III.1 *(continued)*

	FSP Studies (Continued				
	Clarke et al (2004)[a]	Kabbani and Wilde (2002)	Mikelson and Lerman (2004)	Gleason et al. (2001)	Yelowitz (2002)
Outcome	Change in State FSP Caseload	State per capita caseload	HH-level FSP participation	Caseload as % of 1991 Caseload	HH-level FSP participation
FSP Policy					
EBT					
Presence of statewide EBT		✓*	✓		
Certification Periods and Reporting Requirements					
FSP Error Rate					
Certification Periods		✓*		✓*	
Monthly/Quarterly Reporting required					
ABAWDs					
Percent ABAWD Waived/subject to time limits					
Other					
Fingerprinting required of all applicants					
Number of 3rd party verification forms required					
E&T requirements for non-TANF households					
TANF Policy					
FSP-Related Rules					
Transitional Benefits				✓*	
FSP Disqualifications/sanctions		✓*			
Eligibility					
Income Eligibility Threshold					
Earned Income Disregard				✓*	
Treatment of In-Kind Income					
Asset Limits					
Eligibility Rule Stringency (Factor)					
Benefits					
Max TANF ben - family of 3 (sometimes ln of ben)					
Benefit while working in Month 12, 24					
Accessibility					
Family Cap					
Diversion Payments					
Job Search Requirement				✓*	
Behavior Related rules (Factor)					
Time Limits and Work Requirements					
Time Limit				✓*	
Sanctions				✓*	
Work Requirement				✓*	
Mediciad/SSI					
Medicaid					
Max Income for Medicaid among Age-Eligible Children				✓*	
Max Age for Medicaid among Income Eligible Children				✓*	
Whether num. Expansions adopted above national median					✓
Medicaid Eligibility Thres. By child age group					✓
Medicaid Eligibility for SSI Recipients					
Flag if Family's Youngest Child Eligible for Medicaid					
SSI					
Maximum SSI Benefit (log)					
EITC					
Calculated state EITC					
Refundable State EICTC			✓*		
State Economy					
Unemployment Rate	✓	✓*	✓	✓*	
Employment Growth	✓		✓*		
Log Real Minimum Wage					
Log 20th percentile wage					
Mean State Income				✓*	
Mean Wage Manufacturing Industry				✓*	
Other State Characteristics					
Political Affiliation of Governor			✓*		
Political Affiliation of Legislature					
Region					

Table III.1 *(continued)*

	TANF Studies					SSI Studies
	Fender et al (2002)[a]	Fender et al (2002)[a]	Grogger (2000)[a]	McKernan et al. (2000)	DeJong and Graefe (2002)	Schmidt (2004)
Outcome	Casload Entry (Hypothesized Effects)	Caseload Exit (Hypothesized Effects)	HH-level TANF participation	HH-level Employment	HH Migration	HH-level SSI receipt flag
FSP Policy						
EBT						
Presence of statewide EBT						
Certification Periods and Reporting Requirements						
FSP Error Rate						
Certification Periods						
Monthly/Quarterly Reporting required						
ABAWDs						
Percent ABAWD Waived/subject to time limits						
Other						
Fingerprinting required of all applicants						
Number of 3rd party verification forms required						
E&T requirements for non-TANF households						
TANF Policy						
FSP-Related Rules						
Transitional Benefits				✓*		
FSP Disqualifications/sanctions						
Eligibility						
Income Eligibility Threshold	✓					
Earned Income Disregard	✓					
Treatment of In-Kind Income				✓		
Asset Limits	✓			✓		
Eligibility Rule Stringency (Factor)					✓*	
Benefits						
Max TANF ben - family of 3 (sometimes ln of ben)		✓	✓			✓
Benefit while working in Month 12, 24		✓				
Accessibility						
Family Cap	✓					
Diversion Payments	✓					
Job Search Requirement	✓					
Behavior Related rules (Factor)					✓*	
Time Limits and Work Requirements						
Time Limit		✓		✓*		
Sanctions		✓		✓		
Work Requirement		✓		✓*		
Mediciad/SSI						
Medicaid						
Max Income for Medicaid among Age-Eligible Children						
Max Age for Medicaid among Income Eligible Children						
Whether num. Expansions adopted above national median						
Medicaid Eligibility Thres. By child age group						
Medicaid Eligibility for SSI Recipients						✓
Flag if Family's Youngest Child Eligible for Medicaid						
SSI						
Maximum SSI Benefit (log)						✓
EITC						
Calculated state EITC		✓				
Refundable State EICTC		✓				
State Economy						
Unemployment Rate			✓		✓*	✓*
Employment Growth						
Log Real Minimum Wage		✓	✓			
Log 20th percentile wage						
Mean State Income						
Mean Wage Manufacturing Industry						
Other State Characteristics						
Political Affiliation of Governor						
Political Affiliation of Legislature						
Region						

[a]Significance not available

1. FSP Policies

State policy choices on FSP eligibility rules and procedures can potentially explain much of the variation in state participation rates. Studies of variation in state FSP policies are relatively new since, prior to the mid 1990s, few differences in FSP policies existed across states. As shown in Table III.2, we examine the following four types of state FSP policies: (1) statewide implementation of EBT cards, (2) requirements for reporting changes in income, (3) rules governing the eligibility of Able Bodied Adults without Dependents (ABAWDs), and (4) program accessibility.

EBT. Several studies, including Kornfeld (2002), Wilde et al. (2000) and Kabbani and Wilde (2002) have found significant relationships between state FSP participation patterns and whether a state has implemented EBT. EBT cards, which operate much like debit cards, replaced the old Food Stamp coupons. States began adopting EBT in the late 1990s and its use is expected to increase FSP participation because it reduces the stigma associated with being a program participant. By 2003, the focus of this study, all but five states had implemented their EBT program statewide. For our analysis, we use a 0/1 flag to identify states with statewide EBT programs before 2003.[24]

Certification Periods and Reporting Requirements. Recent changes to policies that affect FSP certification periods and reporting requirements may affect participation rates. The FSP certification period is the length of time a household has before it must effectively reapply for benefits. Certification periods typically range from 3 to 12 months, depending on the state guidelines and household circumstances.

[24] Data on EBT policies comes from USDA (2003).

TABLE III.2

FSP POLICIES

Policy	Measure
EBT	
EBT	Flag (0/1) if EBT implemented statewide prior to 2003
Certification Period, Reporting Requirement	
Certification Periods	Average period for households with earnings and for single-mother households
Reporting Requirements	Three flags (0/1), the first indicating the use of simplified or quarterly reporting, the second indicating the use of status or change reporting, and the third reflecting the combination of the first two flags
ABAWD Rules	
ABAWDs Subject to Work Requirements	Flag (0/1) indicating at least some ABAWDs in the state are subjected to the work requirements
Accessibility	
Categorical Eligibility	Flag (0/1) if state confers categorical eligibility to non-cash TANF households
Vehicle Rules	Relative leniency of state vehicle asset rules, or calculated countable vehicle value for a prototypical FSP unit
Fingerprinting	Flag (0/1) if state requires fingerprinting to apply for FSP benefits
Application Page Length	Measure of application page length
Number of Visits	Typical number of visits required to apply (in 2000)
State FSP Outreach Efforts	Flag (0/1) if state has special outreach activities

Reporting requirements govern how a participating household must report changes to income in between recertification months. Traditional FSP rules require all income changes over $25 to be reported, although recent policy options allow states to make these rules more lenient. States have begun to lengthen certification periods for many clients, including those with volatile household income (such as households with earnings). Moreover, states can adopt a set of options on when clients report income changes (USDA 2003):

- The Simplified Reporting option relieves clients from reporting any changes in income during their certification period, as long as their income does not exceed 130 percent of poverty.
- The Quarterly Reporting option allows clients to report their income every three months, regardless of whether it changes within that three month period.
- Status reporting requires a client to report only when a household member has a change in jobs, receives a different rate of pay, or shifts from part time to full time (or has a similar change in employment status); income changes due to different hours of work do not need to be reported.
- States can also adopt rules allowing clients to not report changes less than $100.

States can combine these policies in ways that require more or less reporting from the client. For example, a state may adopt the lenient simplified reporting option, but may also require status reporting from clients.

Changes to certification periods and reporting requirements might influence FSP participation rates if they make it easier to enroll in the program (or, in many cases, easier to stay enrolled in the program). Some previous studies have tried to measure the impact of these changes on FSP participation. Kornfeld (2002) and Ziliak et al. (2000) both used the FSP error rate as a proxy for how restrictive state certification and reporting rules are. The rationale behind using error rates is that states with more restrictive certification periods and reporting requirements (that is, states with rules more like the traditional rules) would have lower error rates, while states with more lenient certification periods and reporting requirements may have higher error rates. However, the error rate may be an imprecise proxy for certification and reporting periods because it only indirectly captures the factors at play, and it is not clear *a priori* whether high error rates should be correlated with high participation rates or low participation rates. Other studies have used measures of the average certification period, either overall or for certain subgroups, but few studies have examined newer options on simplified reporting procedures.

For our analysis, we use five variables to capture changes in certification periods and reporting requirements.[25] For certification periods, we use each state's average certification period for households with earnings as well as their average certification period for single-mother households. We suspect that, all else being equal, states where these certification periods tend to be longer will have higher participation rates.

To capture the various reporting requirement options, we created three variables. The first is a 0/1 flag where a value of 1 indicates that the state has not adopted the simplified reporting or quarterly reporting options.[26] The second is a 0/1 flag indicating that the state has adopted a change reporting or status reporting requirement. The third variable is the interaction of the first two since states with a value of 1 for both of the other reporting requirement variables are more strict than states with a value of one for either but not both of those variables.

ABAWD Restrictions. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) required ABAWDs to meet work requirements or face time-limited FSP benefits. Many aspects of the ABAWD rules can vary by state, but because the ABAWD population is a small portion of the overall eligible population, and because we have limited degrees of freedom in our analysis model, we wanted to minimize the number of variables used to measure ABAWD policies. The only ABAWD policy we examine is whether any ABAWD in a given state is subject to the work requirements. States can exempt large portions of the ABAWD population by waiving geographic regions with high unemployment and by applying the "15 percent exemption," which allows states to exempt specific segments of the ABAWD population. Some states can combine these two options and exempt all ABAWDs in their state

[25] Data on certification period and reporting requirement policies comes from USDA (2003).

[26] Since simplified reporting and quarterly reporting are considered more lenient than the traditional change reporting option, they are given the lower value in the flag. This lower value makes measuring this policy consistent with other policies where higher values are expected to lead to lower participation rates.

from the work requirement. We created a 0/1 flag to indicate whether some ABAWDs are subjected to the work requirements. We expect states in which some ABAWDs are subjected to the work requirements to have lower participation rates, all else being equal.

Program Accessibility. States and localities have control over policies and procedures that can make the FSP more or less accessible. Examples include: [27]

- ***Categorical Eligibility***. Some states confer categorical eligibility to households that receive non-cash TANF benefits. We created a 0/1 flag to indicate whether the state confers categorical eligibility to non-cash TANF households (the value is set to 0 if the state does confer categorical eligibility).
- ***Vehicular Asset Rules***. States can change the rules for determining how the value of vehicles is treated when determining whether a household is eligible for benefits. We rank state vehicular asset rules as being lenient, moderate, or strict.
- ***Fingerprinting***. Some states require FSP applicants to be fingerprinted, potentially increasing the burden associated with applying. We created a 0/1 flag to indicate whether the state requires fingerprinting.
- ***Application Page Length***. Longer FSP applications may make it more burdensome to apply for benefits. We constructed a variable reflecting the number of pages in the state FSP application.
- ***Number of Visits***. State rules may lead individuals in some states to make more trips to the local FSP office to apply than individuals in other states. We constructed a variable reflecting the number of visits typically required of an applicant to complete the application process.
- ***FSP Outreach***. States may have specific outreach campaigns to increase participation among eligible individuals. We created a 0/1 variable to indicate whether the state has an outreach program in place (the value is set to 0 if the state does have an outreach program).

2. TANF Policies

In 2003, about 17 percent of FSP households also participated in the TANF program (Cunnyngham and Brown 2004). In most states, the TANF application process is closely linked

[27] Information on categorical eligibility and outreach efforts is based on USDA (2003). Information on vehicular rules comes from the Welfare Rules Database. Information on fingerprinting rules, application page length and number of office visits reflect conditions in 2000 and are based on O'Brien (2000).

to the FSP application process. Assuming that individuals make their decision to participate in the FSP and TANF jointly, policies that discourage TANF participation may also discourage FSP participation. Much research has been conducted to date examining the effects that state TANF rules have on FSP and TANF participation. Several of these studies, including Kornfeld (2002), Kabbani and Wilde (2002), and Gleason et al. (2001), have found that stricter state TANF policies lead to smaller FSP caseloads.

We have identified five broad classes of TANF policies: (1) FSP-related TANF policies, (2) TANF eligibility policies, (3) benefit levels, (4) accessibility policies, and (5) time limits and work requirements. Table III.3 summarizes the variables we examine in this study.[28]

FSP-Related TANF Policies. There are two key FSP-related TANF policies that could affect state FSP participation rates. The first is transitional benefits, which allows households leaving TANF for work to continue receiving food stamps for a set period, such as three months. The potential effect of transitional benefits on state participation rates is unclear. The policy continues to give FSP benefits to newly employed people who would have left the FSP otherwise, which could lead to higher participation rates. However, in the long run, the goal of the policy is to move individuals off of public assistance and into employment. If successful, this would lead more individuals to become ineligible, reducing both the number of participants and the number of eligibles, resulting in a lower participation rate for those remaining eligible. To measure transitional benefits, we use a 0/1 flag to indicate which states do not provide transitional benefits.

[28] Data on TANF policies comes from the Welfare Rules Database.

TABLE III.3

TANF POLICIES

Policy	Measure
FSP-Related Policies	
Transitional benefits (FSP)	Flag (0/1) indicating no FSP transitional benefits
FSP sanctions	Flag (0/1) indicating FSP sanctions policy
Eligibility	
Income Threshold	Eligibility threshold, household of 3
Earned Income Disregard	Percent of earnings not disregarded for a family of 3
Benefits	
Maximum Benefit	Maximum Benefit, family of 3
Family Cap	Flag (0/1) indicating that the state has a family cap provision
Accessibility	
Diversion Payments	Measure of relative size of diversion payments
Application Requirements	Separate flags (0/1) indicating whether job search, drug testing, parenting classes, school attendance and immunization are required at application
Citizenship Requirements	Measure of stringency of citizenship requirements
Time Limits and Work Requirements	
Lifetime Time Limit	Measure of duration of lifetime time limits
Intermittent Time Limit	Flag (0/1) indicating whether the state has an intermittent time limit
Time Limit Exemption Policies	Separate flags (0/1) indicating whether the state does not exempt individuals who are ill/incapacitated from the time limits, and whether the state does not exempt mothers of children age 3 to 12 months from the time limits.
Time Limit Extensions	Flag (0/1) indicating the state does not allow time limits to be extended
Qualifying Activities	Measure of the number of activities that can qualify as meeting the work requirement
Minimum Hours in Work Activities	Flag (0/1) indicating the state requires 30 or more hours in a work activity to meet the work requirement.
Start of Work Requirements	Flag (0/1) indicating the state does work requirements apply before participants' 3rd month of benefits.
Work Requirement Exemption Policies	Separate flags (0/1) indicating whether the state does not exempt individuals who are ill/incapacitated from the work requirements, and whether the state does not exempt mothers of children older than 6 months from the work requirements.
Severe Sanction Amount	The most severe sanction for a family of 3.
Severe Sanction Length	A variable classifying states by the duration of the most severe sanction (1 = long, 5 = short)
Difference between Severe and First Sanctions	A measure of the difference between the most severe sanction and the first sanction for a family of 3.

The second FSP-related TANF policy sanctions FSP benefits for individuals who do not comply with TANF work requirements. We would expect FSP sanctions to lower participation rates if they discourage eligible clients from participating. Also, if the policy successfully moves participants from welfare to work, then as with transitional benefits, the policy could also lower participation rates. We use a 0/1 flag to identify states that have FSP sanction policies as part of their TANF program.

Eligibility. There are numerous TANF eligibility rules that vary from state to state. These include: the income eligibility threshold, the amount of earnings that can be disregarded when determining eligibility, the treatment of in-kind income, asset limits, eligibility status of pregnant women, citizenship requirements, and activities (such as job search, parenting classes and drug screening) that are required to be eligible. Given that our model has limited degrees of freedom, we chose to focus on the two eligibility rules that affect the most applicants: the income eligibility threshold and the earned income disregard. To measure the income eligibility threshold such that higher values reflect stricter policies, we rescaled the 2003 state income eligibility thresholds.[29] Similarly, to measure the earned income disregard such that higher values reflect stricter policies, we compute the percentage of income that would not be disregarded for a family of three in each state.[30]

Benefits. The maximum TANF benefit is set by states and varies widely. In 2003, the maximum benefit for a family of three ranged from $164 in Alabama to $923 in Alaska. The median state benefit was $396. Our model uses the maximum benefit for a family of three,

[29] For each state, the measure of the income eligibility threshold is computed as (2000-THRESH)/20, where THRESH is the income eligibility threshold for a family of three. The minimum value was 18.0, reflecting the state with the highest threshold; the maximum value was 89.9, reflecting the state with the lowest threshold.

[30] We used the percent of earnings that would be disregarded in each state for a family of three working 20 hours a week at the minimum wage. To rescale the variable such that higher values reflect stricter policies, we calculate the percent of income that would not be disregarded.

rescaled such that higher values reflect lower benefits.[31] In addition to the maximum benefit, we include a flag (0/1) for whether the state has a family cap policy limiting benefits to children born to ongoing TANF clients.

Accessibility. There are several TANF rules that can make the application process more or less accessible. These include:

- ***Diversion payments***. Diversion payments are intended to steer applicants away from the TANF program. Our model uses the maximum diversion payment in each state. High values are treated as strict since they are more likely to reduce the number of program entrants.
- ***Application requirements.*** Many states require TANF applicants to complete certain activities before their application can be approved. We included separate flags (0/1) for the following five application requirements: (1) applicants conduct job search, (2) applicant's minor children attend school, (3) children are required to be immunized, (4) drug and/or alcohol screening and/or treatment is required of most/all applicants, and (5) applicants with children must attend parenting classes.
- ***Citizenship rules.*** We created a 0/1 flag to distinguish states with more lenient policies governing the eligibility of noncitizens from states with stricter policies. Lenient states (flag = 0) are those in which all nonexempt noncitizens in country for more than five years are eligible and where there is some state funding for noncitizens entering more recently (there are 24 lenient states). Strict states (flag = 1) are the remaining states.

Time Limits and Work Requirements. TANF requires beneficiaries to participate in work-related activities and places a time limit on how long individuals can receive benefits. States have many policies that govern these time limits and work requirements, including:

- ***Duration of lifetime time limits.*** States can limit the total number of months individuals can receive TANF. We rescaled the state lifetime time limits such that higher values reflect stricter rules.[32] A state with no time limit is given a value of 0.

[31] For each state, the measure of benefit is computed as (1000-MAXBEN)/10, where MAXBEN is the maximum benefit for a family of three. The minimum value is 7.7, reflecting the state with the highest maximum benefit, and the maximum value is 83.6, reflecting the state with the lowest maximum benefit.

[32] Our lifetime time limit variable is computed as (120-*m*) where *m* is the number of months for the state lifetime time limit. The resulting variable ranges from 0 to 99.

- ***Intermittent time limit.*** Some states also have an intermittent time limit for TANF receipt (e.g., a state may limit an individual to 24 months of benefits until they have 36 months of ineligibility). We use a flag (0/1) to indicate whether a state has any intermittent time limit.

- ***Time limit exemptions.*** We constructed two separate flags to reflect the states' policies on time limit exemptions. The first flag indicates whether the state exempts individuals who are ill or incapacitated (a value of 1 means the state does not exempt these individuals). The second flag indicates whether the state exempts mothers with children ages 3 to 12 months (a value of 1 means the state does not exempt these individuals).

- ***Time limit extensions.*** Some states allow time limits to be extended for individuals who have complied with the work requirement policies but who can not find employment. We use a flag (0/1) to identify states that have no extension policies.

- ***Number of qualifying activities***. The number and type of activities that meet TANF work requirements varies from state to state. We use the number of work requirement activities, rescaled such that high values reflect fewer work requirements.[33]

- ***Minimum hours of work activity.*** States can set the number of hours that an individual must participate in a work activity in order to meet the work requirement. We use a flag (0/1) to identify states with a minimum of 30 hours or more.

- ***Start of work requirement.*** States can establish how soon after entry into the TANF program the work requirement applies. We use a flag (0/1) to identify states whose work requirement applies before participants' third month of benefits.

- ***Work requirement exemptions.*** We constructed two separate flags to reflect the states' policies on work requirement exemptions. The first flag indicates whether the state exempts individuals who are ill or incapacitated (a value of 1 means the state does not exempt these individuals). The second flag indicates whether the state exempts mothers with children older than 6 months (a value of 1 means the state does not exempt these individuals).

- ***Most severe sanction amount.*** States can sanction individuals for noncompliance in the work requirements. We compute the state's most severe sanction amount for a family of three.

- ***Duration of most severe sanction***. States can also establish the duration that their most severe sanction applies. We classified states into five groups based on the duration of severe sanctions.[34]

[33] We measure the number of qualifying activities as (5-*n*), where *n* is the number of qualifying activities. The resulting variable ranges from 0 to 3.

[34] Severe sanctions are classified as: 1=one month or until compliance; 2=2-5 months; 3=6-11; months; 4=12=36 months; and 5=permanent.

- ***Difference between severe and first sanction***. States may apply initial sanctions that are lower than their most severe sanction. We measure the difference between the most severe sanction and the initial sanction in each state.

The TANF program has numerous other rules that affect program eligibility, but these other rules are not examined in this study. The limited number of observations in our model requires us to limit the number of covariates included. Some TANF rules, such as rules for asset eligibility, are captured indirectly through the state FSP rules.[35] Other TANF rules, such as rules governing the eligibility of pregnant women, the treatment of deemed income, and the treatment of in-kind income, likely affect such a small portion of the FSP eligible population that they many not affect state FSP participation rates.

3. Medicaid and SSI Policies

State Medicaid policies may also affect state FSP participation rates. Gleason et al. (2002) found that FSP caseloads are affected by state Medicaid policies. They used two measures of Medicaid policies: (1) the maximum age at which income-eligible children automatically qualify for Medicaid benefits, and (2) the maximum income at which age-eligible children are automatically eligible for benefits. Yelowitz (2001) examined state expansions to Medicaid/SCHIP over the 1990s, measuring eligibility thresholds for children in various age groups and examining whether the state had adopted more than the median number of outreach expansions. Uniform data on state Medicaid outreach rules—similar to the measures used by Yelowitz—is not available for the 2003 analysis period. To capture state variation in Medicaid rules, we use the state SCHIP eligibility threshold for children (Table III.4).

Few studies have examined the role that SSI policies can play in driving FSP participation. While SSI is a federal program, many states will supplement the federal SSI benefit with

[35] Many states have aligned their FSP asset rules to be consistent with their TANF asset rules.

additional benefits. We capture this state variation with a variable that reflects the maximum federal plus state SSI benefit to an eligible individual in each state.

TABLE III.4

MEDICAID AND SSI POLICIES

Policy	Measure
Medicaid	
SCHIP eligibility	Measure of eligibility threshold (percent of poverty) for children in SCHIP
SSI	
Maximum Benefit	Maximum federal + state SSI benefit for an individual

4. EITC and State Economy

Few studies have examined the role of state earned income tax credit programs in determining FSP or TANF participation. The federal EITC, which is uniform across states, is a refundable tax credit, meaning people with earnings receive the credit even if it exceeds their tax liability. Several states have additional earned income credits, some of which are refundable and some of which are not. The availability of the state credit would raise household incomes, potentially reducing the likelihood that eligible individuals participate in the FSP. Mikelson and Lerman (2004) found that a 0/1 indicator for whether a state's EITC was refundable was negatively correlated with a household's FSP participation decision. Fender et al. (2002) use state rules to compute the credit for a prototypical family. For this study, we use a measure similar to that constructed by Fender et al., reflecting the state EITC amount for a prototypical family (Table III.5). We do not account for whether the EITC is refundable (in 2003, the EITC was refundable in 13 of the 16 states with state EITCs).

Another factor that could affect state FSP participation rates is the overall state economy. Eligible individuals may be less likely to participate in the FSP if the state economy is strong,

since their expectations for future earnings may be higher. We use three separate measures of the state economy:

- ***Unemployment Rate***. We use the overall state unemployment rate in 2003
- ***Employment Growth Rate***. We measure the change in state employment from January 2002 to January 2003.
- ***20th Percentile Wage***. We measure the 20th percentile hourly wage in the state.

TABLE III.5

STATE EITC AND ECONOMIC MEASURES

Policy	Measure
State EITC	
State EITC	A calculated state EITC amount for a prototypical family
State Economy	
Unemployment rate	Unemployment rate for analysis year
Employment Growth Rates	Employment growth over a fixed period
20th Percentile Wage	20th Percentile Wage

B. VARIABLE REDUCTION

The model to measure the effects of state policies on state participation rates has only 51 observations—one for each state in 2003. To conserve degrees of freedom, we used principal components analysis to combine policies for inclusion in the model. Principal components analysis is a variable reduction technique that combines policies that covary across states. Principal components analysis takes *n* variables and constructs *n* principal components, where the first component is the linear combination of variables that contribute the most to the total variation, the second principal component (which is uncorrelated with the first) contributes the most to the residual variation, and so on (Harman 1967). The principal components are simply a weighted linear combination of variables with no assumption of causal influence (Hatcher 1994).

We then identify *y*—the number of principal components needed to explain most of the variation in reflected in the *n* variables. We transform the principal components into *y* factors.

Following Hatcher (1994), we wanted factors formed from at of least three variables, so we conducted principal components analysis on sets of related policies where there are at least five separate policy measures (assuming two measures will "drop out" of the analysis). We applied principal components analysis to three sets of similar variables: (1) FSP accessibility, (2) TANF eligibility, benefits, and accessibility, and (3) TANF work requirements and time limits (Table III.6).[36] All of the variables included in these three groups have been defined such that higher values are expected to lead to lower participation rates, all else being equal. While these policies have different metrics, an initial step of the principal components analysis converts each variable to have a mean of zero and a standard deviation of one.

1. FSP Accessibility

Table III.7 shows the initial six components constructed from the six FSP accessibility policies. Two components have an eigenvalue greater than one (meaning they account for the variance of more than one variable). Combined, these two components explain 49 percent of the total variation observed in the six FSP accessibility policies.

[36] Hatcher (1994) also recommends that the minimum number of observations included in the analysis should be five times the number of variables. Because we have a fixed number of observations—51—this suggests that we should have a maximum of 10 variables in each group. Two of the three groups have fewer than 10 variables; the third group—TANF Work Requirements and Time Limits—has 13 variables. However, we were not able to explain more variation across policies by limiting this third group to 10 variables.

TABLE III.6

POLICIES CONSOLIDATED THROUGH PRINCIPAL COMPONENTS ANALYSIS

FSP Accessibility	TANF Eligibility, Benefits and Accessibility	TANF Work Requirements and Time Limits
Categorical Eligibility	Income Threshold	Lifetime Time Limit
Vehicle Rules	Maximum Benefit	Intermittent Time Limit
Fingerprinting	Family Cap	Time Limit Exemption for Ill/Incapacitated
Application Page Length	Diversion Payments	Time Limit Exemption for Parents with Young Children
Number of Visits	Job Search Application Requirements	Time Limit Extensions
State FSP Outreach Efforts	School Attendance Application Requirements	Qualifying Activities
	Immunization Application Requirements	Minimum Hours in Work Activities
	Drug Testing Application Requirements	Start of Work Requirements
	Parenting Class Application Requirements	Work Requirement Exemption for Ill/Incapacitated
	Citizenship Requirements	Work Requirement Exemption for Parents with Young Children
		Severe Sanction Amount
		Severe Sanction Length
		Difference between Severe and First Sanctions

TABLE III.7

INITIAL COMPONENTS, FSP ACCESSIBILITY

Principal Component	Eigenvalue	Cumulative Variation Explained
1	1.55787087	0.2596
2	1.36907502	0.4878
3	0.9565634	0.6473
4	0.79851673	0.7803
5	0.71415116	0.8994
6	0.60382282	1.0000

We retained the two components with eigenvalues greater than one.[37] Table III.8 shows the results of the verimax rotation of these components. Since this is an orthogonal rotation, the coefficients—called loadings—in Table III.8 reflect the bivariate correlation between the variable and the factor. Variables with loadings greater than 0.4 are flagged as "meaningful" (we ignore variables that have loadings greater than 0.4 on more than one component). We can then use the meaningful variables to interpret the factors. Thus, Factor 1 represents the number of visits required and FSP outreach policies, and Factor 2 represents the categorical eligibility and vehicular asset policies.

TABLE III.8

FACTOR LOADINGS, FSP ACCESSIBILITY

Input Variable	Factor 1	Factor 2
Categorical Eligibility	-0.50	0.64*
Vehicle Rules	0.40	0.71*
Fingerprinting	-0.56	0.43
Application Page Length	0.49	0.43
Number of Visits	-0.67*	0.17
State FSP Outreach Efforts	0.72*	0.31

2. TANF Eligibility, Benefits, and Accessibility

To reduce the number of TANF-related variables, we explored using principal components analysis over three alternative combinations of TANF eligibility, benefits, accessibility, and time limit/work requirement policies: (1) one large group containing all policies, (2) two separate groups (one for eligibility, benefits, and accessibility policies and one for time limit/work requirement policies), and (3) three separate groups (one for eligibility and benefits, one for

[37] As an alternative to keeping those components with an eigenvalue greater than 1, Hatcher (1994) suggests keeping those components that explain at least 70 percent of the total variation. In this case, that would suggest

accessibility, and one for time limit/work requirement policies). Using two separate groups was preferred to using only one group because it yielded factors that were easier to interpret. For example, when we used only one large group of all TANF policies, one factor was loaded by income eligibility, application requirement, work requirement exemption, and sanction amount policies. If this factor were shown to influence standardized state participation rates, it would be difficult to interpret what policy issues were actually affecting the rates. Because a key goal of this process is variable reduction, using two separate groups was preferred to using only one group because it yielded fewer total factors.

Table III.9 shows the eigenvalues of the initial components extracted for the TANF eligibility, benefits, and accessibility variables. Three components have an eigenvalue greater than 1, explaining 59 percent of the total variance observed in these policies. Table III.10 shows the factor loadings for these variables. Factor 1 is interpreted as reflecting income eligibility, benefit, and citizenship policies; Factor 2 is interpreted as family cap, school attendance, and immunization policies; and Factor 3 is interpreted as reflecting drug testing and parenting class application requirements.

TABLE III.9

INITIAL COMPONENTS, TANF ELIGIBILITY, BENEFITS AND ACCESSIBILITY

Principal Component	Eigenvalue	Cumulative Variation Explained
1	2.97152437	0.2972
2	1.57898459	0.4551
3	1.36665214	0.5917
4	0.95301365	0.6870
5	0.86001204	0.7730
6	0.70149325	0.8432
7	0.48894638	0.8921

(continued)

keeping the first four components. Because the goal of this process is to conserve degrees of freedom, we chose to keep only the two components with eigenvalues greater than 1.

8	0.40641409	0.9327
9	0.37107541	0.9698
10	0.30188408	1.0000

TABLE III.10

FACTOR LOADINGS, TANF ELIGIBILITY, BENEFITS AND ACCESSIBILITY

Input Variable	Factor 1	Factor 2	Factor 3
Income Threshold	0.70 *	0.27	-0.18
Maximum Benefit	0.75 *	0.39	0.10
Family Cap	0.11	0.66 *	-0.50
Diversion Payments	-0.75 *	0.16	-0.17
Job Search Application Requirements	0.43 *	-0.19	0.36
School Attendance Application Requirements	0.11	0.84 *	0.17
Immunization Application Requirements	0.60	0.80 *	0.11
Drug Testing Application Requirements	0.19	0.22	0.67 *
Parenting Class Application Requirements	-0.11	0.40	0.88 *
Citizenship Requirements	0.64 *	0.16	0.10

3. TANF Work Requirements and Time Limits

For the 13 TANF work requirement and time limit policies, 6 principal components have an eigenvalue greater than 1 (Table III.11). Keeping six factors, Factor 1 reflects time limit policies, Factor 2 reflects sanction amounts, Factor 3 reflects work requirement exemptions, Factor 4 reflects the number of qualifying activities, Factor 5 reflects work requirement extensions and the start of the work requirement, and Factor 6 reflects the presence of intermittent time limits and the length of sanctions (Table III.12).

4. Factor Scores

To use the results of the principal components analysis, we want to create variables that reflect each state's position relative to others along the factors that have been extracted. There are two approaches to constructing these variables (Hatcher 1994). Factor scores are optimally weighted linear combinations of all variables in each group of policies. Factor-based scores are

unweighted linear combinations of just those variables that demonstrate meaningful loadings. We constructed factor scores such that the summary factors reflect all policies examined.

TABLE III.11

INITIAL COMPONENTS, TANF WORK REQUIREMENT AND TIME LIMIT POLICIES

Principal Component	Eigenvalue	Variation Explained
1	2.48634807	0.1913
2	2.26003143	0.3651
3	1.44667304	0.4764
4	1.25522381	0.5729
5	1.10302537	0.6578
6	1.02725068	0.7368
7	0.94024893	0.8091
8	0.72886667	0.8652
9	0.57647948	0.9095
10	0.44687639	0.9439
11	0.3155546	0.9682
12	0.24896106	0.9873
13	0.16446044	1.0000

TABLE III.12

FACTOR LOADINGS, TANF WORK REQUIREMENT AND TIME LIMIT POLICIES

Input Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Lifetime Time Limit	0.74 *	0.40	0.40	0.31	0.11	0.70
Intermittent Time Limit	-0.32	-0.80	0.36	-0.50	-0.70	0.61 *
Time Limit Exemption for Ill/Incapacitated	0.73 *	0.12	0.33	-0.39	0.80	0.40
Time Limit Exemption for Young Children	0.87 *	-0.10	-0.11	-0.30	0.13	0.00
Time Limit Extensions	0.19	-0.10	0.18	-0.30	0.82 *	-0.90
Qualifying Activities	0.60	-0.9	0.80	0.86 *	-0.70	-0.40
Minimum Hours in Work Activities	-0.10	-0.67	0.40	-0.45	0.17	-0.24
Start of Work Requirements	-0.90	-0.60	0.33	0.90	-0.71 *	-0.24
Work Requirement Exemption for Ill/Incapacitated	0.20	0.16	0.76 *	-0.10	-0.10	0.14
	-0.17	0.12	0.71 *	0.38	-0.30	-0.24
Work Requirement Exemption for Young Children	0.00	0.81 *	0.23	-0.60	0.26	-0.22
Severe Sanction Amount	0.23	-0.50	-0.15	0.00	0.11	0.71 *
Severe Sanction Length	0.90	0.89 *	0.80	-0.20	-0.16	-0.70
Difference between Severe and First Sanctions						

The principal components analysis enables us to reduce 29 FSP and TANF policy variables to 11 factor scores, a substantial reduction considering the state level model will be estimated over only 51 observations. As discussed in the next section, we conducted sensitivity analyses of the factor scores, replacing each set of factors with all component policy variables and with those component policy variables that have the highest loadings.

C. ESTIMATION METHODS

The basic model for examining the degree to which standardized participation rates vary with respect to state policy and economic conditions is:

$$r_s' = P_s\alpha + E_s\beta + e_s$$

where,

r_s' = 2003 standardized participation rate for state *s* (a participation rate of 50 percent is measured as 0.50)
P_s = a vector of policy variables for FSP, TANF, Medicaid, SSI, and EITC rules in state *s* in 2003
E_s = a vector of economic conditions in state *s* in 2003

This model is estimated with one observation per state. For the basic model, we weight the individual state participation rate estimates by the inverse of the variance of those participation rate estimates. This weighting allows standardized rates for which we have more confidence to have more weight in the regression results. Our variance estimates were derived using jackknife estimation techniques and then smoothed with a generalized variance function (GVF).

Table III.13 lists the various specifications of this model. In addition to the basic model (Model 1), we estimated the following alternative specifications:

- ***Alternative Weighting***: To examine the effects of weighting, we estimate two alternative versions. Model 2 is identical to Model 1, except the individual state observations are unweighted. Model 3 is also identical to Model 1, except it is

weighted using the initial jackknife variance estimates (that is, the variance estimates before being smoothed with the GVF).

- ***Direct Participation Rates*:** To examine how the correlation between state policy conditions and participation rates differ between standardized and direct (unstandardized) participation rates, we replicate Models 1 and 2 using the direct participation rates (Models 4 and 5).
- ***Simplified Model*:** To examine whether the limited degrees of freedom constrains the model, we estimate a simplified version of Model 1 using a reduced set of covariates (Model 6).

TABLE III.13

ALTERNATIVE MODEL SPECIFICATIONS

	Basic Model	Alternative Weighting		Direct Participation Rates		Simplified Model
	1	2	3	4	5	6
Standardized Participation Rate	✓	✓	✓			✓
Direct Participation Rate				✓	✓	
Weighted Model (GVF)	✓			✓		✓
No Weights		✓			✓	
Weighted Model (Jackknife)			✓			
Degrees of Freedom	23	23	23	23	23	37

D. RESULTS

In general, the variance in participation rates cannot be explained by differences in state policies or economic conditions. This holds true whether we are examining the variation in standardized or direct participation rates, which suggests that participation rates vary for reasons other than state program policies or aggregate state economic conditions.

Table III.14 presents the results of Model 1. Only two policies have a significant relationship with the standardized participation rates: (1) the state FSP policy on change

TABLE III.14

RESULTS FROM MODELS OF STANDARDIZED PARTICIPATION RATES
USING ALTERNATIVE APPROACHES TO WEIGHTING (MODELS 1, 2 AND 3)

	Model 1 (Weighted, GVF)		Model 2 (Unweighted)		Model 3 (Weighted, Jackknife)	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	1.0305	(0.4071)	1.1373	(0.4932)	0.8668	(0.4529)
FSP Policies						
EBT	0.0721	(0.0575)	0.0856	(0.0677)	0.0603	(0.0658)
Certification Period (Earnings)	0.0134	(0.0341)	0.0216	(0.0372)	0.0173	(0.0390)
Certification Period (Single Mothers)	-0.0042	(0.0412)	-0.0179	(0.0458)	-0.0071	(0.0464)
Reporting Requirements	0.0758	(0.1002)	0.1067	(0.1236)	0.0688	(0.1097)
Change Reporting	0.1188*	(0.0521)	0.0811	(0.0668)	0.1153	(0.0591)
Reporting x Change	-0.0596	(0.1314)	-0.0613	(0.1608)	-0.0462	(0.1417)
ABAWD Rules	-0.0884	(0.0615)	-0.0610	(0.0738)	-0.096	(0.073)
Accessibility Policies						
Factor 1	-0.0005	(0.0280)	-0.0067	(0.0331)	0.0008	(0.0288)
Factor 2	-0.0732*	(0.0284)	-0.0604	(0.0374)	-0.0589	(0.0292)
TANF Policies						
Transitional FSP Benefits	-0.0178	(0.0658)	0.0086	(0.0890)	-0.0334	(0.0732)
FSP Sanctions	-0.0417	(0.0707)	-0.0789	(0.0775)	-0.007	(0.0782)
Earned Income Disregard	-0.0001	(0.001)	-0.0001	(0.0012)	0.0002	(0.0012)
Eligibility, Benefits, and Accessibility						
Factor 1	-0.0370	(0.0335)	-0.0218	(0.0399)	-0.037	(0.0369)
Factor 2	-0.0205	(0.0250)	-0.0344	(0.0304)	-0.0242	(0.0277)
Factor 3	-0.0131	(0.0274)	-0.0086	(0.0329)	-0.0055	(0.0294)
Work Requirements and Time Limits						
Factor 1	-0.0331	(0.0328)	-0.0601	(0.0367)	-0.0366	(0.0366)
Factor 2	-0.0269	(0.0275)	-0.0145	(0.0334)	-0.0251	(0.0276)
Factor 3	-0.0148	(0.0261)	0.0006	(0.0322)	0.0002	(0.0311)
Factor 4	0.0046	(0.0244)	0.0106	(0.0289)	-0.0007	(0.0255)
Factor 5	0.0037	(0.0262)	0.0121	(0.0287)	0.0053	(0.0293)
Factor 6	0.0014	(0.0313)	0.0022	(0.0393)	0.0068	(0.0312)
Other Programs						
Medicaid/SCHIP Eligibility	-0.0004	(0.0007)	0.0000	(0.0008)	0.0001	(0.0007)
SSI Maximum Benefit	-0.0005	(0.0005)	-0.0006	(0.0005)	-0.0005	(0.0006)
EITC	0.0000	(0.0001)	-0.0001	(0.0001)	-0.0001	(0.0001)
Economic Indicators						
Unemployment Rate	-0.0262	(0.0288)	-0.0107	(0.0339)	-0.0225	(0.0345)
20^{th} Percentile Wage	0.0003	(0.0427)	-0.0194	(0.0520)	-0.001	(0.0466)
Employment Growth Rate	-0.0132	(0.0134)	-0.0184	(0.0154)	-0.0131	(0.0146)
Adjusted R-Square	-0.0637		-0.1458		-0.0578	

* Significant at the 95% level of confidence.

reporting, and (2) FSP accessibility Factor 2 (reflecting categorical eligibility and vehicular assets). The coefficient on the change reporting variable indicates that states with a change or status reporting policy have a participation rate that is almost 12 percentage points higher than states that do not. The coefficient on the FSP accessibility Factor 2 variable suggests that states with more strict categorical eligibility and vehicular asset rules tend to have lower FSP participation rates.

These policy effects are sensitive to the weighting approach we use in our models. The significant relationships are apparent only when we estimate the model weighted with the GVF-based variance estimates of the participation rates. The GVF estimation process smoothes the more volatile jackknife-based estimates of the participation rate variances, lowering the variance estimates for several states that have small sample sizes and hence relatively large jackknife-based variance estimates for their participation rates. Because we weight by the inverse of the variance, lowering the variance increases the weight these states get in Model 1 (variance smoothed) relative to Model 3 (variance not smoothed). However, these states still have lower relative weight in Model 3 than they do in Model 2, where each state is given equal weight.

In other words, these policy effects are apparent only when we give more weight to states where we have more confidence in the participation rate; they are not apparent if we treat each participation rate equally, and they are not apparent if we give extremely small weights to states where we are less confident in their participation rates. Because we believe the GVF-based variance estimates are the best estimates of the participation rate variances, we are inclined to interpret these policy effects as potentially meaningful. However, because the effects are sensitive to the model weighting, caution should still be used in drawing policy implications from these results.

We used F-tests to examine whether the key policies taken as a group could explain the variation in state participation rates. In particular, we conducted F-tests grouping all FSP policies, all TANF policies, all other program policies and all economic conditions. The F-tests indicated that even when taken as a group, these policy variables are not significantly correlated with standardized participation rates.

In general, the lack of significance among the covariates suggests that after standardizing state participation rates, aggregate state characteristics do not explain the residual variation in these rates. However, even before the standardization process, these variables are not correlated with the direct participation rates. Table III.15 presents the results from models estimated using the direct participation rates. No state policy or economic characteristic is significantly related to the direct state participation rates. Thus, regardless of whether state participation rates are standardized for the composition of state eligible populations, the variation in participation rates cannot be explained by variation in state characteristics.

It is possible that the lack of significant relationships between state characteristics and state participation rates could be driven by the limited degrees of freedom. With only 51 observations, there may not be enough variation in rates to be explained by the numerous covariates. We estimated a simplified version of Model 1 with a reduced set of covariates. In the simplified version, we estimated the model without selected FSP policy variables, without any factor-based variables, and without covariates representing Medicaid and SSI policies. The results from the simplified version are consistent with other models (Table III.16). When we reduce the number

TABLE III.15

RESULTS FROM MODELS OF DIRECT PARTICIPATION RATES (MODELS 4 AND 5)

	Model 4 (Weighted, GVF)		Model 5 (Unweighted)	
	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	0.7915	(0.3632)	0.8276	(0.4272)
FSP Policies				
EBT	0.0210	(0.0510)	0.0131	(0.0586)
Certification Period (Earnings)	0.0270	(0.0304)	0.0329	(0.0322)
Certification Period (Single Mothers)	-0.0204	(0.0372)	-0.0364	(0.0397)
Reporting Requirements	0.1055	(0.0873)	0.1658	(0.1071)
Change Reporting	0.0766	(0.0467)	0.0370	(0.0578)
Reporting x Change	-0.1498	(0.1120)	-0.1848	(0.1393)
ABAWD Rules	-0.0408	(0.0541)	-0.0198	(0.0639)
Accessibility Policies				
Factor 1	0.0253	(0.0243)	0.0199	(0.0287)
Factor 2	-0.0534	(0.0267)	-0.0372	(0.0324)
TANF Policies				
Transitional FSP Benefits	-0.0252	(0.0607)	0.0064	(0.0771)
FSP Sanctions	-0.0290	(0.0626)	-0.0687	(0.0671)
Earned Income Disregard	0.0001	(0.0009)	0.0003	(0.0010)
Eligibility, Benefits, and Accessibility				
Factor 1	-0.0247	(0.0304)	-0.0092	(0.0345)
Factor 2	-0.0165	(0.0220)	-0.0263	(0.0263)
Factor 3	-0.0003	(0.0236)	0.0102	(0.0285)
Work Requirements and Time Limits				
Factor 1	-0.0113	(0.0290)	-0.0328	(0.0318)
Factor 2	-0.0332	(0.0250)	-0.0278	(0.0289)
Factor 3	-0.0145	(0.0229)	-0.0060	(0.0279)
Factor 4	0.0130	(0.0205)	0.0160	(0.0251)
Factor 5	-0.0063	(0.0226)	-0.0057	(0.0248)
Factor 6	-0.0117	(0.0279)	-0.0137	(0.0341)
Other Programs				
Medicaid/SCHIP Eligibility	-0.0007	(0.0007)	-0.0004	(0.0007)
SSI Maximum Benefit	-0.0003	(0.0004)	-0.0003	(0.0005)
EITC	0.0000	(0.0001)	0.0000	(0.0001)
Economic Indicators				
Unemployment Rate	0.0081	(0.0247)	0.0199	(0.0294)
20^{th} Percentile Wage	-0.0014	(0.0383)	-0.0093	(0.045)
Employment Growth Rate	-0.0051	(0.0114)	-0.0146	(0.0133)
Adjusted R-Square	-0.0650		-0.2598	

* Significant at the 95% level of confidence.

TABLE III.16

RESULTS FROM SIMPLIFIED MODEL (MODEL 6)

	Model 6 (Unweighted)	
	Coefficient	Standard Error
Intercept	0.7105	(2.7923)
FSP Policies		
EBT	0.0367	(0.8142)
Certification Period (Earnings)	-0.0014	(0.1839)
Certification Period (Single Mothers)	--	--
Reporting Requirements	0.0462	(0.6121)
Change Reporting	0.0694	(1.6453)
Reporting x Change	-0.0711	(0.7906)
ABAWD Rules	--	--
Accessibility Policies		
Factor 1	0.0102	(0.6016)
Factor 2	-0.0332	(1.8026)
TANF Policies		
Transitional FSP Benefits	0.0304	(0.6524)
FSP Sanctions	0.0081	(0.1532)
Earned Income Disregard	0.0009	(1.1687)
Eligibility, Benefits, and Accessibility		
Factor 1	--	--
Factor 2	--	--
Factor 3	--	--
Work Requirements and Time Limits		
Factor 1	--	--
Factor 2	--	--
Factor 3	--	--
Factor 4	--	--
Factor 5	--	--
Factor 6	--	--
Other Programs		
Medicaid/SCHIP Eligibility	--	--
SSI Maximum Benefit	--	--
EITC	--	--
Economic Indicators		
Unemployment Rate	-0.0020	(0.1023)
20^{th} Percentile Wage	-0.0269	(1.1571)
Employment Growth Rate	-0.0069	(0.6361)
Adjusted R-Square	-0.0243	

* Significant at the 5% level of confidence.

of covariates the variation in key FSP and TANF policies and in economic conditions is still not significantly correlated with the variation in standardized participation rates.[38]

In short, the state participation rates are not correlated with most or all state policy and economic characteristics. These findings hold regardless of how individual states are weighted, whether the standardized or direct participation rates are used, and how the individual state policies are measured.

E. CONCLUSIONS

Even after standardizing the state participation rates to control for differences in the composition of each state's eligible population, variation remains in the rates at which eligible individuals participate in the FSP. However, these patterns of this variation across states are not well explained by other aggregate state characteristics. State participation rates do not appear correlated with most FSP and TANF policies that might affect the ease with which people enter the program. While there may be a relationship between states' policies on change reporting and program access and their standardized participation rate, the evidence for such a relationship is far from concrete. Moreover, the rates do not appear correlated with state economic conditions that could influence eligible individuals' expectations of future income.

[38] We explored other possible explanations for the lack of a significant relationship between policy variables and standardized participation rates. First, to test for multicolinearity, we regressed the standardized participation rate against each covariate in Model 1 separately. The results suggest that multicolinearity is not influencing the results. In these separate models, correlations were insignificant for all variables except the FSP Access Factor 2 variable and SSI maximum benefits. It is also possible that the factor scores derived from the principal components analysis do not accurately capture the meaningful variation in state policies. To test the sensitivity of the results to these factor scores, we estimated the basic model replacing the factor scores with individual policy measures. Even in these models, however, the individual policy measures are not significantly correlated with the standardized state participation rates; no component policy is shown to be significantly related to state participation rates. This holds even for the FSP access component policies, which were shown to be significant in Model 1. We also estimated a version of the model in which we replaced the factor scores with selected component polices. Specifically, we used the policies that had the largest loading for each factor. Again, these individual policies are not significantly related to the state participation rates (as in Model 1, policies on change reporting are shown to be significantly related to participation rates). Appendix C contains the estimates from these alternative models.

While the results of this analysis fail to show a strong relationship between policy and economic characteristics and participation rates, it is hard to believe that the variation in standardized rates would be explained by random factors alone. One would expect that state policies and procedures would have some influence over the rate at which eligible people participate. The failure to identify significant relationships could be explained by several factors:

- ***Similar policies may be implemented differently.*** It is possible that two states adopting the same policy may implement that policy in a different way. For instance, two states may adopt the FSP simplified reporting option. In one state, the rules for simplified reporting may be made clear to participants and hence participating in the FSP is made easier. In the other state, the rules for simplified reporting may be presented in a confusing fashion, leading participants to be more frustrated and confused with the program. Such problems could lead to shorter spells among participants and could discourage others from applying. Thus, if two policies measured similarly in this study are implemented differently, then our model will not capture the meaningful variation in those policies.

- ***Aggregate measures may mask meaningful local variations.*** Just as the same policy could be implemented differently in two different states, the same policy may be implemented differently within a state. This is particularly true in states where county social service agencies have authority to establish FSP rules and procedures. Thus, the actual policy in place in areas with high concentrations of FSP-eligible households—if available—would be a better measure of FSP policy than the state-level measure. Similarly, economic conditions at the local level may be masked by the aggregate economic measures used in the model.

- ***State procedures may be more important than state policies.*** Our model examines the influence of key state policies governing eligibility and benefits for the FSP, TANF, and other programs. However, procedures for accepting applications and conducting outreach—both of which vary at the local level—may be more important determinants of state participation rates than the policies examined here.

- ***Imprecision in participation rate estimates.*** The estimates of state participation rates have substantial error associated with them. Sampling error could mask meaningful variation in the true state participation rates. While we attempt to account for this by weighting observations, sampling error in the participation rates could nevertheless affect our ability to identify significant relationships. Moreover, the participation rates could be affected by measurement errors stemming from underreporting, undercoverage, and simulation error, further affecting our ability to identify significant relationships.

- ***Limited degrees of freedom.*** The fact remains that the models are estimated over only 51 observations. This limited number of observations may mask the individual effects of various policy and economic factors that may influence state participation

rates. Examining the variation across states and over time may allow researchers to better identify the effects of each of these factors.

Thus, while the results of this analysis suggest that state participation rates vary independent of state policy and economic conditions, states still likely have some control over their participation rates. The challenge is to find better measures of state policies and possibly of state participation rates, and examine state participation rates over time.

IV. CONCLUSIONS

A. SUMMARY OF FINDINGS AND SUGGESTIONS FOR FUTURE RESEARCH

As USDA works to increase FSP participation rates, we need to understand why participation rates are higher in some states than in others. Part of these differences can be explained by differences in the composition of each state's eligible population. In particular, states whose eligible populations contain higher proportions of households with no earnings and households headed by African Americans would have higher participation rates, all else being equal, because these populations participate at higher rates. Likewise, states whose eligible populations consist of higher proportions of elderly individuals tend to have lower participation rates, all else being equal, because elderly individuals participate at lower rates.

However, the variation in state participation rates does not decrease once we account for the differences in the compositional differences of the state populations. The standardized participation rates vary as much from state to state as the unstandardized rates, with the standardized rates ranging from 43 percent in California and Wyoming to 89 percent in Oregon. After examining how much of this remaining variation is due to state policies and economic conditions, we find that much of this variation remains unexplained. It may be that our measures of policies or participation rates are too imprecise to capture the relationships between policies, economic conditions, and FSP participation rates. It may also be that limited degrees of freedom constrain the model's ability to identify policy and economic effects.

The research presented here is the first attempt we know of to standardize state FSP participation rates. Thus, our suggestions for future studies include exploring modifications to the techniques presented, which may provide additional insights about why we do not find a reduction in the variation of the rates from the standardization process. Our suggestions are to:

- ***Explore Alternative Standardization Techniques.*** The procedures for generating the standardized FSP participation rates presented here are based on a logistic model of FSP participation. As discussed in Appendix B, this model implied participation rates of over 100 percent for some subgroups. An alternative estimation approach—the semi-logistic model—constrains the participation rates to be less than 100 percent and thus that approach generated standardized rates that differed substantially from those from the logistic approach. While we believe the logistic approach to be the better of the two—see Appendix B for more details—more work should be done evaluating alternative approaches for standardizing the FSP participation rates. In particular, more work should be done to understand why some groups have very high predicted participation rates, including some over 100 percent. The high rates could be attributed to sampling error, undercoverage in the CPS sample, problems with the model that simulates FSP eligibility, or all of these factors.

- ***Measure Participation Rates in Other Datasets.*** Microdata files from the American Community Survey (ACS) are currently being released by the Census Bureau. The ACS will improve researchers' abilities to generate precise estimates of state characteristics. However, the information collected in the ACS differs from that collected in the CPS. Future research should examine state FSP participation rates derived from ACS data, and explore any differences between those rates and the CPS-based participation rates.

- ***Improve State Measures.*** Existing measures of state policies for the FSP and other programs may not capture the meaningful cross-state variations in these programs, and they may also mask meaningful within-state variations. Better measures of state policies would enable researchers to explore the relationship between policies and outcomes. In addition, researchers could explore including measures beyond those used in previous studies.

- ***Examine Multiple Years of Participation Rates***. The limited number of observations likely constrains our ability to identify policy and economic effects on state participation rates. Future research should examine multiple years of participation rates to better identify these effects. By using multiple years, researchers will have more variation in rates to examine relative to the variation in policy and economic factors. Multiple years of data may also allow researchers to better understand the timing of the effects of policy changes on participation rates.

We expect that research on the determinants of FSP participation rates will continue to be important in the coming years. Increasing flexibility with respect to state FSP policies, new efforts to "modernize" state FSP programs, and a continued emphasis on increasing participation rates will certainly combine to affect participation rates in the future. As a result, efforts to refine estimation techniques and to measure state policies accurately will allow researchers and policymakers to better understand those factors that drive state FSP participation rates.

B. SUMMARY COMMENTARY

While our findings do not fully explain the variation observed in state participation rates, we still demonstrate that a state's participation rates can be influenced by the composition of its FSP-eligible population. These findings have implications for how policy makers interpret state participation rates and how states achieve increases in participation rates.

1. Interpreting State Participation Rates

Each year, USDA publishes official state participation rates, which are often interpreted as a measure of state performance. For instance, state policymakers and advocates for low-income families cite their state's rank in the distribution of participation rates as evidence that their FSP is performing well or poorly. However, the findings from this analysis raise the question: if state participation rates are a function of the composition of the eligible FSP population, which is beyond a state's control, do the rates really reflect performance?

Although the answer to this question is not definitive, it is useful to compare participation rates across states because the results still tell policymakers and advocates whether their state ranks among the top, middle, or bottom states. Nevertheless, because we know that variation in rates reflects factors both within and outside of each state's control, the results of a cross-state comparison of rates should be interpreted with caution. That is, the fact that a state ranks among the top states in participation rates could reflect high performance, or an FSP-eligible population that participates at high rates, or both.

Caution should also be used when comparing state participation rates to the national participation rate target. Each year in its budget request to Congress, USDA establishes a performance target for the national participation rate. In the fiscal year 2007 request, the target was 68 percent. However, USDA has never intended this target to be a benchmark for states.

The results of our analysis underscore this approach because a state's ability to reach a target participation rate would depend on the composition of the state's FSP-eligible population.

2. Increasing Participation Rates

A motivation for this study was to help identify policies that states could use to increase FSP participation rates. The results of our state-level analysis, however, suggest that state participation rates are not affected by measurable differences in state FSP policies (or other program policies). As discussed in Chapter III, we are reluctant to conclude that program policies have little impact on participation rates. Rather, we conclude that one possible interpretation is that with only 51 observations, the policy measures used here do not reflect the meaningful variation in program policies and procedures from state to state.

Despite the fact that we do not identify significant policy effects, this study's results can still help inform state efforts to increase FSP participation rates, particularly by examining which household characteristics are associated with FSP participation, and combining that with measures of state population characteristics. States can then identify which populations should receive targeted attention in efforts to provide outreach and increase participation rates. With disproportionately large shares of eligible elderly individuals, states like Florida, Connecticut, and Massachusetts may decide to focus efforts on raising participation rates among these individuals.

An alternative use of these findings would be to identify those populations that may yield the biggest return in terms of increased participation rates. Since eligible individuals without earnings have a higher propensity to participate, efforts targeting these groups could yield larger gains in FSP participation rates. Of course, such a strategy may come at the expense of efforts to reach populations that have low propensities to participate, and that may not be a desired outcome.

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APPENDIX A

VARIANCE ESTIMATION

This appendix provides details on the techniques used to estimate the variance of the standardized participation rates presented in Chapter II. Because the standardized rates are based on samples of participating and eligible households, they are measured with error. Thus, in addition to presenting the standardized rates themselves, we also provide estimates of their sampling variability. The estimated variances of the standardized state participation rates (shown in Table II.8 and Figure II.1) are calculated using a two-step process. We first calculate variance estimates using a jackknife procedure, and then smooth those variances using a generalized variance function (GVF). Those two steps are described in detail in this section.

A. JACKKNIFE-BASED VARIANCES

We first use a jackknife variance estimation procedure (Rao, Wu, and Yue 1992) to obtain preliminary, rough estimates of the variance of the standardized state rates. The method used is similar to that described in Castner and Schirm (2006), but extended to this setting with the concatenated data set of both CPS and FSPQC observations.

The following steps define the jackknife procedure used:

1. Define eight jackknife groups for each data set. For the CPS, the jackknife groups are defined by the eight rotation groups, each of which consists of a set of households (actually, housing units) that begin the CPS at the same time.[39] For the FSPQC, we created eight random groups within state, month, and sampling strata (as appropriate, depending on each state's QC sample design). Our process of assigning FSPQC jackknife groups ensures that for each state, households are evenly distributed across months and sampling strata within each jackknife group.
2. Calculate the standardized state-level rates using the full concatenated data set, as described in the main text. For state *i*, call the resulting standardized state rate R_i.
3. For each jackknife group (k=1 to 8), drop all observations from group k from the data set (i.e., drop CPS jackknife group k and FSPQC jackknife group k). Using this reduced dataset, estimate the standardized state FSP participation rates as described

[39] These sets of households are called rotation groups because the households are in the CPS for four months, rotate out for eight months, and then rotate back in for four months, after which time they are dropped from the CPS.

in the text. For state *i*, call the resulting standardized state rate $R_{i,(k)}$. The "(*k*)" subscript indicates that jackknife group *k* has been excluded.

4. By excluding each of the eight jackknife groups in turn we obtain eight alternative estimates for the standardized state FSP participation rate of state *i*. We use R_i as the estimated standardized state participation rate, and estimate the variance of R_i by measuring the variability among the eight estimates according to:

$$V(R_i) = \frac{7}{8}\sum_{k=1}^{8}(R_{i,(k)} - R_i)^2.$$

The factor 7/8 enters this expression because the $R_{i,(k)}$ are obtained from samples that are only 7/8 the size of the full concatenated data set for state *i*, and hence are expected to be more variable than R_i (by a factor of 8/7). Our jackknife estimate of the standard error of R_i is obtained by taking the square root of $V(R_i)$. The resulting estimated jackknife standard errors of the standardized state participation rates are presented in Table A.1.

B. SMOOTHED VARIANCE ESTIMATES

Given the CPS design, we can use only eight jackknife groups, which results in relatively imprecise estimates of the variance. We thus use a generalized variance function (GVF) to model the variances as a function of the rates and sample sizes, "borrowing strength" across states through the use of the model. The final variance estimate for each state is a precision weighted average of the state's jackknife and GVF variance estimates.

We use a GVF to smooth the variances because the individual states' variances are measured with relatively large uncertainty, but we believe that states with similar rates and sample sizes should have similar variances. This is similar in spirit to the shrinkage done to obtain the official food stamp participation rates by smoothing across states with similar characteristics (Castner and Schirm 2006) and is related to the Fay-Herriott model (Fay and

Herriot 1979), which combined direct and model-based estimates to facilitate calculation of statistics for small geographic areas.

GVF's are described in detail in Wolter (1985), and the use of a GVF with the CPS is described in Otto and Bell (1995) and Griffiths and Mansur (2001). O'Malley and Zaslavsky (2005) use a method of combining direct and model-based estimates of variances similar to that used here. In O'Malley and Zaslavsky (2005) the smoothing was done across survey items (variables) and survey respondents (observations), whereas in our situation we have just one variable per observation and our modeling and smoothing is done just across states (observations).

We explored a variety of GVF models, including those suggested by Wolter (1985) and Otto and Bell (1995) for use with the CPS. After a model selection process that included diagnostic plots and summary statistics, we determined that the following GVF specification provided the best fit to the data:

$$V_i = a + b\frac{R_i}{N_i} + c\frac{R_i^2}{N_i} + e_i,$$

where $e_i \sim N(0, \sigma^2)$, V_i is the estimated variance, R_i is the standardized state-level food stamp participation rate, and N_i is the combined FSPQC and CPS sample size for state *i*. The chosen GVF model is essentially the same as that used by Griffiths and Mansur (2001), which is of the same form as the official CPS GVF, divided by the state sample sizes.

TABLE A.1

STANDARDIZED 2003 FSP PARTICIPATION RATE VARIANCE ESTIMATES

	Jackknife Variance	GVF Variance	Smoothed Variance	Shrinkage Variance
Alabama	0.0012	0.0018	0.0016	0.0010
Alaska	0.0021	0.0043	0.0036	0.0021
Arizona	0.0018	0.0029	0.0028	0.0010
Arkansas	0.0023	0.0023	0.0023	0.0009
California	0.0005	0.0014	0.0007	0.0005
Colorado	0.0008	0.0019	0.0013	0.0008
Connecticut	0.0265	0.0026	0.0026	0.0009
Delaware	0.0023	0.0045	0.0041	0.0012
District of Columbia	0.0087	0.0046	0.0046	0.0023
Florida	0.0008	0.0021	0.0015	0.0009
Georgia	0.0019	0.0035	0.0034	0.0014
Hawaii	0.0075	0.0072	0.0072	0.0021
Idaho	0.0047	0.0041	0.0041	0.0015
Illinois	0.0030	0.0030	0.0030	0.0009
Indiana	0.0053	0.0034	0.0035	0.0010
Iowa	0.0060	0.0027	0.0028	0.0011
Kansas	0.0019	0.0022	0.0022	0.0008
Kentucky	0.0069	0.0033	0.0033	0.0010
Louisiana	0.0033	0.0030	0.0030	0.0011
Maine	0.0044	0.0057	0.0056	0.0014
Maryland	0.0015	0.0018	0.0018	0.0011
Massachusetts	0.0028	0.0017	0.0018	0.0010
Michigan	0.0022	0.0027	0.0027	0.0010
Minnesota	0.0068	0.0028	0.0029	0.0010
Mississippi	0.0028	0.0029	0.0029	0.0016
Missouri	0.0045	0.0070	0.0066	0.0017
Montana	0.0006	0.0026	0.0012	0.0008
Nebraska	0.0040	0.0045	0.0045	0.0012
Nevada	0.0051	0.0026	0.0027	0.0009
New Hampshire	0.0021	0.0042	0.0035	0.0012
New Jersey	0.0004	0.0020	0.0008	0.0005
New Mexico	0.0014	0.0021	0.0019	0.0010
New York	0.0006	0.0018	0.0010	0.0006
North Carolina	0.0016	0.0017	0.0017	0.0008
North Dakota	0.0063	0.0037	0.0037	0.0013
Ohio	0.0020	0.0028	0.0027	0.0008
Oklahoma	0.0032	0.0034	0.0034	0.0010
Oregon	0.0073	0.0081	0.0080	0.0022
Pennsylvania	0.0023	0.0023	0.0023	0.0009
Rhode Island	0.0007	0.0024	0.0015	0.0007
South Carolina	0.0009	0.0031	0.0025	0.0009
South Dakota	0.0080	0.0042	0.0043	0.0013
Tennessee	0.0068	0.0058	0.0058	0.0019
Texas	0.0003	0.0016	0.0005	0.0004
Utah	0.0057	0.0034	0.0035	0.0011
Vermont	0.0073	0.0061	0.0061	0.0012
Virginia	0.0039	0.0025	0.0025	0.0009
Washington	0.0031	0.0023	0.0023	0.0013
West Virginia	0.0063	0.0039	0.0040	0.0016
Wisconsin	0.0049	0.0022	0.0022	0.0009
Wyoming	0.0017	0.0040	0.0028	0.0012

We obtain parameter estimates of *a*, *b*, and *c* using iteratively reweighted least squares to fit the model using the 51 states, with the jackknife variance estimates modeled as a function of the standardized FSP participation rates, the combined CPS and FSPQC sample sizes.[40] The following parameter estimates were obtained: a=0.00; b=-1.66; c=9.61.

The resulting parameter estimates are then used to produce a predicted variance for each state, V_m. The final variance estimates are a weighted average of the jackknife-based variances (V_j) and the GVF model-based variances (V_m), where each is weighted according to its precision. Specifically, we use the following formula (O'Malley and Zaslavsky 2005):

$$Var(R) = \frac{\sigma_m^2 V_j + \sigma_j^2 V_m}{\sigma_m^2 + \sigma_j^2},$$

where V_j and V_m are the jackknife and (GVF) model-based estimates of the variance, respectively, and σ_j^2 and σ_m^2 are their respective variances. The model-based variance (σ_m^2) is obtained from the GVF model. The variance of the jackknife estimate is estimated by $\sigma_j^2 = \frac{2}{7} V_j^2$. This estimate is obtained under an assumption of normality, using the fact that the jackknife estimate of the variance, V_j, is a seventh-degree of freedom estimate of the variance, and the coefficient of variation of a chi-square distribution is $\sqrt{2/df}$, where *df* is the number of degrees of freedom.

The final variance estimate is a weighted average of the jackknife and model-based variance estimates, where the weights reflect the relative precision of the two estimates. Table A.1 shows the three sets of variance estimates: the jackknife-based variances, the GVF model-based

[40] We used the Stata reg command to fit the model.

variances, and the smoothed (final) variances, which are a weighted average of the two previous columns. Additionally, we present in Table A.1 variance estimates of the shrinkage estimates (see Castner and Schirm (2006) for more details on the variance estimation in the shrinkage estimation process).

APPENDIX B

ALTERNATIVE APPROACHES TO ACCOUNTING FOR TANF RECEIPT IN STANDARDIZING PARTICIPATION RATES

As discussed in Chapter II, accounting for TANF receipt in the standardization process presents a complex problem. TANF eligibility and receipt is highly correlated with food stamp receipt. FSP-eligible TANF recipients participate at high rates (Cunnyngham 2005), and we would like to standardize participation rates to account for the fact that some states have more TANF participants than others. However, eligibility for TANF varies across states and thus there is no consistent way of defining the TANF-eligible population across the entire country. Since our model requires us to know what each individual's characteristics would be in each state, we would need to know their TANF participation status in the 50 states and the District of Columbia; since this cannot be observed, it can only be estimated through simulation.

As an alternative, we investigated the link between likely TANF receipt and food stamp program participation by examining the participation of a group of eligible households likely to be eligible for TANF in every state: low-income single mothers. By controlling the participation rates for the composition of low income single mothers in each state, we would indirectly control for the fact that TANF participants are more likely to participate in the FSP, without having to account for the fact that TANF policies lead to different levels of participation among single mothers in each state (a relationship that could then be explored in the state-level model investigating variation in standardized participation rates). In this appendix, we discuss the complicated issues surrounding efforts to estimate participation rates for single mothers. In the end, we conclude that problems with the data result in estimated single mothers participation rates—and potentially overall FSP participation rates—that may be too high.

A. PARTICIPATION RATES OF LOW-INCOME SINGLE MOTHERS

One way of investigating the link between TANF and food stamp receipt would be to generate standardized food stamp participation rates for TANF recipients only, as was done for all food stamp eligible households in the main text. However, since TANF eligibility rules vary

by state, and since we know only if a household is TANF-eligible in the state in which they live (and lack detailed income information in the FSPQC and CPS files), we cannot predict which households would be TANF-eligible in all states.

To get around this, we instead consider a group of households that are likely to be TANF-eligible in all states, but which are defined by observed household characteristics that do not depend on the state in which a household resides. The group we consider consists of low-income single mothers and their children, and in particular, households composed of a female single adult and one or more children under age 17, with household earnings below 150 percent of the poverty line. Because these households are likely to be eligible for TANF regardless of the state in which they live, we can use them to investigate how states' FSP participation rates differ among the (likely) TANF-eligible population.

To examine the state participation rates of this group of low-income single mothers, we modified the logistic model described in the main text. In particular, we include an additional term, α_s, which allows the participation rate for low-income mothers to vary by state. In the same way that the γ_s terms capture the variation in the overall food stamp participation rates across states, the α_s terms capture the variation across states among the subgroup of low-income single mothers. With this extended model, the standardized state-level rates for the overall population are calculated in the same way described in the main text (with the α_s term added in for the low-income single mothers households). Similarly, the standardized state-level rates for low-income single mothers are calculated in the same way, but with the summations over just the low-income single mothers in the eligible population.

B. PARTICIPATION RATES EXCEEDING 100 PERCENT

A key difficulty in examining the food stamp participation rate among this group of single mothers is that the participation rate is very high. The direct estimate of the national participation rate for this group is 97 percent. In fact, in some states the direct estimate of the participation rate for this group is estimated to be over 150 percent (Table B.1). These direct rates are calculated simply as the number of participating single-mother households in a state (estimated using the FSPQC data) divided by the number of eligible single-mother households in the state (estimated using the CPS data). These rates would imply that in some states there are more single mother households participating in the food stamp program than are eligible. The estimation of participation rates greater than 100 percent is not an unheard of occurrence when estimating FSP participation rates of particular subgroups or states; in fact the 2003 estimated participation rate of TANF recipients was 126 percent (Cunnyngham 2005).

TABLE B.1

DIRECT AND STANDARDIZED 2003 FSP PARTICIPATION RATES FOR SINGLE MOTHERS

	Direct Participation Rate	Logistic Standardized Participation Rate	Semi-Logistic Standardized Participation Rate
Alabama	100.4	93.3	80.1
Alaska	154.1	147.7	96.2
Arizona	118.4	140.0	87.5
Arkansas	117.3	115.0	100.0
California	68.1	64.2	58.1
Colorado	91.4	102.3	76.8
Connecticut	150	148.2	84.7
Delaware	131.2	164.2	89.5
District of Columbia	95.7	91.1	78.5
Florida	70.0	71.0	73.4
Georgia	112.3	128.6	91.5
Hawaii	105.7	125.9	88.9
Idaho	121.5	139.0	95.8
Illinois	118.3	133.2	92.3
Indiana	141.1	151.1	97.5
Iowa	103.5	115.9	73.0
Kansas	83.2	87.2	83.2
Kentucky	97.5	100.0	77.5
Louisiana	108.2	112.3	86.9
Maine	94.7	97.2	89.5
Maryland	121.9	127.4	80.9
Massachusetts	108.0	119.5	79.6
Michigan	95.8	84.2	82.4
Minnesota	101.1	92.8	97.7
Mississippi	133.8	151.3	87.9
Missouri	169.9	188.5	96.6
Montana	73.0	80.0	68.0
Nebraska	110.6	127.0	87.0
Nevada	74.6	82.4	71.4
New Hampshire	107.9	137.3	91.6
New Jersey	109.7	109.5	81.3
New Mexico	110.4	109.0	83.0
New York	78.9	79.0	73.2
North Carolina	78.2	75.7	67.4
North Dakota	114.2	116	87.6
Ohio	106.2	97.6	81.6
Oklahoma	139.6	160.8	91.9
Oregon	158.9	184.6	100.0
Pennsylvania	115.1	109	86.1
Rhode Island	101.1	102.2	80.7
South Carolina	140.9	136.9	95.0
South Dakota	156.3	201.0	98.0
Tennessee	159.4	149.3	94.4
Texas	87.2	98.4	70.2
Utah	96.5	119.4	81.9
Vermont	110.4	106.7	91.0
Virginia	93.6	105.9	76.6
Washington	90.6	92.1	84.0
West Virginia	91.0	95.7	86.5
Wisconsin	92.5	98.9	93.3
Wyoming	92.2	117.4	83.6

Participation rates that exceed 100 percent for single mothers could reflect several factors. First, sampling variability in the FSPQC and CPS data could lead the number of participants in FSPQC data to exceed the number of eligibles in CPS data, particularly if the "true" participation rate among this group approaches 100 percent. Second, due to errors in the sampling frame, the CPS could underrepresent low-income single mothers, and this coverage problem may not be completely accounted for in the sampling weights. Third, the simulation model used to estimate eligibility in the CPS data could underestimate the true number of eligible single mothers in each state.

C. THE SEMI-LOGISTIC MODEL

Because the logistic regression model does not constrain the standardized participation rates to fall under 100 percent and because of the very high direct rates for the low-income single mother households (often greater than 100 percent), the standardized rates for that group also end up often being over 100 percent. This section describes an alternative model, the "semi-logistic," which restricts all participation rates to be between 0 and 100 percent. For example, in Connecticut, there are more low-income single mothers in the FSPQC data than in the CPS, which implies that the number of participating households of that type is larger than the number of eligible households of that type. The semi-logistic model assumes that this predicted rate over 100 percent is due just to chance: because of variability in the households selected for the CPS and FSPQC samples, we happened to get more low-income single mothers in the FSPQC than in the CPS. Whether or not this assumption is reasonable is discussed further below, after we give the details of the semi-logistic model.

The semi-logistic model is very similar to the logistic, with just a small change to the "link function" that relates the response variable (in the FSPQC data) to the predictor variables (the household characteristics and state fixed effects). In particular, the semi-logistic model is:

$$\log\left(\frac{\mathrm{F_{is}}}{1-2\mathrm{F_{is}}}\right) = H_{is}\phi + \gamma_s + m_{is}\alpha_s$$

The difference between this and the logistic model is simply the 2*F in the denominator on the left-hand side; the denominator of the logistic model link function is 1-F rather than 1-2*F.

The standardized state rates are calculated in the same way as described for the logistic model, with just one small change as a result of a new form for the probability of participation. The resulting formula for the standardized state rates is:

$$r'_s = \frac{\sum_{s'=1}^{51}\sum_{i\in s'} w_{is'}\left(e^{H_{is'}\hat{\phi}+\hat{\gamma}_s+m_{is'}\hat{\alpha}_s}/\left(1+e^{H_{is'}\hat{\phi}+\hat{\gamma}_s+m_{is'}\hat{\alpha}_s}\right)\right)}{\sum_{s'=1}^{51}\sum_{i\in s'} w_{is'}}$$

To generate the rate for low-income single mothers, the summations are done over only the households that consist of a low-income single mother, rather than over the full population of eligible households.

Because of the modified link function used in the semi-logistic model, the resulting standardized rates are lower than 100 percent for all states. However, the use of the semi-logistic model relies on strong assumptions about the nature of the data. In particular, the semi-logistic model assumes that any participation rate greater than 100 percent is due to sampling variability *only*: that just by chance, we see more participating single mothers in the FSPQC than we see eligible single mothers in the CPS, and that there are no systematic biases in the resulting data.

Through investigation of the data we determined that this is an unrealistic assumption. Although there are no known biases in the FSPQC or CPS data, it is likely that the sampling process of either data set or the assignment of probabilities of eligibility in the CPS may lead to either an underestimate of the number of eligible single mother households in the CPS or an overestimate of the number of single mothers participating households in the FSPQC. Because of this, we chose to use the logistic model rather than the semi-logistic. Although it results in

some participation rates greater than 100, we were not comfortable with the assumptions that would be necessary to use the semi-logistic model instead.

D. ACCOUNTING FOR TANF

Ultimately, we did not adopt our initial approach for accounting for the differences across states in the rates of TANF receipt. The approach would have included a state fixed effect specific to single mother FSP participation, and that fixed effect would be accounted for in the estimation of the state-level model. However, because the fixed effects from the logistic model implied participation rates well over 100 percent for single mothers, we concluded that the results did not pass the standard of face validity. While we could generate rates that appeared more realistic using the semi-logistic regression, the underlying assumption that the rates exceeded 100 percent due solely to sampling variability could not be supported.

As a result, our model for standardizing the state FSP participation rates does not directly address the fact that FSP participation is correlated with TANF participation, and TANF participation varies by state. Our model includes a control for the proportion of each state's eligible population that are single mothers, but the model assumes the propensity for single mothers to participate in the FSP does not vary by state. Our state-level model is designed to capture some of the variation in state TANF policies by allowing total FSP participation rates to vary by TANF policy. However, the model does not estimate the relationship separately for single mothers and other eligibles. Since TANF households are only 17 percent of the FSP caseload, it is possible that the effects of these policies on the single mothers is obscured when we estimate the model for the overall FSP eligible population.

Implicit in this discussion is the finding that the standardized participation rates presented in Chapter II are based, in part, on rates for single mothers that exceed 100 percent. That is, if the models estimated rates for single mothers that were lower than 100 percent, the overall

standardized FSP participation rate would also likely fall. Until we have a better understanding of the reasons that participation rates exceed 100 percent, we cannot fully interpret this problem. In the end, the standardized participation rates presented in Chapter II represent our best estimate of the standardized rates. Moreover, our state-level model discussed in Chapter III assumes that even if the standardized rates are overstated due to this problem, the variation across states in these standardized rates is correctly estimated. This assumption may or may not hold true if the factors leading to participation rates that exceed 100 percent also vary by state.

APPENDIX C

SENSITIVITY OF STATE LEVEL MODEL RESULTS TO FACTOR SCORES

To examine whether individual policy measures explain more variation in state participation rates than the factor scores, we estimated models by replacing the factor scores with policy measures. Given the small number of observations in the model, we could not estimate one model by replacing all factor scores with policy measures. Model 7 replaces the FSP accessibility factors with policy measures; Model 8 replaces the TANF eligibility, benefits, and accessibility factors with policy measures; and Model 9 replaces the TANF work requirement and time limit factors with policy measures. The results from Models 7, 8, and 9 are presented in Table C.1. Model 10 replaces all factor scores with those individual policy measures that had the highest loading for each factor. The results from Model 10 are presented in Table C.2.

In these alternative models, the individual policy measures are not significantly correlated with the standardized state participation rates. No component policy is shown to be significantly related to state participation rates. This holds even for the FSP access component policies, which were shown to be significant in Model 2.

TABLE C.1

RESULTS FROM MODELS OF STANDARDIZED PARTICIPATION RATES USING ALL POLICIES IN PLACE OF FACTOR SCORES (MODELS 7, 8, AND 9)

	Coefficient	Standard Error
FSP Accessibility (Model 7)		
Categorical Eligibility	-0.1577	(0.0811)
Vehicle Rules	-0.0062	(0.0529)
Fingerprinting	-0.1259	(0.1357)
Application Page Length	-0.0019	(0.0038)
Number of Visits	-0.0118	(0.0618)
State FSP Outreach Efforts	-0.0663	(0.0827)
Adjusted R-Square (Model 7)	-0.1498	
TANF Eligibility, Benefits and Accessibility (Model 8)		
Income Threshold	-0.0040	(0.0028)
Maximum Benefit	0.0030	(0.0047)
Family Cap	0.0028	(0.0629)
Diversion Payments	0.0000	(0.0000)
Job Search Application Requirements	0.0347	(0.0779)
School Attendance Application Requirements	-0.0886	(0.0739)
Immunization Application Requirements	0.0418	(0.0679)
Drug Testing Application Requirements	-0.0024	(0.0758)
Parenting Class Application Requirements	-0.0491	(0.0772)
Citizenship Requirements	-0.1452	(0.0704)
Adjusted R-Square (Model 8)	-0.0843	
TANF Work Requirements and Time Limits (Model 9)		
Lifetime Time Limit	0.0014	(0.0019)
Intermittent Time Limit	-0.0531	(0.0791)
Time Limit Exemption for Ill/Incapacitated	0.0006	(0.1026)
Time Limit Exemption for Parents with Young Children	-0.1251	(0.1124)
Time Limit Extensions	0.0397	(0.0919)
Qualifying Activities	-0.0265	(0.0376)
Minimum Hours in Work Activities	-0.0565	(0.0857)
Start of Work Requirements	0.0652	(0.1178)
Work Requirement Exemption for Ill/Incapacitated	0.0071	(0.0748)
Work Requirement Exemption for Parents	-0.0060	(0.1040)
Severe Sanction Amount	0.0000	(0.0003)
Severe Sanction Length	-0.0140	(0.0263)
Difference between Severe and First Sanctions	-0.0003	(0.0003)
Adjusted R-Square (Model 9)	-0.2429	

TABLE C.2

RESULTS FROM MODELS OF STANDARDIZED PARTICIPATION RATES USING SELECTED POLICIES IN PLACE OF FACTOR SCORES (MODEL 10)

	Coefficient	Standard Error
Intercept	0.5368	(0.6199)
FSP Policies		
EBT	0.1302	(0.0681)
Certification Period (Earnings)	0.0133	(0.0330)
Certification Period (Single Mothers)	-0.0039	(0.0364)
Reporting Requirements	0.0881	(0.1046)
Change Reporting	0.1233*	(0.0562)
Reporting x Change	-0.0082	(0.1236)
ABAWD Rules	-0.0523	(0.0594)
Accessibility Policies		
Vehicle Rules	-0.0378	(0.0421)
State FSP Outreach Efforts	-0.0653	(0.0699)
TANF Policies		
Transitional FSP Benefits	0.0132	(0.0667)
FSP Sanctions	0.0095	(0.0681)
Earned Income Disregard	0.0008	(0.0011)
Eligibility, Benefits, Accessibility		
Maximum Benefit	0.0030	(0.0032)
Diversion Payments	0.0000	(0.0000)
School Attendance Application Requirements	-0.0698	(0.0540)
Parenting Class Application Requirements	0.0397	(0.0588)
Work Requirement/Time Limit		
Time Limit Exemption for Parents	-0.1374	(0.0669)
Time Limit Extensions	0.0602	(0.0638)
Qualifying Activities	-0.0357	(0.0259)
Work Requirement Exemption for Ill/Incapacitated	0.0352	(0.0580)
Severe Sanction Amount	-0.0119	(0.0190)
Severe Sanction Length	-0.0001	(0.0002)
Other Programs		
Medicaid/SCHIP Eligibility	0.0004	(0.0007)
SSI Maximum Benefit	-0.0006	(0.0005)
EITC	-0.0001	(0.0001)
Economic Indicators		
Unemployment Rate	-0.0066	(0.0271)
20^{th} Percentile Wage	0.0226	(0.0405)
Employment Growth Rate	-0.0235	(0.0142)
Adjusted R-Square	-0.0972	

APPENDIX D

VALUES OF THE STATE POLICY VARIABLES

In Chapter III we describe the state policy measures explored in this study. We define most of the measures such that lower values reflect more lenient policies (i.e., policies that would lead to higher participation rates, all else being equal), and higher values reflect stricter policies (i.e., policies that would lead to lower participation rates, all else being equal).

In this appendix, we provide the values of these measures by state.

TABLE D.1

VALUES OF STATE POLICY MEASURES

	FSP Policies					
		Certification Period		Reporting Requirements		
State	Had Not Implemented Statewide EBT	Average Certification Period for Households with Earnings	Average Certification Period for Single Mother Households	Not Adopted Simplified Reporting or Quarterly Reporting	Has Adopted Status or Change Reporting	Some ABAWDs are Subect to Work Requirements
Alabama	0	11.59	10.29	0	0	0
Alaska	0	6.62	6.89	1	1	1
Arizona	0	8.66	8.52	0	1	1
Arkansas	0	11.9	11.87	0	0	0
California	1	11.84	11.78	0	0	1
Colorado	0	5.65	6.04	0	0	0
Connecticut	0	7.53	7.82	0	1	1
Delaware	1	6.08	5.92	0	1	0
District of Columbia	0	6.1	6.81	0	1	0
Florida	0	5.13	5.08	0	0	0
Georgia	0	6.51	7.01	0	1	1
Hawaii	0	11.78	11.8	1	0	1
Idaho	0	7.57	7.68	1	1	1
Illinois	0	12.1	11.32	0	1	0
Indiana	1	6.82	7.13	0	1	1
Iowa	1	11.1	10.76	0	0	0
Kansas	0	11.84	11.83	0	0	1
Kentucky	0	6.43	7.11	0	0	1
Louisiana	0	11.41	9.99	0	1	0
Maine	1	7.32	7.59	0	0	1
Maryland	0	6.68	7.26	0	0	1
Massachusetts	0	6.46	9.24	1	0	1
Michigan	0	7	8.6	0	0	0
Minnesota	0	11.92	11.94	1	0	0
Mississippi	1	10.88	9.69	1	0	0
Missouri	0	6.15	6.23	0	0	0
Montana	1	11.71	11.73	0	0	1
Nebraska	1	4.63	4.52	0	0	0
Nevada	1	5.64	6	1	1	1
New Hampshire	0	6.13	6	0	1	1
New Jersey	0	6.14	6.79	0	1	1
New Mexico	0	10.54	9.08	0	1	1
New York	0	7.17	8	0	1	1
North Carolina	0	3.94	5	0	0	1
North Dakota	0	7.79	8	1	1	1
Ohio	0	5.97	6	0	1	1
Oklahoma	0	11.13	9.93	0	1	1
Oregon	0	7.31	7.38	1	1	0
Pennsylvania	0	11.47	11.38	0	1	1
Rhode Island	0	10.85	11.49	1	1	1
South Carolina	0	11.62	11.83	0	1	1
South Dakota	0	13.87	13.9	1	0	0
Tennessee	0	6	5.72	0	0	0
Texas	0	5.44	5.4	0	1	0
Utah	0	3.89	5.03	1	1	0
Vermont	0	7.93	8.27	0	1	1
Virginia	1	5.97	5.84	0	1	1
Washington	0	4.74	4.81	1	1	0
West Virginia	1	6.49	8.62	0	1	0
Wisconsin	0	6.39	6.45	0	1	1
Wyoming	0	3.6	3.92	1	1	1

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

	FSP Policies					
	Accessibility Policies					
State	Does Not Confer Categorical Eligibility	Ranking of Vehicle Asset Rules (Lenient, Moderate, Strict)	Requires Fingerprinting	Application Page Length	Number of Visits Typically Required to Complete Application	Does Not Have Outreach Program
Alabama	1	1	0	19	1	1
Alaska	0	1	0	6	0	0
Arizona	0	2	1	14	0	0
Arkansas	0	2	0	8	0	0
California	0	2	1	21	1	1
Colorado	0	2	0	20	0	1
Connecticut	0	1	0	16	0	0
Delaware	0	2	0	12	0	1
District of Columbia	1	1	0	15	0	1
Florida	0	2	0	1	1	0
Georgia	0	2	0	5	1	0
Hawaii	0	2	0	11	1	1
Idaho	0	2	0	4	0	1
Illinois	1	2	0	5	1	1
Indiana	0	2	0	2	1	0
Iowa	1	1	0	10	1	1
Kansas	0	1	0	10	0	1
Kentucky	0	1	0	0	1	0
Louisiana	0	1	0	6	0	1
Maine	0	2	0	6	0	1
Maryland	0	1	0	23	1	0
Massachusetts	0	2	0	8	0	0
Michigan	0	1	0	16	0	1
Minnesota	0	2	0	36	1	0
Mississippi	0	2	0	21	1	1
Missouri	0	2	0	4	0	1
Montana	0	2	0	17	1	1
Nebraska	0	2	0	14	0	1
Nevada	0	2	0	8	1	1
New Hampshire	0	1	0	10	0	0
New Jersey	0	1	0	16	1	0
New Mexico	0	2	0	6	1	1
New York	0	2	1	8	1	0
North Carolina	0	1	0	15	0	1
North Dakota	0	2	0	24	0	1
Ohio	0	1	0	8	0	1
Oklahoma	0	2	0	20	0	1
Oregon	0	1	0	10	1	0
Pennsylvania	1	2	0	16	1	0
Rhode Island	1	3	0	28	0	1
South Carolina	0	1	0	5	0	0
South Dakota	0	2	0	20	0	1
Tennessee	0	2	0	2	1	0
Texas	1	2	1	4	1	0
Utah	0	2	0	12	0	1
Vermont	0	1	0	11	0	0
Virginia	1	3	0	14	0	1
Washington	0	2	0	6	1	0
West Virginia	0	2	0	33	0	1
Wisconsin	0	1	0	19	1	1
Wyoming	0	1	0	3	1	1

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

State	TANF Policies					
	FSP Related Policies		Eligibility		Benefits	
	Does Not Provide Transitional Benefits	FSP Sanctions	Income Eligibility Threshold for Household of Size 3 (scaled)	Percentage of Earned Income Not Disregard for Family of Size 3	Maximum Benefit for Family of Size 3 (Scaled)	Family Cap Policy
Alabama	1	0	89.75	0	83.6	0
Alaska	1	0	35.4	43	7.7	0
Arizona	0	0	70.7	55	65.3	1
Arkansas	1	0	86.05	100	79.6	1
California	1	0	50.95	23	29.6	1
Colorado	0	0	74.45	33	64.4	0
Connecticut	1	0	58.25	0	45.7	1
Delaware	1	0	78.6	47	66.2	1
District of Columbia	1	0	73.05	20	62.1	0
Florida	1	1	80.35	26	69.7	1
Georgia	1	0	74.3	47	72	1
Hawaii	1	0	17.95	20	43	0
Idaho	1	1	67.6	60	69.1	0
Illinois	1	0	75.7	33.3	60.4	1
Indiana	1	0	81.1	25	71.2	1
Iowa	1	0	46.95	40	57.4	0
Kansas	1	1	74.05	47	57.1	0
Kentucky	1	0	54.55	0	73.8	0
Louisiana	1	0	82	0	76	0
Maine	1	1	48.85	31	51.5	0
Maryland	0	0	70.45	60	52.7	1
Massachusetts	0	1	64.6	35	38.2	1
Michigan	1	1	61.3	41	54.1	0
Minnesota	1	0	48.55	62	46.8	1
Mississippi	1	1	77.1	0	83	1
Missouri	1	0	72.1	11	70.8	0
Montana	1	0	56.2	39	49.3	0
Nebraska	0	0	63.4	80	63.6	1
Nevada	1	0	44	0	65.2	0
New Hampshire	1	0	60.95	50	37.5	0
New Jersey	1	0	68.2	0	57.6	1
New Mexico	1	0	47.2	35	61.1	0
New York	0	0	66.65	38	42.3	0
North Carolina	0	0	62.5	0	72.8	1
North Dakota	1	1	37.4	28	52.3	1
Ohio	1	1	51	20	62.7	0
Oklahoma	1	0	64.8	35	70.8	1
Oregon	0	0	69.2	50	49.7	0
Pennsylvania	0	0	66.15	50	59.7	0
Rhode Island	1	0	36.1	29	44.6	0
South Carolina	1	0	68.75	50	79.5	1
South Dakota	1	1	65.35	63	51.7	0
Tennessee	1	1	48.55	64	81.5	1
Texas	1	0	79.95	7	78.7	0
Utah	1	0	71.35	38	52.6	0
Vermont	1	0	49.95	48	36.1	0
Virginia	0	0	36.4	47	68	1
Washington	1	1	45.5	50	45.4	0
West Virginia	1	0	62.35	60	54.7	0
Wisconsin	1	0	26.9	100	37.2	0
Wyoming	1	1	73	51	66	1

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

	TANF Policies						
	Accessibility						
		Application Requirements					
State	Maximum Diversion Payment	Job Search Requirement	Minor Children Attend School	Children Required to Be Immunized	Drug Screening for Most or All	Parenting Class Requirement	Strict Citizenship Rules
Alabama	0	1	0	0	0	0	1
Alaska	2769	0	0	0	0	1	0
Arizona	1041	0	1	1	0	0	0
Arkansas	612	1	1	1	0	0	1
California	4000	0	1	1	0	0	0
Colorado	1000	0	1	1	0	0	0
Connecticut	1629	0	0	0	0	0	0
Delaware	1500	0	1	1	1	1	0
District of Columbia	1137	1	0	0	0	0	1
Florida	1000	0	1	1	0	0	1
Georgia	0	1	1	1	1	1	0
Hawaii	4560	0	0	0	0	0	0
Idaho	927	1	1	1	1	0	1
Illinois	0	0	1	0	1	1	0
Indiana	0	1	1	1	0	0	1
Iowa	0	0	1	0	1	1	1
Kansas	0	1	0	0	0	0	1
Kentucky	1300	0	1	0	1	0	1
Louisiana	960	0	1	1	1	1	1
Maine	1455	0	0	1	0	1	0
Maryland	1419	1	1	1	1	1	0
Massachusetts	0	0	1	1	0	0	1
Michigan	0	0	1	1	0	0	1
Minnesota	0	0	0	0	0	0	0
Mississippi	0	0	1	1	1	0	1
Missouri	0	1	0	0	0	0	0
Montana	0	0	0	1	1	1	1
Nebraska	0	0	1	0	0	1	0
Nevada	0	1	1	1	1	1	1
New Hampshire	0	0	0	0	0	0	1
New Jersey	1550	1	1	1	1	0	0
New Mexico	1500	0	1	1	1	0	0
New York	1000	0	1	0	1	0	0
North Carolina	816	1	1	1	1	1	1
North Dakota	0	1	1	1	0	1	1
Ohio	1000	1	0	0	0	1	1
Oklahoma	876	0	1	1	1	0	1
Oregon	0	0	0	0	1	0	0
Pennsylvania	0	0	0	0	1	0	0
Rhode Island	0	0	0	0	0	0	0
South Carolina	0	1	1	0	1	1	1
South Dakota	966	0	1	1	0	0	1
Tennessee	0	0	1	1	1	1	1
Texas	1000	0	1	1	1	1	1
Utah	1422	0	1	0	0	0	0
Vermont	0	1	0	0	1	1	0
Virginia	1280	0	1	1	0	0	1
Washington	1500	0	0	0	0	0	0
West Virginia	1359	0	1	1	0	1	0
Wisconsin	1600	1	1	0	0	1	0
Wyoming	0	0	1	0	0	0	1

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

State	TANF Policies				
	Time Limits and Work Requirements				
			Time Limit Exemptions		
	Duration of Lifetime Time Limits	Intermittent Time Limit	No Exemption for Ill or Incapacitated	No Exemption for Mothers with 3- to 12-Month Children	No Time Limit Extenstion
Alabama	60	0	1	1	0
Alaska	60	0	1	1	1
Arizona	60	0	1	1	0
Arkansas	96	0	0	0	0
California	60	0	0	1	0
Colorado	60	0	1	1	1
Connecticut	99	0	0	0	0
Delaware	84	0	0	1	0
District of Columbia	0	0	0	0	0
Florida	72	1	0	0	0
Georgia	72	0	1	1	0
Hawaii	60	0	0	0	1
Idaho	96	0	1	1	1
Illinois	60	0	0	1	1
Indiana	96	0	1	1	0
Iowa	60	0	1	1	1
Kansas	60	0	1	1	0
Kentucky	60	0	1	1	0
Louisiana	60	1	1	1	0
Maine	0	0	0	0	0
Maryland	60	0	0	1	1
Massachusetts	0	1	0	0	0
Michigan	0	0	0	0	0
Minnesota	60	0	1	1	0
Mississippi	60	0	1	1	0
Missouri	60	0	0	1	1
Montana	60	0	1	1	0
Nebraska	60	1	1	0	1
Nevada	60	0	1	1	0
New Hampshire	60	0	1	1	0
New Jersey	60	0	0	1	0
New Mexico	60	0	1	1	1
New York	0	0	0	0	0
North Carolina	60	1	1	1	1
North Dakota	60	0	1	1	1
Ohio	60	1	1	1	0
Oklahoma	60	0	1	1	1
Oregon	0	1	0	0	0
Pennsylvania	60	0	0	1	0
Rhode Island	60	0	0	1	1
South Carolina	60	1	0	1	1
South Dakota	60	0	1	1	1
Tennessee	60	1	0	0	0
Texas	60	1	0	1	0
Utah	84	0	1	1	0
Vermont	0	0	0	0	0
Virginia	60	1	1	1	1
Washington	0	0	0	0	0
West Virginia	60	0	1	1	1
Wisconsin	60	0	1	0	0
Wyoming	60	0	1	1	1

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

	TANF Policies							
	Time Limits and Work Requirements							
				Work Requirement Exemptions				
State	Measure of Qualifying Activities (Scaled)	Minimum Hours of Work Activity	Work Requirement Prior to Third Month of Benefits	No Exemption for Ill or Incapacitated	No Exemption for Mothers with Children 6 Months or Older	Most Severe Sanction Amount for Family of Size 3	Duration of Most Severe Sanction (Scaled)	Difference Between Severe and First Sanction
Alabama	0	1	1	0	0	164	3	123
Alaska	0	1	1	0	0	923	1	553.8
Arizona	3	1	1	1	1	347	1	260.25
Arkansas	0	1	1	0	1	204	1	153
California	1	1	1	0	0	136	3	0
Colorado	0	0	1	1	0	356	2	267
Connecticut	1	0	1	0	0	543	2	407.25
Delaware	3	0	1	0	1	338	5	225.446
District of Columbia	0	1	1	0	0	81	3	0
Florida	0	1	1	0	1	303	2	0
Georgia	0	1	1	1	0	280	5	210
Hawaii	1	1	1	0	1	570	2	0
Idaho	1	1	1	1	1	309	5	0
Illinois	0	1	0	0	0	396	2	198
Indiana	1	0	1	0	1	288	1	198
Iowa	2	1	1	1	1	426	3	0
Kansas	0	1	0	0	0	429	2	0
Kentucky	0	1	1	0	0	262	1	174.66667
Louisiana	0	1	1	1	0	240	1	188
Maine	0	1	1	0	0	236	3	0
Maryland	3	0	0	0	0	473	1	0
Massachusetts	0	0	1	1	1	618	1	618
Michigan	0	1	1	0	1	459	1	0
Minnesota	0	1	1	0	0	532	1	478.8
Mississippi	0	1	0	0	0	170	5	0
Missouri	0	1	0	0	0	73	2	0
Montana	0	1	1	1	1	507	1	403
Nebraska	0	1	1	0	1	364	4	0
Nevada	0	1	1	0	0	348	5	232
New Hampshire	0	1	1	0	0	258	1	189
New Jersey	0	1	1	0	1	424	2	322
New Mexico	0	1	0	0	0	389	3	291.75
New York	0	1	1	0	0	192.3333333	3	83.333333
North Carolina	0	1	0	1	0	272	5	204
North Dakota	0	0	1	0	1	477	4	288
Ohio	0	0	1	0	0	373	3	305
Oklahoma	0	1	1	1	1	292	1	0
Oregon	0	0	1	1	1	503	1	453
Pennsylvania	0	0	1	0	0	403	5	316
Rhode Island	0	1	1	0	0	147	1	42
South Carolina	0	1	1	0	0	205	1	0
South Dakota	0	1	1	0	1	483	1	483
Tennessee	2	1	1	0	1	185	2	0
Texas	3	1	1	0	0	108	3	0
Utah	2	0	1	1	1	474	1	374
Vermont	0	1	1	0	0	225	1	150
Virginia	0	1	1	0	0	320	3	0
Washington	3	1	1	0	1	218	1	112
West Virginia	0	1	0	0	0	453	3	302.151
Wisconsin	0	1	0	1	1	628	5	422
Wyoming	0	1	1	1	1	340	1	0

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.

TABLE D.1

VALUES OF STATE POLICY MEASURES

	Other Programs and Policies						
	Other Programs				Economic Indicators		
State	SCHIP Eligibility Level as Percent of Poverty	Medicaid Expansion	SSI Maximum Benefit	EITC	Unemployment Rate	20th Percentile Wage	Employment Growth Rate
Alabama	200	0	512	0	5.683	8.08	1.0
Alaska	200	1	874	0	7.517	10.1	-1.0
Arizona	200	1	512	0	5.633	8.6	-0.5
Arkansas	200	1	512	0	5.592	7.43	2.0
California	250	0	692	0	6.667	8.47	-1.0
Colorado	185	0	548	0	5.700	9.65	-0.5
Connecticut	300	0	747	0	5.100	9.88	3.0
Delaware	200	1	512	0	4.083	9.14	0.0
District of Columbia	200	1	512	1051	6.692	10.03	-1.5
Florida	200	1	512	0	5.233	8.2	0.0
Georgia	235	0	512	0	4.583	8.7	0.5
Hawaii	200	1	517	0	3.967	8.71	0.0
Idaho	150	1	565	0	5.333	7.82	2.0
Illinois	185	0	512	210.2	6.567	8.77	-2.0
Indiana	200	0	512	252.24	5.025	8.77	1.0
Iowa	200	1	534	273.26	4.350	8.72	-1.5
Kansas	200	1	512	630.6	4.867	8.19	-5.0
Kentucky	200	0	512	0	5.792	8.08	-1.3
Louisiana	200	1	512	0	6.275	7.24	2.0
Maine	200	1	522	206.84	4.800	8.56	-1.5
Maryland	300	1	512	840.8	4.342	9.92	2.0
Massachusetts	200	0	641	630.6	5.592	9.89	-1.0
Michigan	200	0	526	0	7.100	8.9	0.0
Minnesota	275	0	593	1387.32	4.558	9.95	0.0
Mississippi	200	1	512	0	6.208	7.76	-1.0
Missouri	300	0	512	0	5.283	8.66	-2.0
Montana	150	0	512	0	4.458	7.43	0.9
Nebraska	185	0	519	0	3.825	8.39	1.7
Nevada	200	1	548	0	5.183	8.36	5.0
New Hampshire	300	0	539	0	4.192	9.9	-2.0
New Jersey	350	0	543	840.8	5.742	9.81	0.3
New Mexico	235	0	512	0	6.042	7.49	0.7
New York	250	0	599	1261.2	6.183	8.63	-1.0
North Carolina	200	0	512	0	6.275	8.23	-4.0
North Dakota	140	1	512	0	3.617	7.86	-2.0
Ohio	200	0	512	0	6.033	8.42	1.5
Oklahoma	185	1	565	210.2	5.383	7.78	0.7
Oregon	170	1	514	210.2	7.858	8.18	4.0
Pennsylvania	235	0	539	0	5.600	8.76	0.0
Rhode Island	250	1	576	1051	5.175	8.75	0.0
South Carolina	150	0	512	0	6.467	8.09	2.0
South Dakota	200	1	527	0	3.342	8.07	0.7
Tennessee	200	1	512	0	5.250	8.33	-3.0
Texas	200	1	512	0	6.592	7.56	0.0
Utah	200	0	512	0	5.250	7.95	-1.0
Vermont	300	1	570	1345.28	4.175	9.01	0.7
Virginia	200	0	512	0	3.917	8.76	-1.0
Washington	250	1	539	0	7.300	8.97	3.0
West Virginia	200	1	512	0	5.967	7.47	0.5
Wisconsin	200	0	596	588.56	5.500	8.95	1.7
Wyoming	133	1	522	0	4.092	7.97	1.0

Note: Most variables measured so that lower variables reflect more lenient policies and higher values reflect stricter policies. More information about each variable definition can be found in Chapter III.