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**Divergent Trends in State-level SNAP Participation:
Evidence with Aggregate-level Data**

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April 2, 2016

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1 Purpose and Report Summary

The Supplemental Nutrition Assistance Program (SNAP) is the largest federal in-kind nutrition assistance program in the US. SNAP provides low-income households with a monthly-benefit through an Electronic Benefit Transfer (EBT) card that is used to purchase program-eligible food at participating vendors. Using publicly-available state-level data, SNAP participation rates—the ratio of the number of SNAP participants relative to the population of a state—are analyzed over the following four time-periods that reflect recent business cycle conditions: economic expansion (1989, 1993, 1995, 1997-2000), a mild recession and recovery (2001-2006), a deep recession (2007-2009), and the most recent recovery (2010-2012).

Comparing the recent recovery of 2010 to 2012 to the pre-2001 period, the average SNAP participation rate for the US increased from 7.7% to 14.1%—a statistically significant increase of 6.3 percentage points. For Georgia, the average SNAP participation rate increased from 8.6% to 17.9%—a statistically significant increase of 9.3 percentage points that ranked 4th highest across all states, including the District of Columbia. Analyzing the difference for each state, the size of the increase in state-level SNAP participation rates ranged from a minimum of .5 percentage points (Wyoming with an increase from 5.7% to 6.2%) to a maximum of 12 percentage points (Oregon with an increase from 7.8% to 19.8%).

The distribution of state-level SNAP participation rates has also increased over the business cycle. In the pre-2001 period, the median state SNAP participation rate was 7.2% and the range capturing approximately half of the US states was from 5.6% to 9.0%. From 2010 to 2012, the median state-level SNAP participation rate doubled to 14.5% and the range capturing approximately half of the US states nearly doubled with a range from 11.1% to 17.9%.

After comparing state SNAP participation rates against the national average SNAP participation rate over the business cycle, 20 states were always below the US average and 19 states were always above it. For the 20 states that were always below the US average SNAP participation rate, the magnitude of the state-to-national differential has increased over time. Before 2001, the average difference between state SNAP participation rates and the national average was -2.3 percentage points. From 2010 to 2012, this state-to-national difference increased to -3.7 percentage points. Hence, the degree to which these 20 states are below the national rate has increased over time.

For the 19 states that were always above the US average SNAP participation rate, the size of this state-to-national difference has increased over time. In the pre-2001 period, the average difference between state-level SNAP participation rates and the national average was 2.6 percentage points. By the 2010 to 2012 period, the average difference increased to 3.9 percentage points. Hence, the degree to which these 19

states are above the national rate has increased over time.

Given the divergent trend in state-to-national SNAP participation rates, the gap between the states always above the US average SNAP participation rate and the states always below it has increased over time. The gap was 5 percentage points in the pre-2001 period and increased to 7.6 percentage points by the 2010 to 2012 period.

In an attempt to explain this divergent trend, various state-to-national differences were explored, including median household income levels, unemployment rates and SNAP monthly benefits per participant. These variables were chosen because each is relevant in the determination of SNAP eligibility and benefit levels.

Descriptive results suggest that state-to-national differences in median household incomes and unemployment rates are also diverging over the business cycle across the states that are always above and below the US average SNAP participation rate. For the states that were always below the US average SNAP participation rate, median household income was typically above the national average. The reverse held for the states that were always above the US average SNAP participation rate. Hence, a gap in median household income between these states persisted over the business cycle from \$4,185 in the pre-2001 period to \$5,130 by the 2010 to 2012 period.

For the states that were always below the US average SNAP participation rate, average unemployment was consistently below the national average. The reverse generally held for the states that were always above the US average SNAP participation rate. These differences across both sets of states were trending downward over the business cycle; however, the gap between these states persisted. In the pre-2001 period, the gap was about 1.3 percentage points and increased to 1.5 percentage points by the 2010 to 2012 period.

In contrast, there was a pattern of considerable overlap across these states with respect to state-to-national differences in average monthly SNAP benefit levels per participant. Hence, both sets of states failed to have a divergent pattern in SNAP benefits.

These descriptive relationships were further examined using various regression estimates. The estimates suggested state-to-national differences in median household income and state-to-national differences in unemployment rates were explanatory factors for state-to-national differences in SNAP participation rates. Additionally, state-to-national differences in median household income and state-to-national differences in unemployment rates were explanatory factors for the probability a state has a SNAP participation rate above the national average. Lastly, state-to-national differences in monthly SNAP benefits per participant were never a statistically significant explanatory factor.

The descriptive analysis was repeated to specifically highlight Georgia since it was one of the 19 states that were always above the US average SNAP participation

rate over the business cycle. In pre-2001 period, the average SNAP participation rate in Georgia was .87 percentage points higher than the US average (the difference between 8.6%, which ranked 15th highest nationally, and the US average of 7.7%). By the 2010 to 2012 period, the average SNAP participation rate in Georgia was 3.9 percentage points higher than the US average (the difference between 17.9%, which ranked 12th highest nationally, and the US average of 14.1%).

Examining possible explanatory factors, average median household income in Georgia was \$445 below the US average in the pre-2001 period. By the 2010 to 2010 period, the short-fall increased to \$1,880. For unemployment rates, Georgia was below the US average during the pre-2001 period, but was 1 percentage point higher than the US average by the 2010 to 2012 period.

Relative to states that were always below the US average SNAP participation rate, average median household income in Georgia was lower by \$2,000 in the pre-2001 period. By the 2010 to 2012 period, the shortfall increased to \$4,500. The unemployment rate in Georgia was larger by .42 percentage points in the pre-2001 period and increased to 2.8 percentage points by the 2010 to 2012 period. Lastly, differences in SNAP monthly benefits per participant between Georgia, the US and the states always below the US average SNAP participation rate were negligible over time.

2 Overview of SNAP

SNAP provides low-income households with a monthly-benefit through an Electronic Benefit Transfer (EBT) card that is used to purchase program-eligible food at participating vendors. To qualify, a household must pass a gross monthly income requirement (make below 130% of the monthly federal poverty guideline), a net monthly income requirement (make below 100% of the monthly federal poverty guideline) and an asset test where resources must be below a stated threshold (currently below \$2,250).¹ Some households may automatically qualify for SNAP by participating in other assistance programs such as the Temporary Assistance for Needy Families (TANF) program or by receiving Supplemental Security Income (SSI).²

Regardless of how a household qualifies for SNAP, the size of the monthly benefit is determined by a formula which depends on the number of people in the household

¹For the complete set of SNAP eligibility rules, see <http://www.fns.usda.gov/snap/eligibility> and <http://www.fns.usda.gov/snap/able-bodied-adults-without-dependents-abawds>. For the SNAP eligibility rules for non-citizens, see <http://www.fns.usda.gov/snap/snap-policy-non-citizen-eligibility>.

²This is referred to as categorical eligibility for SNAP benefits. Typically under categorical eligibility, the asset test is waived. For more details, see <http://dhs.dc.gov/page/chapter-12-categorical-eligibility>.

that live, purchase and prepare meals together, the net monthly income level of the household and the maximum SNAP benefit level for the fiscal year.³ Consequently, for every dollar of net monthly income the household earns, only a fraction is reduced from the maximum SNAP benefit level. Relative to completely eliminating benefits for each dollar earned, this marginal reduction structure can induce greater labor market participation, particularly for households with low labor market participation rates.⁴ Lastly, SNAP work requirements and benefit time limits apply to able-bodied adults without dependents; however, these restrictions can be waived at the state-level if the area has an unemployment rate above 10% or if the area has insufficient jobs.⁵

At the macroeconomic level, SNAP acts as an automatic stabilizer by following a countercyclical pattern with the performance of the US economy. Specifically, SNAP participation and expenditures are expected to rise during recessions and fall during expansions. Since 1997, the US experienced two recessions: a shallow recession in 2001, lasting 8 months beginning in March of 2001 and ending in November of 2001, and a deep recession in 2007, lasting 18 months beginning in December of 2007 and ending in June of 2009.⁶

As part of the American Recovery and Reinvestment Act (ARRA) of 2009, SNAP benefit levels were increased and eligibility rules were relaxed. These changes included: an additional \$20 billion dollars over 5 years to increase SNAP monthly benefits; a change to a price index for the cost of food that in effect increased the maximum monthly benefit levels; an increase in the minimum monthly benefit from \$14 to \$16; a suspension of time limits, but not work requirements, for able-bodied adults without dependents; and, an increase in administrative funding to state agencies. The waiver on the time limits for able-bodied adults without dependents expired in October of 2010 and subsequent legislation ended the increase in SNAP benefits in October of 2013.⁷

³For details on SNAP benefits for the fiscal year from October 1, 2014 through September 30, 2015, see <http://www.fns.usda.gov/snap/eligibility>.

⁴However, the marginal reduction structure can induce a decrease in labor market participation, particularly for households with relatively high labor market participation rates. Ultimately, from economic theory, it depends on the household's tastes and preferences towards time spent working and time spent enjoying leisure.

⁵For details on SNAP work requirements for able-bodied adults without dependents, see <http://www.fns.usda.gov/snap/able-bodied-adults-without-dependents-abawds>.

⁶The National Bureau of Economic Research (NBER) determines the dates for recessions (contractions) and recoveries (expansions). For details, see <https://www.nber.org/cycles.html>.

⁷For details on SNAP in relation to the ARRA, see the US Department of Agriculture: Economic Research Service at <http://www.ers.usda.gov/topics/food-nutrition-assistance/supplemental-nutrition-assistance-program-%28snap%29/arra.aspx>.

3 Testable Predictions

Given SNAP acts as a countercyclical stabilizer, how has the SNAP participation rate changed over the business cycle for the US and for each state? Since recessions could affect some states more than others (i.e. states more susceptible or less susceptible to fluctuations in the housing market), which states have had SNAP participation rates above or below the average US SNAP participation rate over the business cycle? For these states, do state-to-national differences in SNAP participation rates exhibit a trend over the business cycle?

Lastly, what factors likely explain cross-state differences in SNAP participation rates? Given how SNAP eligibility is determined, some likely factors worth examining include differences in median household income and differences in unemployment rates. Additionally, given the increase in SNAP benefits as part of the ARRA, a final factor worth examining is differences in monthly SNAP benefits per participant.

4 Examining SNAP Participation Rates

Using publicly-available state-level data, SNAP participation rates are analyzed over the following four time-periods, which were selected to approximate the business cycle over the past 20 years.⁸ The pre-2001 period, a time of economic expansion, included the following years of available SNAP data: 1989, 1993, 1995 and 1997 to 2000. Since 2000, the macroeconomy experienced a recession and recovery in the 2001 to 2006 period; a deep recession in the 2007 to 2009 period; and, the most recent recovery in the 2010 to 2012 period.⁹

For the US, average SNAP participation rates have steadily increased over time as shown in Figure 1. In the pre-2001 period, the US average SNAP participation was 7.7%. From 2001 to 2006, it increased by .25 percentage points to an average rate of 8.0%. From 2007 to 2009, it increased by 1.66 percentage points to an average rate of 9.6%. From 2010 to 2012, it increased by 4.42 percentage points to an average rate of 14.1%.¹⁰

Also shown in Figure 1 are the quartiles for state-level SNAP participation rates, illustrating the variability of SNAP participation rates within time periods and over the business cycle.¹¹ In the pre-2001 period, the median state SNAP participation

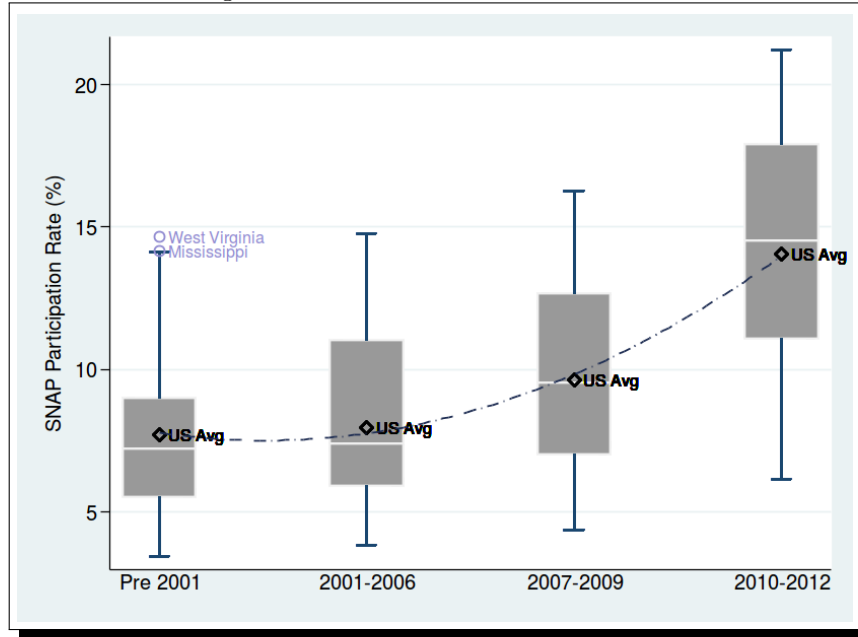
⁸For the data sources, see the appendix.

⁹The most recent year of available SNAP data was 2012.

¹⁰The statistical significance of the reported percentage point increases are provided in Table A1 in the appendix.

¹¹The base of the box indicates the first quartile (25th percentile); the line within the box indicates the median (50th percentile); and, the top of the box indicates the third quartile (75th percentile). The difference between the third and first quartiles defines the interquartile range (IQR). The top

Figure 1: SNAP Participation Rates



rate was 7.2% with most states ranging from 5.6% to 9.0%. By the 2010 to 2012, the median state-level SNAP participation rate doubled to 14.5% and the range capturing approximately half of the US states nearly doubled with a range from 11.1% to 17.9%.

Within-state differences in average SNAP participation rates over the business cycle have also increased with considerable variability across states. Quartiles of within-state differences in average SNAP participation rates are shown in Table 1. Comparing the 2001 to 2006 period to the pre-2001 period, the increase in state-level SNAP participation rate ranged from a minimum of -1.84 percentage points to a maximum of 3.67 percentage points with a median increase of .56 percentage points. Comparing the 2007 to 2009 period to the 2001 to 2006 period, the increase in state-level SNAP participation rate ranged from a minimum of -.44 percentage points to a maximum of 3.51 percentage points with a median increase of 1.51 percentage points. Comparing the 2010 to 2012 period to the 2007 to 2009 period, the distribution of the size of the increase in SNAP participation rates increased substantially. The range for the increase in state-level SNAP participation rates was a minimum of 1.3

line ends at the highest SNAP participation rate not greater than the following: third quartile + 1.5*IQR. When SNAP participation rates are beyond this upper limit, these data are plotted with circles. The bottom line ends at the lowest SNAP participation rate not lower than the following: first quartile - 1.5*IQR. See Cox (2009) for additional details on box plots.

percentage points to a maximum of 7.42 percentage points. The median size of the increase in SNAP participation rates was 4.04 percentage points.¹²

Table 1: Quartiles of Within State-Level Differences in Average SNAP Participation Rates

	(1)	(2)	(3)	(4)
	<i>2001-2006 vs</i>	<i>2007-2009 vs</i>	<i>2010-2012 vs</i>	<i>2010-2012 vs</i>
	<i>Pre-2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>Pre-2001</i>
Min	-1.84	-0.44	1.3	0.49
Quartile 1	-0.22	0.99	3.3	4.96
Median	0.56	1.51	4.04	6.7
Quartile 3	1.25	2.09	5.41	8.35
Max	3.67	3.51	7.42	11.99

Lastly, comparing the 2010 to 2012 period to the pre-2001 period, the size of the increase in state-level SNAP participation rates ranged from a minimum of .5 percentage points (Wyoming with an increase from 5.7% to 6.2%) to a maximum of 12 percentage points (Oregon with an increase from 7.8% to 19.8%) with a median increase of 6.7 percentage points.

5 Comparing Differences in State-level SNAP Participation

Comparing state average SNAP participation rates against the US average across the business cycle, 20 states were always below the US average and 19 states were always above the US average. For the 20 states that were always below the national rate, the magnitude of the state-to-national differential has increased in absolute value over time as shown in Figure 2.¹³ In the pre-2001 period, the average difference in SNAP participation rates between state averages and the US average was -2.3 percentage points. From 2001 to 2006, the average difference increased to -2.4 percentage points. From 2007 to 2009, the average difference increased to -2.9 percentage points. From 2010 to 2012, the average difference increased to -3.7 percentage points.

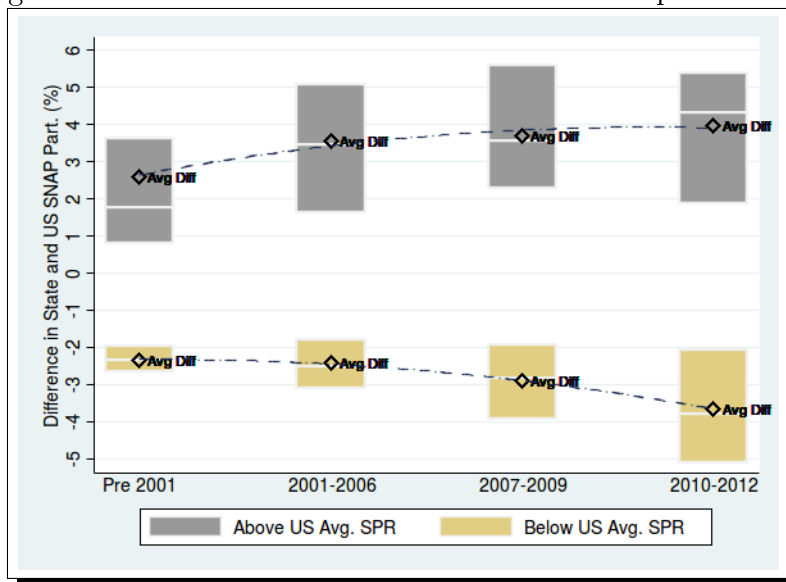
For the 19 states that were always above the national rate, the magnitude of the state-to-national differential has also increased over time as shown in Figure

¹²The statistical significance of the reported within-state percentage point increases did increase over time; see Table A2 in the appendix for details.

¹³The average SNAP participation rate for each of these 20 states over the business cycle is shown in Table A3 in the appendix.

2.¹⁴ In the pre-2001 period, the average difference in SNAP participation between states always above the US average was 2.6 percentage points. From 2001 to 2006, the average difference increased to 3.6 percentage points. From 2007 to 2009, the average difference increased to 3.7 percentage points. From 2010 to 2012, the average difference increased to 3.9 percentage points.

Figure 2: Difference in State to US SNAP Participation Rates



Hence, Figure 2 illustrates how the gap between these average differentials has increased over time, indicating a divergent trend between these states over the business cycle. In the pre-2001 period, the gap was 5 percentage points. By the 2010 to 2012 period, the gap increased to 7.6 percentage points.¹⁵

6 Examining Possible Correlated Factors for State-level Differences in SNAP Participation Rates

Three possible explanatory factors for the growing SNAP participation rate gap across the states always above and always below the national rate were examined: state-level household median income adjusted for overall price inflation, state-level unemployment rates, and state-level monthly SNAP benefits per participant adjusted

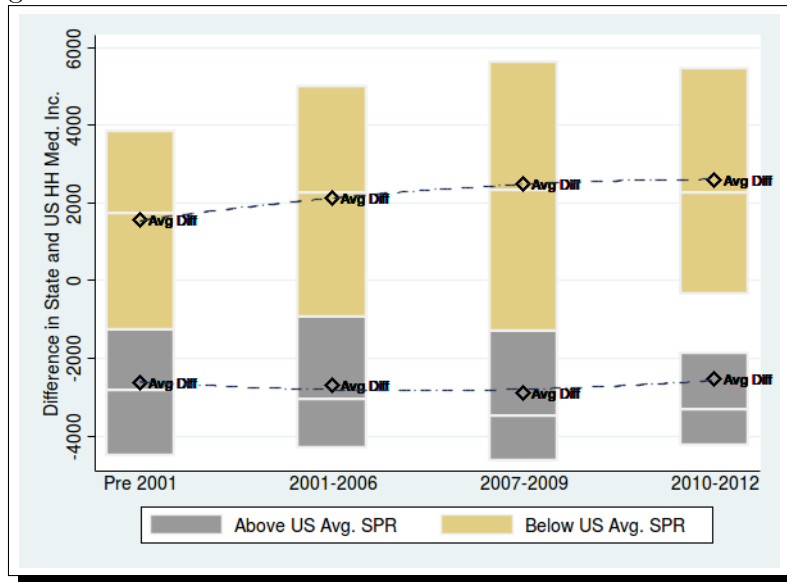
¹⁴The average SNAP participation rate for each of these 19 states over the business cycle is shown in Table A4 in the appendix.

¹⁵Each reported gap was statistically different from zero at the 1% significance level; see Table A5 in the appendix for details.

for food-price inflation. At issue is whether any of these factors exhibit a similar diverging trend over the business cycle when analyzed for the states always above and always below the US average SNAP participation rate.

Figure 3 illustrates the average and the first to third quartiles of state-to-national differences in median household incomes for the states always below and always above the US average SNAP participation rate. For the states that were always below the US average SNAP participation rate, median household income was typically above the US average over the business cycle. During the pre-2001 period, the average differential was \$1,553 above the average US median household income level. It steadily increased to \$2,110 by the 2001 to 2006 period and to \$2,490 by the 2007 to 2009 period. By the 2010 to 2012 period, the average differential increased to \$2,603.

Figure 3: Difference in State to US Median Household Income



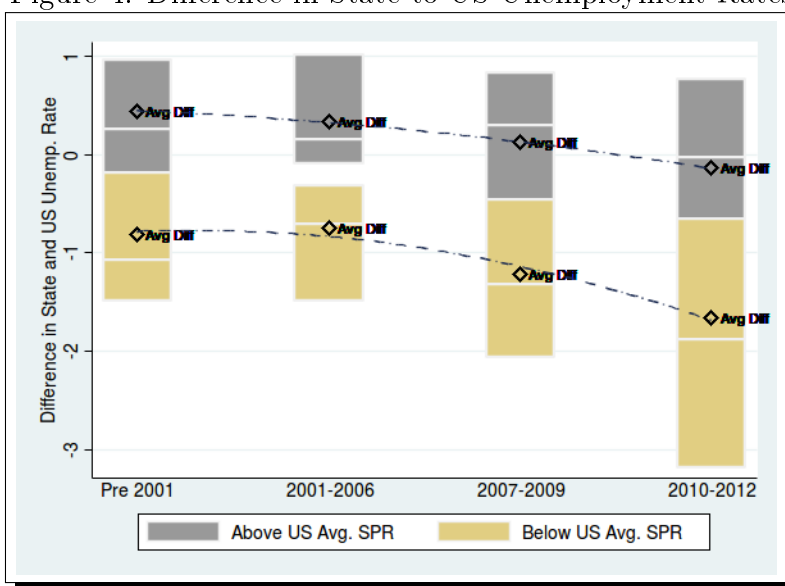
For the states that were always above the US average SNAP participation rate, average median household income was typically below the national average. In the pre-2001 period, the average differential was \$2,632 below the national average and this differential persisted over time. Additionally, the first and third quartiles, capturing the differential of state-to-national household median household incomes, were always negative. The range indicates that half of the states that were always above the US average SNAP participation rate had average median household income levels that were \$2,000 to \$4,000 below the national average.

Finally, the gap in household income between the states always above and below the US average SNAP participation rate persisted over the business cycle. In the pre-2001 period, the gap was \$4,185. It increased slightly to \$4,816 in the 2001

to 2006 period and to \$5,384 in the 2007 to 2009 period. It remained stable and relatively high at \$5,130 in the 2010 to 2012 period.¹⁶

Figure 4 illustrates the average differential and the first to third quartiles between state-level unemployment rates and the average US unemployment rate for the states always below and always above the US SNAP participation rate. For the states that were always below the US average SNAP participation rate, average unemployment was consistently below the average US unemployment rate over the business cycle. During the pre-2001 period, the average differential was .81 percentage points below the average US unemployment rate. By the 2010 to 2012 period, the average differential increased to 1.7 percentage points below the average US unemployment rate.¹⁷

Figure 4: Difference in State to US Unemployment Rates



For the states that were always above the US average SNAP participation rate, average unemployment was slightly above the average US unemployment rate but trended towards no difference over time. In the pre-2001 period, the average differential was .44 percentage points above the average US unemployment rate. By the 2010 to 2012 time period, the average differential decreased to .14 percentage points below the average US unemployment rate.

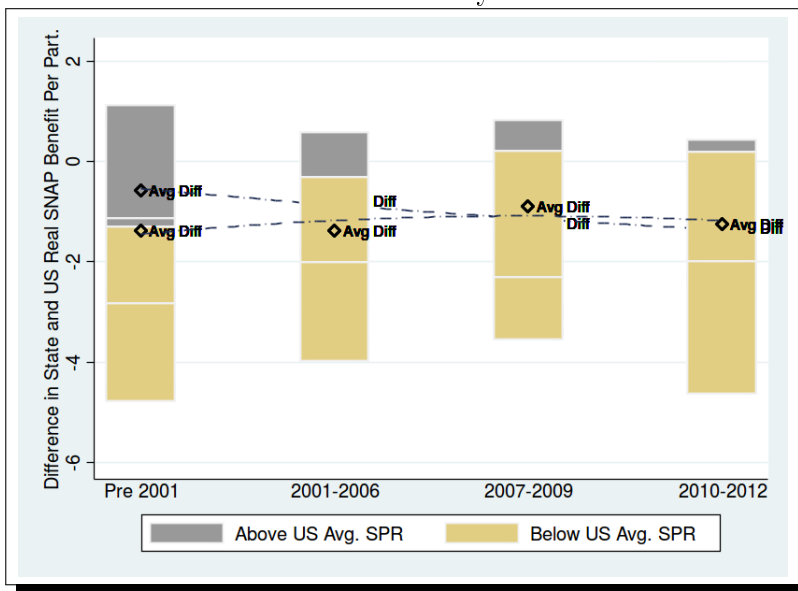
¹⁶Each reported gap was statistically different from zero at the 1% significance level; see Table A5 in the appendix for details.

¹⁷Also in the pre-2001 period, the range capturing half of the states that were always below the US average SNAP participation rate suggested these states were below the average US unemployment rate by about .20 to 1.5 percentage points. This range increased to being below the average US unemployment rate by .7 to 3.2 percentage points by the 2010 to 2012 period.

Finally, the gap in the unemployment rate across the states always above and below the US average SNAP participation rate has remained stable over the business cycle. In the pre-2001 time period, the gap was about 1.3 percentage points. By the 2010 to 2012 period, it slightly increased to 1.5 percentage points.¹⁸

Figure 5 illustrates the average differential and the first to third quartiles for state-to-national differences in monthly SNAP benefits per participant for the states always below and always above the US SNAP participation rate. Both sets of states on average were below the US average monthly SNAP benefit per participant.

Figure 5: Difference in State to US Monthly SNAP Benefits Per Participant



Also, the magnitude of these state-to-national differences was very similar across both sets of states. Thus, both sets of states failed to have a divergent pattern in SNAP benefits.¹⁹ This suggests differences in average monthly SNAP benefits per participant across states are an unlikely explanatory factor for the divergent pattern in SNAP participation rates for the states always above and below the national rate.

Table 2 provides full-sample correlations between the percent difference in state-level SNAP participation rates relative to the national rate and similarly defined state-to-national percent differences for median household income, unemployment rates and monthly SNAP benefits per participant. The sample correlations indicate

¹⁸Each reported gap was statistically different from zero at the 1% significance level; see Table A5 in the appendix for details.

¹⁹Each reported gap was not statistically different from zero; see Table A5 in the appendix for details.

a strong negative association between the percent difference in state-to-national median household income levels and state-to-national SNAP participation rates. As state-level median household income levels rise above the national level, state-level SNAP participation rates fall below the national rate.

Table 2: Full-Sample Correlations

	(1)	(2)	(3)
	<i>% Change in State Median HHI vs US</i>	<i>% Change in State State UR vs US</i>	<i>% Change in State SNAP BPP vs US</i>
% Change in State SNAP Part. Rate relative to US	-0.6323	0.5386	0.042
Statistically Different from 0?	Yes at 1% Sig. Level	Yes at 1% Sig. Level	No. P-value is .1912

Also the sample correlations indicate a strong positive association between the percent difference in state-to-national unemployment rates and state-to-national SNAP participation rates. As state-level unemployment rates rise above the national unemployment rate, state-level SNAP participation rates rise above the national SNAP participation rate. Lastly, the sample correlation between state-to-national percent differences in monthly SNAP benefits per participant and state-to-national percent differences in SNAP participation rates were very small and not statistically different from zero, indicating no association.

Figures 6, 7 and 8 illustrate scatter plots and estimated linear relationships between the percent change in state-to-national SNAP participation rates and the percent change in state-to-national median household incomes, unemployment rates and monthly SNAP benefits per participant, respectively.²⁰

From Figure 6, as state-level median household income increases by 1 percentage point relative to the national income level, state-level SNAP participation rates decrease by 1.5 percentage points below the national rate.²¹

From Figure 7, as state-level unemployment rates increase by 1 percentage point relative to the national unemployment rate, state-level SNAP participation rates increase by .88 percentage points above the national SNAP participation rate.²²

²⁰A linear multivariate regression was also estimated; the results are in Table A6 in the appendix.

²¹In a multivariate regression, the estimated relationship slightly decreased in absolute value to where the percent difference between a state's SNAP participation rate relative to the US was estimated to decline by .90 percentage points. This estimated relationship was statistically different from zero at the 1% significance level.

²²In a multivariate regression, the estimated relationship decreased to where the percent difference

Figure 6: Percent Change in State-to-National SNAP Participation Rates versus Percent Change in State-to-National Median Household Income

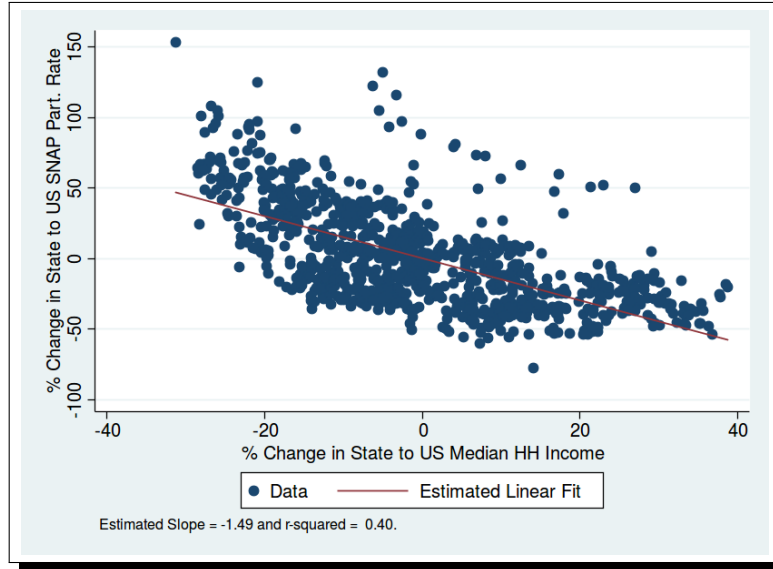
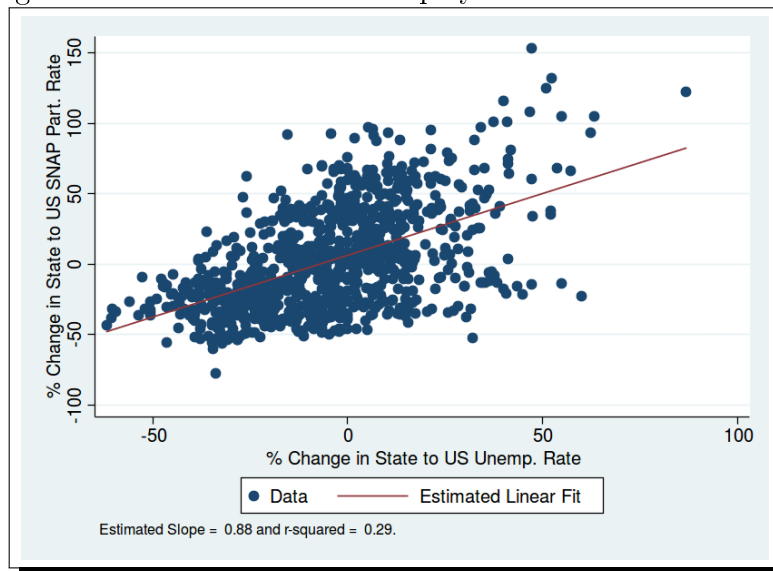


Figure 7: Percent Change in State-to-National SNAP Participation Rates versus Percent Change in State-to-National Unemployment Rates



between a state's SNAP participation rate relative to the US was estimated to increase by .40 percentage points. This estimated relationship was statistically different from zero at the 1% significance level.

From Figure 8, as state-level monthly SNAP benefits per participant increase by 1 percentage point relative to the national benefit level, state-level SNAP participation rates are estimated to increase by .11 percentage points above the national rate.²³

Figure 8: Percent Change in State-to-National SNAP Participation Rates versus Percent Change in State-to-National Monthly SNAP Benefits per Participant

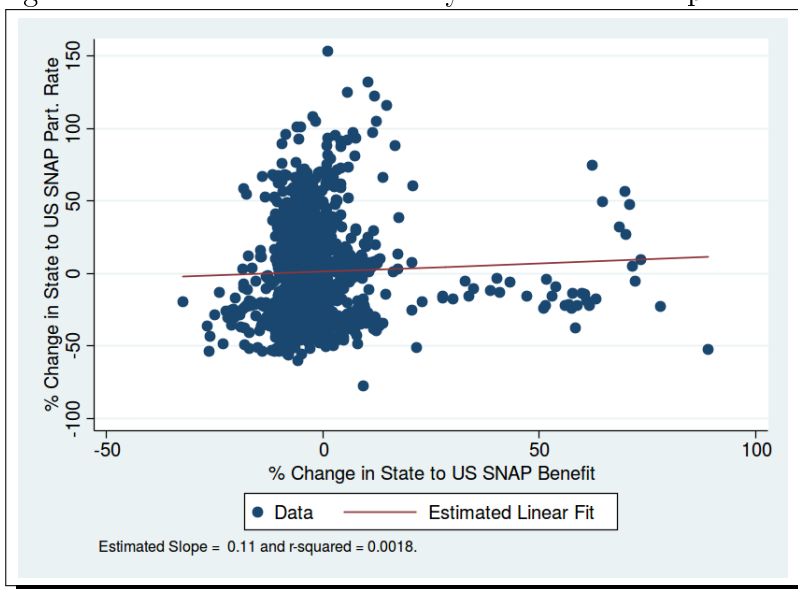


Table 3 provides probability estimates to examine if state-to-national percent differences in median household income, unemployment rates and monthly SNAP benefits per participant influence the probability of a state having a SNAP participation rate above the national rate.²⁴ As the percent difference in state-to-national median household income increases by about 15 percentage points—an increase of 1 standard deviation—the probability of a state having a SNAP participation rate above the national rate decreases by nearly 12 percentage points. This estimated relationship was statistically different from zero at the 5% significant level.

As the percent difference in state-to-national unemployment rates increases by about 22 percentage points—an increase of 1 standard deviation—the probability of a state having a SNAP participation rate above the national rate increases by nearly 8 percentage points. This estimated relationship was statistically different from zero at the 1% level.

²³In a multivariate regression, the estimated relationship changed to where the percent difference between a state's SNAP participation rate relative to the US was estimated to decrease by .20 percentage points. This estimated relationship was not statistically different from zero.

²⁴For more details, see Table A7 in the appendix.

Table 3: Probability a State has a SNAP Participation Rate above the National Rate

	(1)	(2)	(3)
	<i>Linear Prob. Estimates</i>	<i>Sample Std. Dev.</i>	<i>Estimated Change in Probability</i>
% Change in State-to-US Median HH Income	-0.0078	14.98	-11.75
% Change in State-to-US Unemp. Rate	0.0035	21.66	7.64
% Change in State-to-US Monthly SNAP BPP	-0.0016	13.83	-2.22

Lastly, as the percent difference in state-to-national monthly SNAP benefits per participant increases by about 14 percentage points—an increase of 1 standard deviation—the probability of state having a SNAP participation rate above the national rate decreases by about 2 percentage points. This estimated change to SNAP participation rates was not statistically different from zero.

7 SNAP in Georgia

Table 4 provides SNAP participation rates for Georgia over the business cycle since it was one of the 19 states that were always above the US average SNAP participation rate.²⁵ Before 2001, the average SNAP participation rate in Georgia was 8.6%, which ranked 15th highest in the nation, and was .87 percentage points higher than the US average. In the 2001 to 2006 period, the average SNAP participation rate in Georgia increased by .88 percentage points to 9.5%, which ranked 17th highest in the nation and was 1.5 percentage points higher than the US average. In the 2007 to 2009 period, the average SNAP participation rate in Georgia increased by 1.95 percentage points to 11.4%, which ranked 16th highest nationally, and was 1.8 percentage points higher than the US average. In the 2010 to 2012 period, the average SNAP participation rate in Georgia increased by 6.51 percentage points to 17.9%, which ranked 12th highest in the nation, and was 3.9 percentage points higher than the US average. Lastly, comparing the 2010 to 2012 period to the pre-2001 period,

²⁵See Table A8 in the appendix for the full results which indicate statistically significant changes—i.e. increases or decreases over time—as well as statistically significant changes between Georgia and the US.

SNAP participation rates in Georgia have more than doubled with a 9 percentage point increase from an average of 8.6% to almost 18%.

Table 4: Average SNAP Participation Rates in Georgia

	(1)	(2)	(3)	(4)
<u>SNAP Part. Rate</u>	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
GA SNAP Rate	8.6	9.48	11.42	17.94
National Ranking	15 th	17 th	16 th	12 th
US SNAP Rate	7.72	7.97	9.63	14.06
<u>GA vs US</u>	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Difference	0.87	1.51	1.79	3.88
<u>GA SNAP Part. Rate</u>	<i>2001-2006 vs Pre2001</i>	<i>2007-2009 vs 2001-2006</i>	<i>2010-2012 vs 2007-2009</i>	<i>2010-2012 vs Pre2001</i>
Difference	0.88	1.95	6.51	9.34

Table 5 examines the possible factors that are likely correlated with the increasing trend in Georgia’s SNAP participation rate.²⁶ Before 2001, the average median household income in Georgia was \$445 below the US average. By the 2010 to 2012 period, this short-fall increased to \$1,880. Comparing the 2010 to 2012 period to the pre-2001 period, average median household income in Georgia decreased by over \$2,000. For unemployment rates, Georgia was below the US average during the pre-2001 period but was 1 percentage point higher than the US average by the 2010 to 2012 period. Comparing the 2010 to 2012 period to the pre-2001 period, average unemployment rates in Georgia increased by 5.3 percentage points, from an average of 4.67% to 9.97%. Average SNAP benefits have increased in Georgia with a range of \$5.86 to \$13.53 per month per SNAP participant. Compared to the US average, there was no statistical difference between monthly SNAP benefits in Georgia relative to the US average SNAP benefit level.

²⁶See Table A8 in the appendix for the full results which indicate statistically significant changes—i.e. increases or decreases over time—as well as statistically significant changes between Georgia and the US.

Table 5: Median Household Income, Unemployment and SNAP Benefits for Georgia

	(1)	(2)	(3)	(4)
Avg. for GA	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Med. HHI	22842.09	23243.58	23135.91	20711.91
UR	4.67	4.77	6.87	9.97
SNAP Benefits	46.04	45.85	51.71	59.57
GA vs US	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Diff. in Med. HHI	-445.72	-446.48	-879.47	-1880.46
Diff. in UR	-0.39	-0.52	0.3	1.1
Diff. in Benefits	-0.42	0.57	0.82	0.71
	<i>2001-2006 vs</i>	<i>2007-2009 vs</i>	<i>2010-2012 vs</i>	<i>2010-2012 vs</i>
GA Over Time	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>Pre2001</i>
Diff. in Med. HHI	401.49	-107.67	-2424	-2130.18
Diff. in UR	0.1	2.1	3.1	5.3
Diff. in Benefits	-0.2	5.86	7.87	13.53

Table 6 compares Georgia to the states that were always below the US average SNAP participation rates over the business cycle.²⁷ Relative to these states, average SNAP participation rates in Georgia during the pre-2001 period were higher by 3.21 percentage points higher. By the 2010 to 2012 period, the average SNAP participation rate in Georgia was higher by 7.5 percentage points.

Table 6: Georgia vs. States Always Below the Average US SNAP Participation Rate

	(1)	(2)	(3)	(4)
GA vs. States Always Below	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Diff. in SNAP Part. Rate	3.21	3.95	4.71	7.54
Diff. in Med. HH. Income	-1998.87	-2556.97	-3369.92	-4483.01
Diff. in Unemp. Rate	0.42	0.23	1.52	2.75
Diff. in Benefits	0.96	1.94	1.71	1.95

The average median household income in Georgia was lower by \$2,000 in the pre-2001 period. By the 2010 to 2012 period, this shortfall increased to \$4,483. For unemployment rates, the average unemployment rate in Georgia was larger by .42 percentage points relative to the average unemployment rate across states that were

²⁷See Table A9 in the appendix for the full results which indicate statistically significant differences between Georgia and the states always below the US average SNAP participation rate across the business cycle.

always below the US average SNAP participation rate in the pre-2001 period. By the 2010 to 2012 period, the gap increased to 2.8 percentage points.

Lastly, average monthly SNAP benefits per participant in Georgia were typically higher but the magnitude was small with a range of \$.96 to \$1.95. These differences were mostly statistically indistinguishable from no difference.

8 Conclusion

Average SNAP participation rates have trended upward over the recent business cycle—the expansionary period of before 2001, the mild recession and recovery period of 2001 to 2006, the deep recession of 2007 to 2009, and the most recent recovery of 2010 to 2012. Relative to the national average SNAP participation rate, 19 states were always above the national rate and 20 states were always below the national rate. Additionally, the gap between these two sets of states has increased over the recent business cycle, suggesting a divergent trend.

Three possible correlates for this divergent trend were examined: state-to-national differences in median household income, in unemployment rates and in monthly SNAP benefits per participant. Correlations and regression results indicated a statistically significant relationship between state-to-national differences in SNAP participation rates and state-to-national differences in both median household income and unemployment rates. Additional regression results indicated a state with a median household income level below the national average is more likely to have a SNAP participation rate above the national average. Also, a state with an unemployment rate above the national average is more likely to have a SNAP participation rate above the national average. In contrast, state-to-national differences in monthly SNAP benefits per participant failed to have a statistical effect.

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Technical Appendix

Table A1: Differences in Average SNAP Participation Rates for the US

	(1)	(2)	(3)	(4)
	<i>Next</i>	<i>Base</i>	<i>Difference</i>	<i>R-T P-value</i>
Avg. in 2001-2006 vs Pre-2001	7.97 (0.95)	7.72 (1.71)	0.25 [0.756]	0.376
Avg. in 2007-2009 vs 2001-2006	9.63 (1.13)	7.97 (0.95)	1.66 [0.762]	0.052
Avg. in 2010-2012 vs 2007-2009	14.06 (0.94)	9.63 (1.13)	4.43 [0.850]	0.004

Notes: Sample means with standard deviations are shown in parentheses are in columns 1 and 2. Two-sample t-tests with unequal variances with standard errors in brackets are in column 3. Right-tailed p-values examining if the difference in means exceeds zero are shown in column 4.

Table A2: Quartiles of Right-Tailed P-values for Within State-Level Differences in Average SNAP Participation Rates

	(1)	(2)	(3)	(4)
	<i>2001-2006 vs Pre-2001</i>	<i>2007-2009 vs 2001-2006</i>	<i>2010-2012 vs 2007-2009</i>	<i>2010-2012 vs Pre-2001</i>
Min	0.00001	0.007	0.001	2.85E-07
Quartile 1	0.0655	0.03425	0.003	1.30E-05
Median	0.2215	0.059	0.005	9.61E-05
Quartile 3	0.608	0.1155	0.007	9.68E-04
Max	0.997	0.929	0.026	0.16

Notes: Shown are quartiles for right-tailed p-values examining if the difference in within-state average SNAP participation rates exceed zero based on two-sample t-tests with unequal variances.

Table A3: Average SNAP Participation Rates for States Always Below the National Average

	<i>Pre-2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Alaska	5.6 (1.3)	7.1 (0.6)	8.6 (0.5)	11.7 (0.9)
California	7.1 (2.0)	5.3 (0.4)	6.3 (0.8)	9.6 (0.9)
Colorado	5.2 (1.5)	4.9 (0.6)	5.6 (0.7)	8.8 (0.7)
Connecticut	5.4 (1.1)	5.5 (0.5)	6.5 (0.6)	10.4 (0.9)
Idaho	5.5 (1.1)	6.1 (0.6)	7.0 (1.6)	13.8 (1.3)
Iowa	5.3 (1.1)	6.3 (1.3)	8.7 (0.9)	12.2 (1.1)
Kansas	5.3 (1.3)	6.1 (0.6)	7.0 (0.7)	10.1 (0.6)
Maryland	5.8 (1.5)	4.9 (0.5)	6.6 (1.2)	11.1 (1.3)
Massachusetts	5.0 (1.4)	5.4 (1.3)	8.2 (1.3)	12.2 (0.8)
Minnesota	5.2 (1.2)	4.9 (0.4)	5.8 (0.6)	9.2 (1.0)
Nebraska	5.7 (0.8)	6.2 (0.8)	7.0 (0.4)	9.3 (0.3)
Nevada	4.4 (1.5)	4.9 (0.3)	5.9 (1.4)	11.8 (1.4)
New Hampshire	3.5 (1.2)	3.8 (0.5)	5.1 (0.8)	8.5 (0.5)
New Jersey	5.2 (1.2)	4.3 (0.4)	5.2 (0.5)	8.3 (1.1)
North Dakota	5.8 (0.8)	6.4 (0.3)	7.4 (0.5)	8.7 (0.3)
South Dakota	6.4 (0.7)	7.0 (0.5)	8.2 (0.8)	12.2 (0.4)
Utah	4.8 (1.1)	4.8 (0.7)	5.5 (1.1)	9.6 (0.6)
Virginia	6.1 (1.5)	6.0 (0.8)	7.3 (0.8)	10.5 (0.7)
Wisconsin	4.7 (1.3)	5.9 (0.8)	8.0 (1.5)	13.7 (1.0)
Wyoming	5.7 (1.2)	4.8 (0.3)	4.4 (0.3)	6.2 (0.2)

Notes: Sample averages are shown above. Standard deviations are in parentheses.

Table A4: Average SNAP Participation Rates for States Always Above the National Average

	<i>Pre-2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Alabama	10.5 (1.6)	11.0 (0.9)	12.7 (1.4)	18.3 (1.3)
Arkansas	10.0 (0.8)	12.4 (1.4)	13.6 (0.6)	16.5 (0.5)
District of Columbia	13.9 (2.2)	14.7 (1.1)	16.0 (1.3)	21.2 (1.4)
Georgia	8.6 (1.9)	9.5 (1.2)	11.4 (1.7)	17.9 (1.5)
Kentucky	11.3 (1.6)	12.9 (1.3)	15.1 (1.1)	18.7 (0.8)
Louisiana	13.8 (2.9)	14.8 (1.2)	16.3 (1.5)	19.4 (1.2)
Maine	9.1 (1.3)	10.8 (1.4)	13.5 (1.5)	18.3 (0.9)
Michigan	8.3 (1.8)	9.6 (1.8)	13.1 (1.4)	18.7 (0.8)
Mississippi	14.2 (4.5)	13.0 (1.2)	15.6 (1.3)	20.8 (1.4)
Missouri	8.5 (1.5)	11.9 (2.1)	12.2 (1.1)	15.5 (0.4)
New Mexico	11.0 (2.3)	11.3 (1.4)	12.7 (1.4)	19.4 (1.9)
New York	9.0 (1.7)	8.4 (1.0)	10.5 (1.3)	15.1 (0.8)
Ohio	7.8 (2.5)	8.1 (1.2)	10.4 (1.3)	15.0 (0.9)
Oklahoma	8.8 (1.6)	11.1 (1.4)	11.9 (0.7)	15.9 (0.4)
Oregon	7.8 (1.0)	11.4 (0.8)	13.2 (1.8)	19.8 (1.3)
South Carolina	8.5 (1.2)	11.4 (1.4)	13.4 (1.4)	17.9 (0.6)
Tennessee	10.6 (2.3)	13.1 (1.8)	15.2 (1.6)	19.9 (0.6)
Texas	9.5 (3.2)	9.5 (1.6)	10.9 (1.1)	15.0 (0.8)
West Virginia	14.6 (2.0)	14.0 (0.7)	15.4 (1.0)	18.6 (0.2)

Notes: Sample averages are shown above. Standard deviations are in parentheses.

Table A5: Differences in Average State-to-National Differences between States Always Above and Below the US Average SNAP Participation Rate

	(1)	(2)	(3)	(4)
	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Diff. in SNAP Participation Rate Differential	4.92 (0.551)	5.99 (0.489)	6.60 (0.509)	7.60 (0.626)
Diff. in Med. HH Inc Differential	-4185.26 (884.170)	-4816.13 (918.959)	-5384.08 (1026.642)	-5129.86 (972.681)
Diff. in Unemp. Rate Differential	1.25 (0.312)	1.08 (0.254)	1.34 (0.388)	1.52 (0.566)
Diff. in Monthly SNAP Benefit Per Part. Differential	0.81 (1.811)	0.59 (1.527)	-0.33 (1.328)	-0.08 (1.426)

Notes: Shown above are differences in average state-to-national differences between states always above and states always below the US average SNAP participation rate based on two-sample t-tests with unequal variances. Standard errors are in parentheses. All but the reported differences in the monthly SNAP benefit per participant differential were statistically different from zero at the 1% significance level.

Table A6: Bivariate and Multivariate Regression Results

	(1)	(2)	(3)	(4)
% Change in State-to-US Median HH Income	-1.491*** (0.059)			-0.900*** (0.174)
% Change in State-to-US Unemp. Rate		0.879*** (0.044)		0.389*** (0.056)
% Change in State-to-US Monthly SNAP Benefit per Part.			0.107 (0.082)	-0.2 (0.143)
Observations	969	969	969	969
R-squared	0.4	0.29	0.0018	0.91

Notes: The dependent variable is the percent change in a state's SNAP participation rate relative to the national SNAP participation rate. Columns 1-3 provide bivariate ordinary least squares regression estimates. Column 4 provides multivariate ordinary least squares regression estimates that control for year fixed-effects and state fixed-effects with clustered robust standard errors by state. Stars indicate estimates that are statistically different from zero at the 10% significance level (one star), the 5% significance level (two stars) and the 1% significance level (three stars).

Table A7: Linear Probability Regression Results

	(1)
% Change in State-to-US Median HH Income	-0.008** (0.003)
% Change in State-to-US Unemp. Rate	0.0035*** (0.001)
% Change in State-to-US Monthly SNAP Benefit per Part.	-0.0016 (0.002)
Observations	969
R-squared	0.78

Notes: The dependent variable equals 1 if a state has a SNAP participation rate above the national SNAP participation rate and zero otherwise. Shown are multivariate ordinary least squares regression estimates that control for year fixed-effects and state fixed-effects with clustered robust standard errors by state. Stars indicate estimates that are statistically different from zero at the 10% significance level (one star), the 5% significance level (two stars) and the 1% significance level (three stars).

Table A8: Average SNAP Participation Rates in Georgia (Full Results)

	(1)	(2)	(3)	(4)
<u>SNAP Part. Rates</u>	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
GA SNAP Rate	8.6 (1.89)	9.48 (1.25)	11.42 (1.71)	17.94 (1.47)
National Ranking	15 th Highest	17 th Highest	16 th Highest	12 th Highest
US SNAP Rate	7.72 (1.71)	7.97 (0.95)	9.63 (1.13)	14.06 (0.94)
<u>Diff. btwn. GA and US</u>	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Difference	0.87 [0.964] {0.19}	1.51 [0.641] {0.02}	1.79 [1.184] {0.107}	3.88 [1.005] {0.01}
<u>GA SNAP Part. Over Time</u>	<i>2001-2006 vs Pre2001</i>	<i>2007-2009 vs 2001-2006</i>	<i>2010-2012 vs 2007-2009</i>	<i>2010-2012 vs Pre2001</i>
Difference	0.88 [0.877] {0.169}	1.95 [1.11] {0.087}	6.51 [1.3] {0.004}	9.34 [1.11] {0.0002}

Notes: Reported are sample averages and differences in averages between Georgia and the US. Standard deviations are shown in parentheses. Standard errors for two-sample t-tests with unequal variances are shown in brackets. One-tailed p-values testing if the reported differences in means exceeds zero (when positive) or is less than zero (when negative) are reported in curly brackets.

Table A9: Georgia vs. States Always Below the Average US SNAP Participation Rate

	(1)	(2)	(3)	(4)
GA vs. States Always Below	<i>Pre2001</i>	<i>2001-2006</i>	<i>2007-2009</i>	<i>2010-2012</i>
Diff. in SNAP Part. Rate	3.21 [0.724] {0.0019}	3.95 [0.518] {0.0002}	4.71 [1.004] {0.0185}	7.54 [0.887] {0.0038}
Diff. in Med. HH. Income	-1998.87 [493.462] {0.001}	-2556.97 [345.855] {0.000}	-3369.92 [697.469] {0.001}	-4483.01 [499.234] {0.000}
Diff. in Unemp. Rate	0.42 [0.343] {0.1267}	0.23 [0.200] {0.1397}	1.52 [1.616] {0.221}	2.75 [0.489] {0.0014}
Diff. in Benefits	0.96 [1.113] {0.199}	1.94 [1.580] {0.1296}	1.71 [3.174] {0.3178}	1.95 [1.154] {0.072}

Notes: Reported are differences in averages between Georgia and the states that were always below the average US SNAP participation rate across the business cycle. Standard deviations are shown in parentheses. Standard errors for two-sample t-tests with unequal variances are shown in brackets. One-tailed p-values testing if the reported differences in means exceeds zero (when positive) or is less than zero (when negative) are reported in curly brackets.