

Skidmore College

Creative Matter

Economics Student Theses and Capstone
Projects

Economics

2016

Raising Minimum Wage Lowering SNAP Expenditures

Samuel Yarian
Skidmore College

Follow this and additional works at: https://creativematter.skidmore.edu/econ_studt_schol



Part of the [Economics Commons](#)

Recommended Citation

Yarian, Samuel, "Raising Minimum Wage Lowering SNAP Expenditures" (2016). *Economics Student Theses and Capstone Projects*. 7.

https://creativematter.skidmore.edu/econ_studt_schol/7

This Thesis is brought to you for free and open access by the Economics at Creative Matter. It has been accepted for inclusion in Economics Student Theses and Capstone Projects by an authorized administrator of Creative Matter. For more information, please contact dseiler@skidmore.edu.

Raising Minimum Wage Lowering SNAP Expenditures

How a Rising Minimum Wage Raises Individuals Out of Poverty

And Reduces Governmental Expenditures

By

Samuel Yarian

A Thesis Submitted to

Department of Economics

Skidmore College

In Partial Fulfillment of the Requirement for the B.A Degree

Thesis Advisor: Qi Ge

May 3, 2016

Abstract

The amount of money that the United States spends annually on the welfare program Supplemental Nutrition Assistance Program (SNAP) has been on the rise over the last two decades. In tandem with this increase is a trend for a greater portion of Americans falling below the poverty line. This study has looked at the effect that minimum wage has on decreasing or reversing this trend. Two types of models are used U.S. Regression and State Difference-in-Difference. The dependent variables being tested for were percent of population on SNAP and change in per-capita expenditure on SNAP. The findings from these models indicate that there is a correlation between the minimum wage and SNAP expenditure and participation reduction. The policy implications from this study are that the minimum wage should be increased as a measure to reduce government spending on SNAP.

Keywords- Minimum Wage, SNAP, Poverty, Difference-in-Difference, Welfare

I Introduction

In our country, today, there is a great divide in income level. While the wealthiest individuals are becoming more affluent, a growing amount of people live in poverty and are reliant on social programs to provide for themselves and their families. In today's economy, federal and state social programs such as: Medicare, Medicaid, unemployment benefits, veteran's benefits and Supplemental Nutrition Assistance Program (SNAP) cumulatively take up a greater amount of the U.S. GDP, as they did in the past¹. As a result of the increase and declining tax revenues, there is an increased focus on government expenditures, such as those provided to the poor. One of the programs currently under scrutiny is SNAP, which provides in-kind benefits (in goods and services as opposed to money) in the form of food to those that qualify.

The focus of this paper is to determine if there is a positive, negative, or negligible result from an increase in minimum wage in regards to SNAP, and the analysis will look at two statistics representative of changes in SNAP. The first is the portion of a state's population enrolled in SNAP (PSNAP), and the second is the change in per-capita cost of SNAP (SNAPP_log). These two measures capture the changes to the program with portion enrolled showing those who have qualified and applied for the program. The cost captures the real cost of the services incorporating the extent of need.

The two measures, PSNAP and SNAPP_log, will be used as the dependent variables in two sets of studies. The first study incorporates a nationwide regression, which analyzes the effects of the four main dependent variables. Those four variables are: changes in per capita GDP (PCGDP_log), unemployment, average income of wageworkers (Average Wage) and minimum

¹ SNAP alone went from being .22% of total U.S. GDP in 1989 to .47% in 2011

wage (EMW). The second study utilized a difference-in-difference model. This model looked at three sets of states where one state in the pair increased their minimum wage, while the other stayed stagnant. For this model the control variables of unemployment, average wage and PCGDP_log were also utilized.

The results of this study shows that there is a correlation between a rise in minimum wage and a reduction in SNAP enrollment and expenditures. Two of the difference-in-difference models showed that there was a decrease in the SNAP variables, as a result of an increase in EMW. The countrywide regressions showed no significance in terms of EMW, which will be discussed later in this paper. This result is very significant in regards to the policy connotations that accompanies it. Due to the positive effects that minimum wage has on reducing the enrollment in and expense of SNAP, there is a strong argument to increase the minimum wage to reduce the economic expenses that comes from providing SNAP benefits to the working poor.

This research paper is divided into six sections. Section two provides background information on SNAP and Minimum Wage, in addition to discussing recent events in relevant legislation. Section three discusses relevant literature from which this research is built upon. It also includes evaluations of the models and methodology used in the past literature, and their strengths and weaknesses. Section four looks at the data and methodology breaking down source and interpretation of variables. The process used to manipulate and record the data is also laid out in this section. Trends in the data are evaluated in this section, focusing on differences between the states, trends over time, and summary statistics. The latter part of this section, sub-labeled methodology, discusses the models and variables that were used in the regression analyses. Section five discusses the results of the models. Each of the OLS and Difference-in-Difference models are evaluated and their implications are discussed. The last section looks at

the results as a whole and connects back to policy recommendations and projections for our economy today.

II Background

The U.S. government has two main tools that it uses to reduce poverty in the country, the first being legislation aimed at alleviating poverty. This includes setting a progressive tax system, providing tax breaks for families with children, and setting the federal minimum wage. The other tools that the government has are reactionary/alleviating, which provide assistance to those in need called social programs. Social programs include: disability benefits, Medicare, Medicaid, Social Security, unemployment benefits, and more direct intervention such as homeless shelters, in addition to SNAP. Together these programs are meant to provide a safety net for those whom have fallen on hard economic times, however more and more in our country we are seeing individuals and families unable to get out of poverty despite these programs causing a cyclical cycle. There are conflicting opinions even within the pro-social benefits group, regarding the optimal way to provide support to the poor, with the largest distinction being cash outlays or in-kind services. SNAP is an in-kind service as it provides a good, rather than giving funds to be used at the family's discretion.

The Two Sides of Welfare Argument

There are two main camps in the argument surrounding governmental aid. One side says that the best way to reduce poverty is to lower the taxes on the job creators through subsidies and tax breaks. Through the growth in profitability of these companies from a favorable business environment, there will be a growth in hiring, thus causing a reduction in those that need help from the government. These political and economic figures view the minimum wage as a destructive force to the private sector. Economists in this camp refer to the foundation of

economic theory, the supply and demand graph to argue their point. The price of labor will always be correct if the market supply and market demand is allowed to produce equilibrium in the market represented by the fair wage. If the government puts a price floor on wage by instituting a minimum wage above the equilibrium point, it is argued that the result will be a reduction in jobs illustrated by a rise in the unemployment rate. The argument is that the end result of raising the minimum wage is a growth in the number of people in need of a greater quantity of governmental support. This is due to the growth of individuals and households that are out of work, thus requiring assistance from the state to survive.

Those on the other side of the argument have a contradicting view than their peers. They see government programs and poverty alleviating programs as instruments to raise individuals out of poverty. Their opinion on the minimum wage is that in its current state, \$7.25 at the federal level is too low for individuals to provide for themselves and their families. As real wages have failed to keep up with inflation, there has been a rise in the group referred to as the working poor. These individuals are classified as those currently in the labor force, but still living below the poverty line. The general economic idea behind this group's argument is that people in the workforce should not be allowed to live below the poverty line. Many view such a trend as a violation of human rights. In addition, the growth of the impoverished population represents a high level of government assistance that is provided through government programs to these individuals. Exhibit 2 shows the trend of a growing portion of the population being enrolled in SNAP. The average enrollment as a portion of population has gone from under 8 percent in 1989 to over 14 percent in 2011.

Despite their disagreements on the subject of the cause and the solution to reducing poverty, both groups can agree that the government is spending too much on programs such as

SNAP. In this paper, I will incorporate both of these theories into my models in order to discern the cause or causes of the growth in SNAP expenditures. Through both OLS and difference-in-difference models, this paper will evaluate whether minimum wage relieves the economic strain on federal social programs or burdens it further.

SNAP

The Supplemental Nutrition Assistance Program (SNAP) was started in 1964 during President Johnson's administration, and was known as food stamps. It is run by the Department of Agriculture pulling its funding from the federal government. Benefits from the program are administered based upon an individual's or family's income and the amount of people that are in a family. The variation of benefits is also dependent on the family unit being below a certain level in terms of economic resources. For 2016 that number is \$2,250 or \$3,500, if a member of the family is elderly or disabled.

Those that are on the program receive a set monthly allotment of food stamps, which can be redeemed at most retailers that sell food products. However, there are limitations on the type of food that can be purchased using SNAP, including tobacco, soda, alcoholic beverages, and hot food. These benefits, in addition, cannot be transferred or converted into cash.

For those that have qualified for the program, and applied, the amount of food stamps that they receive will vary upon future income, and the status of non-wage earners and wage earners in the family alike. The maximum range of benefits goes from \$194 for an individual to \$1,167, for a family of eight, with an additional \$146 for each additional family member above eight. As a general rule of calculation for each additional dollar that a person or family on SNAP makes, their benefits will be reduced by \$.30 cents until they reach the cutoff point. The cutoff point is either a net income of 100 percent above the poverty line or a gross income of 130

percent above the poverty line. The poverty line as SNAP benefits is determined by the amount of adults and children in a family unit.

Larger families and those with children are the most prominent users of SNAP. Children account for 45 percent of those enrolled, the elderly and the disabled account for 19 percent and caregivers of the previous two groups, accounts for 4 percent. The remaining 32 percent are non-elderly adults. This study will specifically focus on this group of individuals, of which 11 percent are members of the labor force, and the remaining 20 percent are not (Rosenbaum 2013). These 11 percent and those willing to reenter the labor force for a higher wage are those affected by a rise in minimum wage, which will reduce their reliance on SNAP by \$.30 for every additional dollar they make.

Minimum Wage

The Fair Labor Standard Act (FLSA) was introduced in 1938 with a countrywide standard of \$.25 per hour. Since 1989 there have been three increases in the federal minimum wage, in 1990-1991, 1996-1997, and 2007-2009. The range in years represents the time between the federal governments passing of the law and the period when states were required to have implemented the legislation. The latest minimum wage that was federally instituted, raised the wage to \$7.25, and has been in effect for the last seven years.

In addition to the federal minimum wage, states have the ability to legislate a minimum wage for their citizens that is above the federal rate. As of the beginning of 2016, 29 states have chosen to put their minimum wage above that of the federal rate. The remaining states have either chosen to link their state minimum wage to the federal rate or rely on the federal legislation. Five states have chosen not to institute any minimum wage over the entire history of FLSA, these states include: Alabama, Louisiana, Mississippi, South Carolina and Tennessee, two

of which have allowed theirs to fall below the federal rate. For these seven states, the effective wage is the federal minimum wage.

The minimum wage does not pertain to all businesses or employees. There are three main exceptions that allow businesses to pay employees less than the minimum wage. The first is if the company does not make over half a million dollars in gross profits a year, or has less than two employees. The second exception is for employees that gain a portion of their income from tips, which refers to those that work in the restaurant industry. However, this exception is subject to federal and state regulations, and the last exception is for businesses that have been classified as nonprofits.

In recent years, there has been a growing amount of groups that have been pushing for a rise in the federal minimum wage to what is often classified, as a “living wage”. The most prominent group is the National Employment Law Project (NELP). These groups have proposed two federal minimum wage increases of \$10.10 and \$15 an hour. The former represents an increase to counteract the decline in real wage. The U.S. minimum wage was at a high in real terms in the 1960’s when it hit a high above \$10 in 2009 dollars, but has declined in the last five decades. The latter proposal of \$15 is based on the poverty line for a family of four with one family member in the labor force. As a result of the growing push for an increase in wage, 14 states have raised their minimum wages since the beginning of 2016 (Kimball, 2016). In addition to these states, forty cities have chosen to raise their minimum wage within their respective city limits since 2013. Most prominent among the recent legislation is NY and California. At the start of 2016 they signed a bill to raise the state minimum wage to \$15 an hour, by 2022, which also includes a 12-week family leave for employees.

III Literature Review

Inequality has been a huge point of contention in the United States in the last decade thereby prompting a renewed focus on the root problems and solutions within the field of economics. This trend is driven by a growing gap between the wealthiest Americans and those at the bottom of the ladder. This issue has even come to the forefront in the presidential campaign where candidates are proposing dramatic changes to our government in terms of taxes and social programs. One candidate for president, Bernie Sanders, has based his platform upon providing a greater deal of assistance to those at the bottom of the economic ladder. “How could anybody defend the top 400 richest people in this country owning more wealth than the bottom half of America, 150 million people” (Sanders, 2015).

The driving force in America’s growing monetary divide is not only because the wealthy accumulate more wealth, but also because of the downward pressure on the lower class, which resulted in more Americans living below the poverty line. In the year 2000 there was approximately two million people receiving SNAP benefits, whereby in 2011 that number reached nearly six and a half million. This increase in benefits correlates with a growing population of families falling below the poverty line.

The connection between SNAP enrollment and poverty is simple to understand. According to the Center for Budget and Policy Priorities, a family is eligible for the program if their gross household income is below 130% of the poverty line (CBPP, 2015). The poverty line is created from a bundle of goods and adjusts based upon the number of adults and children in a given family. The range of the poverty line is from \$11,880 (for an individual) to \$40,890 (for a family of eight), in the year 2016 (Healthcare.gov, 2016).

Many proponents for the elimination of government benefits, such as SNAP, question the need for these benefits to help the unemployed. However, the majority of families receiving these benefits have one or more members in the work force. According to The Washington D.C. Center on Budget Policies and Priorities, only 30% of individuals receiving SNAP benefits are expected to work, and approximately 70% are either elderly, children or disabled. Of the remaining 30%, 11% were in the labor force at one point in 2013 (Rosenbaum, 2013).

Micro-Level

The bulk of the literature on minimum wage addresses the effect on the most vulnerable and low skilled members of the labor force, primarily those in the fast food industry. Card & Krueger (1994) analyzed the impact of an increase in the minimum wage in the state of New Jersey on the fast food industry. The author's focus was on the change in employment before, and after the implementation of a new minimum wage. In New Jersey, the minimum wage increased from \$4.25 to \$5.05 in 1992, which was the highest in the country at that time. Although the increase was high, the findings of this research indicate that there was no reduction of employment as a result of this increase. In fact, the increase was actually a small increase in comparison to Pennsylvania.

Card and Krueger (1992) utilized the neighboring state of Pennsylvania as a control, as their minimum wage stayed stagnant over the period of 1992. The paper incorporates multiple difference-in-difference models that take into account all the additional factors including location effects, store ownership, and the number of hours the businesses were open. However, the main focus is on the difference-in-differences model. There were three groups of restaurants that were used in this model. The first two were Pennsylvania restaurants, and New Jersey restaurants, which paid wages below \$5.05, and third those in New Jersey that paid above \$5.05. The change

in employment levels was recorded between March of 1992 and in November of the same year. The differences of the first two groups of restaurants were compared to the third representing the locations effected by the increase. The results showed that there was no correlation between the rise in wage and a loss of employment.

With the release of Card and Krueger's (1994) came other research such as Neumark & Wascher (2000), that utilized their data, adding supplemental sources in order to prove the previous findings false. Their study was executed with the intent of disproving Card & Krueger's (1994) findings that the minimum wage resulted in an increase in employment rather than a decrease. The methodology used in their research was similar to that of Card and Krueger (1994), but with the inclusion of additional micro-level data. The additional data was payroll data collected by Employment Policy Institute for 71 Burger King and Wendy's locations and telephone surveys. In addition to using the same data as Card and Krueger (1994) they used their additional payroll data from New Jersey, which covers a greater amount of locations. Using their supplemented data they found that instead of employment increasing it actually decreased by 4.6%. The findings in their paper should be taken with a grain of salt, because they combined employment data collected by two different sources and do not address the possibility of bias resulting from different collection methods.

My paper will use a similar methodology as these two papers, which focus on New Jersey's fast food employment, especially relating to the difference-in-difference model. The focus of these papers is on the micro level, looking at the specific effect on the fast food industries of New Jersey, while the analysis in this paper will focus on the macro level. I will utilize data reflecting the employment statewide and the effects of increasing the minimum wage within states across the country. The expansion of the analysis outside of the fast food industry

will eliminate the possible industry specific effect. The focus outside of industries that are dominated by minimum wage workers will add to the analysis by incorporating the upward pressure on wages outside of minimum wage occupations. As hypothesized in Hanson & Hawley (2014) there will be a ripple effect from a shift in the wage floor that has a substantial but diminishing effect that runs through all classes of workers.

Macro-Level

In recent years there has been a renewed focus on the subject of the minimum wage, however the discussion has shifted to look at the effect of future federal legislation to increase the minimum wage across the country. The proposal introduced at the federal level is to increase the federal minimum wage to \$10.10 an hour. This proposed increase has received attention from politicians and economists alike, including a presidential inquiry into its viability. This proposed wage has been incorporated into numerous subsequent federal bills and actions, and has been reviewed by many economists to analyze what the aggregate effect of such an action would be. These studies focus on the independent variable of employment. Hanson & Hawley (2014) is one of the prominent papers evaluating the effects of a nation wide increase to this wage.

Hanson & Hawley (2014) look at unemployment as affected by minimum wage increases at a macro level. In their paper the authors examine the \$10.10 nationwide minimum wage proposal focusing on the quantity of jobs that would be lost. The paper concludes that if minimum wage is increased to \$10.10, it will have a greater effect on the economy than the rise of family income. They find that there will be massive layoffs that will effect between 550,000 and 1.5 million Americans. The approach that is taken in their paper is a simulation approach, where the estimates are based upon expected changes in income and labor elasticity. The model that is used in their paper to derive the estimates is the expected percentage wage change for

each of the percentiles across all states. The estimates are based upon the median percentile income with diminishing effect and ranges from a .269 change in the lowest percentile of Alabama to .006 in the highest percentile of Maine. They use these estimates of the wage increase for each percentile across all states and estimates of labor elasticity (-.05 for adults and -.15 for youth) to estimate the reduction in employment. The findings of the study are that the estimates made by the CBO are too low and fail to accurately represent the true expected loss of employment based upon the wage increase.

Hanson & Hawley (2014) take the stance that the estimates produced by the CBO (Congressional Budget Office) are too low and the real negative impact is much higher. According to CBO (2014) the national reduction in employment with such a policy would be between a half and a million people, while Hanson and Hawley found that the effect could result in as many as 1.55 million jobs being lost. Furthermore, the study finds that the job losses will ultimately focus on specific regions over others. It was hypothesized that as many as 45% of the jobs in Puerto Rico could be lost, whereas only 5% of jobs would be lost in Arkansas. The findings for both the CBO estimates and Hanson and Hawley are that employment will be reduced across the country. If their lowest estimates are correct we can expect to see 2.8% reduction in jobs if there was an increase in minimum wage to \$10.10 nationwide.

The difference in the results of these two studies CBO (2014) and Hanson & Hawley (2014), illustrates the limitation of a simulation approach. This paper avoids the inaccuracies that these papers share by using past data to project the future effect of minimum wage legislation. Despite the limitations, this paper provides an insight into the negative variable of unemployment, which diminishes the positive impact of increased minimum wage.

Neumark & Wascher (2011) look at the effects of minimum wage on Earnings Income Tax Credit (EITC), in terms of how they complement each other to assist women in the workforce. The paper looks at how an increase in the minimum wage incentivizes young women to enter the work force. The findings of the study are, that a higher minimum wage does in fact contribute to the effectiveness of EITC at increasing the labor participation rate of women. This study does not show a clear positive correlation, however, as it was found in tandem with the benefits for minority women, there is an approximately equal and opposite effect on minority men.

This study adds a great deal to the field as it takes into account the accumulative effect of minimum wage on government programs. Their methodology shows the importance of taking into account how benefits to one group may negatively affect another. This method is seen in Card & Krueger (1994) with their variables looking at unemployment before and after a minimum wage increase. The value of looking at restaurant financials has two advantages. On the one hand the labor costs at these establishments are very high compared to other sectors. On the other hand the industry employs predominantly the youth, and low skilled population at wages at or slightly above the minimum wage, as noted in Card & Krueger (1994).

This paper takes into account the likelihood of a change in labor participation rate. There are no assumptions included into the methodology as to whether there will be an increase or decrease in the aggregate, however the change will be captured by the change in per-capita GDP, unemployment, and SNAP statistics. These statistics will incorporate the possible change by capturing the effect of a growing or shrinking labor force on the economy as a whole and the wellbeing of families due to a change in the number of providers in a family.

Page et. al, (2000) was written to examine the connection between welfare caseloads and the minimum wage. Their study looked at data from Aid to Families with Dependent Children (AFDC) of the caseloads across time and states, utilizing state minimum wage data to create a regression analysis. The conclusion that was made from this study is that there is a positive correlation with a rising minimum wage and increased welfare caseloads. They estimate that an increase of 35% in the minimum wage will result in a 3% to 7% increase in the caseloads of welfare offices in that state. Page et. al (2010) uses a similar methodology as Hanson & Hawley (2014) where elasticity of demand for caseloads with respect to minimum wage is used. This methodology has limitations in my opinion, as it does not allow for any differentiation in scale of effect. The increase in the minimum wage will increase the caseload of the welfare offices of the U.S. Department of Health and Human Services at the same rate regardless of whether it's a one percent increase or one hundred percent. These findings don't reflect changes that could occur with a larger increase in minimum wage nor a decrease.

Page et. al (2010) utilizes an academically correct methodology for the creation of the analysis and model, however the conclusion that is reached may not be as straightforward as the paper presents it. The conclusion is that with the increase in California's minimum wage, there will be an increase in welfare. This conclusion seems to ignore the real cost of welfare. It focuses on the amount of caseload in a given state but ignores the net cost to the state and federal governments from this increase. While an increase in caseload appears to be negative, finding the real monetary effect of this increase is not seen in this paper. While the conclusion that is reached may not be shared in this paper, much of the methodology is useful in this context. The regression component of this research uses both state level fixed effects and year effect to

account for exogenous effects. In this analysis, similar variables are used to account for differences across states and time.

SNAP and Minimum Wage

Reich & West (2015) is the closest paper to this study, depicting the effects of a rise in minimum wage on government expenditures to SNAP. Their paper looks both at the effect on the family unit as well as a statewide effect by the historical state increases in minimum wage from 1990-2012. These dimensions were meant to cover both sides of the coin as well as provide robustness test for each other. The results of the study showed that there was a large reductionary effect on the SNAP expenditures throughout the United States with the rise of a state's minimum wage. They projected the effects onto the proposed increase in the federal minimum wage from \$7.25 to \$10.10. These findings showed that there would be a fall in enrollment in SNAP programs by between 7.5%-8.5% and an overall drop in expenditures of 6% (\$4.6 billion).

Reich and West's methodology focused primarily on the effects caused by rising household incomes of the sample families recorded in the 2014 CPS (Current Population Survey). The general theory is that with a rise in minimum wage, there will also be a subsequent aggregate increase in the wage of a household. Consequentially, this will cause the federal SNAP program to provide less financial resources for those families that are affected. For instance, every dollar in additional income for a family will reduce the expenditures of SNAP by \$.30. The families that were effected, representing the decrease in expenditures are those 58% that have one or more family members in the work force according to Rosenbaum (2013).

Reich and West (2015) found the effects of family and state level statistic from the census family supplement and used them in their first model, calculating the change in enrollment. These family variables include family size, marital status, race/ethnicity indicators,

family size, the presence of children and presence of adult male. The state-level characteristic variables are average unemployment, employment-to-population ratio, and median family income. The effects on the micro family level were used in order to calculate the effect for the state as a whole (Macro level). The analysis in this paper differs from that utilized by the previous papers with the inclusion of aggregate family attributes such as race/ethnicity, family size, marital status, and presence of children. Using this data to find the effect of states gives the analysis an extra dimension by discerning the key characteristics that affects the impact of wage legislation. This data complements state specific characteristics providing a better picture of the effect on the state's employment, wage by income bracket and thru this analysis make a claim regarding the effect on SNAP enrollment and real expenditures of the program for each of the given states.

One key difference that separates this literature from the majority of the related literature is that, it takes into account the differences that exist in our country between regions, races, and family. It solves the problem of differences that may exist in those surveyed, by taking a large sample that is evenly representative of the races, genders, and family sizes of those recorded in the CPS survey. Lastly, what makes this article distinct in terms of methodology, is that it does not utilize situational analysis nor does it utilize labor elasticity to project the future effect.

Instead it uses the family and state specific information to produce a more accurate estimate.

Research Connection

Like the previous papers, I will utilize data from the past two decades focusing on the three years the federal minimum wage was increased. These minimum wage increases provides numerous advantages in the analysis because the change crosses state borders allowing for a nationwide analysis in these three years when the federal minimum wage changed. The added

benefit is the standardization of the state's minimum wages; states have chosen as policy to alter their state minimum wage laws after federal increases to provide superior wages to their citizens. By analyzing the effects during the first years after a federal increase the effect of states choosing to raise their wages will be marginal. Furthermore states that raise their state mandated minimum wage allow for the use of the difference-in-difference model as they differentiate themselves from their neighboring states in terms of wage.

The important variable that is under represented in Reich & West (2015) is the subsequent rise in the unemployment rate. The common economic thought in our neoclassical economic society shows that with a higher wage the demand for labor will reduce as shown in the marginal product of labor curve. This paper will give weight to the loss of jobs that may accompany the rise in wage. The effect will be addressed through the focus on the downward pressure exerted on employment. This part of the analysis will look at the change in unemployment after the nationwide increases in the minimum wage that occurred during the following three periods (1990-1991, 1996-1997, and 2007-2009), to determine if a trend is present.

This research is intended to be the connection between these two effects and bridges the gap between the two research papers by (Reich & West, 2015) and Hanson & Hawley (2014). The analysis will utilize the dominant principles behind both papers to provide a claim on whether the amount of resources given to SNAP and people on SNAP will decrease. A great deal of care will be taken to meld the methodology of these two papers, in addition to using similar years researched in the studies by looking at 1989-2011.

IV Methodology

I examined the levels of SNAP expenditures and minimum wage at a state level. My research includes data from 1989-2011 on all fifty states, and the District of Columbia. The main sources of my data are The Department of Agriculture, Bureau of Labor Statistics, and Department of Economic Statistics, for which yearly state SNAP expenditures, state minimum wage, and state GDP are retrieved. Each of the statistics represented are reported in 2009 dollars. The studies conducted for this report are divided into two main categories, U.S. regression and the State difference in difference models.

Data

Effective Minimum Wage (EMW) is a result of both the Federal and State minimum wages. Many states have either passed legislation, which set the minimum wage at or below the federal minimum wage (FMW), while others have chosen to rely on the Federal Minimum wage. A third set of states has chosen to set minimum wage above that of the FMW. To resolve this recording issue of the minimum wage the value inputted was the larger of the two values, Federal or State minimum wage for a given year.

The data used to represent SNAP expenditures was taken from the U.S. Department of Agriculture. It includes the Average Number of Persons on SNAP (ANPS), Average Expense per Person (AEPP), Average Number of Households (ANHH), and Total yearly state SNAP expense (TotalYearly). Note that the average expense per household variable was excluded from this analysis, because it fails to capture any significance not already covered by the four variables above. These variables were recorded using the Department of Agriculture's fiscal year, which begins in October and ends in September of the next year. The units of measure for the recording of the statistics were monthly, with an average or total for the year recorded below. In addition to this unorthodox method of recording, each fiscal year was recorded on separate spreadsheets,

which were organized by region instead of alphabetically. The data needed to be manipulated in order to start and end during a set year and to accomplish this, a series of different manipulations of the data was required. First, the month, state, and year were combined using the command concatenate. Secondly, the regional data from each fiscal year was combined using the pivot table. The third step in the process was unpacking the reference variable and splitting the state, month, and year into separate columns. The final step, required the use of the pivot table to get the sum/average of each of the variables for the given state, and year. This process was repeated for each of the eight regions.

For the average income of wageworkers (Average Wage) the data was collected from the U.S. Census Bureau. The data was recorded by state as the average yearly income for the state population employed in a wage based occupation. This data excludes those that receive income from salary-based employment and income from other sources such as investments.

For each of the figures that were reported in dollars, a deflator variable was needed to record each year in the same unit. The unit that I choose was 2009 dollars, which required that the values of two years, 2011 and 2010, be deflated. It also required that the values, from 1989-2008, be inflated without changing the value of 2009. The ultimate choice to utilize 2009 dollars is due to the common use of this unit by most federal departments.

After compiling all the data to produce the models, the data was divided into three separate pages. This was done so that the model variables, states used as focus and control, and the years for which the analysis spans were properly formatted for input into the application STATA. One sheet contained the data for the fifty states (and D.C), and three sheets were created with two states each for the use in difference-in-difference models. The set of states are New Jersey/Pennsylvania, New Mexico/Oklahoma, and Vermont/New Hampshire. For these last

three sheets, three additional variables were created in STATA, which are `dummystate`, `dummyAfter` (After unilateral increase in minimum wage), and `dummyDiff`, which is a product of the first two dummy variables. For the `DummyAfter` variable records the year in which the minimum wage changed for the state. The nominal value was used for this variable in order to clearly identify when the change was a result of legislation rather than a difference produced by the effects of inflation.

For three of variables utilized in this analysis a log was taken in order to record the change in the variable over time. These variables are `PCGDP_log`, `SNAPP_log`, and `EMW_log`, which represent percent change of per-capita GDP, SNAP expenditures per person, and effective minimum wage respectively. The first two variables are a product of dividing the following statistics by population, ANPS and State GDP. The choice to convert these variables into per-capita statistics reflects the methodology of Reich and West (2015). Without such a conversion these variables would not have incorporated the size of a state's population, which would result in an inflated variable for under populated states such as Wyoming and Alaska. For each of these three variables the log was taken to produce more accurate results, as the percent change is a superior variable for dollar statistics in a panel analysis. This method is in line with the methodology used in the past study of (Reich & West, 2015b).

Pre-Study Analysis

Prior to performing the regression, I analyzed the data to determine the trends between the statistics and regions (Exhibit 1). My analysis clearly showed that the Far West region (West Coast, Alaska, and Hawaii) has the highest real minimum wage, with the central regions of South West, South East, Plains, and Rocky mountains at the bottom. This trend continues even at the average income of wage workers of the regions. Overall, these two statistics show that there is a

strong correlation between average yearly income of wageworkers and minimum wage. In addition, it shows that the center of America is lagging behind the two coasts, in terms of both variables, average income of wageworkers and minimum wage. Also, the regions with the highest minimum wages, do not correlate with those that have the lowest unemployment rate. This indicates that there is no direct correlation between high wages and low unemployment, nor is there a negative correlation between wages and low unemployment. The Far West has both the highest minimum wage, and is also the state with the highest unemployment rate. One possible explanation for this occurrence could be said to be the inclusion of states such as Alaska, where there is a large number of subsistence households, and California, where jobs are more competitive and require a higher level of skills.

An additional observation can be made in regards to the two southern regions. These two regions as shown in Exhibit 1 have the highest portion of their population on SNAP with over 10% enrolled. In addition the states on average spend the most on SNAP as a portion of their total population.

In Exhibit 2 the table shows the yearly averages of each of the important statistics. A significant trend in the data is that the unemployment rate has never been higher than it has been for the last three years of observation 2011, 2010, and 2009. In terms of per-capita expenditures on SNAP for the two decades of observation, the expense has a steady increasing trend. This shows that the real expense on the taxpayers for this program continues to increase, representing a fundamental problem that exists in our economy. An additional trend that can be garnished from this table is that the amount of people on SNAP as a portion of the total population continues to rise year after year.

To evaluate the common hypothesis of the minimum wage critics, I evaluated the years for which the federal minimum wage was raised in 1990-1991, 1996-1997, and 2007-2009. In graph 1, the average unemployment rate in the U.S. is graphed across years. A line marks each of the three instances during the time period that the minimum wage was raised on the federal level. As can be seen from this graph, for the first two raises, there is a subsequent decline in the unemployment rate in the following years. This shows that there was no visible effect on the unemployment rate due to the rise. For the third increase in the end of the 2000's there was an increase in the unemployment rate. This observation should be discarded, as during this time period the United States was going through the great recession, which accounts for the increase.

The last level of observations, which were conducted prior to performing the analysis, was to look at the significant statistics in terms of their minimum, median, and maximum values. As shown in Exhibit 3, unemployment has ranged over the 22 years from 2.3% to 13.8%, averaging 5.6%. In looking at the expense from SNAP per year, the maximum expenditure was just under \$6.5 billion and at a low of \$26 million. Arguably, the most important statistic is the percent of the state's population enrolled in the SNAP program. This statistic ranges from 2% to 32%, with an average of 9%.

U.S. Regression

$$A. \text{SNAPP}_{\log_{it}} = \beta_0 + \beta_1 \text{PCGDP}_{\log_{it}} + \beta_2 \text{Unemployment}_{it} + \beta_3 \text{EMW}_{\log_{it}} + \beta_4 \text{AW} + i.\text{year} + \epsilon_{it}$$

$$B. \text{PSNAPP}_{it} = \omega_0 + \omega_1 \text{PCGDP}_{\log_{it}} + \omega_2 \text{Unemployment}_{it} + \omega_3 \text{EMW}_{\log_{it}} + \omega_4 \text{AW} + i.\text{year} + \epsilon_{it}$$

Two countrywide regressions were conducted to determine the effect of minimum wage on state SNAP expenditure (Regression A) and enrollment (Regression B). These regressions utilize the same set of four independent variables with the log of EMW (EMW_log) as the focus variable. Log of Per-capita state GDP (PCGDP_log), unemployment, and average income of

wageworkers (Average Wage) are used as control variables for the economic situation of the states. The dependent variables are log of total yearly SNAP expense per-capita and average number of individuals on welfare in a state as a portion of the population. The regression method that was used to interpret this data was the OLS method. The results of this study shows how each of the independent variables contribute to the amount of people on SNAP and the expenditures that are spent on the program. Considering the past research, the expectation for the outcome of this regression is that the coefficients of average wage, EMW_log, and PCGDP_log will be negative. This would show that they reduce the amount of people on SNAP and the overall expense of the program. The coefficient for unemployment is expected to be positive showing that a decrease in jobs corresponds with more people and cost to SNAP.

State difference model

$$C. SNAPP_{log_{it}} = \delta_0 + \beta_1 PCGDP_{Log_{it}} + \delta_2 Unemployment_{it} + \delta_3 dummyDiff_{it} + \delta_4 dummysstate_i + \delta_5 After\ 92_t + \delta_6 AW + \epsilon_{it}$$

$$D. PSNAPP_{it} = \lambda_0 + \lambda_1 PCGDP_{Log_{it}} + \lambda_2 Unemployment_{it} + \lambda_3 dummyDiff_{it} + \lambda_4 dummysstate_t + \lambda_5 After\ 92_i + \lambda_6 AW + \epsilon_{it}$$

The difference-in-difference model is used to compare two states effected from a change in the minimum wage. The states were chosen because of their proximity, similarity and because one utilized a higher minimum wage than its adjacent neighbor. I have chosen three sets of States New Jersey/Pennsylvania, New Mexico/Oklahoma and Vermont/New Hampshire, which will here forth be referred to as the Mideast, Southern, and New England difference-in-difference models, respectively. The Mideast states were chosen, because of the past literature of Card & Krueger's (1994) and Neumark & Wascher (2000), which utilized these states focusing on the same increase in minimum wage. The states of New Hampshire and Vermont were chosen, because they both are primarily rural states, but differ heavily in terms of minimum wage over an

extended time period. Finally, New Mexico and Oklahoma were chosen because New Mexico is the only state in The Southwest that legislated its minimum wage above that of the FMW and Oklahoma unlike Nevada and Texas has a comparable economy to New Mexico. In addition, the Southwestern states are geographically and industrially different from the two pairs of states from the Northeast.

The same variables were used for each of these models, and like the previous models the two dependent variables being tested are the average number of people enrolled in SNAP as a portion of population (PSANPP) and percentage change of yearly expenditures to SNAP as a percentage of population (SNAPP_log). The dependent variables are unemployment; percent change of state GDP as a percentage of population, and dummy variables representing the control or focus state, before and after the implementation of a higher minimum wage, and the product referred to as dummyDiff for the difference-in-difference model.

The value of this model is that it shows the effect of a given change in minimum wage for states with similar economies. Unlike the other models, it shows a more direct effect from one state changing their minimum wage through legislation. Some limitations to this model are that the minimum wage frequently changes, especially in those states where they continuously keep their state minimum wage above that of the FMW. The other limitation of the model is that there is generally similar minimum wages in the same region, especially neighboring states. This reduces those pairs of states that can be used in the model. It also creates a limitation to the amount of useful years and state pairs that can be used in the model. These limitations were addressed by utilizing those states that did conform to the necessary requirement for utilization in the model. These requirements are namely being geographically and economically similar and having sustained differences in their minimum wages for a period of at least three years.

V Results

U.S. Regression

The OLS regressions on the countrywide data resulted in mixed results. Exhibit 4 shows results from regression A testing the quantity of citizens on SNAP. The regressions did not result in any level of significance for the focus variable of EMW_log, because the p-value for the regression was above .10. Regression A resulted in similar results with EMW_log having a p-value of above .10. These results failed to prove the hypothesis that was asserted prior to conducting this study that minimum wage would reduce SNAP. The other three independent variables however, show significance effect on SNAP expense. For both percentage changes in state GDP as a percentage of population and unemployment with every additional unit enrollment in SNAP increases and cost of SNAP. This is to be expected with unemployment, as the more individuals are without work it can be expected that the number of people on food stamps will increase. As shown by the coefficient for every percent increase in unemployment there will be a .52 percent increase in the cost of SNAP per person living in the state. To put this into perspective, the state of Maryland can be used as it possesses a population in line with the country average. Maryland had 5.8 million citizens in 2011 with a per-capita cost of \$175. The effect of a one percent unemployment increase would be approximately a dollar increase (\$.91), increasing total cost by \$5.2 million dollars. The results show that the percentage change in real state GDP results in a growth in the enrollment in food stamps. This is unexpected, as an increase in a state's economy should reflect a reduction in SNAP expense, as all held equal the amount of money in the system has increased. An explanation for the increase in SNAP connected to an increase in GDP per capita is that the share of the increase in GDP is not shared equally across the quantiles. With a growing portion of growth going to the top quantiles, at the

expense of the lower quantiles, the effect on the impoverished population will be negative.

Average wage resulted in a negative coefficient of -9.42×10^{-6} , which translates to a decrease of $-.942\%$ for every increase of \$1,000.

For regression B (PSNAPP), shown in Exhibit 5, there are very similar results with no significance in EMW_log, however, PCGDP_log is also insignificant. For the variables of average wage and unemployment, the coefficients were the same sign as the previous model at -1.01×10^{-6} and $.00524$ respectively. What the average wage coefficient shows is that for every additional \$10,000 in average income of wageworkers, there will be a reduction in the percentage of people on SNAP of approximately 1%. The unemployment coefficient shows that for every one percent decrease in unemployment enrollment, there will be a decrease by over half a percent. From these results it can be seen that unemployment has a larger effect on percent enrollment than increasing average income of wageworkers by \$10,000. This is because decreasing unemployment by 1% is a smaller change in comparison to increasing average income of wageworkers by \$10,000.

State Difference-in-Difference models

The results from the three sets of states New England, Mideast, and Southwest varied in their results. The two New England models looking at Vermont and New Hampshire produced significance in terms of the Difference-in-Difference variable of dummyDiff. The other two models did not result in significance for this variable. As shown in the Exhibits 8 and 9 all variables in the models resulted in coefficients at the highest level of significance. In addition, the signs of the coefficients are in line with the results from the U.S. regression models with reductions in expenditures from dummyDiff and average wage and an increase from change in per-capita GDP (PCGDP_log) and unemployment. What the coefficient for dummyDiff in the

models for PSNAPP and SNAPP_log of $-.039$ and $-.529$ respectively show is a strong effect from the variable. In Exhibit 8 the effect from the treatment of changing the minimum wage from \$4.25 to \$4.50 in 1995 resulted in a reduction in people on SNAP as portion of population by 3.9%.

The results from the Mideast models found that the control variables of PCGDP_log, Average Wage, and Unemployment were significant, but not dummyDiff. This is in line with the findings from the U.S. regression model with average wage reducing cost and change in per-capita GDP (PCGDP_log) and unemployment increasing cost. The fact that the variable representing the change in minimum wage for New Jersey in 1992 as compared to Pennsylvania (dummyDiff) is not surprising. The reason for this difference in results can be tied to the lower quantity of data points. For the New England models, there were 42 data points (22 years), while the Mideast models only had 14 data points (7 years).

The third area, the South, did not produce the same type of results as the first two models. As seen in Exhibit 10 and Exhibit 11, the results have no variable showing any level of significance as their P-value exceeded $.10$. The reasoning for the lack of significance will be discussed in the discussion section, but could be a result of a low number of observations after implementation of the higher minimum wage in 2009.

Discussion

The three pairs of regional difference-in-difference models did not share common results. This lack of common findings however, provides insight into the differences between the areas. As noted in the results for the Mideast, the control variables were significant, while dummyDiff, representing the change in minimum wage of New Jersey 1992, was not significant. This may show that the effects of changing the minimum wage, in this area, did not have significant

correlation with SNAP during this short period. The fact that the New England model showed significance while the other models failed to do so may show a time effect. As seen clearly in the long term as opposed to the short term as this model covered a longer period of time (22 years vs. 7 years). Looking at the southern state difference-in-difference model the fact that there was no significance also shows that there is a varying amount of differences between the regions. As shown in the summary statistics (Exhibit 3) the North Eastern regions have similar statistics while the southern regions vary immensely.

One reason that could explain why the Southern model falls outside the observations of the North East, is because of the difference in their political views and demographic. The south, unlike the north, has a concentration of political leaders and constituents that believe that the minimum wage is harmful. Due to this belief, employers may act upon what they expect to happen from the rising minimum wage rather than acting in accordance to the needs of the business. In addition, with a concentration of most undocumented labor in the south, due to border proximity there may be an effect not captured in this model. If these illegal workers are employed below the minimum wage there would be a three-fold effect, one is the lack of records on their employment, and the second is a loss of jobs for the resident population in low wage jobs. The last effect is that for businesses that do not follow the minimum wage, setting a higher wage will have no effect.

Regressions A and B look at the effect across the country and found that for both models there is no significance in a change in minimum wage. One explanation for the lack of significance is that the effect is too variable depending on the type of economy. The south and Midwest depend more heavily on the minimum wage than do the west and east coasts. In addition, the political framework of areas also affects both the choices of labor and employers,

which cannot be quantified for use in these models. One final explanation is that the years 2008-2011 represent the years of the great recession. The impact of the economic collapse during this period is not represented in the model.

In terms of all the models, there seems to be a common factor. That factor is that the control variables of unemployment, average income of wageworkers and change in per-capita GDP are significant indicators of SNAP enrollment and Per-capita SNAP expense. These common factors give validity to the model. If they were not significant it would show that there is a fundamental error in the models or data. As they have the same sign and positive significance throughout the models it supports the conclusion that these independent variables do have a significant effect on the two dependent variables.

There is significance in the difference in results between PCGDP_log and Average Wage. While both of these statistics are indicators of income, the latter focuses on wageworkers. Per-capita GDP looks at the gross domestic production of the state as a whole over all sectors. The way that the average income of wage workers differs is that it only looks at those people making a set wage per hour, excluding those that make a set salary. This is significant in that people who work for an hourly wage are usually making less per year and are more likely to need SNAP benefits. The fact that PCGDP_log increases SNAP while Average Wage decreases shows that the overall increase in a state's GDP doesn't increase the wellbeing of the different classes equally. The Average Wage, on the other hand, has a higher correlation with the lower classes from this analysis.

VI Conclusion

The results that came out of this model are far from concrete, however they allow for many observations to be made, in terms of the hypothesis. First there is no evidence that a rise in

minimum wage results in growth in either the enrollment or the expense is connected with SNAP. In addition, the finding from (Graph 1) shows that there was no increase in unemployment in the three years when the nationwide minimum wage increased. This shows that the first group's beliefs, regarding the effects minimum wage, are unfounded. In contrast there is evidence, while only at a state level, that minimum wage does cause there to be a lower expense to the federal government from SNAP and less people enrolled in the program.

These two findings have a great deal of importance when it comes to policy. It seems clear that only positive results will come from the fourteen states that increased their minimum wages in 2016, in addition to the cities that have increased their minimum wages between 2013 and 2016. This also supports the idea that more states should follow the example of these areas and increase the minimum wages of their respective states. As shown in the New England states, an increase can result in positive outcomes for the populations of the given states. This increase in personal wealth that resulted in people coming out of SNAP, also represents a decrease in other State programs such as Medicaid, Housing Assistance, and Temporary Assistance for Needy Families (TANF). This study focuses on the effects exhibited in SNAP however; the effects should ripple across all programs that utilize poverty level as the bases for enrollment. This does not only result in savings to the government, but also an increase in revenue holding all else equal². For each additional dollar that these individuals make, a portion of it goes to the government, and when the paychecks are spent on goods or services, an additional portion goes to the government via taxes. In total, there are numerous subsequent advantages if the minimum wage was to increase.

² Tax revenue would not increase if there is a subsequent reduction in the number of individuals employed or the number of hours these individuals work in a given period.

One limitation to the policy recommendation is for the southern states. They have kept their state minimum wages stagnant for the duration of the life of FLSA. While New Mexico has only broken away from the trend for a handful of years there is no evidence that it has benefited from the increase. Furthermore, there is clear evidence, both from the summary statistics and difference-in-difference models, that there are economic differences between the North East and the South. Due to the differences between this region and the lack of significant results from the southern difference-in-difference model, no policy recommendation can be made for this region.

There are two large limitations to this study that could not be resolved by the macro-level data. The first limitation is that there is a bias produced by citizens qualifying for the program, but not applying. This could be a result of a lack of information on the individual's part or choice not to utilize the government program for a variety of reasons. This model does not measure choice to enroll limiting possible negative impacts due to a lower enrollment of those qualifying. The second limitation is that there is no data recorded for SNAP participants, in terms of labor participation at the state level. This limits the interpretation of what percent of the benefits are going to members of the labor force. For example, Florida with a disproportionate elderly program is likely to have more SNAP members outside of the labor force.

This research can be used as a building block to look at how the social services system is affected by pro-working class initiatives. The effects of minimum wage on SNAP is only one piece of the puzzle, and there are dozens of other programs that are state centric and country wide, which could be effected by more money being earned by the bottom quantiles. In addition, there is an effect across the quantiles as a result of the upward pressure on wages, as hypothesized in papers such as Hanson & Hawley (2014). The result of an increase on tax

revenue could also be built upon from this study. Additionally state and regional differences in effects could be studied, as it is evident that the impact varies across the country.

Exhibit 1 Regional Average of Key Statistics

Region	Unemployment	EMW	Population	Per Capita GDP	SNAP EXPENSE/POP	PSNAPP
New England	5.30%	\$ 5.72	2,311,137	\$ 36,588.02	\$ 92.52	7.7%
MidEast	5.86%	\$ 5.48	7,699,998	\$ 53,271.50	\$ 111.92	8.8%
Great Lakes	5.77%	\$ 5.29	7,552,802	\$ 35,604.86	\$ 100.12	8.2%
Plains	4.18%	\$ 5.21	2,339,739	\$ 38,261.07	\$ 100.22	8.7%
Southeast	6.07%	\$ 5.19	6,002,608	\$ 29,063.46	\$ 134.14	11.3%
Southwest	5.74%	\$ 5.19	7,852,076	\$ 25,338.38	\$ 131.71	11.0%
Rocky Mountains	5.13%	\$ 5.19	2,177,008	\$ 30,768.69	\$ 78.81	6.7%
Far-West	6.38%	\$ 5.90	7,813,680	\$ 39,861.18	\$ 112.66	8.0%

Exhibit 2 Yearly Averages

Year	Unemployment	Population	Per Capita GDP	SNAP Expense/Population	PSNAPP
2011	8.10%	6,109,645	\$ 51,138	\$ 226.57	14.7%
2010	8.71%	6,065,298	\$ 49,432	\$ 213.38	13.7%
2009	8.58%	6,018,576	\$ 48,014	\$ 180.34	11.8%
2008	5.52%	5,966,946	\$ 49,403	\$ 124.33	9.8%
2007	4.42%	5,912,110	\$ 48,440	\$ 107.89	9.1%
2006	4.46%	5,853,525	\$ 46,651	\$ 106.73	9.0%
2005	4.91%	5,797,803	\$ 44,362	\$ 111.14	9.2%
2004	5.21%	5,744,700	\$ 41,949	\$ 102.08	8.7%
2003	5.59%	5,691,332	\$ 39,476	\$ 93.32	8.1%
2002	5.37%	5,641,886	\$ 37,687	\$ 81.70	7.3%
2001	4.57%	5,588,499	\$ 36,613	\$ 71.17	6.6%
2000	3.92%	5,531,428	\$ 35,553	\$ 67.63	6.4%
1999	4.12%	5,471,376	\$ 33,779	\$ 72.33	6.7%
1998	4.38%	5,408,904	\$ 32,232	\$ 77.37	7.1%
1997	4.71%	5,346,018	\$ 31,082	\$ 86.68	7.9%
1996	5.14%	5,282,241	\$ 29,107	\$ 102.98	9.0%
1995	5.24%	5,221,145	\$ 27,755	\$ 107.88	9.5%
1994	5.60%	5,159,330	\$ 26,641	\$ 111.96	9.9%
1993	6.29%	5,096,443	\$ 25,209	\$ 113.44	10.1%
1992	6.84%	5,029,691	\$ 24,305	\$ 113.34	9.8%
1991	6.51%	4,960,411	\$ 23,281	\$ 102.30	9.0%
1990	5.48%	4,894,565	\$ 22,782	\$ 86.67	7.9%
1989	5.15%	4,839,593	\$ 21,744	\$ 89.83	7.9%
Average	5.60%	5,505,716	\$ 35,941	\$ 110.92	9.1%

Graph 1 Unemployment and Minimum Wage Increases

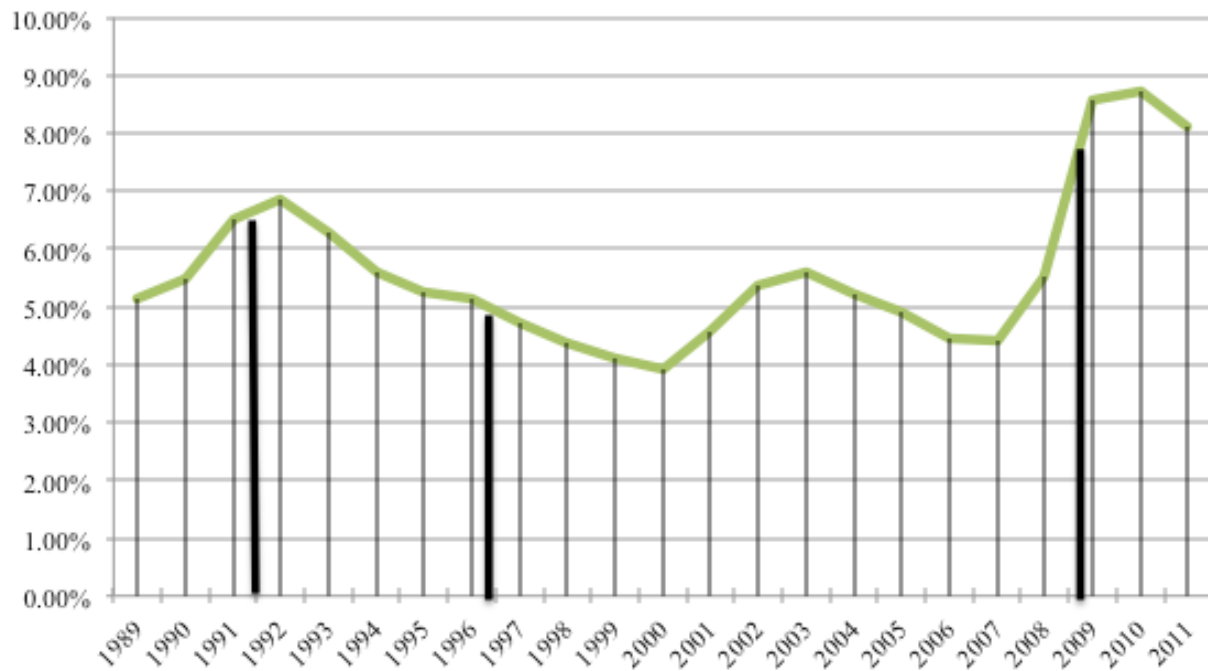


Exhibit 3 Key Statistics

Measure	Unemployment	EMW	State Yearly SNAP Spending	Population	Per Capita GDP	SNAP EXPENSE/POP	PSNAPP
Min	2.3%	\$ 3.35	\$ 21,064,997	453,690	\$ 4,921.95	\$ 19.07	2%
Max	13.8%	\$ 8.67	\$ 6,454,723,450	37,691,912	\$ 175,179.13	\$ 472.90	32%
Mean	5.6%	\$ 5.38	\$ 613,542,484	5,505,716	\$ 35,940.60	\$ 110.33	9%

Exhibit 4 (U.S.) Change in SNAP Expense Per-Capita	
VARIABLES	SNAPP_log
EMW_log	-.0011455
	(.0725915)
Unemployment	.0578225***
	(.0045662)
Average Wage	-9.42e-06***
	(2.80e-06)
PCGDP_log	-.2177675***
	(.0687691)
Constant	6.422354***
	(.67665)
Observations	1,172

States	51
R-squared	.4475
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 5 (U.S.) People on SNAP as Portion of Population	
VARIABLES	PSANPP
EMW_log	.0056684 (.0063299)
Unemployment	.0052478*** (.0003982)
Average Wage	-1.01e-06 *** (2.45e-07)
PCGDP_log	-.0091571 (.0059966)
Constant	.1621613*** (.0590031)
Observations	1172
States	51
R-squared	.3361
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 6 (Mideast) People on SNAP as Portion of Population	
VARIABLES	PSNAPP
dummyDiff	-.0016323 (.0046211)
Unemployment	.0034899** (.0012382)
Average Wage	-2.63e-06 (3.49e-06)
PCGDP_log	.0746892* (.0320128)
dummystate	-.0280676 (.0209107)
After92	.0087294** (.0036341)
Constant	-.5915638** (.2307633)
Observations	14
R-squared	.9890

Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 7 (Mideast) Change in SNAP Expense Per-Capita	
VARIABLES	SNAPP_log
dummyDiff	-.1220213 (.0801022)
Unemployment	.0781062*** (.0214627)
Average Wage	.0000357 (.0000605)
PCGDP_log	1.139352* (.5549086)
dummystate	-.8785184** (.3624648)
After92	.0596015 (.0629933)
Constant	-8.59917* (4.00004)
Observations	14
R-squared	.9824
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

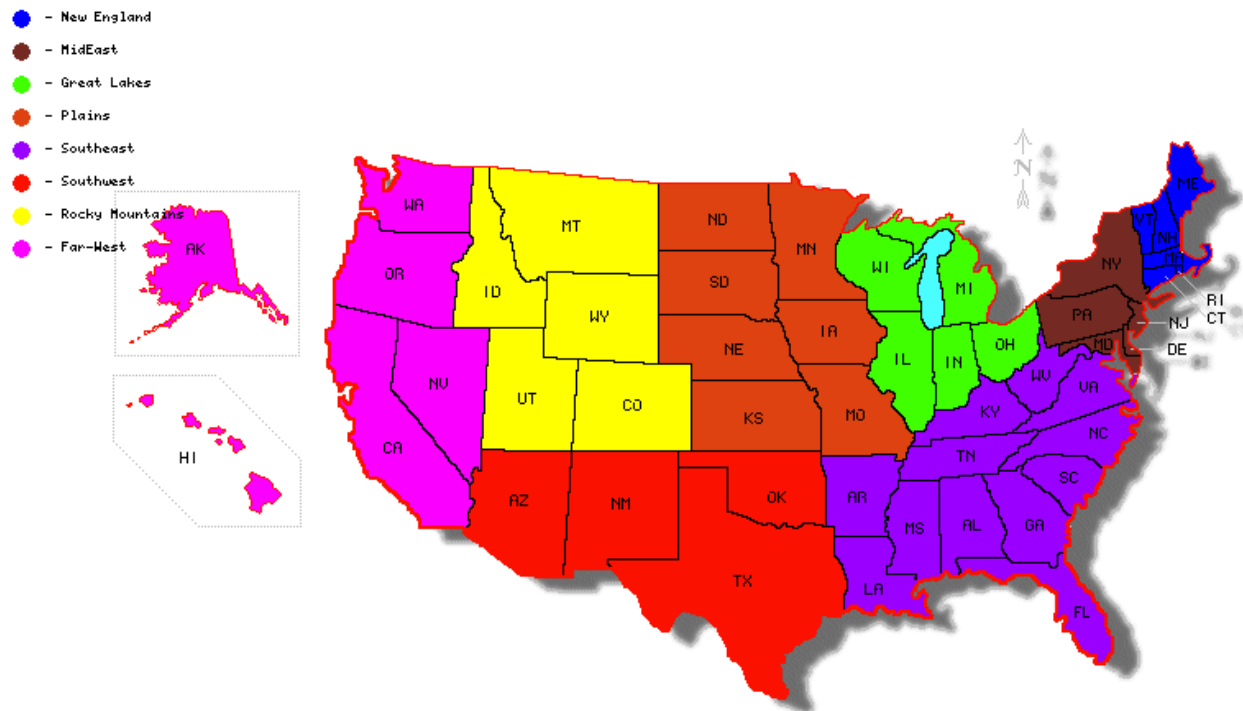
Exhibit 8 (New England) People on SNAP as Portion of Population	
VARIABLES	PSNAPP
dummyDiff	-.0391036*** (.0105201)
Unemployment	.0115614*** (.0020449)
Average Wage	-.0000102*** (2.63e-06)
PCGDP_log	.182584*** (.0406272)
dummystate	.074986*** (.0083282)
After95	.0199778* (.0111947)
Constant	-1.559253*** (.3331247)
Observations	44
R-squared	.8567
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 9 (New England) Change in SNAP Expense Per-Capita	
VARIABLES	SNAPP_log
dummyDiff	-.5293774***
	(.1750046)
Unemployment	.2312193***
	(.0340169)
Average Wage	-.0001717***
	(.0000437)
PCGDP_log	3.343373***
	(.6758454)
dummystate	1.17253***
	(.1385426)
After95	.2888337
	(.1862272)
Constant	-26.14512***
	(5.541632)
Observations	44
R-squared	.8639
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 10 (Southwest) People on SNAP as Portion of Population	
VARIABLES	PSNAPP
dummyDiff	.008971
	(.0205478)
Unemployment	.0116015
	(.0130096)
Average Wage	-.0000183
	(.0000136)
PCGDP_log	.0444711
	(.2054167)
dummystate	-.1888234
	(.1140898)
After 09	.0231769
	(.0336233)
Constant	-3.739159
	(2.249603)
Observations	14
R-squared	.8779
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Exhibit 11 (Southwest) Change in SNAP Expense Per-Capita	
VARIABLES	SNAPP_log
dummyDiff	-.016811
	(.0254097)
Unemployment	-.0071008
	(.0160879)
Average Wage	.0000544
	(.0000168)
PCGDP_log	.0444711
	(.2540211)
dummystate	-.0494977
	(.141085)
After 09	-.0390653
	(.041579)
Constant	8.020736**
	(2.78189)
Observations	14
R-squared	.9468
Standard Errors In Parenthesis	
*** p<0.01, ** p<0.05, * p<0.1	

Appendix 1



References

- Bureau of Labor Statistics, Monthly Labor review, January issue; Department of Labor, Employee Standards Administration
- Bureau of Labor Statistics (2016-03-31). Employment and Unemployment (Seasonally Adjusted): Unemployment Rate - Seasonally Adjusted | State, 01/1976 - 02/2016. Data-Planet
- Card, D., & Krueger, A. B. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *The American Economic Review*, 84(4), 772–793.
- Congressional Budget Office (CBO). (2014, February 18). The Effects of a Minimum-Wage Increase on Employment and Family Income. Retrieved February 15, 2016,
- Center on Budget and Policy Priorities (CBPP). (2015, January 8). Introduction to SNAP.
- Department of Agriculture, 4/8/16, Supplemental Nutrition Assistance Program FY 69- FY 15, Retrieved February 17, 2016

- Healthcare.gov. (2016). Federal Poverty Level (FPL), Retrieved March 3, 2016,
- Hanson, A., & Hawley, Z. (2014). The \$10.10 Minimum Wage Proposal: An Evaluation across States. *Journal of Labor Research*, 35(4), 323–345.
- Kimball, W. (2016). 14 states raised their minimum wage at the beginning of 2016, lifting the wages of more than 4.6 million working people. Retrieved April 9, 2016,
- Neumark, D., & Wascher, W. (2000). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania: Comment. *The American Economic Review*, 90(5), 1362-1396
- Neumark, D., & Wascher, W. (2011). Does a Higher Minimum Wage Enhance the Effectiveness of the Earned Income Tax Credit? *Industrial and Labor Relations Review*, 64(4), 712–746.
- Page, M. E., Spetz, J., & Millar, J. (2005). Does the Minimum Wage Affect Welfare Caseloads? *Journal of Policy Analysis and Management*, 24(2), 273–295.
- Reich, M., & West, R. (2015). The Effects of Minimum Wages on Food Stamp Enrollment and Expenditures. *Industrial Relations*, 54(4), 668–694.
- Rosenbaum, D. (2013). The Relationship Between SNAP and Work Among Low-Income Households. *Center on Budget and Policy Priorities*.
- Sanders, B. (2015). Bernie Sanders Quote. Retrieved March 5, 2016,
- US. Bureau of Economic Analysis. (2016, January 1). Total Gross Domestic Product for Alabama -Wyoming. Retrieved April 1, 2016,
- United States Census Bureau (2015-08-07). Population Estimates - Historical (1900 - Present): Population Estimates | State, 1900 - 2014. Data-Planet

- US Department of Commerce, B. E. A. (2014.). Bureau of Economic Analysis. Retrieved
March 10, 2016,