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THE IMPACT OF FOOD ASSISTANCE ON LABOR SUPPLY AND FAMILY OUTCOMES: A STUDY OF SNAPS ROLE IN WORK INCENTIVES AND FERTILITY CHOICES

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A DISSERTATION APPROVED FOR THE
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To my beloved parents, who laid the foundation of my dreams; my loving wife, whose unwavering support and encouragement have been my greatest strength; and my wonderful children, without whom life would be so dull.

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Abstract

The first chapter of this dissertation examines the impact of expanded eligibility for the Supplemental Nutrition Assistance Program (SNAP) on labor supply decisions across U.S. states. Leveraging variation in eligibility expansions over time, it investigates whether the broadened access to SNAP encourages labor force participation and increases hours worked among newly eligible individuals. Contrary to the expectation that SNAP benefits might reduce work incentives, findings reveal an increase in labor force participation on the extensive margin, particularly among groups exempt from work requirements. The study also explores the heterogeneous effects by education level, household type, and enrollment status, as well as by the intensity with which eligibility criteria were relaxed. This analysis contributes to understanding SNAP's role in labor supply behavior, challenging assumptions about welfare benefits and work incentives. The results have implications for policymakers considering eligibility criteria adjustments to improve labor market engagement.

The second chapter investigates examines how the Supplemental Nutrition Assistance Program (SNAP) may affect teenage birth rates in the U.S. over the period 2001-2019, since teenage childbearing can have long-term socioeconomic impacts on young mothers and their children. Using data from the Current Population Survey (CPS) and a 2SLS approach, we find that a 1% increase in SNAP benefits is associated with a 0.11 to 0.14 percentage point rise in teenage birth likelihood. Our findings suggest that SNAP may unintentionally encourage early childbearing by alleviating financial barriers to child-rearing. Additionally, our heterogeneous analysis reveals that the impact of SNAP benefits on teenage birth rates varies significantly across races, census regions, and time periods, with more pronounced effects observed following the Great Recession. We also investigate potential channels through which SNAP influences teenage childbearing and find that SNAP is associated with lower labor force participation, higher unemployment, and negative effects on family formation. Our results emphasize the need to reevaluate social welfare programs to ensure a balance between the economic support provided by

SNAP and its potential impacts on fertility choices.

The third chapter analyzes the impact of Supplemental Nutrition Assistance Program (SNAP) benefits on the timing of first childbirth among low-skilled women (with births between ages 15 and 40 years), particularly focusing on high school dropouts. Leveraging data from the Current Population Survey (CPS) and a three-way fixed effects model, the analysis finds that a 10% increase in SNAP benefits is associated with an approximate 1.18-year reduction in the age at first childbirth. This effect is most pronounced among Black women, followed by weaker effects for White and Hispanic women. Regional analysis uncovers significant variation, with the strongest negative effects observed in the Midwest. Notably, the association is particularly strong among White women aged 2025, where SNAP benefits show the largest negative impact on the age of first birth. Exploring potential mechanisms, the findings suggest that higher SNAP benefits correlate with increased unemployment rates and larger family sizes, indicating that the financial stability provided by SNAP may incentivize earlier childbearing. Additionally, higher SNAP benefits are linked to declines in marriage rates and increases in divorces, separations, and women choosing to remain unmarried, contributing to earlier transitions to parenthood outside stable relationships. These findings highlight the multifaceted ways in which public assistance programs can influence demographic and behavioral outcomes.

Chapter 1

Rethinking Work Incentives: How Changes in SNAP Eligibility Affect Labor Supply

1.1 Introduction

Supplemental Nutrition Assistance Program (SNAP) is one of the biggest transfer programs in the USA.[1] In 2013 alone, it was providing benefits worth around 76 billion dollars, serving around 47 million individuals across all states![2] It provides nutrition benefits to aid the food budget of the families in need in order for them to purchase healthy food and turn towards self-sufficiency. Previously called the Food Stamp Program, it was started in 1939, and has now become the largest program working to fight hunger in America.[3] The main target beneficiaries of SNAP are the most at-risk citizens; it primarily serves households with elderly, children, or disabled members.

Various studies have investigated the impact of SNAP on different outcomes. These studies particularly shed light on the impact of SNAP on factors that is not just limited to food insecurity. For example, a large number of studies have looked at the impact

[1] Source: What the data says about food stamps in the U.S.
[2] Source: SNAP Data Tables
[3] Source: Why SNAP?

of SNAP on the health outcomes and incomes of the beneficiaries (H. W. Hoynes et al. (2017); Bartfeld et al. (2015); Tiehen et al. (2012a)). Berkowitz et al. (2017) study the impact of SNAP participation on health-care expenditures.

There are also some papers that have shed light on how SNAP impacts labor supply choices of the individuals (Olds (2016); East (2018); Fraker and Moffitt (1988)). However, there is still a dearth of research that details how an increase in SNAP eligibility impacts the poor households in terms of their labor supply decisions.

Starting in the fiscal year 2001, various states started to expand SNAP eligibility. Households that are eligible to receive cash assistance from programs that provide benefits to low-income people are considered categorically eligible for SNAP. Households were deemed to be categorically eligible by USDA (1999 onwards through a statement by USDA[4]) if they received or were eligible to receive benefits through the state Temporary Assistance for Needy Families (TANF). This also allowed states to confer Broad-Based Categorical Eligibility (BBCE) to the households where the states could go above and beyond the 130% of the Federal Poverty Level (FPL) in determining eligibility for SNAP all the way to 200% of the FPL. Many states increased their eligibility criteria following this and by 2013, roughly 43 states were using the BBCE criteria (Laird et al. (2014)).

There are various reasons why states may relax their eligibility criteria for increased SNAP participation and disbursement. The BBCE eligibility criteria simplifies the eligibility determination process for the states (by leveraging eligibility from other low-income assistance programs such as TANF), reduces the administrative burden, increases efficiency in program administration and provides flexibility in tailoring the program according to the state's needs. Very few studies have examined the impact of such expansions. This paper exploits the variation in eligibility expansion across states over time to evaluate the causal impact of SNAP eligibility expansion on labor market decisions.

Although the main target groups for SNAP benefits are children, the elderly and the disabled; SNAP also helps workers by providing them support between jobs and supplementing their low wages. However, is this support just enough to ensure that

[4] Source: Letter to regions on categorical eligibility

the individual is motivated even more and incentivizes him/her to keep working (or increase work) or does it act as a deterrent to work and makes the individual to decrease his/her working hours and become more complacent and reliant on these benefits? Does expanding the eligibility to add individuals with relatively higher incomes compared to those always eligible have an impact on their labor supply? These are some interesting questions that warrant an answer.

SNAP benefits particularly are targeted towards households with low levels of income (with a gross monthly income at or below 130% of the FPL, a net income at or below the poverty level and assets below certain limits)[5]. The FPL varies based on the year and the size of the family. For 2017, for example, the FPL was $12,060 for a single person and $24,600 for a family of 4 persons.

Conventional economic theory states that as individuals would become eligible for SNAP, this would make more income available to them and thus could discourage them from working, leading them to reduce their working hours. This would particularly be true if the benefits reduce as the income increases so within the eligible group, the individuals with the lowest income have the highest benefit and those with the highest income have the lowest benefit. So, in order to get more benefits, individuals would want to be at a lower level of income. The main purpose of food stamps and similar transfer programs is to ensure that the recipients have a basic amount of consumption available (amount that is enough for them to survive). Such benefits are highest when the income is at a minimum and keep reducing as income of the individual keeps increasing. Therefore, someone with a low income would get some benefits from the government, which could possibly increase if the individual can reduce working hours (and hence income earned). He/she would then be “incentivized" to reduce the labor supply since he/she can increase the benefits being received while at the same time saving up on the energy spent on working previously. Whereas, increasing the amount of hours worked would mean getting a lower amount of benefits by the state!

Expanding eligibility to give SNAP access to individuals with higher incomes may

[5] Source: A quick guide to SNAP eligibility and benefits

not have the same effect, though. The expansion of the eligibility may reduce such disincentive effects for the low income, whereas at the same time, it does not create enough disincentive for the higher income who are now eligible. Those individuals who were just above the cutoff would have now become eligible for SNAP and would be getting some benefit that previously they were not getting, while on the other hand, those who are now newly eligible but have a higher income may find it too costly to reduce their working hours just to get slightly more benefits. Therefore, expanding the eligibility could, in fact, encourage labor market participation by the lower-income. M. Bitler et al. (2021) states how individuals just bunch below the point where the benefits start falling for SNAP. Once eligibility is relaxed, we can expect these individuals to increase their work hours, thus leading to an increase in the intensive margin.

There could also be other mechanisms at play here. Since SNAP can only be used to purchase certain kinds of food (meat, poultry, vegetables, fruits, etc.) almost all being healthy and nutritious options, this may improve the health outcomes of the SNAP beneficiaries (Berkowitz et al. (2017) find that participation in SNAP is linked to lower expenditure in healthcare). This could motivate them to increase their labor force participation. Han (2020) find that expanding SNAP eligibility not only increases SNAP participation but also enrollment in other welfare programs, particularly free school lunch and a special supplemental nutrition program for Women, Infants, and Children (WIC). This "bundled elgibility" could also be improving health outcomes, thus resulting in increased labor force participation. There could also be an income effect at play here eligibility for SNAP frees up the money that was used for food previously, and that could now be spent on other areas such as childcare. As households spend on childcare, they can increase their labor supply.

In summary, individuals who were previously reducing their working hours to be eligible for SNAP no longer have to do so, in fact, they would rather increase their labor supply. Thus, SNAP uptake would work as a "motivating" factor for them to work more!

I find that the labor supply at the extensive margin increases for the group that is excluded from the Able Bodied Adults Without Dependents (ABAWD) work requirements

on the period when the specific states relax their eligibility criteria. So, even though this group of individuals was not required to enter the labor force and start working, becoming eligible for SNAP "encouraged" them to join the labor force.

As far as hours worked (labor supply at the intensive margin) is concerned, there is an increase in the hours worked as well. The year following the one when the states relax their eligibility criteria, the workers increase the number of hours they work. It seems as though becoming eligible for SNAP, gives them the extra push to increase their working hours.

This paper contributes to two strands of literature. First, it contributes to the understanding of the impact of SNAP expansion. While SNAP's impact has received much attention (M. Bitler et al. (2015); Gundersen et al. (2017); Kreider et al. (2012); Gregory and Deb (2015); Tiehen et al. (2016); Berkowitz et al. (2017)), very few studies have examined the impact of the expansion of SNAP eligibility (Olds (2016); Han (2016); Han (2020)). This paper contributes to the literature by focusing on the impact of SNAP expansion on labor supply.

Second, it contributes to the literature on transfer and labor supply. Prior studies that seek to estimate the impact of the Food Stamps Program (FSP - now called SNAP) on labor supply include Fraker and Moffitt (1988), Hagstrom (1996), and Keane and Moffitt (1998). Some recent studies that seek to explain the relationship between SNAP uptake and labor supply include Fayaz Farkhad and Meyerhoefer (2018). They find that SNAP participation increases the likelihood of employment and full-time work among low-income adults. While previous studies have shown that SNAP has a positive effect on labor supply, it is not clear whether its expansion will have the same effect. This paper provides an important policy evaluation on whether the expansion of eligibility reduces the work disincentive. It is important to find out how such an expansion impacts the labor supply in order to drive policy. Does expanding eligibility really impact the labor supply decisions and whether higher "intensities" in terms of relaxing the eligibility criteria have a greater impact are important policy questions that need to be addressed.

The structure of the paper is as follows. I begin with the literature review after

this brief introduction. That is followed by a section describing data. The model is presented after that and some preliminary results are presented in the findings section. That is followed by a conclusion which highlights some limitations and provides avenues for future research.

1.2 Theory and Literature

1.2.1 SNAP and Labor Supply

One of the social welfare programs in the US that has been growing significantly over the past couple of years and has improved the lives of the beneficiaries multiple-folds is the food stamps program called SNAP (Bartfeld et al. (2015)). In fact,"SNAP is the cornerstone of food assistance in the United States, serving one in seven Americans in FY2015 at a cost of $74 billion" (Ziliak (2016)). SNAP is also estimated to have a positive impact on the macroeconomic variables; Canning and Stacy (2019) estimate that if SNAP benefits are increased by around $1 billion, then that is expected to increase GDP by around $1.5 billion (a multiplier of 1.5) - however, their model cannot be replicated on every other economy and is most suitable for an economy that is slowing (going through a recession).

How transfer programs impact labor supply has been the focus of a lot of studies in the past (Danziger, Haveman, and Plotnick 1981; Danziger et al. (1981); R. Moffitt (1992); R. A. Moffitt (2002) and H. Hoynes (1997)). R. Moffitt (1983) find that Aid to Families with Dependent Children (AFDC) reduces labor supply while the Earned Income Tax Credit (EITC) increases labor supply among participants of the program. Benefit in the form of Social Security Disability Insurance for the disabled seems to decrease employment among men of old age (Parsons (1991); Bound (1989); Maestas et al. (2013); French and Jones (2011); Chen and Van der Klaauw (2008) and Gruber and Kubik (1997)).

Food insecurity reduces education levels among adolescents due to illness, poor academic performance, high absenteeism; and creates issues social functioning, apart from

other behavioral issues (Rose-Jacobs et al. (2008); Jyoti et al. (2005); Frongillo et al. (2006)). Tiehen et al. (2012b) find that state policy choices impact the effectiveness of SNAP in improving the lives of the households with low-income. Belachew et al. (2011) find that food insecure adolescents complete fewer years of schooling compared to individuals who are not food insecure. Thus, food insecurity is closely linked to the performance and productivity of the individuals.

Food insecurity is found to impact the health behavior of college students even beyond the college years and thus its impact may even carry over to impacting individuals other than the person who is food insecure (in the long-run) (El Zein et al. (2019)). Since food insecurity has such negative impacts on the health, social interactions, and education of the individuals, I believe food insecurity is bound to hamper the productivity and work habits of the individuals as well.

Prior studies that seek to estimate the impact of the Food Stamps Program (FSP - now called SNAP) on labor supply include Fraker and Moffitt (1988), Hagstrom (1996), and Keane and Moffitt (1998). Some recent studies that seek to explain the relationship between SNAP uptake and labor supply are as follows. Fayaz Farkhad and Meyerhoefer (2018) find that SNAP participation increases the likelihood of employment and full-time work among low-income adults.

Similarly, H. W. Hoynes and Schanzenbach (2012) state: "Although there is a large literature on the work incentive effects of AFDC and the EITC, relatively little is known about the work incentive effects of the FSP and none of the existing literature is based on quasi-experimental methods". Despite using quasi-experimental methods, this paper uses data of 1960's and 1970's. The labor market has changed significantly since then and therefore it would make more sense to study how access to food stamps (or SNAP in this case) would impact the labor supply decisions in recent years.

Various other papers also discuss the effect of SNAP expansion on program participation, child and adult health outcomes, and impact on participation in other safety net programs. In an analysis using state SNAP policies as exogenous instruments to predict SNAP participation, D. P. Miller and Morrissey (2017) found that SNAP was mostly

associated with better health among those eligible for the program.

Han (2020) looks at the relationship between eligibility and participation in SNAP to that of other welfare programs. He finds that expanded eligibility for SNAP not only increases SNAP participation but also increases free school lunch and WIC enrollment. Therefore, "bundled eligibility" is responsible for the effects of the SNAP expansions on participation in other programs. Could it be that bundled eligibility is the reason why individuals want to continue to ensure that they stay eligible for SNAP so that they are automatically eligible for other welfare programs? Therefore, if SNAP eligibility has a requirement to work a certain number of hours or to be in the labor force, then these individuals would want to make sure they are doing that so that they stay eligible. I will discuss the work requirement condition later in the paper.

Jones et al. (2021), on the other hand, find that the policies designed to expand SNAP eligibility in fact led to larger increases among non-seniors while increasing program participation among seniors only modestly. This study shows that the age bracket that is more likely to either be a part of the labor force or has a potential to join it is actually the one that increases participation in SNAP. Therefore, it is likely that the labor force supply on the extensive or intensive margin may be impacted due to changes in SNAP participation.

Ganong and Liebman (2018) find that between the years 2007 and 2011 the main reason of an increase in SNAP was due to the macroeconomy. The authors also find that a relaxation in eligibility criteria, particularly the broad-based categorical eligibility, accounted for a roughly 8 percent increase in program participation. There is also an increase in SNAP participation by 10 percent that is experienced by relaxing the Able-Bodied Adults Without Dependents (ABAWD) requirements. I discuss the ABAWD requirement later on.

Since there is not much research that studies the impact of SNAP on labor supply, particularly that of expansion of eligibility criteria and how it impacts the labor supply decisions of the individuals; therefore, I seek to exploit this gap in the literature by using quasi-experimental methods and the most recent data available to estimate how

expansion of SNAP impacts hours worked and the labor force participation of potential eligible individuals.

1.3 Data

The data for this paper is taken from IPUMS Annual Social and Economic Supplement (ASEC) surveys. The data for the year 1996 - 2019 has been used in this paper. This source provides many individual-level and household-level characteristics. The ASEC supplement is particularly useful as it provides data on recipients of SNAP as well as the value of the food supplements. Furthermore, it provides the disability status, veteran status, and the number of children of the individuals; factors which play a crucial role in identifying individuals that are exempt or not exempt from the work requirement condition for SNAP. Incomes of the states, unemployment levels and other state-level data has been taken from University of Kentucky Center for Poverty Research (UKCPR national welfare data).

The data for the extent to which the states relax their eligibility criteria is taken from the Food and Nutrition Service website, part of the US Department of Agriculture (SNAP BBCE). As can be seen on the table B1, the states use different gross income limits to expand eligibility for their program. For example, Arizona and Oregon increase the eligibility criteria to 185% of the Federal Poverty Level (FPL), Kentucky and West Virginia increase it all the way to 200% of the FPL (highest percentage increase), while Oklahoma and South Carolina do not change it from the already 130% of the FPL. Table A1 shows the dollar amounts of Federal Poverty Levels (FPL) for the years 1996 - 2021. The data for federal poverty levels is taken from ASPE poverty guidelines. For example, for 2018, the FPL was $12,140 for 1 person and an additional $4320 for each additional person. The FPL for a household with 4 persons for 2018 was $25,100 ($12,140 + 3 * $4320).

Income of the household is used provided by the IPUMS ASEC survey and then this is compared to the FPL to estimate the eligibility of the household for SNAP.

Trippe et al. (2010) provides data for the years in which the different states relax their eligibility criteria. The various states that did relax their eligibility criteria did so at different points of time, providing a staggered adoption of broad-based categorical eligibility. Figures B2 and B3 show the states that increased the eligibility criteria from 130% of the FPL to a different percentage of the FPL and the year that they did so. The "broad" categorical eligibility represents exactly that. For states that did not increase their eligibility criteria, their status stays as the "narrow" categorical eligibility. For example, Alabama changes its narrow categorical eligibility to broad-based categorical eligibility in the year 2010, while Indiana does not change it to broad-based one. Similarly, Utah stays at the 130% of the FPL, while Wisconsin changes to a broad-based categorical eligibility in the year 2004.

An expansion variable is created using the aforementioned criteria. If a state relaxes the eligibility criteria in a certain year, then this variable takes a value of 1 for that year and all the following years. It is 0 otherwise. Therefore, all the states that do not relax their eligibility criteria have a value of 0 throughout, whereas the states that do have a value of 0 before the periods they relax their eligibility.

Furthermore, the states can be divided into 5 groups. The first group of states expands its eligibility criteria from 130% to 150% of the FPL. The second group expands it from 130% to 160% of the FPL. The third similarly increases it from 130% to 165% of the FPL. The fourth group expands it from 130% to 185% of the FPL. Whereas, the fifth group expands it from 130% to 200% of the FPL.

This classification is useful as it highlights the "intensities" with which the states relax their eligibility criteria. The first group with the criteria changed from 130% to 150% of the FPL can be considered to be the one with the lowest intensity (intensity = 1), while the fifth group that has changed it to 200% of the FPL can be considered to be the one with the highest intensity (intensity = 5).

These groups of states are referred to as state groups. State group 1 includes just 1 state. State group 2 includes 2 states. State group 3 includes 4 states. State group 4 includes 8 states. While state group 5 includes 17 states. The group that does not

change its eligibility criteria throughout the period 1996-2019 includes 9 states - Alabama, Georgia, Idaho, Indiana, Louisiana, Nebraska, Ohio, Oklahoma, South Carolina. This becomes the control group.

1.4 Empirical Method

The baseline model used is a two-way fixed effects difference-in-differences model, exploiting variation in the timing of states expanding the eligibility criteria. The expansion variable takes on a value of 1 for all individuals in the states where the eligibility criteria is relaxed, on and after the years the state relaxes it. Before that year the expansion variable is 0 for all these individuals. For states that do not change their eligibility criteria, the expansion variable takes on a value of 0 for all the time periods.

$$Y_{ist} = \beta_0 + \beta_1 Exp_{ist} + \beta_2 X_{ist} + \gamma_t + \lambda_s + \epsilon_{st}$$

The dependent variable, Y, represents labor force participation for the individual, or the number of hours worked by the individual last week. The variable X includes the control variables including age, education, marital status, gender, race, whether the individual has children under 5, state unemployment rate. γ corresponds to the year fixed effects, while λ corresponds to the state fixed effects. The errors are clustered at the state-level.

However, as highlighted by Sun and Abraham (2021), when the treatment timing varies across units "the coefficient on a given lead or lag can be contaminated by effects from other periods". In order to resolve this issue and to counter the short-comings of the two-way fixed effects, the event study proposed by Sun and Abraham (2021) is implemented.

The event study model adapted from Sun and Abraham (2021) is as follows:

$$Y_{i,t} = \alpha_i + \lambda_t + \sum_{g \in G} \mu_g \mathbf{1}\{t - E_i \in g\} + \nu_{i,t}$$

$Y_{i,t}$ in this equation refers to the main dependent variable for unit i and time t. E_i

is the time that unit i receives a treatment. α_i and λ_t are the unit and time fixed effects respectively. g disjoint sets of relative periods $l \in [-T, T]$ belong to the set G. μ_g represents the relative period coefficients in the regression equation. Although this specification does accommodate units that may not be never-treated, I do have a few states that are never-treated and therefore, serve as the control group.

This event study is followed by some heterogeneity tests in order to look more closely as to which group/s are driving the results. I particularly look at the work requirements condition, the low skill (low education) group of individuals, female-headed households, and SNAP enrollees v/s non-enrollees.

Next, I conduct some robustness tests. One of these is to check for exogeneity of the SNAP eligibility relaxation. To determine that it is not the income of the state driving the fact that the state relaxes the eligibility criteria, I regress expansion on the incomes of the states prior to the year the first few states relaxed their eligibility criteria. Next, I run the same regression but with “intensity" with which the states expanded eligibility as the main dependent variable.

1.5 Results

1.5.1 Main results

1.5.1.1 Full sample

Table A3 shows the results of the baseline difference-in-differences regressions with hours worked and labor force participation as the dependent variable, with the expansion variable as the main independent variable and other controls. Columns 1 and 2 just use the controls and the expansion variable as the main independent variable to estimate how being part of the states that relaxed the eligibility criteria impacts the hours worked (column 1) or labor force participation (column 2).

In this table, it can be observed that the expansion variable is insignificant in determining the impact on the labor force participation and hours worked variables. This

could possibly be because important details are left out when I just use the expansion variable as the main independent variable. The states relaxed their eligibility criteria in a staggered fashion, and also different states used different thresholds. Therefore, relying solely on the estimates from these regressions can be problematic.

To avoid the pitfalls of a simple two-way fixed effects regression in a staggered treatment design, the event study model is used. In this paper I use the event study model proposed by Sun and Abraham (2021).

Figure A4a shows the event study for labor force participation. When the full sample is used, it can be seen that clearly there is an increase in labor force participation at the period when the states relax the eligibility.

The event study for hours worked, conditional on being in the labor force, is shown in figure A4b. Hours worked, on the other hand does not seem to show an increase or decrease, although the period after the eligibility is relaxed, seems to show an upward shift. This, however, is not a significant change. And therefore, labor supply does not change significantly on the intensive margin.

Increased eligibility for SNAP can enhance labor force participation by extending benefits to a newly eligible group, which gains access to a safety net that can support work efforts. This expansion allows individuals to maintain a basic level of economic security while pursuing or re-entering employment. Consequently, the assurance of SNAP benefits can motivate this newly eligible group to join the labor force, reflecting a positive effect on the extensive margin of labor participation.

1.5.2 Heterogeneity Tests

I then proceed to look into what could be the possible groups of individuals, or states that are driving this result. Is it possible that some groups increase their labor force participation so significantly that they bring the average up? Therefore, it is important to look specifically into those groups of individuals who are more likely to be recipients of SNAP. It is also important to break this change down based on the 'intensities' with which the states relaxed their eligibility criteria.

Furthermore, one of the things that could be the possible driver of this change could be the work requirement condition put in place by the administration for the individuals to be eligible for SNAP. According to this, the individuals have to work a certain number of hours to be eligible for SNAP benefits. Could it be that since this condition exists, SNAP beneficiaries are bound to increase participation into the labor force and/or increase the number of hours worked?

Therefore, I separately analyze the group of people who are likely to be excluded from the Able Bodied Adult Without Dependents (ABAWD) work requirements condition and the group that are unlikely to be exempted based on certain characteristics. Exemption from ABAWD work requirement is given if the individual falls under any of the following categories as mentioned on the SNAP work requirements page[6]:

1. the individual has a person under 18 in their household
2. individual is a veteran
3. individual has a disability (mental or physical) that is stopping the person from working
4. individual is pregnant
5. individual is homeless
6. individual is 24 years old or younger and in foster care on the 18th birthday
7. individual is excused from general work requirements (another set of requirements that are not considered here)

Based on the data I had it was not possible to take all these variables into consideration. But I have the data for the first 3 variables, so I am able to chalk the group waived from work requirements based on these restrictions.

I specifically use the following variables from the IPUMS ASEC data: *disabwrk* ("a health problem or a disability which prevents him/her from working or which limits the

[6]Source: https://www.fns.usda.gov/snap/work-requirements

kind or amount of work"), *vetstat* ("dichotomous variable identifying veterans"), and I created a variable to give me all households that has at least one person under 18 years of age within it.

1.5.2.1 Work Requirements

For a group of individuals to fall under this category, it has to fall under any of the categories outlined previously for the ABAWD work requirements. In this case, I am specifically looking at households that are either veterans, have some disability, have an individual under 18 in the household, or a combination of any or all of these. This is how I define the group that is excluded from work requirements.

Figure A5a shows the event study of labor force participation for the group that is potentially excluded from work requirements. It can be seen that labor supply at the extensive margin increases for the group that is excluded from ABAWD work requirements on the period when the specific states relax their eligibility criteria. So, even though this group of individuals was not required to enter the labor force and start working, becoming eligible for SNAP "encouraged" them to join the labor force.

As far as hours worked (labor supply at the intensive margin) is concerned, there is an increase in the hours worked, as can be seen in figure A5b. The year following the one when the states relax their eligibility criteria, the workers increase the number of hours they work. It seems as though becoming eligible for SNAP, gives them the extra push to increase their working hours.

For the group that is not excluded from work requirements, I include all the people in the sample who do not have a veteran status, report a disability, and no individual within the household who is under 18 years of age. This group is the one that is potentially supposed to fulfill the work requirements.

Figures A6a and A6b are the ones showing event study results for the group that is not excluded from work requirements. It can be seen that the expansion by the states does not impact the labor supply on the extensive nor the intensive margin for this group.

1.5.2.2 Low skill (low education)

I then look at how groups of people with certain characteristics, more likely to be recipients of SNAP, are driving the results. I start with the group of individuals with a low education level (referred to here as the low-skill group). This is because based on my sample, around 72% of the SNAP recipients have education of 12 years or less. Therefore, it is important to look into the group that is highly likely of being a SNAP recipient. This is the group of individuals with an education up to high school.

Figures A7a and A7b show the event studies for these groups. Although there seems to be an increase in Labor force participation at the time when the states relax their eligibility criteria, the increase does not seem to be significant. However, there seems to be an increase in the hours worked by the individuals with a high school education or less.

1.5.2.3 Female headed households

Next, I look at households headed by females. These are households that are more likely to include individuals who are SNAP recipients. Based on my sample, around 61% of the SNAP recipients are females; also compared to men and all other individuals in a household, female heads make the largest chunk of SNAP recipients.

As can be seen from figure A8a, there is an increase in labor force participation for females who head households. However, there is no change in hours worked for this group, as can be seen in figure A8b.

1.5.2.4 Enrolled v/s unenrolled

Next I look at the groups that either stated that they received SNAP (referred to here as enrolled) or stated that they did not receive SNAP (referred to here as unenrolled). A9a and A9b show the LFP and hours worked for the group that enrolled in SNAP while A10a and A10b show the corresponding LFP and hours worked for the group not enrolled. It can be seen that the hours worked for the group enrolled in SNAP experienced an increase after the relaxation in SNAP eligibility, whereas the LFP and hours worked

did not experience a change for those who were not enrolled.

1.5.2.5 Triple Difference (DDD) based on the 'intensity' with which states relax their eligibility criteria

The Difference-in-difference regressions in the main results miss an important detail; the intensity with which the states relax their eligibility criteria. This could play an important role in providing a better picture regarding whether higher relaxations impact working hours and labor force participation strongly or not. Therefore, I look at the triple difference next. This Difference-in-difference-in-difference (DDD) regression includes the interaction of the expansion variable with the treated group variable for the states that did expand the eligibility criteria versus those that did not. So, this is a comparison between individuals who belong to the treated income group within the states that were treated versus those in the states that were never treated.

$$Y_{ist} = \beta_0 + \beta_1 Exp_{ist} + \beta_2 Exp_{ist} * TG_n + \beta_3 TG_n + \beta_4 X_{ist} + \gamma_t + \lambda_s + \epsilon_{st}$$

where $n \in \{1, 2, 3, 4, 5\}$.

This gives 5 different regression equations corresponding to 5 different "treated" state groups while the control group is always the states that are never treated. State group 1 corresponds to states that increased the FPL from 130% to 150%, state group 2 to those that increased it to 160%, state group 3 that increased it to 165%, state group 4 that increased it to 185%, and finally state group 5 that increased it to 200%. Correspondingly, treated group 1 (TG 1) includes individuals whose income is between 130% and 150%. Therefore, the treated groups are the individuals who have become newly eligible for the SNAP benefits because of the relaxation in income eligibility for the states they reside in. Similarly, TG 2 represents individuals whose income is between 130% and 160%. And so on.

The results for the triple difference-in-difference with the interaction of expansion variable labor with force participation are presented in table A5. The main variables of interests in these regressions are the interactions between the treated groups and the

expansion variable. The coefficient of all of the interactions apart from that of treatment group 2 are positive and significant. This indicates that the individuals within the income range of the newly eligible category are likely to increase their labor force participation in the states that relax their eligibility criteria.

Table A6 shows the results for the triple difference in difference with hours worked. The main variable of interest here, again, is the interaction of the expansion variable with the treated group. Here, the results only hold for treated group 1 and treated group 3. Therefore, only for state groups that relaxed their eligibility criteria from 130-150% of the FPL or from 130-165% of FPL, do I find that individuals with incomes within this range in the respective states, increase the number of hours worked. For the other state groups, the results are insignificant.

1.5.3 Robustness Tests

This first robustness test is done to estimate whether the real gross state product of the states is determining whether the states relax their eligibility criteria in the future. It is a simple regression where the real state income is the main independent variable and the dependent variable (expansion) is 1 if the states relax their eligibility criteria sometime in the future and 0 otherwise. There are 51 observations in this regression. The state incomes considered in this data are the ones right before the first group of states relax their eligibility criteria in the year 2001; therefore, state incomes for the year 2000 are considered. The expansion variable takes on a value of 1 if the states relax their eligibility criteria sometime in the future (41 states) and a value of 0 if they do not relax it till the last year of this dataset - 2019 (10 states).

I find that the log of real income does not have a significant impact on whether the states relax their eligibility criteria in the future. The coefficient for log of real GSP is insignificant and therefore does not significantly determine changes in the expansion variable.

Next, I look at whether the income of the states has an impact on the intensity with which the states relax their eligibility criteria. For this, I regress the intensity on the log

of real income of the states. The log of real gross state product has already been defined. The intensity variable takes on a value of 1 if the states relax their eligibility criteria to 150%, 2 if they do it to 160%, 3 if they do it to 165%, 4 if they do it to 185%, and 5 if they do it to 200%. The idea is to measure whether higher state incomes lead to the states expanding their eligibility criteria by a greater percentage.

Again, I find that the real income has no significant impact on the intensity variable. The coefficient for the real income is insignificant and therefore does not seem to be vital in determining whether the states expand their eligibility criteria by a greater percentage.

The results for both of these regressions are provided in table A4.

1.6 Conclusion

It is interesting to observe that despite putting in place conditions requiring the SNAP participants to work, there is some increase in labor supply even for the group that is excluded from work requirements.

I find that when individuals become potentially eligible for SNAP, they increase participation into the labor force and hours worked. Normally, it would be expected that once they have some sort of "security" in the form of SNAP, this would motivate them to reduce their working hours. But this is not the case. This could be because of various reasons, such as improved health leading to increase in work hours, more income available to spend on things individuals like to spend on - increasing the motivation to work, and so on.

What are some of the possible explanations for this is something that can be a future avenue of research. Could it be that becoming eligible for SNAP gives the individuals the incentive to buy only healthy products (fruits, vegetables, dairy products, meat, etc) as this is what they can use their SNAP benefits for, improving their mental and physical health and motivating them to do more work?

Also, could it be that the satisfaction the individuals derive from goods beyond their basic needs (such as food) is much more than the benefit from food? Thus, once food

is taken care of (through SNAP) they are more likely to increase their work hours so that they can purchase more of the goods that are giving them a higher utility. Thus, we could say that the marginal utility for the goods that consumers can purchase now is higher than the marginal cost, incentivizing them to purchase more of those goods (by increasing their working hours).

These are some of the ways in which becoming eligible for SNAP could instead be driving the recipients to increase their labor supply and also provide avenues for further research and investigation.

Chapter 2

The SNAP Paradox: Does Food Assistance Encourage Teen Childbearing?

2.1 Introduction

The teenage years represent a pivotal period for human capital accumulation, and decisions made during this timeparticularly regarding fertilitycan profoundly shape the life trajectories of young mothers. Notably, teenage childbearing accounts for a significant proportion of single parenthood in the U.S., which is often associated with a higher incidence of poverty and welfare dependency (Doepke et al. (2023)). Furthermore, teenage motherhood brings socioeconomic disadvantages not only for young mothers (Chevalier et al. (2003)) but also for their children (Francesconi (2008)). Research consistently shows that teenage motherhood has profound short-term and long-term negative impacts on human capital investments, marital prospects, and labor market outcomes (Klepinger et al. (1999); Ashcraft and Lang (2006); Ermisch and Pevalin (2005)). In the short term, for instance, these consequences include lower school attendance and reduced educational attainment (Azevedo et al. (2012); Berthelon and Kruger (2014)). In the long term, being a mother at a young age is associated with decreased work hours, diminished household in-

come, and a higher likelihood of marriage or divorce (Arceo-Gomez and Campos-Vazquez (2014)). Children born to teenage mothers frequently experience limited parental investment and resources, which contributes to increased risks of poverty, poor health, lower educational attainment, higher rates of abuse and neglect, and an elevated likelihood of becoming teenage parents themselves (Korenman et al. (1995); McLanahan and Sandefur (1995); Hillis et al. (2004)).

Over the past several decades, many developed countries have observed a significant decline in the number of teenage births, along with a decline in total birth rates; however, the proportion of teenage motherhood among total births remains high, especially among relatively vulnerable populations (Bellido et al. (2016)). For example, the teenage pregnancy rate in the U.S. has continued to decline, but it varies substantially by race and ethnicity (Figure B1; Centers for Disease Control and Prevention (2023)). This decline has been widely examined, with key factors attributed to expanded access to family planning services, shifts in economic conditions, and reductions in welfare benefits (Kearney and Levine (2015a)).

This paper focuses on the role of the Supplemental Nutrition Assistance Program (SNAP)the largest food and nutrition assistance program in the U.S.in influencing teenage birth rates. Access to safety net programs like food assistance could, on one hand, reduce financial barriers to child-rearing, potentially increasing birth rates among young mothers. On the other hand, by alleviating economic hardship and supporting educational and career development, such benefits may encourage teenagers to delay parenthood. This nuanced relationship between SNAP and teenage motherhood highlights the need for further empirical research to understand these dynamics.

We employ a two-stage least squares (2SLS) approach to address potential endogeneity concerns in examining the effects of access to SNAP benefits on teenage birth rates. Specifically, we leverage state-by-year variations in SNAP eligibility criteria and simulated welfare spending (Schmidt et al. (2024)) to isolate the causal effects of SNAP on teenage birth rates. Our analysis draws on data from the Current Population Survey (CPS) and focuses on economically disadvantaged groups most affected by SNAP policies to provide

insights into how welfare benefits affect teenage motherhood and may influence outcomes differentially across group with various demographic backgrounds.

Our results demonstrate a consistent positive relationship between SNAP benefits and teenage births across various model specifications. The 2SLS estimates indicate that a 1% increase in SNAP benefits is associated with a 0.29 percentage point rise in the likelihood of teenage births, suggesting that SNAP may inadvertently lower financial barriers to early childbearing. Additionally, we find heterogeneous effects of SNAP on teenage births across racial and ethnic groups. While there is no significant impact on birth rates among Black teenagers, SNAP benefits are associated with higher rates of teenage births among Hispanic teenagers and lower rates among White teenagers, particularly from 2011 to 2019. There are also differential effects across regions, where the increased influence of SNAP in the Western region during this time may be attributed to slower economic recovery and heightened reliance on the program.

We further examine two potential mechanisms that may explain the observed relationship between SNAP benefits and teenage birth rates. Our findings indicate that SNAP affects family formation decisions, correlating with higher rates of divorce and separation, as well as lower marriage rates. Moreover, SNAP is associated with decreased labor force participation and elevated unemployment. These results underscore the complex interplay between economic support and reproductive behavior, suggesting that while SNAP is crucial for assisting low-income families, it may also yield unintended consequences concerning teenage pregnancy. This highlights the necessity for targeted interventions that consider both the economic advantages of assistance programs and their potential impacts on fertility decisions.

In examining the determinants of teenage and premarital motherhood, the literature highlights the controversial impact of government programs on the prevalence of this issue. The empirical evidence regarding the effects of welfare benefits on teenage childbearing is mixed. Several studies suggest that welfare benefits and tax provisions significantly increase the rates of teenage births and single motherhood (Aassve (2003); Blackburn (2000); Guner and Knowles (2009); Lundberg and Plotnick (1995); R. A. Moffitt (1997);

R. A. Moffitt (1998); Whittington et al. (1990a)). However, other studies find little to no evidence linking welfare benefits to higher rates of teenage or single motherhood (Averett et al. (2000); Blau et al. (2004); Duncan and Hoffman (1990); Grogger and Bronars (2001); Hoffman and Foster (2000); Rosenzweig (1999)), with some indicating that impacts may vary across racial or ethnic groups (Baughman and Dickert-Conlin (2003)). This divergence in findings underscores the need for further investigation into the nuances of these relationships. It also suggests that while economic incentives from welfare policies are significant, they may not fully account for the observed trends in teenage motherhood. Other policies have also been identified as contributing to teenage motherhood. For example, changes in abortion laws (Donohue et al. (2009)), reforms in compulsory schooling legislation (Black et al. (2008)), child support enforcement (Plotnick et al. (2007)), youth training programs (Novella and Ripani (2016)), and family planning policies (Acs (1996); An et al. (1993); Blank (1995); Kearney and Levine (2015a)) have been examined for their potential influence on teenage pregnancies.

In addition to policy impacts, family and socioeconomic characteristics are important determinants of teenage birth rates. Key factors such as family structure (Cooksey (1990)), parental education levels (An et al. (1993); Cooksey (1990)), maternal employment (Lopoo (2004)), family income (Aassve (2003); South (1999)), and neighborhood socioeconomic disadvantages (South (1999)) significantly influence the likelihood of teenage pregnancies. Parental expectations (Rascon-Ramirez (2014)), adolescents attitudes toward pregnancy (Kearney and Levine (2015b)), and expectations regarding marriage and cohabitation (Wolfe et al. (2007)) also play a significant role in shaping decisions about early motherhood. Furthermore, cultural factors and intergenerational influences contribute to teenage fertility behavior (Bellido et al. (2016)). Together, these elements highlight the intricate interplay between individual choices, family dynamics, and societal factors in shaping adolescents' reproductive decisions.

This paper contributes to the existing literature by enhancing our understanding of how SNAP may influence young womens reproductive choicesan area not specifically addressed by previous studies in relation to teenage childbearing. Most research on

the effects of welfare benefits has primarily focused on Aid to Families with Dependent Children (AFDC) and the Earned Income Tax Credit (EITC) in relation to teenage or premarital motherhood. Understanding the extent to which SNAP as a safety net influences fertility decisions among teenagers is essential, as these choices have lasting effects on young mothers' economic prospects and shape the family environments in which their children are raised. Our findings raise important considerations for welfare policy design and its potential unintended effects on teenage childbearing. Although SNAP offers essential support to low-income families, it may also unintentionally encourage higher rates of early motherhood.

2.2 Data

Our primary data source is the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC), accessed through the Integrated Public Use Microdata Series (IPUMS) (Flood et al. (2023)), covering the years 2001 to 2019. This dataset offers a comprehensive array of individual and household-level characteristics, as well as detailed information on SNAP participation and benefits. Additionally, state-level data, such as unemployment rates, are obtained from the National Welfare Data (Center for Poverty Research, University of Kentucky (2024)).

The main outcome variable is a binary variable called "teen birth" which takes on a value of 1 if the individual had her first child when she was a teenager (between the age of 15 and 19, inclusive).

The two Instrumental Variables (IVs) that are used to address the problem of endogeneity are "cash & food" and "log (eligibility criteria)". The variable "cash & food" is extracted from Schmidt et al. (2024). State safety net database uses federal and state program rules in order to simulate welfare spending for a constant sample across years and states. It is assumed that this constant sample of families claimed the entire benefit amount that they were eligible for. The simulated sample includes non-disabled, non-immigrant, single-parent families. Benefit amounts are averaged across state and year

and reported as an index in thousands of 2022 dollars.

"Log (eligibility criteria)" is created using the Broad-Based Categorical Eligibility (BBCE) that gave the states leeway to expand SNAP eligibility beyond the 130% of the Federal Poverty Level (FPL). Previously, households with income below 130% of the FPL were eligible to receive SNAP. The BBCE criteria gave states the flexibility to increase SNAP eligibility from 130% of the FPL all the way to 200% of the FPL. Figures B2 and B3 show the years when different states relaxed their eligibility criteria from "none"/"narrow" to "broad" (BBCE). This is a staggered adoption where different states adopted the broad-based categorical eligibility at different periods of time. Table B1 on the other hand highlights the extent to which different states relaxed their eligibility criteria. We use this information to generate "log (eligibility criteria)". As an example, Arizona expanded its eligibility criteria to 185% from 2007 onwards. Therefore, the eligibility criteria for Arizona for the years 2007 and beyond would be the FPL times 1.85. All the households with an income below this level would be eligible for SNAP in the year 2007 and after. We then generate the logarithm of that eligibility criteria and use that as an IV for "log (SNAP Value)."

2.3 Empirical Approach

The baseline econometric model is a linear probability model (LPM) with both state and year fixed effects. The dependent variable, *Teen Birth*, is a binary variable indicating whether a high school dropout female-head had a birth between the ages of 15 and 19. The key independent variable of interest is the logarithm of the value of SNAP benefits - *log(SNAP Value)*, which measures the household's SNAP assistance. The model is specified as follows:

$$\text{Teen Birth}_{ist} = \beta_1 \log(\text{SNAP Value}_{ist}) + \beta_2 \text{Married}_{ist} + \beta_3 \text{Black}_{ist} + \mathbf{X}'_{ist}\gamma + \delta_s + \lambda_t + \epsilon_{ist} \tag{2.1}$$

Where:

- Teen Birth$_{ist}$ is a binary indicator for whether woman i in state s at time t had a teen birth.
- log(SNAP Value$_{ist}$) is the log of the value of SNAP benefits received by woman i.
- Married$_{ist}$ is a dummy variable indicating whether the woman is married.
- Black$_{ist}$ is a dummy variable indicating whether the woman is black.
- $\mathbf{X}'_{ist}$ is a vector of control variables including occupation categories, household income, family size, and other socioeconomic characteristics.
- δ_s are state fixed effects, which control for time-invariant characteristics specific to each state.
- λ_t are year fixed effects, which account for common shocks or trends over time.
- ϵ_{ist} is the error term.

In this specification, state fixed effects (δ_s) control for unobserved heterogeneity between states, while year fixed effects (λ_t) account for time-specific factors that could influence teen birth rates across the entire sample. The coefficients of interest, particularly β_1, capture the effect of SNAP benefits on the probability of a teen birth, while other coefficients such as β_2 and β_3 capture the effects of marital status and race, respectively.

This model seeks to quantify the relationship between the value of SNAP benefits and the likelihood of a teen birth among high school dropout female-heads. The use of both state and year fixed effects ensures that the analysis accounts for differences across states that are constant over time, as well as macroeconomic or policy shifts that affect all states in a given year. By including a comprehensive set of control variables ($\mathbf{X}'_{ist}$), the model controls for factors such as occupation, household income, and family size, isolating the impact of SNAP benefits on teen birth outcomes. Given that the dependent variable is binary, this linear probability model provides an interpretable estimate of the marginal effect of each independent variable on the likelihood of a teen birth.

2.4 Results

2.4.1 Descriptive Statistics

Table B2 presents results of the summary statistics for SNAP and Non-SNAP recipients. The summary statistics provide insights into the relationship between SNAP benefits and various socio-economic characteristics, with a focus on teenage pregnancy. The sample is divided into SNAP recipients and non-recipients, and the differences between the two groups are statistically significant at the 1% level for all variables.

The mean incidence of teenage births is higher among SNAP recipients (0.328) compared to non-recipients (0.212), with a statistically significant difference of 0.116. This suggests a potential correlation between SNAP receipt and higher rates of teenage births, which may indicate that households receiving SNAP benefits are associated with higher levels of socio-economic disadvantage, potentially contributing to higher rates of teenage pregnancy.

The average value of SNAP benefits is substantial among recipients (a family within a household), with a mean value of $3,494.45, whereas non-recipients report zero SNAP benefits. This large difference confirms the significant gap in benefit receipt between the two groups, as expected.

SNAP recipients are less likely to be married (0.33) compared to non-recipients (0.557), indicating a statistically significant difference of -0.227. This may reflect economic need among single-parent households that are more likely to rely on SNAP assistance. A higher proportion of SNAP recipients identify as Black (0.155) compared to non-recipients (0.088), with a significant difference of 0.067. This may indicate racial disparities in the receipt of SNAP benefits. The average family size is larger for SNAP recipients (4.257) compared to non-recipients (4.019), with a difference of 0.238. This suggests that larger families are more likely to qualify for and receive SNAP benefits.

SNAP recipients have a lower average log household income (9.572) compared to non-recipients (10.409), with a significant gap of -0.837. This aligns with the expectation

that SNAP recipients are from lower-income households. There is a slight but significant difference in income inequality measures between SNAP recipients and non-recipients (0.020), indicating a modestly higher level of inequality in states with higher SNAP participation. The labor force participation (LFP) rate is slightly lower among SNAP recipients (0.509) compared to non-recipients (0.535), with a difference of -0.026. This could reflect higher unemployment or underemployment rates among SNAP households.

The EITC participation rate is higher among SNAP recipients (0.103) than non-recipients (0.092), with a significant difference of 0.011, suggesting a possible interaction between EITC eligibility and SNAP participation. The poverty rate is higher among SNAP recipients (13.727%) compared to non-recipients (13.266%), showing a difference of 0.461 percentage points. This further underscores the economic need of SNAP households. The average state minimum wage is slightly higher for SNAP recipients, with a significant difference of 0.128. The unemployment rate is marginally higher among SNAP recipients (6.201%) than non-recipients (6.016%), indicating a difference of 0.185 percentage points, which may contribute to higher SNAP receipt. There is a slight difference in MSA residence status between the groups, suggesting some variation in urban and rural SNAP participation.

Overall, the summary statistics suggest that SNAP recipients exhibit characteristics associated with lower socio-economic status, such as higher teen birth rates, lower household income, larger family sizes, and higher poverty and unemployment rates. These factors likely contribute to the increased reliance on SNAP benefits among this group. The significant differences across all variables highlight the importance of considering these characteristics when analyzing the impact of SNAP benefits on teenage pregnancy outcomes.

Table B3 on the other hand provides a breakdown of various socio-economic and demographic characteristics according to race, offering insights into potential disparities and patterns across different racial groups. The mean value for teenage births is highest among black individuals (0.290), indicating that, on average, 29 out of 100 observations report a teenage birth. Hispanic and White groups show similar levels (0.240 and 0.250,

respectively), while the rate is considerably lower among Asians (0.090). This suggests significant racial differences in teenage birth rates, with black individuals experiencing a higher incidence. The average SNAP benefit is highest for black individuals ($1,586.58), followed by Hispanics ($979.78), whites ($971.29), and Asians ($796.13). The higher mean benefit among black households may reflect greater economic need or lower average household income compared to other groups, while Asians tend to receive lower SNAP benefits on average.

The proportion of married individuals is lowest among black individuals (0.230), compared to higher rates among whites (0.530), Hispanics (0.560), and Asians (0.600). The lower marriage rate among black households could be linked to higher economic challenges or different family structures, potentially affecting SNAP eligibility and teenage birth rates.

Hispanic households have the largest average family size (4.320), followed by white (4.150) and Asian (4.150) households, while black households have the smallest average family size (3.700). Larger family sizes among Hispanic households could contribute to higher SNAP eligibility due to greater economic needs. Asians have the highest mean log household income (10.500), followed by whites (10.190) and Hispanics (10.180), with Black households having the lowest average income (9.840). This income disparity aligns with the observed differences in SNAP benefit amounts and may partially explain the variation in teenage birth rates across racial groups. Labor force participation is relatively consistent across groups, with rates ranging from 0.510 for Asians to 0.550 for Black individuals.

Black and Asian households show higher mean EITC participation (0.140 and 0.130, respectively) compared to whites and Hispanics (0.090 each). This suggests that black and Asian households are more likely to qualify for EITC benefits, potentially reflecting differences in income levels and family structures. Poverty rates are fairly similar for white (13.440), black (13.620), and Hispanic (13.650) households, with Asians having a slightly lower mean poverty rate (12.510). These figures suggest that poverty is relatively consistent across racial groups. The average state minimum wage is highest for Asian

households ($7.580), followed by Hispanics ($7.160), Whites ($6.960), and Black households ($6.520). The variation in state minimum wages reflects geographic differences in where these populations are concentrated and the prevailing labor market conditions.

The mean unemployment rate is similar across racial groups, ranging from 5.960 for black and Asian individuals to 6.250 for Hispanics. This consistency suggests that unemployment levels do not vary substantially by race in this sample. Asians have the highest average MSA residence (0.480), indicating greater urban concentration, followed by black (0.440) and Hispanic (0.440) households. Whites have a lower mean MSA value (0.350), suggesting a more uneven distribution between urban and rural areas.

Overall, the table reveals notable differences across racial groups in terms of socio-economic characteristics, SNAP benefit amounts, and teenage birth rates. Black households show higher average SNAP benefits and teenage birth rates but lower income and marriage rates, indicating greater economic challenges. Asian households, while having the highest average income and lowest teenage birth rate, tend to receive lower SNAP benefits. These disparities underscore the importance of considering race when analyzing the impact of SNAP benefits and related socio-economic outcomes.

The summary statistics by region, shown in Table B4 reveal notable differences. Higher rates are observed in the Midwest (0.270) and South (0.270), while the West (0.220) and Northeast (0.230) show lower rates. The Midwest has the highest average SNAP benefits ($1,310.90), while the West has the lowest ($875.09). Marriage is more common in the West (0.560), with lower rates in the Northeast (0.410). The South has the highest poverty rate (14.920) and the lowest average state minimum wage ($6.360), while the West has the highest minimum wage ($7.610). Log household income varies slightly, with the West having the highest average (10.260). The Northeast has the highest urban concentration (0.470), while the South has the lowest (0.280). These regional disparities suggest differing economic conditions and demographic patterns across the U.S.

2.4.2 Effects of SNAP on Teenage Births

Table B5 presents OLS regression results with "Teen Birth" as the dependent variable, examining the impact of SNAP benefits (log-transformed) and other socio-economic variables on the likelihood of teenage births. The main independent variable of interest is Log (SNAP), with the addition of controls and fixed effects across six models to assess the robustness of the association.

Across all specifications, the coefficient on Log (SNAP) is positive and statistically significant, indicating that an increase in SNAP benefits is associated with a higher likelihood of teenage birth. In the baseline model (1), a 1% increase in SNAP benefits corresponds to a 0.059-point increase in the probability of teenage birth. This effect size decreases to 0.018 in models (3) through (6) after additional controls are included, but remains significant at the 1% level, suggesting that the association between SNAP benefits and teenage birth outcomes is robust.

The coefficient for marital status becomes significant and negative starting in model (3), indicating that being married reduces the likelihood of teenage birth by approximately 6 percentage points. This result remains consistent across models, highlighting the protective effect of marriage on teenage birth rates.

The positive and statistically significant coefficient on the black variable (0.0630.065) suggests a higher likelihood of teenage birth among black individuals compared to other racial groups, a disparity that persists even after controlling for additional socio-economic factors. Larger family size is significantly associated with a higher probability of teenage birth, with a stable coefficient of 0.061 across models, implying that each additional family member correlates with a 6.1 percentage point increase in teenage birth likelihood. This could indicate increased socio-economic pressures within larger families, potentially influencing teenage birth outcomes.

The negative coefficient for household income (-0.031) indicates that higher household income is associated with a lower probability of teenage birth. This inverse relationship underscores the importance of economic stability in reducing teenage pregnancies.

Variables like labor force participation (LFP), poverty rate, state minimum wage, unemployment, EITC, and income inequality are not consistently statistically significant, suggesting limited independent effects on teenage birth probability after controlling for other factors. However, model (6) includes MSA fixed effects, which slightly increases the models explanatory power (R-squared of 0.079).

While the models account for several important covariates and fixed effects, endogeneity may still be an issue in these OLS regressions. Endogeneity could arise if there are unobserved factors that simultaneously influence both SNAP benefit levels and teenage birth likelihood. For example, teenage births could lead to higher SNAP eligibility and benefit levels due to increased economic need in households with teen parents, potentially reversing the observed relationship. Unobserved characteristics, such as parental education or community-level support systems, may influence both SNAP participation and teenage birth rates, biasing the OLS estimates. And, SNAP benefits are self-reported or inferred and may not accurately reflect the actual economic assistance received, leading to attenuation bias in the estimated coefficients.

Addressing these endogeneity concerns is crucial for accurately estimating the causal impact of SNAP benefits on teenage births. Alternative approaches, such as instrumental variable (IV) techniques or longitudinal data methods, could help mitigate these issues by isolating exogenous variation in SNAP benefits. Next, we explore the use of instrumental variables in addressing the aforementioned issues.

Table B6 presents instrumental variable (IV) regression results for the impact of SNAP benefits on teenage births, using Log (SNAP) as the endogenous independent variable and teen birth as the dependent variable. The first-stage regressions, shown in the appendix table, use two instruments: Log (Eligibility Criteria) and Cash + Food Assistance (C.&F. Assistance) by states.

The main IV results show the impact of SNAP on teen births. Across all specifications, the coefficient on Log (SNAP) remains consistently positive and statistically significant at the 0.1% level, with a substantial effect size of around 0.290. This suggests that, when accounting for endogeneity through IV, a 1% increase in SNAP benefits correlates

with an approximately 0.29 percentage point increase in the probability of teenage birth. Compared to the OLS estimates, which showed smaller coefficients, the IV results indicate a stronger association between SNAP benefits and teenage births, suggesting that the OLS results may have been downwardly biased due to omitted variable bias or reverse causality.

The coefficient for married is negative and statistically significant in models (3) through (6), with an effect size of approximately -0.039. This indicates that being married is associated with a 3.9 percentage point reduction in the likelihood of teenage birth, consistent with the protective effect of marriage seen in the OLS results, though with a slightly reduced magnitude. The positive and significant coefficient on Log Household Income (0.040) contrasts with the OLS results, where income was negatively associated with teenage births. This positive association in the IV specification might suggest that incomes impact is more nuanced or that IV corrects for confounding variables, aligning income with other socio-economic dynamics influencing teenage births.

Similar to the OLS results, most other economic variables, such as labor force participation, poverty rate, and state minimum wage, remain insignificant. This lack of significance suggests that, once SNAP benefits and other primary controls are included, these economic conditions do not independently predict teenage birth likelihood.

In Table B7 we report the first-stage regression results. The main independent variables are two key instruments used in Table B6: (i) Log (eligibility criteria) and (ii) cash + food assistance. Log (eligibility criteria) instrument captures the log of state-specific SNAP eligibility criteria as a function of the Federal Poverty Level (FPL), which varies by state and over time as states adjust their eligibility thresholds. The coefficient on Log (Eligibility Criteria) is consistently positive and highly significant (coefficients around 1.035 to 1.281, $p < 0.001$). This indicates that more relaxed eligibility criteria (higher thresholds as a percentage of the FPL) are associated with increased SNAP benefits. The staggered nature of these changes allows the instrument to capture exogenous variation in SNAP access based on policy shifts, rather than individual characteristics.

The other instrument, Cash & Food Assistance, reflects state-level simulated cash and

food expenditures for single mothers. It is also positive and significant, with coefficients around 0.263 to 0.476 ($p < 0.001$), suggesting that states with higher expenditures on single mothers see higher SNAP benefit levels. This variation, based on state safety net policies, is exogenous to individual decisions, strengthening its validity as an instrument.

The use of these IVs addresses potential endogeneity issues from the OLS regressions. By using state policy variables that are unlikely to be affected by individual teenage birth outcomes (e.g., state-level eligibility criteria and expenditure simulations), the IV approach mitigates reverse causality. SNAP benefits are thus treated as exogenously determined by policy variations, not by individual household characteristics. State-specific variations in eligibility criteria and cash/food expenditures are less likely to correlate with unobserved characteristics, such as parental education or local socio-economic factors, that could otherwise bias OLS estimates. This approach strengthens the causal interpretation of SNAP benefits on teenage births by isolating variation in SNAP benefits that is unrelated to unobserved family-level confounders.

Next, we regress Log (SNAP) - the main independent variable - on Cash & Food Assistance and log (eligibility criteria) - the primary instruments, along with additional covariates (e.g., marital status, race, employment status, household income, family size, etc.) and state fixed effects. This is equivalent to estimating the portion of log (SNAP) that is explained by policy-driven factors (the instruments) and other socio-economic controls. We then generate the predicted values of log (SNAP) based solely on the exogenous variation provided by the instruments and the controls. This predicted value captures the part of log (SNAP) driven by exogenous, policy-based factors rather than by individual characteristics correlated with the outcome (teen birth).

Table B8 presents results from the logit regression model using the predicted value just described - Predicted Log (SNAP). The dependent variable, teen birth, is binary, and the coefficients are interpreted as marginal effects, capturing the probability of teenage birth.

The coefficient on Predicted Log (SNAP) is consistently positive and highly statistically significant across all models, suggesting that an increase in SNAP benefits, as

predicted by the IV model, is associated with a higher probability of teenage birth. In the base model (1), a 1% increase in the predicted SNAP benefits leads to a 0.280 percentage point increase in the likelihood of teenage birth, decreasing to approximately 0.1130.146 in models (3) through (6), where additional controls are introduced. This marginal effect size is generally smaller than the effects seen in the OLS and IV models, reflecting the non-linear relationship captured by the logit model.

Similar to the OLS and IV results, marital status remains negatively associated with the probability of teenage birth, while family size and log (household income) show statistically significant positive and negative effects, respectively, across models. These relationships are consistent across methodologies, underscoring the robustness of marital status, family size, and income as factors influencing teenage births.

Labor Force Participation (LFP) is statistically significant in models (4) and (6), with a positive marginal effect, implying that higher labor force participation slightly increases the likelihood of teenage birth. Other economic indicators, such as the state minimum wage and unemployment rate, show weaker or insignificant effects.

Unlike the OLS and IV regressions, which treat teen birth as a continuous outcome, this logit model appropriately accounts for the binary nature of teen birth. The logit model, through non-linear estimation, provides marginal effects that directly measure changes in the probability of teenage birth, rather than assuming a linear increase across the entire probability range (which can be problematic with binary outcomes). Here, the marginal effects capture the changes in the probability of teenage birth for small changes in SNAP benefits as predicted by the instruments, better reflecting real-world probabilities.

Since our depedent variable is a binary variable, in addition to the OLS and IV results we also use a logit model and report the results in Table B8. In this logit model we use the Predicted Log (SNAP) as the main independent variable because then the logit model results are conceptually comparable to an IV approach. The predicted values of Log (SNAP) are derived from the first-stage regression, where exogenous variables (eligibility criteria and cash + food assistance expenditures) instrument SNAP benefits, isolating

variation in SNAP benefits that is driven by policy changes rather than by individual characteristics. This approach helps address endogeneity by removing biases from factors like reverse causality or omitted variable bias, effectively using predicted SNAP values as a clean source of variation in SNAP benefits.

In line with the OLS and 2SLS results, our findings indicate a positive association between increased SNAP assistance and teen pregnancy rates among high-school dropout women. The coefficients for predicted log(SNAP), presented in columns 3-6, range from 0.113 to 0.146, suggesting that a 1% increase in SNAP assistance is associated with an increase in the probability of teen birth rates by approximately 0.113 to 0.146. These coefficients are statistically significant at the 1% level and are roughly half the magnitude of the 2SLS estimates.

To compare the OLS results in Table B5, we also present results from a logit regression without instrumental variables (IV) in Table B9, where teen birth is the binary dependent variable, and Log (SNAP) is the main independent variable. Here, Log (SNAP) is used directly in the regression without addressing potential endogeneity concerns. All coefficients are presented as marginal effects, reflecting changes in the probability of teenage birth associated with a small change in each predictor.

The coefficient on Log (SNAP) is consistently positive and statistically significant across all models, with marginal effects around 0.020 in models (3) through (6). This suggests that a 1% increase in SNAP benefits is associated with a 0.02 percentage point increase in the likelihood of teenage birth. The strong statistical significance across models points to a stable, positive association between SNAP benefits and teenage birth.

The coefficient for "married" is negative and statistically significant in models (3) through (6), with marginal effects around -0.056. This implies that marriage is associated with a 5.6 percentage point reduction in the probability of teenage birth, consistent with the idea that marriage can reduce the likelihood of teenage pregnancies. The positive and significant coefficient for black (around 0.058) indicates a higher probability of teenage birth among black individuals compared to the reference group, suggesting a persistent racial disparity in teen birth outcomes.

Larger family sizes are positively associated with teenage births, with each additional family member increasing the probability by approximately 5.8 percentage points. The negative coefficient for household income (-0.030) implies that higher income is associated with a lower probability of teenage birth, reinforcing the importance of economic resources in reducing teenage pregnancy risks. Most economic and policy variables, such as labor force participation, poverty rate, and state minimum wage, are not statistically significant in these models, suggesting limited direct influence on teenage birth probability after accounting for other covariates.

2.4.3 Heterogeneous Effects

2.4.3.1 Heterogeneous Impacts by Race

Table B10 presents the interaction effects of Predicted Log (SNAP) with different racial groups (White, Black, Hispanic, and Asian) on the likelihood of teenage birth. The main coefficients of interest are those for the interaction terms between Predicted Log (SNAP) and each race, which help to determine whether the impact of SNAP benefits on teenage birth varies by race.

The coefficient for the interaction of white race with predicted log (SNAP) (0.056, $p < 0.01$) is positive and statistically significant, indicating that for white individuals, an increase in predicted SNAP benefits is associated with a higher probability of teenage birth. The significant negative main effect of white (-0.423) suggests that, on average, white women are less likely to have a teenage birth, but the positive interaction with SNAP indicates that the increase in SNAP benefits attenuates this effect.

Similarly, the interaction for Hispanics (0.042, $p < 0.01$) is positive and significant, indicating that SNAP benefits have a notable association with teenage birth probability for Hispanic individuals. The main effect of Hispanic (-0.326) suggests a lower likelihood of teenage birth on average, with SNAP benefits somewhat increasing this likelihood.

The interaction for Asians is also positive and statistically significant (0.005, $p < 0.001$), albeit with a small effect size. This suggests that SNAP benefits have a slight positive association with teenage birth probability among Asians, despite their overall

lower likelihood of teenage birth (-0.034).

The interaction coefficient for black individuals (-0.003) is statistically insignificant, contrasting with previous regressions where black individuals showed a positive association between SNAP benefits and teenage birth probability. The lack of statistical significance for the black interaction term likely reflects that the impact of SNAP benefits on teenage birth probability does not vary significantly within the black population relative to other races. This suggests that, for black individuals, SNAP benefits do not significantly alter the probability of teenage birth beyond the main effects captured in prior models.

There could possibly be a few possible reasons for this. In previous models, black individuals already exhibited a generally higher probability of teenage birth, potentially driven by other socio-economic and contextual factors that may play a stronger role than SNAP benefits alone. Thus, adding SNAP benefits through an interaction term may not produce an additional significant effect within this group. Furthermore, it is possible that the black population in the sample shows less variation in response to SNAP benefits than other racial groups, either due to socio-economic uniformity or structural factors that consistently affect teenage birth outcomes, making the interaction effect less pronounced.

Table B12, on the other hand, presents the results of a regression analysis examining how the effect of SNAP benefits (as measured by the predicted log of SNAP benefits) on teenage birth rates varies across racial groups over two periods: 2001-2010 and 2011-2019. The dependent variable is teenage birth, with separate interactions for White, Black, Hispanic, and Asian racial groups, along with controls applied consistently across all models.

These findings highlight notable differences in how SNAP benefits interact with racial groups concerning teenage births across two decades. While SNAP benefits appear to have increased teenage birth likelihood among White and Hispanic individuals, especially in the later period (2011-2019), they do not exhibit a statistically significant effect on black individuals teenage birth rates in either period. For Asian individuals, a small but statistically significant positive effect appears only in the latter period, suggesting

minimal influence of SNAP benefits on teenage births within this group.

2.4.3.2 Heterogeneous Impacts by Region

Table B11 examines the interaction between Predicted Log (SNAP) and U.S. regions (Northeast, Midwest, West, and South) on the probability of teenage birth. Each column includes the interaction of Predicted Log (SNAP) with a specific region, allowing us to explore whether the impact of SNAP benefits on teenage birth rates varies by region. The interaction terms capture region-specific variations in SNAP's effect).

The interaction term of Northeast region and the predicted value (0.045) is positive but not statistically significant, indicating that in the Northeast, the relationship between SNAP benefits and teenage birth probability does not significantly differ from the baseline category. The main effect for the Northeast (-0.485, $p < 0.05$) suggests that, on average, individuals in the Northeast have a lower probability of teenage birth compared to the baseline region.

The interaction term of Midwest with the predicted value (-0.025) is negative but insignificant, implying that SNAP benefits do not have a statistically distinct impact on teenage birth rates in the Midwest. The main effect for the Midwest (0.051) is also insignificant, suggesting no significant difference in the average teenage birth probability in the Midwest compared to the baseline region.

West interacted with the predicted value (0.016) is positive but not statistically significant, indicating no distinct effect of SNAP benefits on teenage births in the West relative to the baseline. The main effect for the West (-0.191, $p < 0.1$) is marginally significant and negative, suggesting that individuals in the West may have a slightly lower probability of teenage birth on average compared to the baseline region.

The interaction term between South and the predicted value (0.029) is positive but not statistically significant, indicating no significant regional effect of SNAP benefits on teenage birth rates in the South. The main effect for the South (-0.158) is negative but insignificant, suggesting that the average probability of teenage birth in the South does not differ significantly from the baseline.

Across all regions, none of the interaction terms between Predicted Log (SNAP) and region are statistically significant, indicating that the effect of SNAP benefits on teenage birth rates does not vary significantly across the Northeast, Midwest, West, and South. However, the main effects for some regions (e.g., Northeast and West) indicate a lower average likelihood of teenage birth compared to the baseline region. This suggests that while regional differences exist in teenage birth rates, the impact of SNAP benefits does not vary significantly by region.

This result contrasts with other interaction models (e.g., by race), where significant differences were observed in SNAP's effect across groups. Here, the lack of significance in regional interactions suggests that the relationship between SNAP benefits and teenage birth probability is relatively stable across U.S. regions, with no particular region showing a markedly different responsiveness to SNAP benefits in this context.

Table B13 provides the results of a regression analysis investigating how the relationship between SNAP benefits (as indicated by the predicted log of SNAP benefits) and teenage birth rates varies across U.S. regions over two time periods: 2001-2010 and 2011-2019. The dependent variable is teenage birth, with specific interactions for the Northeast, Midwest, West, and South regions. Each column corresponds to a different specification, focusing on how SNAP benefits might differently affect teenage birth rates depending on regional factors and period.

It shows that SNAPs relationship with teenage birth rates varies by region and over time. In the earlier period (2001-2010), SNAP benefits were associated with an increase in teenage births in the Northeast and South, while the Midwest and West showed no significant effects. In the later period (2011-2019), the Midwest and West regions showed a shift, with SNAP benefits linked to reduced teenage births in the Midwest and increased teenage births in the West, indicating changing dynamics over time. These variations suggest that regional socioeconomic or policy differences may shape how SNAP benefits influence teenage birth outcomes across the U.S.

2.4.4 Potential Mechanisms

In order to understand through what channels log (SNAP) impacts teen birth, we examine the marital status and labor supply factors to understand which of these are actually driving the change.

Table B14 presents regression results examining the relationship between Predicted Log (SNAP) and teenage birth, segmented by marital status categories: married, divorced, separated, and never married. By disaggregating the data in this way, we gain insight into how SNAP benefits may affect teenage birth rates differently across marital status groups, potentially revealing mechanisms of impact.

For the married individuals, the coefficient is highly negative and statistically significant (-1.898, $p < 0.001$), suggesting that an increase in SNAP benefits is associated with a substantial decrease in the likelihood of teenage births among married individuals. This may reflect that, within married households, SNAP benefits could reduce economic pressures, allowing parents to delay having children until they achieve greater financial stability or support.

Factors like family size (positive) and household income (positive) contribute significantly, indicating that within married households, larger family size and higher income increase the likelihood of teenage births. Labor force participation (LFP) has a strong negative association, suggesting that economic engagement may provide married teens with additional resources or motivation to delay childbearing.

The positive and significant coefficient for the divorced (0.486, $p < 0.001$) indicates that, among divorced individuals, higher SNAP benefits are associated with an increased likelihood of teenage birth. This could reflect an increased reliance on SNAP benefits as a form of financial support in the absence of partner support, potentially leading to earlier family formation decisions within this group.

Negative coefficients for race (black) and family size suggest that, for divorced teens, being black or having a larger family reduces the probability of teenage birth. The positive association with LFP suggests that those working or seeking work may still rely

on SNAP as an essential supplement, influencing family planning choices.

For those who are separated, the coefficient for SNAP (0.412, $p < 0.001$) is also positive and significant, indicating that, similar to divorced teens, separated individuals may also see SNAP as crucial support that enables early family formation decisions, potentially in response to economic vulnerability.

The effects of family size and income are negative, suggesting that separated teens with larger families or higher household income are less likely to have a teenage birth, likely due to reduced dependency on SNAP. The positive association with LFP implies that for separated teens, SNAP benefits combined with employment may contribute to choices around family expansion.

The positive and significant coefficient for the never married (0.769, $p < 0.001$) indicates that SNAP benefits are associated with a higher likelihood of teenage birth among never-married individuals. This group, often facing higher socio-economic vulnerability, may view SNAP benefits as a form of income stability, which could reduce the perceived economic risks associated with early parenthood.

The negative impact of household income and family size on teenage birth likelihood suggests that greater economic resources reduce dependency on SNAP and thus may delay childbearing. The positive association with LFP indicates that, despite workforce engagement, this group may rely heavily on SNAP benefits for basic needs, impacting their family planning decisions.

The varied impact of SNAP benefits on teenage birth probability across marital status groups points to distinct mechanisms. For married individuals, SNAP benefits appear to act as a financial buffer, allowing for family planning and delaying early childbearing within a stable household. Increased SNAP benefits likely provide additional resources that help married teens maintain economic stability without needing to expand the family prematurely.

For divorced and separated individuals, SNAP benefits may provide a critical financial safety net in the absence of a partners support, possibly lowering barriers to family formation. This increased dependency may lead to higher teenage birth rates as SNAP benefits

mitigate the economic challenges these groups face when considering childbearing.

For the never-married group, SNAP benefits might reduce the perceived economic risks associated with early parenthood. SNAP serves as a key income source, and increased benefits could reduce the deterrent of economic instability, potentially leading to earlier family formation.

Across all groups, the presence of LFP and household income typically reduces the reliance on SNAP, which may then influence family planning decisions differently. For employed teens, SNAP could either supplement income, encouraging family formation, or provide additional flexibility to delay childbearing.

This analysis reveals that SNAP benefits influence teenage birth rates differently based on marital status, likely due to the role of SNAP in addressing specific economic needs in each group. For married teens, SNAP reduces financial pressure and allows delayed family expansion, whereas for divorced, separated, and never-married individuals, SNAP may function as a necessary income source, facilitating early family formation under less stable economic conditions. This differentiation underscores the complex ways in which public assistance interacts with socio-economic factors to shape family planning decisions among teenagers.

2.4.5 Limitations

There are several important caveats to our analysis. First, the underreporting of SNAP receipt and benefits in survey data, particularly in the CPS, is well-documented and may significantly affect our estimates of the program's reach and impact, especially for minority populations (Meyer et al. (2024)). This reporting bias suggests that our estimates may understate the true effect of SNAP benefits on teenage birth rates, as well as other related outcomes. Consequently, the results we report for Hispanic and Black populations likely represent a lower bound on the potential impacts of SNAP, given that the true extent of program receipt and benefits may be higher than reported in the CPS. Second, there are potential issues of endogeneity. Specifically, variations in welfare generosity across states could likely reflect differences in state attitudes toward births in single-headed,

low-income families. Therefore, a positive correlation between welfare generosity and rates of nonmarital and teenage childbearing may involve state responses to pre-existing high rates of premarital births rather than solely reflecting young womens reactions to generous welfare policies. In addition, our main analysis focuses on high school dropouts, which may introduce potential biases, as the decision to discontinue education is often associated with factors that also influence teenage pregnancy. Third, due to the cross-sectional nature of the data, we are unable to determine the exact timing of childbirth in relation to changes in marital status and changes in labor market outcomes. However, examining these outcomes provides suggestive evidence of how changes in SNAP benefits could potentially influence the complex decisions of the populations of focus across various aspects and how these factors may be interconnected. These limitations underscore the necessity for caution in interpreting our findings.

2.5 Conclusion

This paper studies the role of SNAP in shaping teenage birth rates in the US. We examine this relationship because the teenage years are critical for human capital development, with fertility decisions during this period shaping young mothers' long-term socioeconomic outcomes. Children of teenage mothers often grow up in resource-limited environments, facing higher risks of food insecurity, health challenges, and lower educational attainment, which may lead to increased dependence on social safety programs. Therefore, we examine whether the unintended consequences of SNAP may contribute to a vicious cycle of dependency on social safety programs.

We use a 2SLS approach to establish the causal relationship between SNAP and teenage births. Our instruments are the state-level eligibility criteria and pre-determined amount of cash and food assistance, which are most likely exogenouly given to individuals who are likely to recieve SNAP benefits. Using data from the CPS and leveraging state-level variations in SNAP eligibility as instruments we find that 1% increase in SNAP benefits is associated with a 0.14 percentage point increase in the likelihood of teenage

births in logit models. The effect is larger in 2SLS method, showing a 0.29 percentage point increase, suggesting that SNAP may unintentionally encourage early childbearing by reducing financial barriers to raising children.

Our heterogeneous analysis, stratified by race, region, and time periods, reveals differing impacts of SNAP benefits across racial and ethnic groups and regions. Specifically, SNAP benefits show no significantly differential effect on teenage birth rates among Black teenagers but are associated with higher rates among Hispanic teenagers and lower rates among White teenagers, particularly from 2011 to 2019. Additionally, the impact of SNAP on teenage birth rates increased significantly in the Western region during this period, while it decreased significantly in the Midwest. Regional differences in economic recovery after the 2008-2010 financial crisis might have played a role. In the West, slower economic recovery in certain areas and generous SNAP benefits most likely have increased reliance on SNAP, making it easier for teens to consider early parenthood with financial support from SNAP.

We also examine two potential channels that may influence the positive association between SNAP benefits and teenage birth rates. First, we find that SNAP impacts individual decisions regarding family formation: SNAP benefits are positively associated with higher rates of divorce and separation and negatively associated with marriage rates. Additionally, we also find that SNAP is linked to lower labor force participation and higher unemployment rates. These findings underscore the complex dynamics between economic support and reproductive behavior, contributing to ongoing discussions on welfare policy. While SNAP offers critical support to low-income families, our results suggest that its impact on teenage pregnancy may produce unintended consequences. These findings emphasize the need for targeted interventions that account for both the economic benefits of assistance programs and their potential effects on fertility decisions.

Chapter 3

Food Security and Fertility Choices: Does SNAP Encourage Early Parenthood?

3.1 Introduction

Food securitythe ability to access sufficient resources for a healthy and active lifestyle is the most essential indicator for individual well-being (Jaron and Galal (2009)). Therefore, reduction in food insecurity is the primary goal of government assistance programs like the Supplemental Nutrition Assistance Program (SNAP) (Carlson and Llobrera (2022)). Since the benefits of SNAP assistance vary over the size of the household, individuals from low income families may use Supplemental Nutrition Assistance Program (SNAP) benefits to support themselves financially. Furthermore, the financial assistance from SNAP might also reduce the urgency for these women to pursue further education or training, especially if they perceive the program as a stable income source (Tiehen et al. (2012a)). Hence, in this study, I examine whether SNAP can create unintended incentives to have children earlier than they might otherwise have done.

This is an important topic to investigate because early childbearing for low-skilled women can not only have significant impacts on their social life and labor market out-

comes but also affect the next generation (Bernstein et al. (2005); Rossow et al. (2016)). Children raised in economically constrained environments often have fewer educational and developmental opportunities, which can affect their academic performance and overall aspirations. These children may be more likely to struggle in school, limiting their future career choices and contributing to the intergenerational cycle of poverty. Additionally, the reliance on support programs may instill a dependency mindset, as children may see this as a norm.

Therefore, in this study I examine the impact of SNAP benefits on the age at first birth, focusing on female heads of households aged 15 to 40 who are high school dropouts. By analyzing the relationship between the value of SNAP benefits and the timing of first childbirth, this research aims to explore how increased access to economic resources influences reproductive decisions. Hence, the goal is to highlight the ongoing discussion on the balance of additional interventions, the cycle of limited opportunities and dependence on social support programs that may continue into the next generation, making it harder for families to achieve upward social mobility.

Previous literature has shown that economic stability often allows individuals to delay childbearing, whereas financial pressures may prompt earlier family formation. Given that SNAP provides essential nutritional support to low-income families, the program could affect family planning decisions, particularly among vulnerable groups. This analysis specifically investigates whether increases in SNAP benefits are associated with earlier or later ages at first birth, while controlling for a variety of demographic and socio-economic factors, including marital status, race, labor force participation, income, and occupation.

The main results reveal that higher SNAP benefits are associated with a significant decrease in the age at first birth. Specifically, a 10% increase in SNAP benefit value corresponds to a reduction in the age at first birth by approximately 1.18 years. This effect is particularly pronounced among Black women, for whom a 1% increase in SNAP benefits leads to a 0.204-year decrease in age at first birth, while for White and Hispanic women, the effect of SNAP benefits on childbearing age is relatively smaller; whereas the effect for Asian women is statistically insignificant. The results also show that being

married is consistently associated with a later age at first birth, while larger family sizes are linked to earlier childbearing across specifications. Additionally, employment status and household income are found to influence the timing of first births, with higher income and being part of the workforce delaying childbirth.

Further analysis of regional heterogeneity indicates that the effect of SNAP benefits on the timing of first childbirth is strongest in certain regions, particularly where higher benefits lead to significantly earlier childbearing (particularly Midwest which has the highest magnitude and is significant at the 1% level). The cost of raising a child varies significantly across regions. In lower-cost regions, such as Midwest, SNAP benefits could have a more pronounced effect, as they cover a larger proportion of essential costs like food and childcare. South and Midwest also have a higher proportion of rural areas, where early childbearing is more common and SNAP benefits may play a more significant role in reducing the economic constraints of parenting.

In order to find out which age groups are driving the main results, I categorize the age at first birth into different categories. I find that the results are primarily driven by females with age at first birth between the ages of 20 and 25 inclusive. Within this age group it is the white females that are mainly driving the results. Miettinen and Jalovaara (2020) find that unemployment particularly promotes child-bearing particularly for women under age 25. Thus, if the SNAP benefits increase unemployment for this age group, then it is likely to promote early childbirth among them.

Some potential channels through which SNAP may impact age at first birth include unemployment and number of children. Higher SNAP benefits correlate with higher unemployment and number of children for the high school dropout female heads, which may become a key factor in shaping their reproductive choices. Unemployment is found to promote earlier child-bearing especially for the “basic-level-educated" younger women (Miettinen and Jalovaara (2020)). Additionally, higher SNAP benefits correlate with lower marriages, and higher divorces and separations, suggesting that SNAP may provide a financial buffer that allows individuals to maintain childbearing intentions despite relationship instability. It also points to a positive correlation between SNAP benefits

and never getting married. This support may facilitate family planning even in less traditional or unstable family structures, potentially leading to earlier childbearing.

In summary, this research provides a comprehensive analysis of the relationship between SNAP benefits and the age at first birth, shedding new light on how government assistance programs may shape reproductive behavior among low-income women. By exploring the nuanced ways in which SNAP acts as an economic cushion, this study reveals that SNAP benefits can allow for greater flexibility in family planning, enabling some individuals to pursue earlier childbearing without the need to prioritize economic stability through delayed parenthood or marriage. The findings point to a potentially transformative role of SNAP, especially within specific demographic and regional groups, where such benefits appear to offset some of the economic constraints that traditionally influence the timing of first births.

The findings have important policy implications, suggesting that government support programs like SNAP can have far-reaching impacts beyond immediate financial assistance (M. P. Bitler and Karoly (2015); Witte et al. (1998)) by subtly altering life choices related to marriage, career, and family planning. For policymakers, understanding these broader effects is crucial to design social welfare policies that support not only financial needs but also the diverse life choices of low-income individuals. Thus, this study opens discussion for a more holistic view of economic support programs and their potential influence on demographic trends and family dynamics.

The rest of the paper is organized as follows. Section 2 introduces the background of SNAP and parenthood timings. Section 3 describes the data. Section 4 provides the econometric model followed by empirical results in section 5. Section 6 concludes.

3.2 Background

The Supplemental Nutrition Assistance Program (SNAP) has been widely studied for its impact on various individual-level characteristics, contributing to our understanding of its effects across multiple domains. Research has shown that SNAP plays a significant

role in enhancing health and nutritional outcomes, with studies like Almond et al. (2011), and Bailey and Goodman-Bacon (2015) documenting improvements in diet and overall health among recipients. Other research has highlighted SNAP's influence on food security and consumption patterns, indicating that the program helps alleviate food scarcity and supports dietary needs (H. W. Hoynes and Schanzenbach (2009); Nord (2009)). Additionally, studies such as Ziliak (2016) emphasize the programs positive effects on child and family wellbeing, while others have explored its role in economic stability and mobility (M. Bitler et al. (2017); Ratcliffe and McKernan (2010)). Together, these findings underscore SNAPs importance in achieving outcomes aligned with its mission to support the nutritional and financial security of low-income individuals and families.

Beyond these intended impacts, researchers have examined other significant areas where SNAP may influence economic and social behaviors. Studies suggest that SNAP access can shape employment and labor market participation (H. W. Hoynes and Schanzenbach (2012); R. Moffitt (1983)), educational attainment and cognitive development (H. Hoynes et al. (2016)), poverty reduction, and income levels (Tiehen et al. (2013)). However, welfare programs like SNAP may also produce unintended effects, warranting a closer look at outcomes not initially targeted by the program. One such area of interest is whether access to SNAP benefits might affect the age at which a female has her first birth. Investigating this potential impact can provide a more comprehensive view of SNAPs broader social implications and contribute to discussions on program design and policy effectiveness.

SNAP was primarily established to provide food security to marginalized segments of the American population. Initially known as the Food Stamp Program, SNAP was designed to ensure that no one should endure hunger due to financial hardship. By alleviating food insecurity, the program aimed to promote not only physical well-being but also to support broader benefits, such as improved mental health and enhanced performance at school or work. While SNAPs core mission is to reduce hunger, it also indirectly contributes to the overall stability and welfare of recipient households. Given that SNAP benefits are closely tied to household size, an interesting question arises:

could the availability or potential eligibility for SNAP benefits influence decisions around childbearing? Specifically, might access to SNAP affect the timing of a females first birth, either encouraging a delay or an earlier transition into motherhood?

This question holds significant importance, as the timing of first childbirth can have profound and lasting effects not only on the mother but also on her children. Early childbearing is associated with unique challenges that impact a mothers health, economic stability, and educational opportunities, all of which, in turn, influence the development and well-being of her children. Numerous studies have explored how early parenthood affects both parents and children, examining outcomes related to educational attainment, economic independence, and long-term health. Investigating the potential relationship between SNAP access and childbearing timing provides an opportunity to understand SNAPs broader social impacts, shedding light on how welfare programs may shape life choices beyond their immediate economic effects. This paper aims to explore this intersection to better inform policies that support the holistic welfare of low-income families.

Johansen et al. (2020) find that even for a Nordic state with its generous welfare system, early parenthood can have long-term negative effects on the mothers and fathers. Education, employment and earnings were all negatively impacted due to early parenthood (with the effect on education and employment slightly weaker for men). Whereas a delay in childbearing increases earnings by 9% for every delayed year, wages by 3%, while the hours worked increase by around 6% (A. R. Miller (2011)). This advantage is highest for women with higher education, though. Women who already have lower expected earnings, on the other hand, would not experience a significant improvement in their labor market outcomes due to a delay in motherhood (Hotz et al. (2005)). However, this would not mean that there are no other challenges a young mother would face.

For the mothers with an economic disadvantage, early parenthood leads to an increase in housing instability, causing a spike in homeless shelter stays, ultimately leading to a long-term reliance on public housing (Eichmeyer and Kent (2022)). Thus, those segments of the society that are not so well-off are impacted relatively strongly in the negative direction due to earlier parenthood.

Early childbearing does not just impact further education and put a halt to career growth, education is one of the key determinants of age at first birth a positive relationship is found between the two (Rindfuss and St. John (1983)). This would indicate that for the low-skill (less educated) females, we would expect an early age of first birth. So a low level of education results in early parenthood in many cases which ultimately results in even reduced further education, causing a hindrance in the intellectual growth of the mother beyond a basic level.

Early childbearing often disrupts educational and career pursuits, while higher education and labor force participation are major factors associated with postponing first childbirth (Mills et al. (2011)). Although this association is not necessarily causal, it is generally observed that women who prioritize higher education or career advancement tend to delay having their first child. In contrast, those who are economically disadvantaged frequently experience early pregnancies. This pattern underscores the socioeconomic divide in family planning, where access to education and career opportunities significantly influences reproductive decisions and timing.

Beyond the timing of childbirth, early parenthood can negatively impact quality of life, particularly in high-income countries where, as Neuberger and Preisner (2018) find, becoming a parent may not be as beneficial for low-income individuals. In wealthier nations, there tends to be less supportive-benefit for parents in poorer segments compared to those in low-income groups within less affluent countries. This suggests that, without sufficient economic or institutional support, early parenthood can exacerbate inequalities and impose a heavier burden on disadvantaged families.

These are all indirect costs of childbearing, or the opportunity costs, including but not limited to a break in career and/or a barrier to further education. There can be other costs linked to this as well, such as a longer term cost of “loss of derived pension rights" and other shorter-term direct costs associated with rearing the child such as the cost of childcare, education, food and clothing, and others (Letablier et al. (2009)).

Earlier parenthood is also linked to a fall in satisfaction within the relationship, especially for individuals belonging to lower income groups (Trillingsgaard et al. (2014)).

This could be because, for these groups, sometimes the females get pregnant before a strong bond between the couple is created (Edin and Nelson (2014)).

As far as single mothers are concerned, the challenges are even greater. Single mothers belonging to low-income families face social and economics hurdles. Being the sole responsible authority for the kids brings along with it a lot of stress, that may result in negative mental health and also a means of leading them towards health behavior that may be quite risky, including smoking and drinking (Jun and Acevedo-Garcia (2007)). Both of these are likely to impact not just the functioning of the mother, but also the outcomes of the kids (Bernstein et al. (2005); Rossow et al. (2016)).

SNAP benefits vary by household size. As can be seen in table C1; in 2024, maximum monthly benefits for a household with just 1 member were around $292. These benefits increase as the household size increases. For example, in 2024 alone, maximum benefits increase to $535 as the household size increases to 2 members. Maximum benefits increase to $766 with a household having 3 members. Thus, a household with a greater number of members is eligible to receive greater benefits. These maximum benefits are for households that do not have any income at all.

However, SNAP being a support program, the benefits are directly tied to income and fall as income increases. SNAP households are required to spend 30% of their net income on food. This amount is deducted from the maximum benefit they could possibly receive in order to calculate their benefit for a particular month. For example, in 2024 if a household with 5 members has a monthly net income of $800, then 30% of that is $240. This amount of $240 is then subtracted from the maximum possible SNAP benefits for that month ($1155) and that gives a value of $915. This is the benefit that a household of 5 would receive in 2024 if it had a net income of $800.

There are studies that explore the relationship between SNAP and psychological well-being. The results indicate that having access to SNAP results in reduced levels of psychological distress and improves mental well-being. This could be one of the key factors that play a role in reducing the childbearing age. When women feel more relaxed mentally, they are likely to start their families earlier. Munger et al. (2016) find a higher probability

of depression when SNAP benefits are lost, and a fall in probability of depression when benefits are gained among women.

Garganta et al. (2017) study the impact of a cash transfer program in Argentina that provides cash transfers per child on a monthly basis and find a positive impact on the fertility levels in households with one or more children. Although this program directly provided cash transfers based on the number of children in the household, this is similar to SNAP in the sense that SNAP benefits increase as the size of the household increases. Thus, we could expect fertility levels to increase as SNAP benefits increase or as more individuals become eligible to receive SNAP. Whittington et al. (1990b) study the fertility rates in the US due to a tax exemption. They find that an increase in personal tax exemption value led to an increase in aggregate fertility rates.

Whereas, there are studies that show the impact of SNAP and other welfare programs on the mental health of mothers and their risky health behaviors (Schmidt et al. (2023)), there is a dearth of literature that studies how SNAP affects the timings of parenthood.

Given the huge scale at which SNAP operates, and its benefits disbursed, it is important to highlight to policymakers the impact it can have on the fertility levels of the lower socioeconomic segments of the society.

Thus, when a simple scatter plot is created for high school dropout female heads with age of first birth between 15 and 40 years old, it is found that the age of first birth is impacted negatively due to increases in the value of SNAP benefits that they receive. Figure C1 shows the results for this scatter plot. A line of best fit has been plotted to show clearly that the age of first birth and log (SNAP value) has a negative relationship.

3.3 Data

The data is mainly extracted from IPUMS CPS. This is an individual-level data. State-level control variables are taken from University of Kentucky Centre for Poverty Research. The data for years 2001 to 2019 is used in this paper. Years beyond 2019 are left because of high fluctuations in SNAP disbursements and changes to the disbursement amounts,

primarily due to COVID-19.

The main outcome variable is the “age at first birth". The sample is restricted to high school dropout female heads of household with an age at first birth between 15 and 40, inclusive; an age where they are still likely to have births. Summary statistics are shown in table C2 for the aforementioned sample when the data for log (SNAP value) is not missing. The years range between 2001 and 2019, suggesting that the data covers almost two decades. The state variable represents the FIPS code for each state indicating the inclusion of all U.S. states and some territories. SNAP value is the total value of Supplemental Nutrition Assistance Program (SNAP) benefits received by the household. On average, households received $1,143.193 in benefits, with substantial variation (standard deviation of 2,192.324) and values ranging from as low as $0 to nearly $25,000. Log (SNAP value) is the natural logarithm of SNAP benefits. The mean log value is 2.55, with a range from 0 to 10.127, corresponding to the wide spread of actual benefit values. Married is a binary variable indicating whether the individual is married (1 = married, 0 = not married). The mean of 0.463 suggests that around 46% of individuals in the sample are married. Black is a binary variable indicating if the individual is black (1 = Black, 0 = Non-Black). The mean of 0.141 indicates that approximately 14.1% of the sample is racially black.

Management, Business and Financial operations is a binary variable for whether the individual is employed in a management occupation. A mean of 0.004 suggests that only a small proportion of individuals work in management roles. Professional and Related Occupations is a binary variable representing employment in a professional occupation. The mean of 0.024 indicates that 2% of the sample is employed in professional jobs. Service Occupations is a binary variable indicating whether the individual works in a service occupation. About 4% of the sample (mean = 0.042) is employed in these roles. Sales and Office occupations is a binary variable for individuals employed in sales or office occupations. The mean is 0.039, indicating that around 4% of individuals are employed in this sector. Natural Resources, Construction, and Maintenance is a binary variable indicating employment in natural resources, construction, or extraction industries. The

mean of 0.019 shows that around 2% of individuals work in these industries. Production, Transportation, and Material Moving is a binary variable that represents employment in production, transportation, or material moving occupations. Approximately 15.9% of individuals (mean = 0.159) are employed in these jobs.

The aforementioned variables that correspond to various occupation categories are included as controls in the analyses. These variables provide occupation fixed effects, controlling for the occupation-specific characteristics that may be impacting the dependent variable.

Labor Force Participation (LFP) represents a binary variable for whether the individual is in the labor force (1 = in labor force, 0 = not in labor force). The mean of 0.556 indicates that about 55.6% of the individuals in the sample are active in the labor force. The mean value for natural logarithm of household income is 10.135, with a range from 0 to 14.614, reflecting the variation in household income levels. Family size, with an average household consisting of 4.043 members. Family sizes in the dataset range from 2 to 16 members. Metropolitan is a binary variable indicating if the individual resides in a metropolitan area (1 = metro, 0 = non-metro). The mean of 0.357 shows that approximately 35.7% of the sample lives in metropolitan areas. The average state-level unemployment rate is 6.049%, with a range from 2.1% to 13.7%, showing the variation in economic conditions across the sample.

After providing summary statistics for the data, I provide the econometric model used to analyze the data and study the impact of SNAP benefits on the age of first birth for the target sample.

3.4 Empirical Approach

3.4.1 Econometric Model

The econometric model can be represented as:

$$\begin{aligned}\text{Age at First Birth}_i = \beta_0 &+ \beta_1 \text{log(SNAP value)}_i + \beta_2 \text{Married}_i + \beta_3 \text{Black}_i \\ &+ \beta_4 \text{Employment status}_i + \beta_5 \text{Log (Household Income)}_i \\ &+ \beta_6 \text{Family size}_i + \beta_7 \text{Metropolitan}_i \\ &+ \beta_8 \text{Unemployment rate}_s + \delta_j + \gamma_t + \lambda_s + \epsilon_i\end{aligned}$$

In the above equation, i represents the individual, s represents the state, and t represents the time. Age at First Birth$_i$ is the dependent variable, measuring the age at which an individual has her first child.

The independent variables include various demographic and socioeconomic factors including Log (SNAP value)$_i$ which measures the Log of SNAP value received. The original variable in the dataset is called "*stampval*" derived from the previous term; this indicates the value of the food stamps (SNAP) received. Married$_i$ is an indicator if the individual is married. Black$_i$ is an indicator if the individual is black. Employment Status$_i$ is a variable describing the employment status of the individual. Log (Household Income)$_i$ is the logarithm of household income. Family size$_i$ is the size of the individual's family. Metropolitan$_i$ is an indicator if the individual lives in a metropolitan area. Unemployment rate$_s$ is the unemployment rate within the state.

Year Fixed Effects (γ_t) control for time-specific shocks or trends that affect all individuals similarly (e.g., macroeconomic conditions, policy changes). State Fixed Effects (λ_s) account for state-specific factors that do not vary over time but might influence the outcome (e.g., state-level policies, cultural factors). Occupation Fixed Effects (δ_j) control for occupation-specific characteristics that may impact the outcome consistently across individuals within the same occupation (e.g., industry norms, job stability, income

potential). These effects capture differences associated with each occupation that do not vary over time, isolating the influence of other variables in the model.

This is an Ordinary Least Squares (OLS) regression with state, year, and occupation fixed effects. The inclusion of fixed effects controls for unobserved heterogeneity at these levels. The regression uses probability weights. The variable (`asecwt`) is used which is an individual-level weight that is to be used when dealing with individual-level CPS supplement data. These weights adjust for sampling design, ensuring that the estimates are representative of the population. The standard errors are clustered at the state level, which accounts for potential within-state correlation in the errors. Clustering at this level corrects for heteroskedasticity and autocorrelation within states, leading to more reliable standard error estimates.

The coefficients $(\beta_1, \beta_2, \ldots, \beta_8)$ represent the estimated marginal effects of each independent variable on the age at first birth, controlling for year, state, and occupation fixed effects. The fixed effects ensure that the model accounts for unobserved factors specific to years, states, and occupations. Clustering the standard errors at the state level allows for more robust inference, acknowledging that observations within the same state may not be independent. This baseline model analyzes how various individual and contextual factors influence the age at which individuals have their first child while controlling for time-, state-, and occupation-specific influences.

3.5 Results

3.5.1 Main Results

The results in Table C3 show the impact that log (SNAP value) has on the main outcome variable, age at first birth. The sample is restricted to 15 to 40 years old high school dropout female heads. The results show that an increase in the value of SNAP benefits received (that is, making SNAP more accessible to the individuals) leads to a fall in the age at first birth. Model 1 just shows the correlation between log (SNAP Value) and Age at First Birth. Model 2 includes state fixed effects, while model 3 includes

year fixed effects. Model 4 includes both year and state fixed effects along with some controls. Whereas, occupation fixed effects are also included in Model 5 to account for occupation-specific factors.

The coefficient for the log of SNAP value is negative and statistically significant in all models, indicating a potential association between higher SNAP benefits and a lower age at first birth. In Model 1, where no additional controls are included, the coefficient is -0.250 and highly significant ($p<0.01$). This indicates that a 1% increase in the value of SNAP benefits is associated with a 0.25-year reduction in the age at first birth, holding other factors constant. Higher SNAP benefits may reduce the economic cost of raising children, incentivizing earlier childbearing. This may especially influence lower-income populations, who rely more on SNAP.

The magnitude of the negative effect slightly decreases but remains significant in model 2. A 1% increase in SNAP benefits is linked to a 0.24-year decrease in age at first birth. This suggests the relationship persists even after controlling for state-specific effects, which might account for systematic differences in SNAP availability or utilization. State-level and factors could influence both SNAP value and age at first birth (e.g., cost of living).

Controlling for temporal factors (e.g., policy changes, economic trends), the effect remains stable, as can be seen in model 3. This indicates the negative correlation between SNAP benefits and age at first birth is not entirely driven by changes over time, such as economic recessions or SNAP policy modifications.

The inclusion of covariates such as marital status, number of children, income, and race, along with state and year fixed effects, attenuates the SNAP coefficient. A 1% increase in SNAP benefits is now associated with a 0.12-year reduction in age at first birth. As can be seen in model 5, the results are consistent with Model 4, confirming that the negative association between SNAP benefits and age at first birth holds even after accounting for multiple fixed effects and socioeconomic variables. Thus, as benefits increase by 1%, there could possibly be a 0.118-year reduction in age at first birth. SNAP

benefits reduce the financial burden of child-rearing, making it feasible for lower-income households to have children earlier. This aligns with economic theory, where subsidies lower the "price" of a goodin this case, child-rearing. Furthermore, lower-income families benefiting from SNAP may face fewer opportunity costs (e.g., forgone wages, education) of having children earlier compared to higher-income families.

Being married is consistently associated with a later age at first birth across models 4 and 5. The coefficients, which are around 0.34, are statistically significant at the 5% level ($p<0.05$). This result aligns with expectations, as marriage often provides greater economic stability, which can lead couples to delay childbearing.

The coefficient for being Black is negative, however it is statistically insignificant in models where it is included. The negative sign does indicate that Black women are likely to have their first child earlier than non-Black women, however, this is insignificant which could be pointing to the fact that there is no relationship between race and age at first birth for the entirety of the sample. This could possibly change if we look into specific subgroups within the sample.

Employment status is positively associated with the age at first birth, with significant coefficients in both the last models ($p<0.05$). This suggests that women that are working tend to have children later. This is in line with studies that show labor force participation as one of the key factors leading to delayed first child birth (Mills et al. (2011)).

The log of household income is positively associated with age at first birth in both models 4 and 5 ($p<0.01$), suggesting that higher household income allows for delaying childbearing. Thus, there is a possibility that income affects child birth and households with lower incomes have children early.

Family size is consistently negatively associated with the age at first birth across both models where it is included ($p<0.01$). Larger family sizes are linked with earlier childbearing, which may reflect cultural or economic factors where families with more children tend to start having children earlier.

The metropolitan dummy variable is not significant in any of the models, suggesting that living in a metropolitan area does not significantly impact the age at first birth. The

unemployment rate shows mostly insignificant effects, implying that local labor market conditions do not have a statistically significant direct impact on the timing of first births. Although the coefficient has a negative sign, this cannot be interpreted as evidence of a relationship given the lack of statistical significance.

3.5.2 Heterogeneity Analysis

3.5.2.1 By Race

Next, I perform heterogeneity analysis. As shown in table C4, the results for White, Black, Asians and Hispanics are shown in columns 1-4 respectively. The dependent variable in this regression is *age at first birth*, and the table presents results separately for the four racial groups. One of the key independent variables, *Log (SNAP Value)*, represents the logarithm of the value of Supplemental Nutrition Assistance Program (SNAP) benefits.

For Whites, a 1% increase in SNAP benefits is associated with a 0.096-year decrease in age at first birth, and this result is statistically significant at the 1% level ($p < 0.01$). This suggests that higher SNAP benefits may encourage earlier childbearing among White individuals. For Blacks, the coefficient is again negative with a higher magnitude and also statistically significant, implying that the value of SNAP benefits possibly has a notable impact on age at first birth for this group. It indicates that a 1% increase in SNAP benefits is associated with a 0.204-year decrease in age at first birth for the Black females. For Asians, the coefficient is negative but not statistically significant, indicating no meaningful effect of SNAP benefits on age at first birth for Asians. However, for Hispanics there does seem to be a correlation between their race and the age at first birth. A 1% increase in SNAP benefits is associated with a 0.064-year decline in age at first birth for Hispanics. Apart from Asians, the results are significant at the 1% level for all the other groups ($p < 0.01$).

3.5.2.2 By Region

Table C5 examines regional differences in the relationship between SNAP benefits and age at first birth. The results show a consistently negative and statistically significant

association across all regions, but the magnitude of the effect varies.

The strongest negative effect is observed in the Midwest (coefficient = -0.170, t = -11.260). This might reflect the demographic and economic characteristics of the region, where a larger proportion of families may rely on SNAP benefits due to higher concentrations of rural or low-income communities. In such contexts, SNAP benefits could play a more pivotal role in alleviating financial barriers to starting a family, thus leading to earlier childbearing.

The Northeast follows with a slightly smaller, but still significant, effect (coefficient = -0.138, t = -2.790). The Northeast is characterized by higher costs of living and greater access to social services compared to other regions. In this context, SNAP benefits might contribute to fertility decisions by supplementing household resources, particularly for low-income families, thereby encouraging earlier transitions to parenthood. However, the smaller magnitude compared to the Midwest may reflect the greater availability of other support mechanisms in the region, which could offset SNAPs influence.

In the South (coefficient = -0.110, t = -3.970) and the West (coefficient = -0.088, t = -9.040), the effects are weaker but remain statistically significant. The smaller magnitude in these regions could be explained by differences in demographic composition, labor market conditions, or cultural norms surrounding family formation. For instance, in the South, higher poverty rates might mean that SNAP benefits are essential but not sufficient to drive substantial changes in fertility timing. Similarly, in the West, the high cost of living might dilute the relative impact of SNAP benefits on fertility decisions, as other financial constraints take precedence.

The regional variation in SNAPs effects highlights the interplay between policy and local socioeconomic contexts. In regions like the Midwest, where low-income households may have fewer alternative resources, SNAP benefits likely have a stronger influence on family formation decisions. Conversely, in regions with higher costs of living or access to broader social safety nets, the relative importance of SNAP benefits in shaping fertility behavior may be diminished.

These findings underscore the need to consider regional heterogeneity when evaluating

the impacts of social welfare programs. Policymakers should account for the unique demographic and economic conditions of each region to better understand how programs like SNAP influence fertility timing and related outcomes.

3.5.2.3 Age Group Analysis

Table C6 explores the age-specific effects of SNAP benefits on the timing of first births. The results indicate a nuanced relationship that varies across age groups. In Age Group <=19, a small but positive and statistically significant relationship is observed (coefficient = 0.013, $t = 2.740$). This finding suggests that higher SNAP benefits might slightly delay first births among teenagers, possibly reflecting the role of SNAP in alleviating immediate financial constraints, thereby enabling young women to delay childbearing. However, for Age Group 20-25, a negative and statistically significant relationship emerges (coefficient = -0.021, t = -3.230). This indicates that higher SNAP benefits might encourage earlier childbearing among women in their early twenties, perhaps due to the income effect, where improved financial security lowers the perceived cost of having children.

In contrast, the coefficients for Age Groups 26-30 and 31-40 are negative but not statistically significant, implying that SNAP benefits have minimal direct impact on the timing of first births for women aged 26 and above. These findings suggest that the strongest effects of SNAP benefits are concentrated among younger women, particularly teenagers and those in their early twenties. This could possibly be because for the high-school droupouts who are young, small benefit amounts through SNAP could act as an incentive for them to change their decision regarding when to have their first child (especially since this amount would be a higher percentage of their total income).

Further analysis of Age Group ≤ 19 by race (Table C7) reveals important heterogeneity. Among White and Hispanic teens, SNAP benefits are positively and significantly associated with the age at first birth (coefficient = 0.013 & 0.015 respectively). This finding suggests that higher SNAP benefits may provide financial security that enables White and Hispanic teens to delay childbearing, potentially reflecting a preference to postpone motherhood until greater stability is achieved.

For Black, and Asian teens, the coefficients are not statistically significant, indicating no clear evidence of a relationship between SNAP benefits and the timing of first births in these groups. This lack of significance could reflect differences in cultural norms, economic circumstances, or access to other resources that influence fertility decisions among these racial groups.

For Age Group 20-25, Table C8 highlights racial differences in the negative association between SNAP benefits and the age at first birth. Among White women in this age group, the relationship is statistically significant and negative (coefficient = -0.021, t = -2.640). This suggests that higher SNAP benefits might reduce the age at first birth for White women in their early twenties. One possible explanation is that SNAP benefits reduce economic barriers to childbearing, allowing these women to transition to parenthood earlier.

For Black, Asian, and Hispanic women in Age Group 2, the coefficients are not statistically significant. This indicates that, for these groups, SNAP benefits do not have a clear impact on the timing of first births during their early twenties. The variation in significance across racial groups may reflect differences in how SNAP benefits interact with broader socioeconomic factors, such as family structure, labor market opportunities, and cultural expectations surrounding motherhood.

The age-specific analysis underscores the complexity of SNAPs impact on fertility timing. The positive association observed in Age Group 1 suggests that SNAP benefits may delay childbearing among teens, particularly White and Hispanic teens, by reducing immediate financial stress. In contrast, the negative association in Age Group 2, concentrated among White women, highlights how SNAP benefits might encourage earlier transitions to parenthood during early adulthood. These findings emphasize the importance of considering age and race as moderating factors when evaluating the effects of SNAP on fertility behavior.

3.5.3 Potential Mechanisms

Table C9 explores the mechanisms through which SNAP benefits might influence the age at first birth. The results show that higher SNAP benefits are significantly associated with an increase in the number of children (coefficient = 0.016, t = 4.690). This finding could reflect the *income effect* of SNAP benefits: as SNAP provides additional resources, families may feel financially better positioned to expand their households. This is consistent with economic theory suggesting that when constraints on essential resources (such as food security) are alleviated, individuals may opt to have children earlier or have more children.

Higher SNAP benefits are also associated with higher unemployment (coefficient = 0.007, t = 11.610). This could indicate that SNAP benefits act as a partial safety net, reducing the pressure to participate in the labor market, especially for individuals in low-income households. For young women, this could mean delaying workforce entry and instead prioritizing family formation, contributing to earlier childbirth. However, no significant relationship is observed between SNAP benefits and labor force participation (LFP), suggesting that SNAP's effect on employment is not strong enough to directly influence broader labor market engagement.

Table C10 examines marital status as a potential mediator. The results reveal that for married women, higher SNAP benefits are associated with a delay in age at first birth (coefficient = -0.020, t = -22.470). One possible explanation for this finding is that married couples may use the additional financial resources provided by SNAP to invest in longer-term goals such as education, career-building, or savings before having children. This delay could reflect a situation where couples in stable relationships optimize the timing of childbearing to achieve economic security.

In contrast, among divorced, separated, and never-married women, SNAP benefits are positively associated with the age at first birth. For divorced or separated women, the positive association (e.g., coefficient = 0.003 for divorced women, t = 3.400) might suggest that SNAP benefits provide a buffer against economic hardship, enabling these

individuals to delay subsequent births. For never-married women, the positive coefficient (coefficient = 0.017, $t = 11.190$) could indicate that SNAP benefits partially alleviate the financial pressures of single parenthood, allowing some to have children earlier without being as constrained by immediate economic insecurity.

These patterns can be understood through the lens of differing opportunity costs and resource constraints. Marriage often provides a dual-income household or shared financial resources. For this group, SNAP benefits might be used to enhance household stability, reduce immediate financial stress, or invest in education or careers before starting a family. As a result, married women may delay childbearing to achieve higher economic returns in the long term.

For women who are single or lack spousal support, SNAP benefits might reduce the relative economic burden of childbearing, thereby enabling earlier transitions to motherhood. In this case, SNAP could act as a substitute for the income or resources that might typically be provided by a partner. Divorced or separated women may use SNAP benefits to stabilize their financial situation post-separation or divorce. The positive association suggests that these women might choose to delay further childbearing while they rebuild economic security.

The positive association between SNAP benefits and unemployment could reflect reduced economic pressure to participate in low-wage or precarious jobs. For some women, this might make earlier childbearing more feasible, as SNAP provides a safety net.

Overall, the results demonstrate a robust negative association between SNAP benefits and the age at first birth, which varies by race, region, and age group. The findings suggest that SNAP benefits may influence fertility timing through socioeconomic pathways, including marital status and employment. The heterogeneity in effects underscores the importance of considering demographic and regional differences when evaluating the implications of SNAP policy changes.

3.6 Conclusion

Supplemental Nutrition Assistance Program (SNAP) aims to reduce food insecurity and is designed to help low-income families meet basic nutritional needs. However, this study demonstrates that SNAP may also unintentionally encourage earlier childbearing among low-skilled women by providing financial support. Since the assistance varies based on household size, some individuals, especially low-skilled women, may rely on SNAP benefits to support themselves financially. Such dependence may have long-term consequences, including intergenerational poverty and limited upward mobility.

Using data from the Current Population Survey (CPS) and applying a three-way fixed effects model, this study finds that a 10% rise in SNAP benefits corresponds to a decrease in the age at first birth by about 1.18 years. Marriage is consistently associated with a delayed age at first birth, likely due to the economic stability it provides. Other demographic factors also influence timing: employment status correlates with later childbirth, while larger family sizes are linked to earlier childbearing. Household income is positively associated with delaying childbearing. On the other hand, I do not find state unemployment rates to be significantly associated with the timing of first births, nor does living in a metropolitan area have a significant impact.

The heterogeneity analysis reveals significant racial and regional differences in how economic and demographic factors affect the age at first birth. Among racial groups, a 10% increase in SNAP benefits is linked to an approximately 2.04-year reduction in the age at first birth for Black women, while the impact is lower for White women followed by the Hispanic population. The impact for Asian women, despite having a negative coefficient, is statistically insignificant. These results suggest that there could possibly be some heterogeneity in the influence of SNAP benefits on childbearing decisions.

Regional analysis further highlights these variations, with the strongest negative effect of SNAP benefits observed in the Midwest and Northeast regions, where SNAP benefits are typically higher and may have a more pronounced role in shaping family formation decisions. The South and West regions exhibit weaker but still significant effects. These

findings suggest that regional economic conditions and social norms likely interact with SNAP benefits to influence fertility timing.

I further explore potential pathways through which SNAP benefits may influence the age at first birth. My findings suggest that SNAP support may enable individuals to prioritize immediate family formation over long-term career investments, particularly in high-skilled occupations, potentially contributing to earlier childbearing. Furthermore, SNAP benefits are significantly associated with a lower likelihood of marriage, indicating that financial support may allow individuals to feel secure enough to have children outside of marriage. This could also explain the observed earlier age at first birth.

Additionally, higher SNAP benefits are linked to an increased likelihood of divorce and separation, possibly leading to individuals opting to have children sooner despite relationship instability.

The findings of this study highlight critical policy considerations around structuring social support programs like SNAP to promote long-term economic mobility and reduce intergenerational poverty. While SNAP provides essential financial stability for low-income families, it may inadvertently influence decisions around family formation and career development. These effects could perpetuate cycles of poverty if individuals are encouraged to prioritize immediate childbearing over investments in human capital and economic stability.

Policymakers should consider how to design SNAP and similar programs to support both short-term needs and long-term economic outcomes. For example, incorporating incentives for education, employment, or skill-building into SNAP eligibility criteria might help mitigate the unintended consequences on fertility timing. Additionally, policies that promote family stability and economic security could further align SNAP's goals with broader anti-poverty strategies.

Overall, this study underscores the importance of evaluating the broader impacts of social assistance programs beyond their primary objectives. Addressing these unintended consequences will be crucial for breaking cycles of poverty and fostering upward mobility across generations.

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Appendix

A Chapter 1

Figure A1: Year and type of non-cash categorical eligibility for all the US states

	Year and Type of Non-Cash Categorical Eligibility									
State	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Alabama	None									Broad
Alaska	Narrow									
Arizona	Narrow						Broad			
Arkansas	Narrow									
California	Narrow								Broad	
Colorado	Narrow									
Connecticut	Narrow								Broad	
Delaware	Broad									
District of Columbia	None									Broad
Florida	None		Narrow							Broad
Georgia	Narrow							Broad		
Guam	None								Broad	
Hawaii	Narrow									
Idaho	None								Broad	
Illinois	None									Broad
Indiana	Narrow									
Iowa	None									
Kansas	Narrow									
Kentucky	Narrow									Broad
Louisiana	Narrow									Broad
Maine	Broad									
Maryland	Broad									
Massachusetts	Broad									
Michigan	Broad									
Minnesota	Narrow					Broad				
Mississippi	None									Broad
Missouri	Narrow									

Source: Memo (2010)

Figure A2: Year and type of non-cash categorical eligibility for all the US states (continued)

	Year and Type of Expanded Categorical Eligibility									
State	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Montana	None								Broad	
Nebraska	None		Narrow							
Nevada	Narrow								Broad	
New Hampshire	Narrow								Broad	
New Jersey	Narrow									Broad
New Mexico	Narrow									Broad
New York	None							Broad		
North Carolina	Narrow									Broad
North Dakota	Broad									
Ohio	Narrow								Broad	
Oklahoma	Narrow								Broad	
Oregon	Broad									
Pennsylvania	Narrow								Broad	
Rhode Island	None								Broad	
South Carolina	Broad									
South Dakota	None					Narrow				
Tennessee	Narrow									
Texas	None	Broad								
Utah	Narrow									
Vermont	Narrow								Broad	
Virgin Islands	None								Broad	
Virginia	Narrow									
Washington	None			Broad						
West Virginia	Narrow								Broad	
Wisconsin	Narrow			Broad						
Wyoming	None									
Total Broad	8	9	9	11	11	12	13	15	29	39
Total Narrow	28	28	30	29	29	29	28	27	18	12
Total None	17	16	14	13	13	12	12	11	6	2
Total States	53	53	53	53	53	53	53	53	53	53

Source: Memo (2010)

Figure A3: Average state-wise SNAP recipiency before and after the states relaxed their eligibility criteria

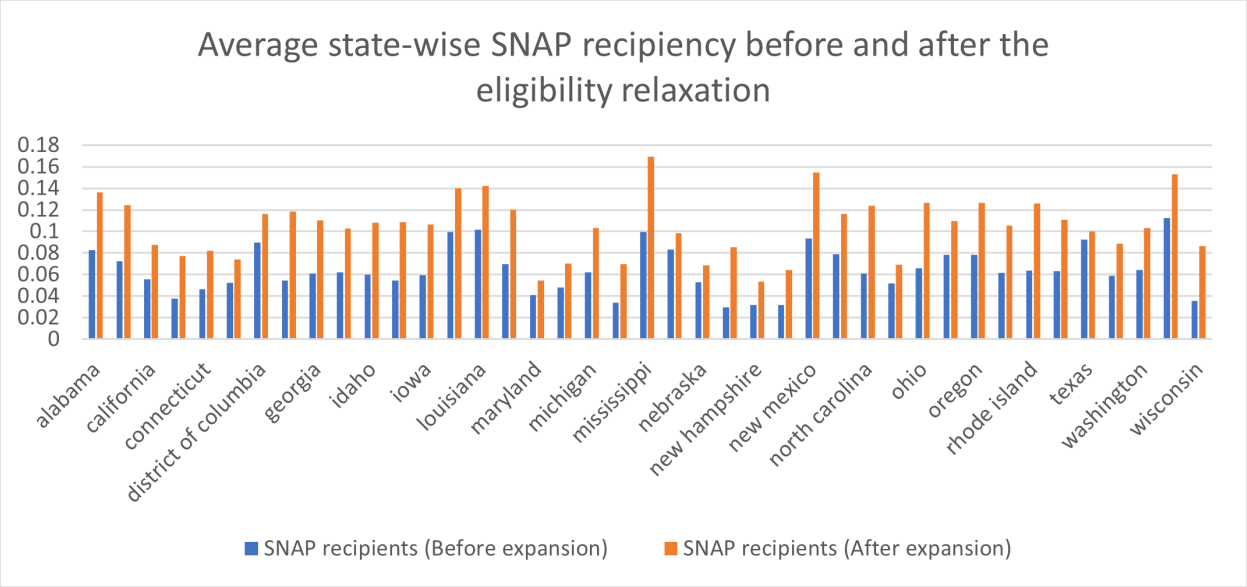
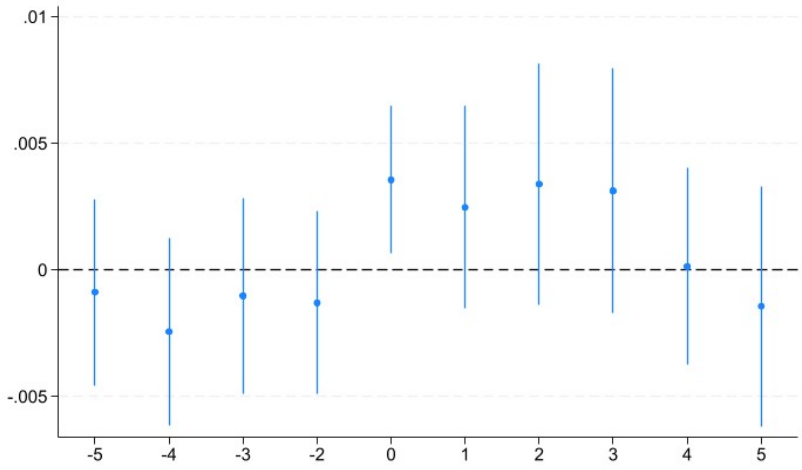
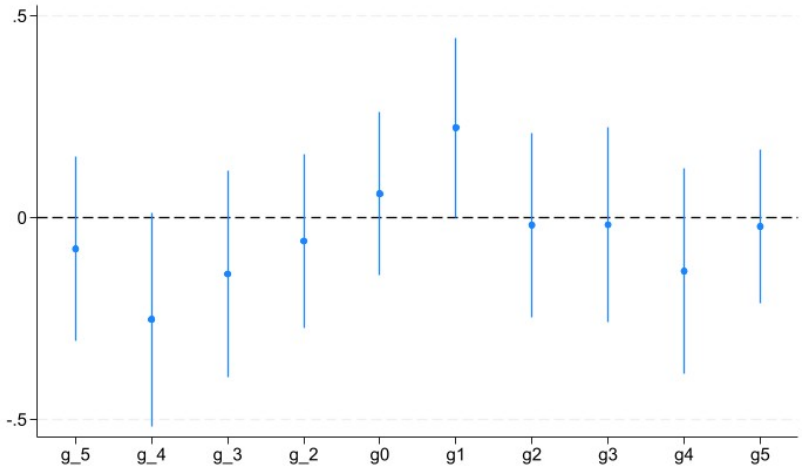


Figure A4: Event studies for the full sample

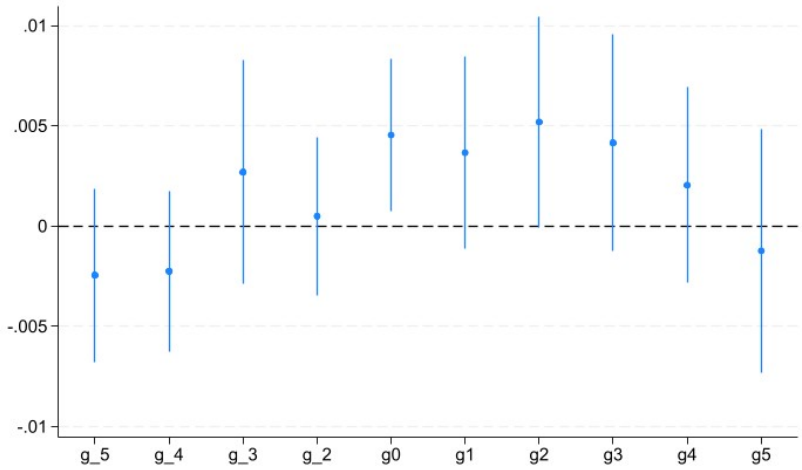


(a) Event study for the labor force participation for the full sample

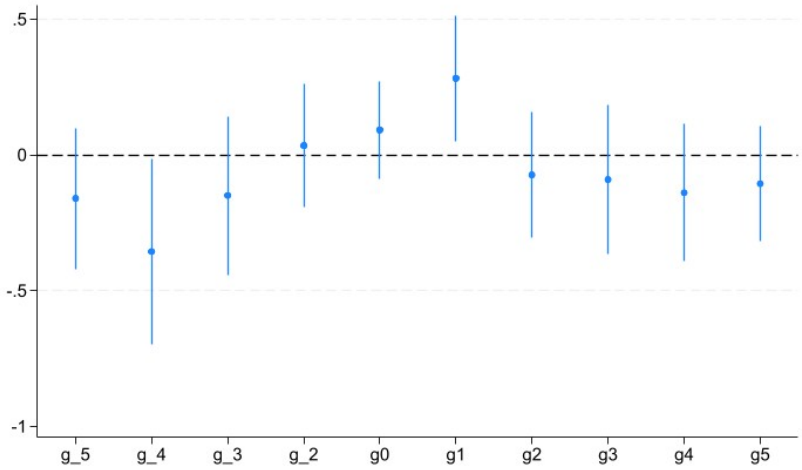


(b) Event study for hours worked for the full sample

Figure A5: Event studies for the group excluded from ABAWD work requirements

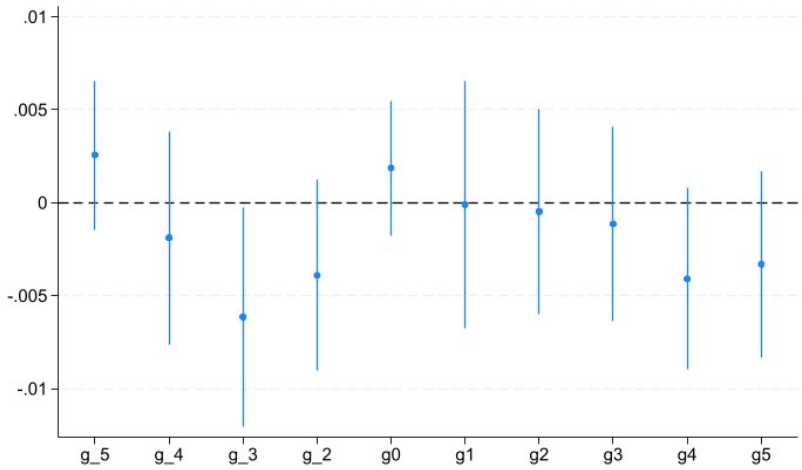


(a) Event study of Labor Force Participation for group excluded from ABAWD work requirements

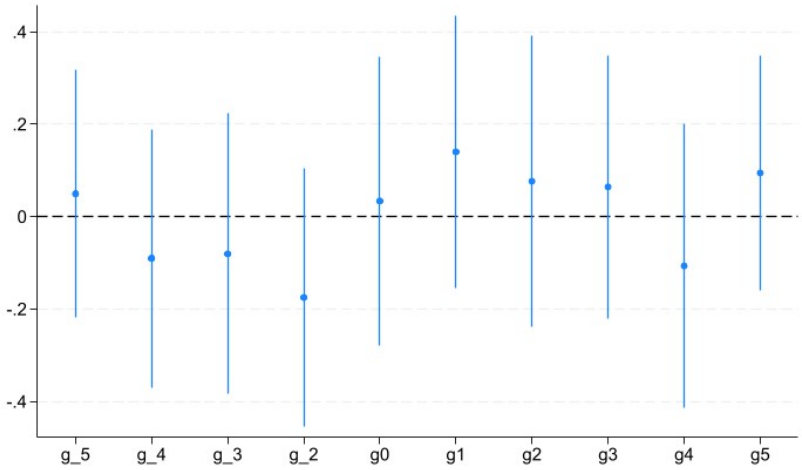


(b) Event study of hours worked for group excluded from ABAWD work requirements

Figure A6: Event studies for individuals not excluded from ABAWD work requirements

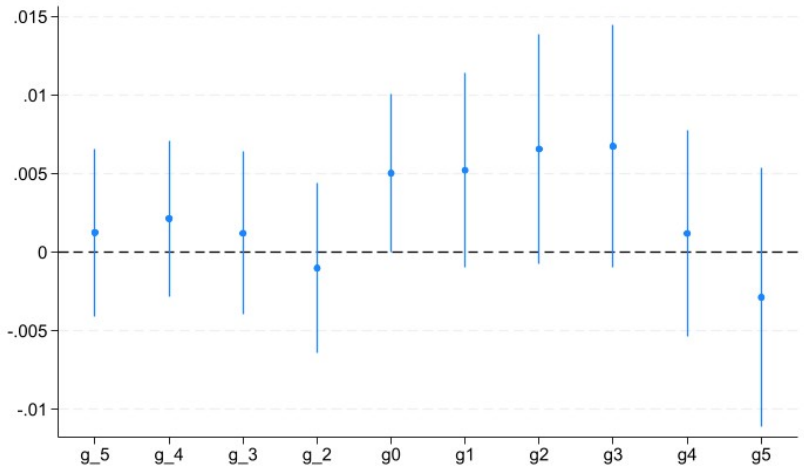


(a) Event study for Labor force participation for individuals not excluded from ABAWD work requirements

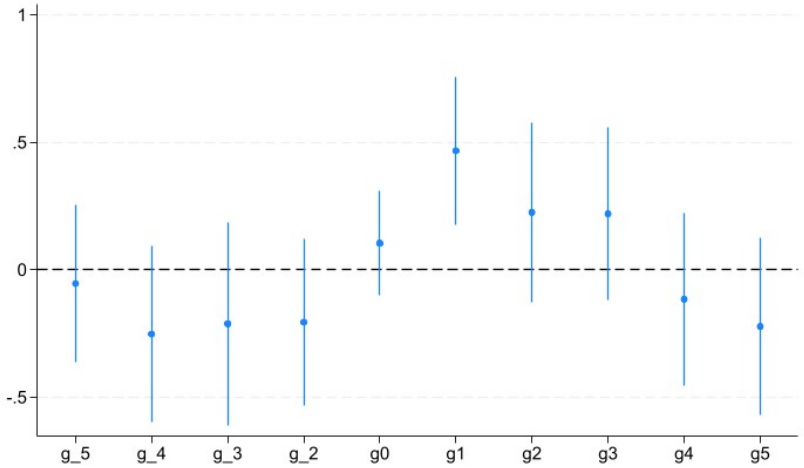


(b) Event study for hours worked for individuals not excluded from ABAWD work requirements

Figure A7: Event studies for individuals with high school or less education

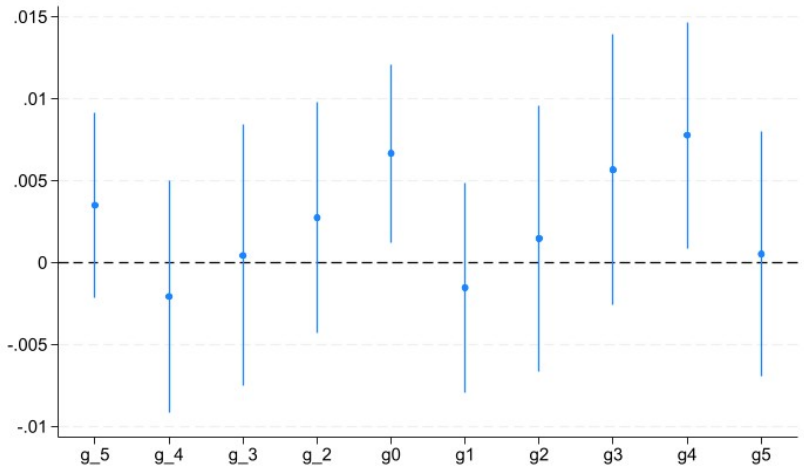


(a) Event study for LFP for individuals with high school or less

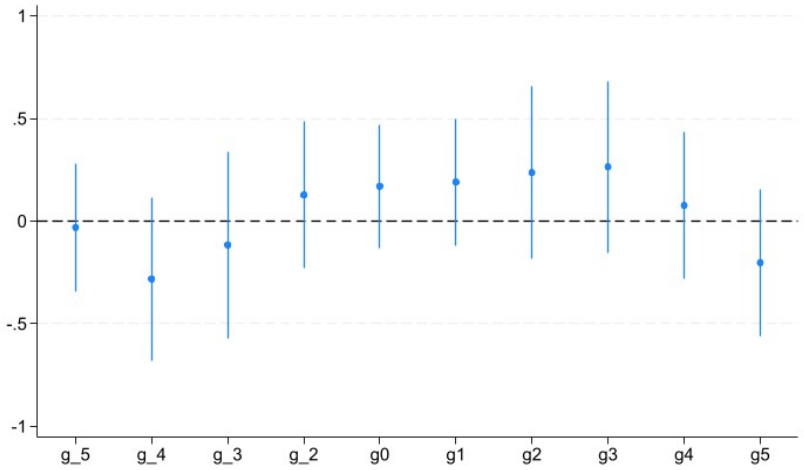


(b) Event study for hours worked for individuals with high school or less

Figure A8: Event studies for individuals who are female household heads

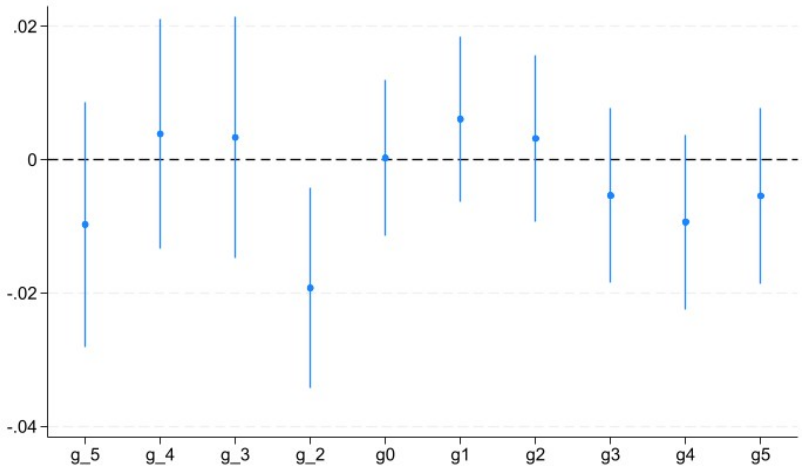


(a) Event study for labor force participation for individuals who are female household heads

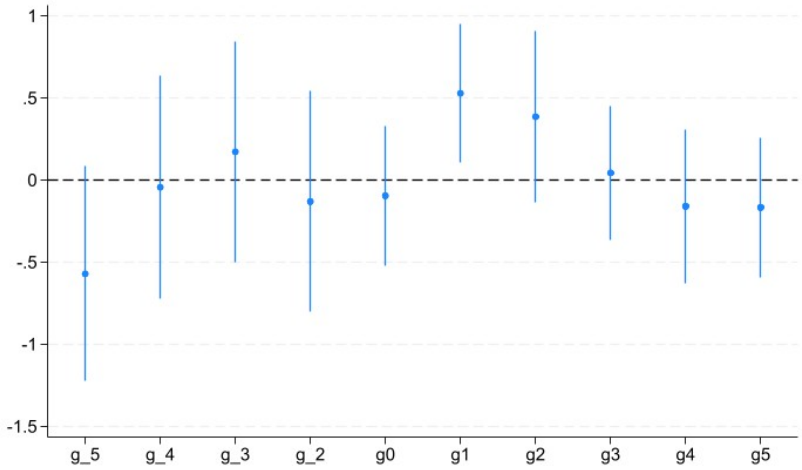


(b) Event study for hours worked for individuals who are female household heads

Figure A9: Event studies for individuals who enrolled in SNAP

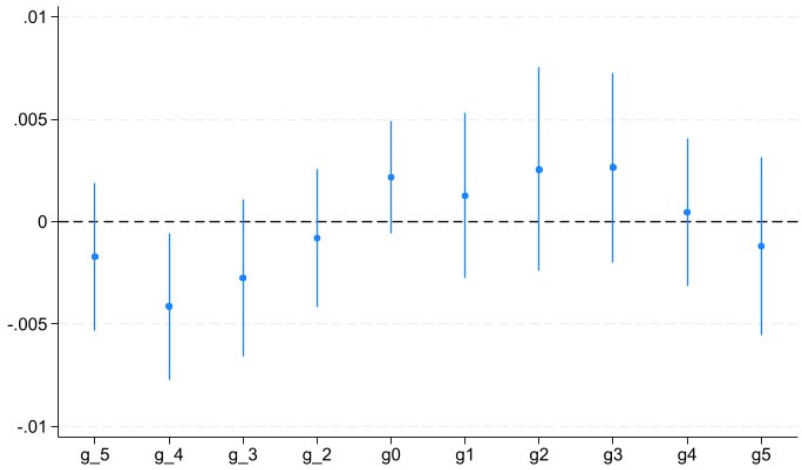


(a) Event study for labor force participation for individuals who enrolled in SNAP

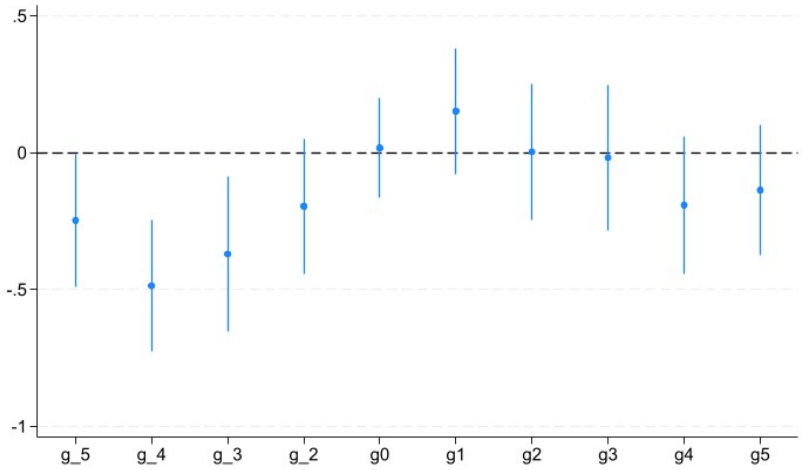


(b) Event study for hours worked for individuals who enrolled in SNAP

Figure A10: Event studies for individuals who did not enroll in SNAP



(a) Event study for labor force participation for individuals who did not enroll in SNAP



(b) Event study for hours worked for individuals who did not enroll in SNAP

Table A1: Poverty Guidelines by Year, Household Size, and Additional Persons

Year	1 Person	4 Persons	$ For Each Additional Person
2021	$12,880	$26,500	$4,540
2020	$12,760	$26,200	$4,480
2019	$12,490	$25,750	$4,420
2018	$12,140	$25,100	$4,320
2017	$12,060	$24,600	$4,180
2016	$11,880	$24,300	$4,160
2015	$11,770	$24,250	$4,160
2014	$11,670	$23,850	$4,060
2013	$11,490	$23,550	$4,020
2012	$11,170	$23,050	$3,960
2011	$10,890	$22,350	$3,820
2010	$10,830	$22,050	$3,740
2009	$10,830	$22,050	$3,740
2008	$10,400	$21,200	$3,600
2007	$10,210	$20,650	$3,480
2006	$9,800	$20,000	$3,400
2005	$9,570	$19,350	$3,260
2004	$9,310	$18,850	$3,180
2003	$8,980	$18,400	$3,140
2002	$8,860	$18,100	$3,080
2001	$8,590	$17,650	$3,020
2000	$8,350	$17,050	$2,900
1999	$8,240	$16,700	$2,820
1998	$8,050	$16,450	$2,800
1997	$7,890	$16,050	$2,720
1996	$7,740	$15,600	$2,620

Table A2: Gross Income Limit by State

State	Gross Income Limit
Alabama	130%
Arizona	185%
California	200%
Colorado	200%
Connecticut	185%
Delaware	200%
District of Columbia	200%
Florida	200%
Georgia	130%
Guam	165%
Hawaii	200%
Idaho	130%
Illinois	165%
Indiana	130%
Iowa	160%
Kentucky	200%
Louisiana	130%
Maine	185%
Maryland	200%
Massachusetts	200%
Michigan	200%
Minnesota	165%
Montana	200%
Nebraska	130%
Nevada	200%
New Hampshire	185%
New Jersey	185%
New Mexico	165%
New York	200%
North Carolina	200%
North Dakota	200%
Ohio	130%
Oklahoma	130%
Oregon	185%
Pennsylvania	160%
Texas	165%
Vermont	185%
Virginia	200%
Washington	200%
West Virginia	200%
Wisconsin	200%

Source: https://www.fns.usda.gov/snap/broad-based-categorical-eligibility

Table A3: Impact of expansion on dependent variables: hours worked and labor force participation

	(1) LFP	(2) Hours worked
Expansion	0.001	0.082
	(0.002)	(0.097)
Age	-0.001**	0.154***
	(0.000)	(0.003)
Education	0.031***	0.788***
	(0.001)	(0.031)
Married	0.052***	2.080***
	(0.003)	(0.058)
Male	0.117***	4.183***
	(0.006)	(0.110)
Black	-0.016**	-0.943***
	(0.005)	(0.092)
Number of children under 5	-0.003	0.939***
	(0.002)	(0.042)
Unemployment rate	-0.001	-0.545***
	(0.001)	(0.039)
N	2825649	2077362
R^2	0.071	0.118

Labor force participation and hours worked as the dependent variables in the two regressions.
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A4: Impact of log of real gross state product on expansion and the intensity with which states relaxed their eligibility

	(1) Expansion	(2) Intensity
Log (Real GSP)	0.0688	0.124
	(0.0525)	(0.295)
Constant	-0.949	-0.531
	(1.338)	(7.516)
N	51	51
R^2	0.034	0.004

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A5: Triple difference for Labor Force Participation (LFP)

	(1) LFP	(2) LFP	(3) LFP	(4) LFP	(5) LFP
Treatment Group (TG)	-0.049***				
	(0.004)				
Expansion (Exp) * TG	0.022***				
	(0.004)				
TG 2		-0.049***			
		(0.005)			
Exp * TG 2		-0.008			
		(0.006)			
TG 3			-0.051***		
			(0.005)		
Exp * TG 3			0.033***		
			(0.006)		
TG 4				-0.041***	
				(0.004)	
Exp * TG 4				0.020**	
				(0.006)	
TG 5					-0.039***
					(0.003)
Exp * TG 5					0.020**
					(0.006)
Expansion	0.011*	0.011*	-0.001	0.004	0.004
	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)
Age	-0.008***	-0.009***	-0.008***	-0.008***	-0.008***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.041***	0.043***	0.038***	0.040***	0.037***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)
Married	0.126***	0.128***	0.124***	0.124***	0.121***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)
Male	0.101***	0.099***	0.112***	0.103***	0.104***
	(0.004)	(0.004)	(0.011)	(0.004)	(0.007)
Black	0.021*	0.017	0.011	0.024***	0.009
	(0.007)	(0.011)	(0.009)	(0.006)	(0.009)
Number of children under 5	-0.014*	-0.022***	-0.014**	-0.017***	-0.009
	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)
Unemployment rate	-0.005*	-0.006*	-0.003	-0.001	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
N	586981	585805	811780	833000	1613750
R^2	0.176	0.194	0.167	0.176	0.169
State group	1	2	3	4	5

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Here Treated Group (TG) refers to the individuals who have newly become eligible and were not eligible previously.

For state group 1 it is the group of individuals with incomes between 130-150% of the FPL and so on for the other state groups.

Table A6: Triple difference for hours worked

	(1)	(2)	(3)	(4)	(5)
	Hours worked	Hours worked	Hours worked	Hours worked	Hours worked
TG	-2.041***				
	(0.132)				
Exp * TG	0.490***				
	(0.079)				
TG 2		-2.087***			
		(0.165)			
Exp * TG 2		-0.102			
		(0.221)			
TG 3			-2.064***		
			(0.155)		
Exp * TG 3			1.026***		
			(0.116)		
TG 4				-1.789***	
				(0.169)	
Exp * TG 4				0.505	
				(0.283)	
TG 5					-1.634***
					(0.153)
Exp * TG 5					0.415
					(0.227)
Expansion	0.673***	0.505**	-0.150	0.346	0.264
	(0.127)	(0.140)	(0.322)	(0.281)	(0.136)
Age	-0.190***	-0.213***	-0.191***	-0.201***	-0.203***
	(0.121)	(0.009)	(0.011)	(0.009)	(0.014)
Education	1.654***	1.771***	1.569***	1.627***	1.499***
	(0.056)	(0.038)	(0.102)	(0.057)	(0.112)
Married	5.487***	5.726***	5.639***	5.575***	5.378***
	(0.197)	(0.264)	(0.190)	(0.209)	(0.206)
Male	5.484***	5.689***	6.041***	5.718***	5.440***
	(0.225)	(0.252)	(0.395)	(0.244)	(0.220)
Black	0.415	0.332	-0.209	0.399	-0.148
	(0.238)	(0.344)	(0.370)	(0.248)	(0.298)
Number of children under 5	-0.129	-0.397*	-0.041	-0.281*	0.057
	(0.228)	(0.130)	(0.159)	(0.113)	(0.152)
Unemployment rate	-0.454**	-0.598***	-0.421***	-0.362***	-0.391***
	(0.105)	(0.082)	(0.095)	(0.085)	(0.054)
N	530093	532433	735569	759943	1458733
R^2	0.213	0.220	0.207	0.211	0.209
State group	1	2	3	4	5

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Here Treated Group (TG) refers to the individuals who have newly become eligible and were not eligible previously.

For state group 1 it is the group of individuals with incomes between 130-150% of the FPL and so on for the other state groups.

B Chapter 2

Table B1: Gross Income Limit by State

State	Gross Income Limit
Alabama	130%
Arizona	185%
California	200%
Colorado	200%
Connecticut	185%
Delaware	200%
District of Columbia	200%
Florida	200%
Georgia	130%
Guam	165%
Hawaii	200%
Idaho	130%
Illinois	165%
Indiana	130%
Iowa	160%
Kentucky	200%
Louisiana	130%
Maine	185%
Maryland	200%
Massachusetts	200%
Michigan	200%
Minnesota	165%
Montana	200%
Nebraska	130%
Nevada	200%
New Hampshire	185%
New Jersey	185%
New Mexico	165%
New York	200%
North Carolina	200%
North Dakota	200%
Ohio	130%
Oklahoma	130%
Oregon	185%
Pennsylvania	160%
Texas	165%
Vermont	185%
Virginia	200%
Washington	200%
West Virginia	200%
Wisconsin	200%

Source: https://www.fns.usda.gov/snap/broad-based-categorical-eligibility

Table B2: Summary statistics table

	All	**SNAP Recipient**	**Non SNAP Recipient**	**Difference**
Teen Birth	0.247	0.328	0.212	0.116***
	(0.431)	(0.470)	(0.409)	(19.4)
SNAP (in Dollar Value)	1064.960	3494.454	0.000	3494.454***
	(2136.941)	(2548.455)	(0.000)	(180.000)
Married	0.487	0.330	0.557	-0.227***
	(0.500)	(0.470)	(0.497)	(-33.223)
Black	0.108	0.155	0.088	0.067***
	(0.310)	(0.3616)	(0.283)	(15.553)
Family Size	4.091	4.257	4.019	0.238***
	(1.633)	(1.669)	(1.612)	(10.479)
Log Household Income	10.154	9.572	10.409	-0.837***
	(0.981)	(0.997)	(0.857)	(-66.510)
Income Inequality	10.091	10.104	10.085	0.020***
	(0.149)	(0.148)	(0.150)	(9.421)
LFP	0.527	0.509	0.535	-0.026***
	(0.499)	(0.500)	(0.499)	(-3.765)
EITC	0.095	0.103	0.092	0.011***
	(0.162)	(0.168)	(0.160)	(4.886)
Poverty Rate	13.406	13.727	13.266	0.461***
	(2.964)	(3.011)	(2.932)	(11.181)
State Min Wage	6.921	7.009	6.882	0.128***
	(1.511)	(1.481)	(1.523)	(6.052)
Unemployment	6.072	6.201	6.016	0.185***
	(2.177)	(2.176)	(2.175)	(6.099)
MSA	2.420	0.386	0.357	0.029***
	(0.950)	(0.487)	(0.479)	(4.293)
No of Observations	24216	7380	16836	24216

Mean values with SD in parentheses; t-stat in parentheses for differences

Table B3: Summary Statistics - According to race

	White	**Black**	**Hispanic**	**Asian**
Teen Birth	0.250	0.290	0.240	0.090
	(0.430)	(0.460)	(0.430)	(0.290)
SNAP (in Dollar Value)	971.290	1586.580	979.780	796.130
	(2037.690)	(2481.460)	(2052.690)	(1932.180)
Married	0.530	0.230	0.560	0.600
	(0.500)	(0.420)	(0.500)	(0.490)
Black	0.000	0.900	0.000	0.000
	(0.000)	(0.300)	(0.000)	(0.000)
Family Size	4.150	3.700	4.320	4.150
	(1.600)	(1.680)	(1.590)	(1.770)
Log Household Income	10.190	9.840	10.180	10.500
	(0.950)	(1.070)	(0.930)	(0.980)
LFP	0.530	0.550	0.540	0.510
	(0.500)	(0.500)	(0.500)	(0.500)
EITC	0.090	0.140	0.090	0.130
	(0.150)	(0.200)	(0.160)	(0.190)
Poverty Rate	13.440	13.620	13.650	12.510
	(2.920)	(3.240)	(2.770)	(2.760)
State Min Wage	6.960	6.520	7.160	7.580
	(1.510)	(1.370)	(1.550)	(1.460)
Unemployment	6.110	5.960	6.250	5.960
	(2.190)	(2.000)	(2.270)	(2.390)
MSA	0.350	0.440	0.440	0.480
	(0.480)	(0.500)	(0.500)	(0.500)
No of Observations	19,395	2,902	14,372	825

Mean values with SD in parentheses

Table B4: Summary Statistics - According to Region

	Northeast	**Midwest**	**West**	**South**
Teen Birth	0.230	0.270	0.220	0.270
	(0.420)	(0.440)	(0.420)	(0.450)
SNAP (in Dollar Value)	1124.780	1310.900	875.090	1130.030
	(2089.440)	(2333.180)	(1978.240)	(2213.340)
Married	0.410	0.450	0.560	0.470
	(0.490)	(0.500)	(0.500)	(0.500)
Black	0.130	0.140	0.010	0.180
	(0.330)	(0.350)	(0.110)	(0.390)
Family Size	3.800	4.060	4.350	3.970
	(1.560)	(1.700)	(1.670)	(1.560)
Log Household Income	10.130	10.060	10.260	10.100
	(1.050)	(1.040)	(0.900)	(1.000)
LFP	0.540	0.560	0.530	0.510
	(0.500)	(0.500)	(0.500)	(0.500)
EITC	0.300	0.150	0.030	0.040
	(0.210)	(0.160)	(0.070)	(0.120)
Poverty Rate	11.750	11.570	13.370	14.920
	(2.670)	(1.930)	(2.710)	(2.850)
State Min Wage	7.040	6.460	7.610	6.360
	(1.430)	(1.460)	(1.630)	(1.090)
Unemployment	5.960	5.600	6.630	5.760
	(1.910)	(2.040)	(2.540)	(1.800)
MSA	0.470	0.340	0.410	0.280
	(0.500)	(0.470)	(0.490)	(0.450)
No of Observations	3,869	3,359	8,484	8,504

Mean values with SD in parentheses

Table B5: OLS Regressions - Dependent Variable: Teen Birth

	(1)	(2)	(3)	(4)	(5)	(6)
Log (SNAP)	0.059***	0.058***	0.018**	0.018**	0.018**	0.018**
	(7.540)	(7.520)	(2.570)	(2.550)	(2.570)	(2.520)
Married		-0.011	-0.060***	-0.059***	-0.060***	-0.059***
		(-0.740)	(-3.810)	(-3.870)	(-3.810)	(-3.850)
Black		0.063***	0.063**	0.063**	0.063**	0.065**
		(2.430)	(2.330)	(2.310)	(2.330)	(2.440)
Family Size			0.061***	0.061***	0.061***	0.061***
			(15.330)	(15.340)	(15.340)	(15.390)
Log (HH Income)			-0.031***	-0.031***	-0.031***	-0.031***
			(-4.590)	(-4.590)	(-4.590)	(-4.570)
LFP				0.013		0.013
				(0.800)		(0.800)
Poverty Rate				-0.003		-0.004
				(-0.650)		(-0.790)
State Min Wage				-0.010		-0.010
				(-1.120)		(-1.210)
Unemployment				0.003		0.002
				(0.350)		(0.280)
EITC				0.042		0.048
				(0.450)		(0.510)
Income Inequality					-0.067	-0.096
					(-0.720)	(-1.080)
Occ FE	No	Yes	Yes	Yes	Yes	Yes
MSA FE	No	No	No	No	No	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R sq	0.040	0.044	0.078	0.078	0.078	0.079
No of Observations	7,380	7,380	7,380	7,380	7,380	7,380

t-statistics in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B6: Instrumental Variable Regressions - Dependent Variable: Teen Birth

	(1)	(2)	(3)	(4)	(5)	(6)
Log (SNAP)	0.294***	0.308***	0.289***	0.290***	0.289***	0.291***
	(11.630)	(11.940)	(13.190)	(13.360)	(13.210)	(13.580)
Married		-0.022	-0.039**	-0.039**	-0.039**	-0.039**
		(-1.110)	(-2.050)	(-2.120)	(-2.050)	(-2.120)
Black	0.027	0.037	0.037	0.037	0.037	0.041
	(0.920)	(1.310)	(1.290)	(1.310)	(1.290)	(1.490)
Log (HH Income)			0.040***	0.040***	0.040***	0.041***
			(4.740)	(4.820)	(4.730)	(4.870)
LFP				0.001		0.001
				(0.080)		(0.080)
Poverty Rate				-0.003		-0.004
				(-0.520)		(-0.660)
State Min Wage				-0.014		-0.015
				(-1.310)		(-1.430)
Unemployment				-0.003		-0.004
				(-0.360)		(-0.450)
EITC				0.069		0.076
				(0.790)		(0.850)
Income Inequality					-0.064	-0.109
					(-0.540)	(-0.880)
MSA						-0.018
						(-0.940)
Occ FE	No	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	7,380	7,380	7,380	7,380	7,380	7,380

t-statistics in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B7: IV First Stage Results - Dependent Variable: Log (SNAP)

	(1)	(2)	(3)	(4)	(5)	(6)
Cash & Food	0.263***	0.291***	0.378***	0.477***	0.378***	0.476***
Assistance	(4.010)	(4.510)	(4.990)	(5.940)	(5.020)	(5.970)
Log (Elig. Criteria)	1.035***	1.131***	1.268***	1.281***	1.268***	1.280***
	(15.620)	(14.760)	(16.450)	(16.150)	(16.480)	(16.370)
Married		-0.158***	-0.069**	-0.067**	-0.069**	-0.067**
		(-4.710)	(-2.260)	(-2.190)	(-2.270)	(-2.180)
Black		0.152**	0.105*	0.108*	0.105*	0.099
		(2.250)	(1.740)	(1.780)	(1.750)	(1.610)
Log (HH Income)			-0.253***	-0.255***	-0.253***	-0.255***
			(-11.750)	(-11.900)	(-11.750)	(-11.910)
LFP				0.036		0.036
				(1.340)		(1.340)
Poverty Rate				-0.008		-0.008
				(-0.630)		(-0.620)
State Min Wage				-0.002		-0.002
				(-0.080)		(-0.080)
Unemployment				-0.006		-0.005
				(-0.440)		(-0.370)
EITC				-0.692**		-0.689**
				(-2.420)		(-2.380)
Income Inequality					0.002	-0.026
					(0.010)	(-0.090)
MSA						0.040
						(1.580)
Occ FE	No	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R sq	0.151	0.163	0.228	0.229	0.228	0.230
No of Observations	7,379	7,379	7,379	7,379	7,379	7,379

t-statistics in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B8: Logit Regression with IV (Predicted log (SNAP) - Dependent Variable: Teen Birth

	(1)	(2)	(3)	(4)	(5)	(6)
Pred. Log (SNAP)	0.280***	0.282***	0.113***	0.142***	0.114***	0.146***
	(21.450)	(21.690)	(3.450)	(3.960)	(3.430)	(4.070)
Married		-0.017	-	-	-	-
			0.035***	0.028***	0.035***	0.027***
		(-1.620)	(-3.990)	(-3.100)	(-3.930)	(-3.120)
Black		0.011	0.017	0.013	0.017	0.014
		(0.770)	(1.070)	(0.820)	(1.050)	(0.870)
Family Size			0.034***	0.029***	0.034***	0.029***
			(5.370)	(4.370)	(5.350)	(4.350)
Log (HH Income)			-	-	-	-
			0.036***	0.037***	0.036***	0.037***
			(-	(-	(-	(-
			11.980)	11.910)	11.940)	11.910)
LFP				0.029***		0.029***
				(4.220)		(4.190)
Poverty Rate				-0.001		-0.001
				(-0.400)		(-0.350)
State Min Wage				-0.012*		-0.012*
				(-1.810)		(-1.750)
Unemployment				-0.004		-0.004
				(-0.920)		(-0.930)
EITC				0.083		0.081
				(1.280)		(1.230)
Income Inequality					0.057	0.057
					(0.770)	(0.410)
Occ FE	No	Yes	Yes	Yes	Yes	Yes
MSA FE	No	No	No	No	No	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R sq	0.045	0.048	0.056	0.057	0.056	0.057
No of Observations	24,216	24,216	24,216	24,216	24,216	24,216

All coefficients are marginal effects
t-statistics in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B9: Logit Regression without IV - Dependent Variable: Teen Birth

	(1)	(2)	(3)	(4)	(5)	(6)
Log (SNAP)	0.063***	0.062***	0.020**	0.020**	0.020**	0.020**
	(7.830)	(7.720)	(2.750)	(2.730)	(2.750)	(2.690)
Married		-0.011	-	-	-	-
			0.056***	0.055***	0.056***	0.056***
		(-0.730)	(-3.590)	(-3.630)	(-3.590)	(-3.620)
Black		0.058**	0.058**	0.058**	0.058**	0.060**
		(2.400)	(2.280)	(2.260)	(2.280)	(2.400)
Family Size			0.058***	0.058***	0.058***	0.058***
			(15.540)	(15.590)	(15.560)	(15.700)
Log (HH Income)			-	-	-	-
			0.030***	0.030***	0.030***	0.030***
			(-4.700)	(-4.700)	(-4.700)	(-4.670)
LFP				0.013		0.013
				(0.810)		(0.810)
Poverty Rate				-0.003		-0.004
				(-0.680)		(-0.810)
State Min Wage				-0.012		-0.013
				(-1.300)		(-1.380)
Unemployment				0.003		0.003
				(0.380)		(0.310)
EITC				0.043		0.049
				(0.450)		(0.510)
Income Inequality					-0.067	-0.095
					(-0.730)	(-1.100)
Occ FE	No	Yes	Yes	Yes	Yes	Yes
MSA FE	No	No	No	No	No	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R sq	0.035	0.035	0.062	0.062	0.062	0.063
No of Observations	7,380	7,380	7,380	7,380	7,380	7,380

All coefficients are marginal effects
t-statistics in parentheses
** p<0.05, ** p<0.01, *** p<0.001*

Table B10: Dependent Variable: Teenbirth

	(1)	(2)	(3)	(4)
White x Predicted Log (SNAP)	0.056**			
	(2.100)			
White	-0.423**			
	(-2.070)			
Black x Predicted Log (SNAP)		-0.003		
		(-0.120)		
Black		0.0535		
		(0.260)		
Hispanic x Predicted Log (SNAP)			0.042**	
			(2.320)	
Hispanic			-0.326**	
			(-2.390)	
Asian x Predicted Log (SNAP)				0.005***
				(4.990)
Asian				-0.034***
				(-4.600)
All Other Controls	Yes	Yes	Yes	Yes
No of Observations	24,216	24,216	24,216	24,216

Table B11: Dependent Variable: Teenbirth

	(1)	(2)	(3)	(4)
Northeast x Predicted Log (SNAP)	0.045			
	(1.530)			
Northeast	-0.485**			
	(-2.160)			
Midwest x Predicted Log (SNAP)		-0.025		
		(-0.880)		
Midwest		0.051		
		(0.230)		
West x Predicted Log (SNAP)			0.016	
			(1.080)	
West			-0.191*	
			(-1.740)	
South x Predicted Log (SNAP)				0.029
				(1.410)
South				-0.158
				(-1.010)
All Other Controls	Yes	Yes	Yes	Yes
No of Observations	24,216	24,216	24,216	24,216

Table B12: Dependent Variable: Teenbirth (2001-2010 vs 2011-2019)

	2001-2010				2011-2019			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
White x Pr. Log (SNAP)	0.059**				0.113**			
	(2.420)				(2.470)			
White	-0.440**				-0.887**			
	(-2.340)				(-2.510)			
Black x Pr. Log (SNAP)		0.0143				-0.038		
		(0.520)				(-0.740)		
Black		-				0.328		
		0.073						
		(-0.340)				(0.810)		
Hisp. x Pr. Log (SNAP)			0.013				0.119***	
			(0.900)				(2.990)	
Hispanic			-				-0.946***	
			0.107					
			(-0.960)				(-3.030)	
Asian x Pr. Log (SNAP)								0.005***
								(4.990)
Asian								-0.034***
								(-4.600)
All Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	14,259	14,259	14,259	14,259	9,957	9,957	9,957	9,957

Table B13: Dependent Variable: Teenbirth (2001-2010 vs 2011-2019)

	2001-2010				2011-2019			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NE x Pr. Log (SNAP)	0.061***				0.029			
	(3.020)				(0.500)			
Northeast	-0.517***				-0.626			
	(-3.410)				(-1.320)			
MW x Pr. Log (SNAP)		-0.003				-0.091**		
		(-0.100)				(-2.030)		
Midwest		-0.058				0.514		
		(-0.230)				(1.480)		
W x Pr. Log (SNAP)			-0.004				0.083***	
			(-0.240)				(2.900)	
West			0.057				-0.812***	
			(0.410)				(-3.710)	
S x Pr. Log (SNAP)				0.039*				0.054
				(1.940)				(1.640)
South				-0.330**				-0.279
				(-2.100)				(-1.110)
All Other Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	14,259	14,259	14,259	14,259	9,957	9,957	9,957	9,957

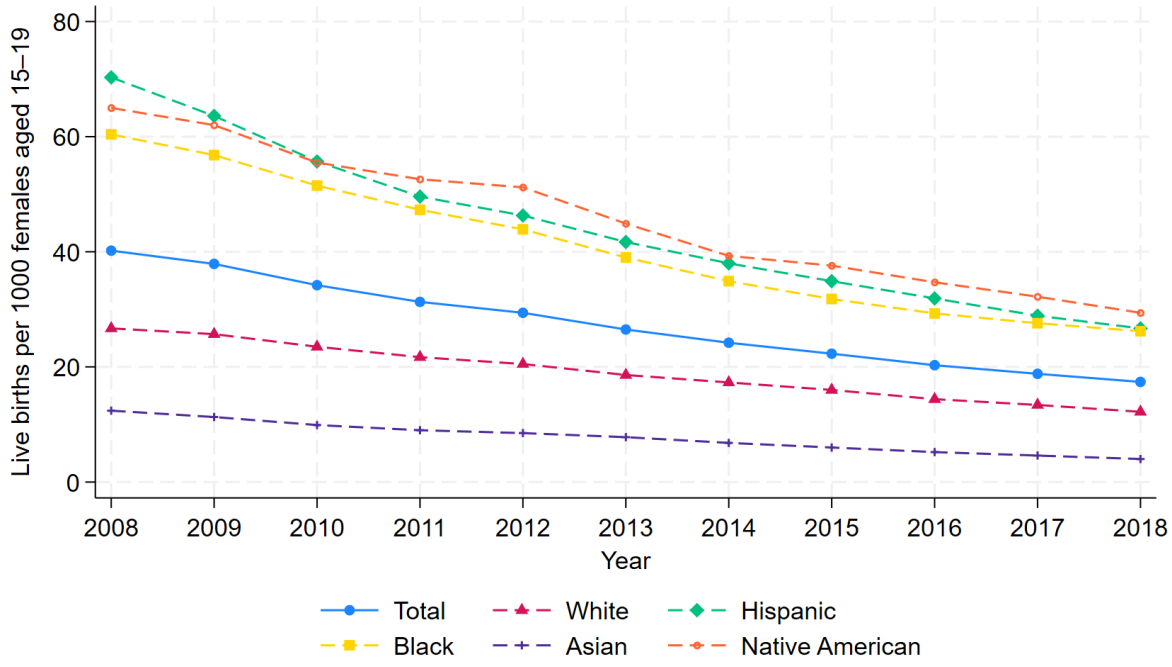
Table B14: Dependent Variable: Teenbirth by Marital Status

	Married	**Divorced**	**Separated**	**Never Married**
Predicted Log (SNAP)	-1.898***	0.486***	0.412***	0.769***
	(-15.510)	(8.690)	(5.970)	(9.850)
Black	0.028	-0.084***	-0.074***	0.060***
	(0.900)	(-9.660)	(-7.830)	(3.370)
Family Size	0.385***	-0.112***	-0.073***	-0.129***
	(30.730)	(-11.370)	(-6.020)	(-10.100)
Log Household Income	0.057***	0.002	-0.022***	-0.069***
	(7.690)	(0.540)	(-9.340)	(-16.140)
LFP	-0.199***	0.107***	0.116***	0.152***
	(-22.280)	(18.390)	(16.150)	(15.760)
Poverty Rate	0.025**	-0.007**	-0.007	-0.004
	(2.000)	(-1.990)	(-1.470)	(-0.990)
State Min Wage	0.030	-0.010	-0.003	-0.014
	(1.180)	(-1.320)	(-0.360)	(-1.030)
Unemployment	0.034**	-0.014**	-0.009	-0.014
	(1.990)	(-2.010)	(-1.590)	(-1.380)
EITC	0.082	-0.018	-0.044	0.034
	(0.310)	(-0.260)	(-0.530)	(0.300)
MSA	0.058***	-0.021***	0.001	0.006
	(7.640)	(-3.660)	(0.240)	(0.650)
Occ FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R sq	0.495	0.127	0.137	0.224
No of Observations	24,216	24,216	24,216	24,216

Table B15: Labor Force Participation and Unemployment Results

	Labor Force Participation			Unemployed		
	(1)	(2)	(3)	(4)	(5)	(6)
Pr. Log (SNAP)	-0.714***	-0.793***	-0.819***	0.080***	0.072***	0.079***
	(-11.030)	(-9.580)	(-9.250)	(4.730)	(4.100)	(4.490)
Married	-0.183***	-0.195***	-0.198***	0.007	0.005	0.006
	(-13.480)	(-11.950)	(-11.570)	(0.880)	(0.710)	(0.810)
Black	0.087***	0.094***	0.089***	0.022***	0.023***	0.025***
	(7.770)	(7.840)	(7.390)	(3.430)	(3.570)	(3.930)
Family Size	0.122***	0.136***	0.140***	-0.007**	-0.005	-0.006*
	(10.670)	(10.660)	(10.230)	(-2.060)	(-1.590)	(-1.920)
Log (HH Income)	0.025***	0.025***	0.026***	-0.027***	-0.027***	-0.027***
	(7.560)	(7.710)	(7.700)	(-17.550)	(-17.590)	(-17.750)
Unemployment	0.033***	0.034***		0.006**	0.006**	
	(2.750)	(2.780)		(2.160)	(2.030)	
EITC	-0.317***	-0.320***		-0.028	-0.028	
	(-3.360)	(-3.250)		(-0.770)	(-0.760)	
MSA			0.035***			-0.0120***
			(5.650)			(-3.08)
Occ FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R sq	0.514	0.517	0.518	0.134	0.135	0.136
No of Observations	24,216	24,216	24,216	24,216	24,216	24,216

Figure B1: Teen Births by Race and Ethnicity, 20082018



Source: National Center for Health Statistics.
https://www.cdc.gov/nchs/hus/contents2019.htm#Figure-007

Figure B2: Year and type of non-cash categorical eligibility for all the US states

	Year and Type of Non-Cash Categorical Eligibility									
State	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Alabama	None									Broad
Alaska	Narrow									
Arizona	Narrow						Broad			
Arkansas	Narrow									
California	Narrow								Broad	
Colorado	Narrow									
Connecticut	Narrow								Broad	
Delaware	Broad									
District of Columbia	None									Broad
Florida	None		Narrow							Broad
Georgia	Narrow							Broad		
Guam	None								Broad	
Hawaii	Narrow									
Idaho	None								Broad	
Illinois	None									Broad
Indiana	Narrow									
Iowa	None									
Kansas	Narrow									
Kentucky	Narrow									Broad
Louisiana	Narrow									Broad
Maine	Broad									
Maryland	Broad									
Massachusetts	Broad									
Michigan	Broad									
Minnesota	Narrow					Broad				
Mississippi	None									Broad
Missouri	Narrow									

Source: Memo (2010)

Figure B3: Year and type of non-cash categorical eligibility for all the US states (continued)

	Year and Type of Expanded Categorical Eligibility									
State	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Montana	None								Broad	
Nebraska	None		Narrow							
Nevada	Narrow								Broad	
New Hampshire	Narrow								Broad	
New Jersey	Narrow									Broad
New Mexico	Narrow									Broad
New York	None							Broad		
North Carolina	Narrow									Broad
North Dakota	Broad									
Ohio	Narrow								Broad	
Oklahoma	Narrow								Broad	
Oregon	Broad									
Pennsylvania	Narrow								Broad	
Rhode Island	None								Broad	
South Carolina	Broad									
South Dakota	None					Narrow				
Tennessee	Narrow									
Texas	None	Broad								
Utah	Narrow									
Vermont	Narrow								Broad	
Virgin Islands	None								Broad	
Virginia	Narrow									
Washington	None			Broad						
West Virginia	Narrow								Broad	
Wisconsin	Narrow			Broad						
Wyoming	None									
Total Broad	8	9	9	11	11	12	13	15	29	39
Total Narrow	28	28	30	29	29	29	28	27	18	12
Total None	17	16	14	13	13	12	12	11	6	2
Total States	53	53	53	53	53	53	53	53	53	53

Source: Memo (2010)

C Chapter 3

Figure C1: Scatterplot showing the relationship between log(SNAP value) and Age at first birth for single highschool dropout mothers aged 15-40 years. Data was collapsed at the state-level to get one point for each of the states and then plotted to find out the correlation between age at first brith and log (SNAP).

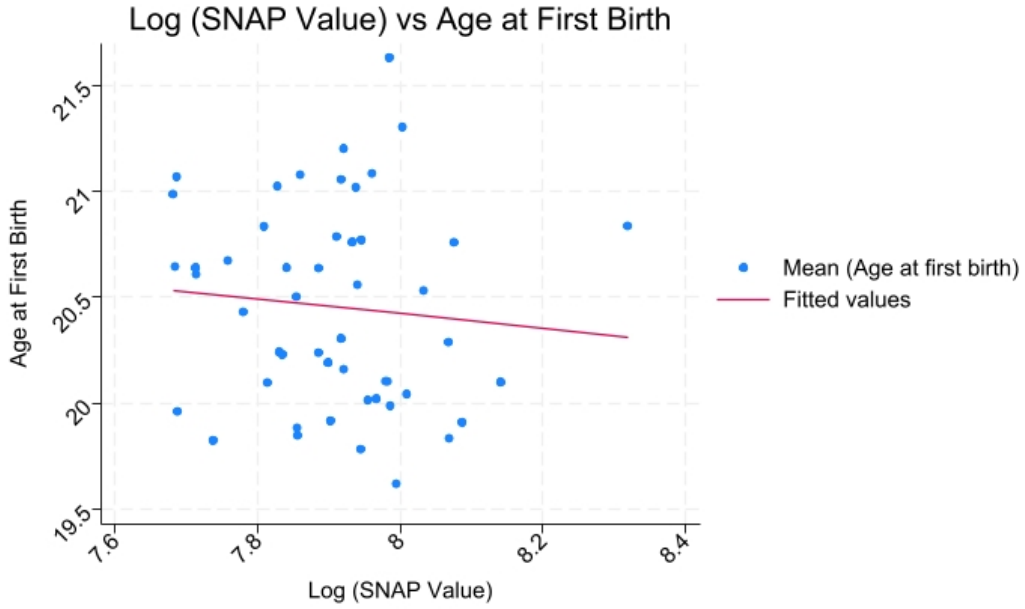


Table C1: SNAP Benefits by Household Size for Fiscal Year 2024

Household Size	**Maximum Monthly Benefit, Fiscal Year 2024**	**Difference from Previous Size**
1	$291	-
2	$535	$244
3	$766	$231
4	$973	$207
5	$1,155	$182
6	$1,386	$231
7	$1,532	$146
8	$1,751	$219
Each additional person	$219	-

Source: SNAP FY 2024 Cost-of-Living Adjustments, USDA, August 3, 2023, https://www.fns.usda.gov/snap/fy-2024-cola

Table C2: Summary Statistics

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Year	30,672	2009.156	5.345	2001.000	2019.000
State	30,672	26.790	16.855	1.000	56.000
SNAP Value	30,672	1143.193	2192.324	0.000	24999.000
Log (SNAP Value)	30,672	2.550	3.713	0.000	10.127
Married	30,672	0.463	0.499	0.000	1.000
Black	30,672	0.141	0.348	0.000	1.000
Management Occupation	30,672	0.004	0.062	0.000	1.000
Professional Occupation	30,672	0.024	0.153	0.000	1.000
Service Occupation	30,672	0.042	0.200	0.000	1.000
Sales/Office Occupation	30,672	0.039	0.195	0.000	1.000
Natural Resources/Construction	30,672	0.019	0.137	0.000	1.000
Production/Transportation	30,672	0.159	0.366	0.000	1.000
Labor Force Participation (LFP)	30,672	0.556	0.497	0.000	1.000
Log (Household Income)	30,672	10.135	0.999	0.000	14.614
Family Size	30,672	4.043	1.599	2.000	16.000
Metropolitan	30,672	0.357	0.479	0.000	1.000
Unemployment Rate	30,672	6.049	2.157	2.100	13.700

Note: This table shows the mean, standard deviations, minimum and maximum values for all the key variables. There are a total of 30672 observations.

Table C3: Dependent Variable: Age at First Birth

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Log (SNAP)	-0.250***	-0.240***	-0.249***	-0.119***	-0.118***
	(-16.060)	(-15.250)	(-15.700)	(-7.370)	(-7.410)
Married				0.341**	0.347**
				(2.760)	(2.830)
Number of Children				-1.198***	-1.197***
				(-13.390)	(-13.400)
Black				-0.328	-0.305
				(-1.670)	(-1.590)
Family Size				-0.260***	-0.261***
				(-5.490)	(-5.470)
Log Household Income				0.214***	0.220***
				(3.540)	(3.800)
Employment Status				0.016**	0.017**
				(2.860)	(3.340)
Unemployment				-0.078	-0.076
				(-1.910)	(-1.880)
MSA				0.031	0.026
				(0.280)	(0.230)
Occ FE	No	No	No	No	Yes
State FE	No	Yes	No	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
R-squared	0.027	0.038	0.041	0.131	0.132
No. of Observations	30,672	30,672	30,672	30,672	30,672

Note: t-statistics in parentheses
**** p<0.01, ** p<0.05, * p<0.1*
This table shows the impact of log (SNAP) on the age at first birth of the sample. The first column shows the results without any control or fixed effects, column (2) shows the results with state FE, column (3) with year FE, column (4) with both state and year FE along with controls, while column 5 with controls and state, year and occupation FE

Table C4: Dependent Variable: Age at First Birth

	White	**Black**	**Asian**	**Hispanic**
Log (SNAP Value)	-0.096***	-0.204***	-0.057	-0.064***
	(-5.240)	(-6.950)	(-0.850)	(-3.510)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
All Other Controls	Yes	Yes	Yes	Yes
R-squared	0.123	0.153	0.199	0.147
No. of Observations	23,316	4,551	866	15,823

Notes: t-statistics in parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Controls include married, number of children, family size, log household income, employment status, unemployment rate, and MSA

Table C5: Dependent Variable: Age at First Birth

	Northeast	**Midwest**	**South**	**West**
Log (SNAP Value)	-0.138*	-0.170***	-0.110**	-0.088***
	(-2.790)	(-11.260)	(-3.970)	(-9.040)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
All Other Controls	Yes	Yes	Yes	Yes
R-squared	0.132	0.120	0.132	0.131
No. of Observations	4,882	4,669	10,669	9,884

Notes: t-statistics in parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Controls include married, number of children, black, family size, log household income, employment status, unemployment rate, and MSA

Table C6: Dependent Variable: Age at First Birth

	Age under 19	**Age 20-25**	**Age 26-30**	**Age 31-40**
Log (SNAP Value)	0.013**	-0.021**	-0.005	-0.019
	(2.740)	(-3.230)	(-0.790)	(-1.370)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
All Other Controls	Yes	Yes	Yes	Yes
R-squared	0.034	0.0254	0.035	0.041
No. of Observations	8,660	12,199	5,459	4,354

Notes: t-statistics parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Age group 1: Age at first birth $\leq$ 19; *Age group 2:* 20 $\leq$ Age at first birth $\leq$ 25; *Age group 3:* 26 $\leq$ Age at first birth $\leq$ 30; *Age group 4:* 31 $\leq$ Age at first birth $\leq$ 40.
Controls include married, number of children, black, family size, log household income, employment status, unemployment rate, and MSA

Table C7: Dependent Variable: Age at First Birth (Age Under 19)

	White	**Black**	**Asian**	**Hispanic**
Log (SNAP Value)	0.013*	0.015	0.034	0.015**
	(2.620)	(1.470)	(0.380)	(2.680)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
All Other Controls	Yes	Yes	Yes	Yes
R-squared	0.034	0.072	0.516	0.047
No. of Observations	6,499	1,667	92	4,333

Notes: t-statistics parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Age group 1: Age at first birth ≤ 19
Controls include married, number of children, family size, log household income, employment status, unemployment rate, and MSA

Table C8: Dependent Variable: Age at First Birth (Age 20-25)

	White	**Black**	**Asian**	**Hispanic**
Log (SNAP Value)	-0.021**	-0.018	0.006	-0.006
	(-2.640)	(-1.300)	(0.220)	(-0.800)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
All Other Controls	Yes	Yes	Yes	Yes
R-squared	0.027	0.062	0.0.285	0.024
No. of Observations	9,674	1,673	306	6,512

Notes: t-statistics in parentheses
**** p<0.01, ** p<0.05, * p<0.1*
Age group 2: Age at first birth between 20 and 25 inclusive
Controls include married, number of children, family size, log household income, employment status, unemployment rate, and MSA

Table C9: Regression Results showing possible channels

	LFP	**Unemployed**	**Number of Children**
Log (SNAP)	0.000	0.007***	0.016***
	(0.190)	(11.610)	(4.690)
Married	-0.129***	-0.006	-0.146***
	(-5.390)	(-0.990)	(-4.170)
Number of children	0.056***	0.005	
	(10.060)	(1.490)	
Black	0.059**	0.044***	0.075***
	(3.310)	(5.740)	(4.610)
Employment status			-0.006***
			(-12.490)
Family Size	-0.035***	0.001	0.604***
	(-8.570)	(0.350)	(30.040)
Log Household Income	0.064***	-0.026***	-0.176***
	(15.120)	(-8.820)	(-31.750)
Unemployment	0.014**	0.008***	-0.007
	(2.830)	(3.920)	(-0.750)
MSA	0.021*	-0.009*	0.007
	(2.200)	(-2.180)	(0.510)
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R-squared	0.041	0.046	0.617
No. of Observations	30,104	30,104	30,104

Notes: t-statistics in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table C10: Regression Results showing possible channels based on Marital Status

	Married	**Divorced**	**Separated**	**Never Married**
Log (SNAP)	-0.020***	0.003***	0.004***	0.017***
	(-22.470)	(3.400)	(5.790)	(11.190)
Number of children	-0.050***	0.009**	0.030***	0.016
	(-3.640)	(3.180)	(11.010)	(1.840)
Black	-0.185***	-0.032***	-0.037***	0.231***
	(-11.170)	(-4.210)	(-5.020)	(20.060)
Family Size	0.129***	-0.030***	-0.023***	-0.024***
	(10.270)	(-13.510)	(-11.310)	(-3.660)
Log Household Income	0.058***	0.001	-0.021***	-0.078***
	(14.840)	(0.300)	(-6.410)	(-17.460)
Employment status	0.004***	-0.004***	-0.003***	-0.005***
	(4.270)	(-21.010)	(-9.480)	(-12.160)
Unemployment	-0.004	-0.002	0.000	0.001
	(-0.930)	(-0.310)	(0.010)	(0.300)
MSA	-0.015	-0.004	0.014**	0.029**
	(-1.750)	(-0.620)	(2.950)	(3.240)
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R-squared	0.239	0.039	0.050	0.195
No. of Observations	30,104	30,104	30,104	30,104

Notes: t-statistics in parentheses.
**** p<0.01, ** p<0.05, * p<0.1*