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The Introduction of the Food Stamp Program: Impacts on Food Consumption and Family Well-being

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Abstract

The food stamp program, serving 24 million persons in 2004 at a cost of $27 billion, is one of the most important income support programs in the United States. Despite this prominence, it has been relatively understudied as it has been difficult for researchers to isolate the causal impact of the Food Stamp Program on food spending, nutritional intake, labor supply and other outcomes. Because the program is national, there is not variation in program parameters (such as stark differences in state benefit levels or eligibility) that are typically exploited by researchers to measure program impacts. In this work, we leverage previously underutilized variation across counties in the date they originally implemented their Food Stamp Program in the 1960s and early 1970s. Using the Panel Study of Income Dynamics and the 1960, 1970 and 1980 Decennial Census, we employ difference-in-difference methods to estimate the impact of program availability on food spending, family income, labor supply, and health. Using the PSID, we find that that the introduction of food stamps leads to decreases in out of pocket food expenses, decreases in the propensity to eat out, and overall increases in food consumption. The results are consistent with theoretical predictions but are not precisely estimated. Results from the Census and PSID show no evidence of a significant work disincentive from introduction of food stamps.

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I. Introduction

The Food Stamp Program (FSP) is one of the largest transfer programs for the low income population. In 2004, for example, the program cost $27 billion and served 24 million persons. This compares to $25 billion for Temporary Assistance for Needy Families and $33 billion for the Earned Income Tax Credit.

The primary goal of the food stamp program is to promote nutritional well-being of low-income persons. As such, a first order question is to understand and estimate the impact of the program on nutrition, food consumption, and health outcomes. Importantly, the food stamp benefits are structured like the standard income support program—the family receives some guaranteed benefit which is then reduced as family resources increase. Therefore, to fully evaluate the efficacy of the program, it is important to know how the program and its benefit reduction rate affect labor supply and family economic well-being.

It has been very difficult for researchers to isolate the causal impact of the FSP on food spending, nutritional intake, labor supply and other outcomes. Because the program is national, there is not variation in program parameters (such as stark differences in state benefit levels or eligibility) that are typically exploited by researchers to measure program impacts. In the absence of programmatic variation, most researchers have studied the impact of the FSP by comparing food stamp recipients with eligible non-recipients. Since we would expect participants and non-participants to differ in important – and potentially unobservable – ways, researchers have employed a variety of methods to control for selection into the program (see Fraker, 1990, for a comprehensive review of the early food stamp literature).

In general, that literature has concluded that the marginal propensity to consume food out of food stamp income is about 4 times higher than it is out of cash income. As a result, food stamp benefits worth $100 are thought to cause about a $60 increase in food spending while a

cash transfer of $100 is associated with closer to a $15 increase in food spending. But, as mentioned above, these results have been based on studies that rely on strong and untested assumptions. In addition, they are focused on the impact of the type of income, and only indirectly address the more basic policy question regarding the impact on food spending and other important outcomes of a sizeable, targeted transfer to the poor.

To measure the impact of the food stamp program in this project, we utilize an underexploited source of variation: the original introduction of the program across counties.[1] There is tremendous variation in the timing of the FSP introduction across counties in the United States—the earliest county programs were established in 1961 and the last county programs were established in 1975. The FSP started as eight county-level pilot programs and later expanded to 43 counties. This led to passage of the Food Stamp Act of 1964 which gave local areas the authority to start up FSPs in their county. This led to a steady increase in FSP adoption over the next 10 years. Finally, the 1973 Amendments to the Food Stamp Act mandated that all counties offer FSP by 1975.

We begin by examining the determinants of the food stamp program start dates across counties. We are guided by the historical descriptions of the political landscape around the FSP. Using data from the 1960 City and County Data Book, we find that earlier food stamp program introduction occurs in counties that are more urban, black, low income, and with a smaller fraction of land used in agriculture. These results imply that food stamp introduction is not purely exogenous. Ignoring this could lead to spurious findings if counties that implement food stamps earlier are on a different trend than counties that implement later. We use these results to motivate the inclusion of trends interacted with county pre-treatment characteristics in our regression models.

[1] Currie and Moretti (2006) use food stamp program introduction across California counties to examine the impact of the program on birth outcomes.

We use data from the Panel Study of Income Dynamics (PSID) and the Decennial Census to address three important research questions. First, we use the PSID from 1968-1980 to examine the impact of the program on food consumption. Specifically, we look at expenditures on food spent at home, meals out, food stamp savings, and total food consumed. We estimate a difference in difference model that controls for county and year fixed effects. Based on the analysis of food stamp adoption described above, we also include 1960 county characteristics interacted with time trends. We also explore the sensitivity to controls for state linear time trends, state-year unrestricted fixed effects and family fixed effects. Our results are quite robust and consistent with theoretical predictions—out of pocket costs on food at home decline and total food consumption increases. The results, however, are largely statistically insignificant.

Second, we examine the FSP as a traditional income support program—a guaranteed benefit combined with a program phase-out or benefit reduction rate. This structure is well known to cause a disincentive to work (Moffitt 1983). While the benefit reduction rate in food stamps is quite low compared to cash welfare programs, standard labor supply models would predict that food stamps would reduce employment and hours worked. We use county level tabulations (STF) data from the 1960, 1970, and 1980 to examine impacts of food stamp introduction on labor force participation and family income. As above, we estimate a difference in difference model with controls for county and year fixed effects and 1960 county characteristics interacted with year. The results provide no evidence that work or income levels are lower after program introduction.

Third, we examine the impact of the FSP on health. Evaluating the impact of the program on nutrition and health using this research design is quite limited by available data.[2] Here we present estimates from the PSID which provides information on the health status of the head—in

[2] Recall that we need data spanning the 1960s and 1970s that identifies county of residence.

particular we use data on the number of hours of work lost due to illness. Other studies (Currie and Moretti 2006; Almond, Chay, Hoynes and Schanzenbach 2006) use detailed natality data to estimate the impact of food stamp program introduction on birth outcomes.

The remainder of the paper proceeds as follows. Section II presents a history of the food stamp program. Section III discusses the expected effects of the program and Section IV reviews the existing literature. Section V describes the data and Section VI presents the methodology. Section VII presents our results and Section VIII concludes.

II. Introduction of Food Stamp Program

The origins of the modern Food Stamp Program began in 1961 with President Kennedy's first executive order establishing eight county-level pilot programs.[3] The pilot programs were later expanded to 43 counties in 1962 and 1963. The success with these pilot programs led to the Food Stamp Act of 1964 (FSA). The FSA gave local areas the authority to start up Food Stamp Programs (FSP) in their county. As with the current FSP, the program was federally funded and benefit levels did not vary across areas. In the period following the passage of the FSA, there was a steady stream of counties initiating food stamp programs. Support for requiring food stamp programs grew due to a national spotlight on hunger (Berry 1984). This interest culminated in passage of 1973 Amendments to the Food Stamp Act, which mandated that all counties offer FSP by 1975.

It is important to understand the political context in which the FSP was introduced in the U.S. Prior to the modern day FSP, most counties provided food aid through a commodity distribution program (CDP). The main goal of the CDP was to support farm prices and farm income by removing surplus commodities from the market. It was seen, however, as inadequate

[3] This section is based on Berry (1984) and MacDonald (1977).

to promote the nutritional well-being of low income persons because of the limited range of products and infrequent timing of the distribution of goods. Consequently, debate about moving from the CDP to the FSP pitted powerful agricultural interests against advocates for the poor (MacDonald 1977, Berry 1984). In fact, as described in Berry (1984), passage of the 1964 Food Stamp Act was achieved through classic legislative logrolling. The farm interest coalition (Southern Democrats, Republicans) wanted to pass an important cotton-wheat subsidy bill while advocates for the poor (Northern Democrats) wanted to pass the FSA. Neither had majorities, yet they combined forces, supported each others bills, and both bills passed.

This political history is important because it illustrates that there was significant heterogeneity across the country in support for the FSP. Remember that the 1964 Act allowed for counties to voluntarily set up food stamp programs. The above discussion suggests that counties with strong support for farming interests may adopt FSP later in the period while those with strong support for the low income population may adopt FSP earlier in the period. Consequently, the food stamp program introduction may not be completely exogenous. We return to this below.

Figure 1 summarizes the overall pattern of FSP introduction. We present the percent of counties offering FSP, where the counties are weighted by their 1970 population. Note this is NOT the food stamp caseload, but represents the percent of the national population that lived in an area offering a FSP. The figure shows that there was a long ramp up period between 1964 and 1975, leading to the eventual universal coverage of the FSP. For example in 1968 about half of the population lived in counties with FSP and by 1972 this rose to over 80 percent. It is this ramp up period that forms the basis of our research design.[4]

[4] The source for county level start dates are USDA annual reports on food stamp caseloads by county. See USDA (various years).

Figure 2 compares the average monthly caseloads in the FSP to the CDP. As more counties replaced their commodity programs with the food stamp program, the food stamp caseload grew quickly. The commodity caseload seemed to fall more slowly. Theoretically, counties were not supposed to have both FSP and CDP in place at the same time, but in practice some places did offer both, while others offered neither. In 1967, for example 35 percent of counties (not population-weighted) offered neither FSP nor CDP. Commodity distribution programs were offered by 38 percent of counties, and food stamps were offered by 21 percent. The remaining 6 percent of counties offered both at the same time. It is important to understand the CDP program in order to interpret the magnitude of the FSP effects. For example, if all food stamp recipients simply moved over from receiving an equal amount of commodities, we would not expect to find any impact of the FSP on consumption. (Although in practice the CDP provided a very narrow set of commodities in contrast to the purchase possibilities with food stamps.) On the other hand, if counties adopting FSP did not previously have access to CDP, the estimated coefficients would pick up the full effect of the introduction of the program.

To get more insight into the geographic variation in the ramp-up to a universal FSP, Figure 3 shows the timing of food stamp introduction by county. In the figure, the shading of the counties is assigned by county FSP start up date—with darker shading denoting an earlier start up date. This shows a great deal of variation in FSP introduction within and across states. Our basic identification strategy uses this county level variation in food stamp "treatment."

To further explore the degree of within state variation in FSP start dates, Figure 4 presents FSP coverage rates by state for 1961-1975. This figure, as in Figure 1, plots the percent of the population (in this case in the state) that lives in a county offering food stamps. This is done by weighting by the county population. In some states, such as Nevada, Utah, Colorado, Massachusetts, and Florida, there was little or no within state variation in food stamp start dates.

Other states such as California, New Mexico, and Minnesota have much greater within state variation in the food stamp start dates. The figure shows that in most states, the county level food stamp introduction took place in a narrower period than for the country as a whole.

As discussed above, the 1964 FSA allowed counties to start FSP—but it was *voluntary*. Therefore, for our research design to be valid, we need for the assignment of county start up of FSP to be exogenous. The discussion above suggests that northern, urban counties with large poor populations were more likely to adopt food stamp programs earlier while southern, rural counties with strong agricultural interests adopted food stamps later. This systematic variation in food stamp adoption could lead to spurious estimates of the program impact if those same county characteristics are associated with differential trends in the outcome variables.

To explore this we compiled characteristics of counties in 1960, on the eve of the first food stamp pilot programs. We use these "pre" characteristics to predict the date that the county eventually adopted a food stamp program. The data on county characteristics is from the 1960 City and County Data Book, which is based on data from the 1960 Census and the Census of Agriculture. The dependent variable is the county food stamp start date—expressed as an index equal to 1 in January 1961. We drop from the analysis the initial pilot counties as they were chosen by a different process than the later counties.[5] Therefore the dependent variable ranges from 25 (January 1963) to 175 (July 1975). The independent variables include the percent of the population that lives in an urban area, is black, is less than 5, is 65 or over, has income less than $3,000 (1959$), and the percent of square miles in the county that is farmland. Descriptive statistics for this data are provided in Appendix Table 1.[6]

[5] The results are very similar if we include the pilot counties.

[6] Further, in this analysis—and in the subsequent analyses of the PSID and Census—we drop observations from Alaska and Virginia due to problems with changes in county definitions over time. We also drop very small counties (with population less than 1,000) and a few counties where the percent of land used in farming was greater than 100 percent.

The results are presented in Table 1. We present estimates with (columns 2 and 3) and without (column 1) state fixed effects. All regressions are weighed by the county population. Focusing on the results with state fixed effects, we find that counties with larger urban, black, and low income populations implement FSPs earlier. Further, those with a larger share of the population that is very young or old also implement earlier. In contrast, counties where more of the land is used in farming implement later. In the final column we allow the impacts to differ within counties in the South. In general, the impacts of county characteristics are smaller (in absolute value) in counties South. In order to control for possible differences in trends across counties that is spuriously correlated with the county treatment effect, all of our regressions include interactions of these 1960 pre-treatment county characteristics with time trends.[7]

III. Expected Effects of Food Stamp Introduction

The early Food Stamp Program differed along an important dimension from the current program. Economists are used to thinking about the budget constraint in terms of today's program rules, which provides the difference between the cost of a family-size adjusted "thrifty food plan" and the amount a family can afford to spend on food, illustrated in Appendix Figure 1. In this scenario, the original budget line reflects the tradeoff between food and all other goods, and is shifted out horizontally by the amount of food stamps received. As a result, a recipient who would choose to consume *all* other goods and no food stamps would still be able to purchase the original bundle, plus the food stamp amount in food.

The benefits of the food stamp program are typically understood in a Southworth (1945) model, which shows that for families that want to spend more than the amount of their food

[7] This period of FSP introduction took place as part of the much larger federal "war on poverty." Another source of bias may be the introduction or expansion during this period of Medicaid, AFDC, WIC, and Head Start. If these programs are mainly varying at the state level then our controls for state linear time trends or state-year fixed effects should absorb these program impacts.

stamp benefits on food, program participation is equivalent to a cash transfer in the amount of the food stamp discount. For other families who would spend less on food in a pure income transfer scheme than the thrifty food budget amount (or, as economists think about it, families that are on the kinked part of the budget constraint), the program is associated with some deadweight loss and a change in the relative price of food compared to other goods, but still is associated with an increase in the size of a family's budget.

Prior to 1978 (and during the time period studied here), though, the program required participants to purchase food stamps at a discounted rate.[8] How this "purchase requirement" alters the standard budget analysis is illustrated in Appendix Figure 2. Those who select into the program must trade some of their income (call it C) for food stamps. The sloped part of the budget constraint is still shifted outward by the "discount factor" (that is, the difference between the face value of the stamps F and the purchase price C), but the top is censored. As a result, a participant can no longer choose any consumption bundles that would have them spending more than their total income That is, a participant can no longer choose any consumption bundles that would have them spending more than their total income (Y) minus C.[9] This means that there will likely be more people consuming at the kink in the budget constraint under the old-style, purchase requirement program than under the new, take-it-or-leave it program. It is therefore likely that we will be able to measure an increase in food spending that is larger than it would be under the new-style program, or under a cash transfer scheme instead.[10]

[8] That is, if a family was determined to be able to afford to spend $100 on food, but the cost of the thrifty food plan was $300, the family could purchase $300 in food stamps for the cash price of $100. Today, a similar family would receive $200 in food stamps and would not have to outlay any cash.

[9] Of course, a potential recipient would choose not to participate in the program if they would prefer to consume such a bundle to the consumption bundle at the kinked part of the budget constraint.

[10] After a certain point (1975?), participants were given the choice to purchase their entire food stamp allottment, or their choice of .25, .5 or .75 of that amount at the same discount rate. This would serve to reduce the number of families consuming at the kink point.

Since the program increases the size of a family's budget, we can look for program impacts along many outcomes that should be impacted by increased income. But the structure also favored increased consumption of food, so an obvious starting point is to test the impact of the FSP on food spending. The PSID provides several measures of food consumption – food at home, food bought with food stamps, and food away from home – that in theory respond in different manners to the food stamp program.[11] Clearly food bought with food stamps should increase after the introduction of the program, and we would expect to see the increase there at least somewhat offset by declines in purchase of groceries with cash income, and in purchases of food away from home (which cannot be purchased with food stamps). An increase in total food consumed from all sources would reflect the combined impact of 1) higher total income under food stamps and 2) distortion of consumption toward food for those consuming at the kink point.

We will also measure the impact on other outcomes, such as labor supply and health proxies. Like other means-tested programs, the FSP alters the household's labor-leisure tradeoff by increasing total income conditional on hours worked. In addition, benefits are reduced for each additional dollar earned (although at 30 percent the tax rate is lower than typical tax rates under welfare programs). As a result, introduction of the FSP may actually lower the number of hours worked and total cash income in the household. Finally, to the extent that lack of access to food causes health problems, the FSP may cause a decline in health problems, which we proxy in the PSID with an indicator variable for whether the household head missed any work in the prior year because of health problems.

IV. Literature Review

[11] Food bought with food stamps is the value of food bought less the purchase price. So it is the "benefit" from participating in food stamps.

Most recent studies focus on whether food spending is increased because of the FSP, but the available variation that can be used to identify the impact is limited. Most of the observational studies in the literature (described in Fraker, 1990, and Levedahl, 1995) estimate the marginal propensity to consume food using the following linear specification:

$$fspend_i = \beta_0 + \beta_1 cash_i + \beta_2 fstamp_i + Z_i\gamma + \varepsilon_i \qquad \text{(X)}$$

where $fspend_i$ is expenditure on food for household *i*, $cash_i$ and $fstamp_i$ are income in cash and from food stamps, respectively, Z_i is a vector of covariates such as household size and age/gender makeup, and ε_i is a normal disturbance term. Variants on this standard specification include the "semi-log specification" which replaces *cash* with *ln(cash)* (food stamps, though, are typically still estimated in levels) or a "double-log specification" in which *ln(fspend)* is the dependent variable. Here the primary impact of the food stamp program is measured as the increased consumption out of food stamps compared to cash income, as measured by the differences in estimated coefficients by income type in equation (X).

Fraker (1990) provides a comprehensive summary of the literature. He reports that most of the food stamp literature finds that the marginal propensity to consume (MPC) food out of food stamps is 2-6 times higher than out of cash income and can easily reject the null hypothesis that $\beta_2 = \beta_1$, even when the samples are restricted to only food stamp recipients who spend more on food than their food stamps are worth. The median study in Fraker's literature review reports a marginal propensity to consume food out of food stamp income that is 3.8 times as large as that from cash income.[12] These findings are often interpreted as evidence that a policy replacing food stamps with a cash-transfer system would significantly reduce food spending.

[12] The MPC out of cash is estimated to be 0.03-0.17 (with most estimates between 0.05 and 0.10), and the MPC out of food stamps is estimated to be 0.17-0.47.

The literature suffers from many of the standard shortcomings of observational studies. For example, most of the estimates were identified from differences between food stamp recipients and equally low-income families that were eligible for food stamps but for some unobservable reasons chose not to enroll in the program (such as a preference to consume non-food goods). In this case, a comparison between participants and non-participants may overstate the impact of the program.

Labor supply effects of the FSP have been studied by Moffitt and Fraker (1988), who conclude that the FSP reduces hours of work by participants by a modest 1 hour per week, or since mean weekly hours worked for Food Stamp participants is about 9.5, a 9 percent reduction.

V. Data

In our results we use two sources of data—the Panel Study of Income Dynamics (PSID) and the Decennial Census. We discuss each of these in turn.

A. Panel Study of Income Dynamics

The PSID is a longitudinal data set collected by the Institute for Social Research (ISR) at the University of Michigan which began in 1968 with a sample of about 5,000 households containing 18,000 individuals. All members (and descendants) of these original survey families have been re-interviewed annually such that by the twenty second year of the panel (1989), more than 38,000 individuals have participated in, or are currently participating in, the survey. The original 1968 sample consists of two subsamples: a nationally representative subsample of 3,000 households (Survey Research Center or SRC subsample) and a subsample of 1,900 households selected from an existing sample of low income and minority populations (Survey of Economic Opportunity or SEO subsample). To adjust for this nonrandom composition, the PSID includes

weights designed to eliminate biases attributable to the oversampling of low income groups and to attrition. All results will use the weights provided by the PSID.

The central focus of the PSID is labor market and demographic variables, containing substantial detail on income, employment, and family composition. It also includes annual information on annual food expenditures for food consumed at home, away from home, and food purchased with food stamps (the value of food purchased less the purchase requirement). These data have been used by many researchers examining impacts of social programs (for example see Gruber 1997, 2000). To account for family size, we can normalize the expenditures by the food needs standard or poverty threshold. We can also use the PSID to examine crude health outcomes of the head of household including whether they have a condition that limits work and the amount of work missed due to illness. In addition, we measure total household cash income, which we would expect to decline if there is an offsetting labor supply impact of FSP introduction.

The public use release of the PSID includes state level identifiers for each year. In addition, we have obtained county level identifiers for each family in each year through special arrangement with the ISR.

We present estimates for two subsamples of the PSID—all female headed households with children, and nonwhite female headed households with children. In each case we limit the sample to women with twelve years of education or lower. Unlike virtually all other public assistance programs, there is no categorical eligibility (e.g. limiting benefits to female headed household with children) for the food stamp program. Yet, program participation rates are highest in this group. We illustrate the differences in food stamp program participation across demographic groups using the 1980 Current Population Survey (CPS). We choose the 1980 CPS

because it is the first year that food stamp participation was provided in the survey.[13] The results, presented in Table 2, show that food stamp participation among single parent families with children is three times as high as the rates in any other group. For example, among families where the head has less 12 years of education, 52 percent of single parent families with children receive food stamps compared to 15 percent of married couples with children, 15 percent of single nonelderly persons with no children, and 13 percent of single elderly. The rates are uniformly higher among black families, with 68 percent of single nonelderly parent families with children (where the head has less than 12 years of education) participating in food stamps.

Our final sample sizes are 6,089 for all low educated female heads and 4,707 for nonwhite female heads. This sample includes observations from survey years 1968-1980. We stop the sample in 1980 recognizing that the final counties join the food stamp program in 1975. Descriptive statistics for the analysis sample are presented in Appendix Table 2. The sample is extremely disadvantaged: average income hovers right at the poverty line, and approximately half of respondent-by-year observations used food stamps. The program was available in their county of residence in almost 90 percent of observations. Over 60 percent of the sample is a high school dropout, and on average there are 2.5 children per household.

B. Census

We construct two different data sets using the Decennial Census data. Due to confidentiality, the public use Census data (IPUMS) does not identify counties—which we need to assign the FSP treatment. However, the Census provides county level tabulations of the full census which it releases as separate data products. We use these STF (for summary tape files) data to construct county panels for 1960, 1970, and 1980. The limitation of this data is that we

[13] While we could have presented tabulations from the PSID, the CPS has much larger sample sizes leading to more accurate program participation rates.

can only use the variables that have been released with the data and that are consistently available over the three censuses. We present estimates for labor force participation rates and family income by gender and race.

We construct the second census estimation data set using the 1970 and 1980 IPUMS data.[14] As stated above, we can not identify counties but we are able to identify "county groups" which are the smallest geographic areas identified. We have combined county groups when necessary to match county groups (which change definitions) between the 1970 and 1980 Census.[15] The disadvantage of using the IPUMS is that we have to average the FSP treatment across all counties in the country group. Further, the sample begins in 1970 and thus we miss the county FSP introduction that occurs between 1960 and 1970. The advantage of using the IPUMS, however, is that we can construct the variables we would like for the treatment groups we like. We define the following variables: employment rates, hours worked, earnings, income, and poverty. As with the PSID, our main treatment groups are low educated female heads of household with children and low educated nonwhite female heads of household with children. Low educated is defined as those with twelve or fewer years of education.

VI. Methodology

The data discussed above consists of household level data with geographic indicators (PSID) or county/county group data (Census) that spans the period during which the FSP is introduced. By pooling periods, we can control for area and time fixed effects. This helps to

[14] There is no IPUMS data for 1960 that allows identification of county groups.

[15] We use the 1970 (county group) boundaries to create a consistent set of county group cells across 1970 and 1980. To construct this data, we first created 1970 county group cell averages based on 1970 boundaries and 1980 county group cell averages based on the 1980 boundaries. Based on detailed 1980 population estimates we then estimated the sub-population of the 1980 county group that would have been within each 1970 county group were the 1980 boundaries to be redrawn to 1970 specifications. Next, based on these population estimates we compute adjusted 1980 cell averages for the 1970 boundaries weighted by the respective 1980 county group(s) sub-population. Finally, the adjusted 1980 cells are merged with the 1970 cells, which are uniquely identified by the 1970 boundaries.

address the concerns raised above in Section II arising from the voluntary nature of the FSP introduction across counties. In particular, with the PSID, we will estimate the following equation where the unit of observation is the family-year:

$$y_{ict} = \alpha_i + \delta FSP_{ct} + X_{it}\beta + L_{ct}\gamma + CB60_c*t + \eta_c + \lambda_t + \varepsilon_{ict}$$

where y_{ict} is the outcome variable, FSP_{ct} is an indicator variable equal to 1 if county c in year t has a FSP program, X_{it} are family characteristics, and L_{ct} are county level characteristics. We include many additional controls with the goal being exogenous variation in the FSP indicator. Our basic model includes control for county fixed effects η_c, time fixed effects λ_t, and interactions of 1960 county characteristics with a linear time trend ($CB60_c*t$). We estimate additional specifications with state linear time trends, fixed effects for each state-year, and family fixed effect α_i. The individual controls X include controls for education, number of children, race, and urban location.[16]. The local area controls include state unemployment rates. (In future drafts we will expand this to include controls for availability/generosity of other public programs such as AFDC benefits and Medicaid.) Following the results presented in Section 2, the 1960 county characteristics interacted with trends include: percent of county that is black, urban, less than age 5, age 65 or over, with incomes less than $3,000 (1959$), and percent of the land used in farming. We include these factors because the earlier analysis showed that they were correlated with food stamp introduction.

The model estimated with the Census is identical to the above except the data is at the county (or county group) level. Further, because the data are pooled cross sections rather than a panel, there is no family fixed effect. In particular, we will estimate the following model where the unit of observation is the county-year:

$$y_{ct} = \alpha + L_{ct}\gamma + \delta FSP_{ct} + CB60_c*t + \eta_c + \lambda_t + \varepsilon_{ct} \ .$$

[16] With individual fixed effects models, any individual variable that is not time varying is not identified.

Using these specifications, we the impact of food stamp introduction is identified using cross county variation in the outcomes.

VII. Results

PSID

Results for all low-education female-headed households with children are reported in Table 3. The strongest result is that households living in a county that participates in the FSP in a given year are more likely to receive food stamps. The impact ranges from a 7 to 15 percentage point increase in participation. Other results are imprecisely estimated, but consistent with theoretical predictions: food at home (that is, food bought with cash income instead of food stamps) declines slightly, as does the indicator variable for meals out. It appears that some of the increase in food consumption induced by the FSP is offset by substitution along other margins. Overall, though, total food consumption appears to increase slightly (with point estimates indicating between a 1 and 8 percent increase). There is no consistent evidence on the impact of FSP on total family (cash) income, indicating that offsetting labor supply effects of the program are likely small. Finally, heads are between 5 and 10 percentage points less likely to have missed any work last year due to illness, suggesting that access to more food improves the short-term health of participants.

Results for non-white female headed households (Table 4) are qualitatively similar, and slightly more likely to show larger and statistically significant impacts on outcome variables. Nonwhites are more likely to report participation in FSP when it is available, and show larger increases in total food consumed as a result of the program. In contrast to the overall findings, in some specifications it appears that nonwhites are *more* likely to report being ill and missing work in response to FSP.

Census

The results using the 1960, 1970 and 1980 county level STF files are reported in Table 5. In panel A we report estimates for all persons and in panel B we report estimate for nonwhites. These treatment groups are broader than those used in the PSID but it is all we have available in the STF data. However, the food stamp participation rates presented in Table 2 show that participation rates among nonwhites are quite high without conditioning on education and female heads of household. In all specifications we control for census year fixed effects, county fixed effects, and 1960 county characteristics interacted with decade fixed effects.

Recall that the introduction of food stamps provides a new benefit to low income families, but it also introduces a new benefit reduction rate. The theoretical prediction, therefore, is that this benefit reduction rate will lead to lower levels of work effort. Because family income in the Census is cash income and thus does not include food stamp benefits, we would also expect family income to fall. The results show no evidence of a work disincentive effect of the food stamp program. These results show a relatively statistically precise *zero* estimated impact. For example, the largest (relative) estimate is for nonwhites which shows that implementing a food stamp program leads to an insignificant positive 0.6 percentage point increase in female labor force participation rate compared to the mean value of 38. This qualitative finding is consistent with Fraker and Moffitt (1988) who use a very different identification strategy.

The results using the county-group data from the 1970 and 1980 IPUMS are reported in Table 6. While no estimates are statistically significant, the point estimates suggest a disincentive effect on labor supply among black low educated female heads of household. These results, shown in Panel B, suggest that the introduction of food stamps is associated with reductions in family earned income and an increase in the likelihood that the family head is not

working. Among white female heads of household, the impacts are smaller (as a percent of the mean of the dependent variable) and there is no evidence of a fall in family earned income.

VIII. Conclusion

Even though there have been changes in the population of the United States and the parameters of the Food Stamp Program since the period we are studying, these results are relevant for today's policy debates. To date, there have been no studies that we have found that provide credible evidence on the impact of the FSP on consumption and income. The FSP is once again receiving considerable political attention, and it is crucial from a policy maker's perspective to be able to measure the benefits of the program not only on food spending, but also on other outcomes like income, child well-being, and health.

VII. References

Almond, Doug, Kenneth Chay, Hilary Hoynes and Diane Whitmore Schanzenbach (2006). "The Impact of the Food Stamp Program on Infant Outcomes," *In progress*.

Berry, Jeffrey M. (1984). *Feeding Hungry People: Rulemaking in the Food Stamp Program*. New Brunswick, NJ: Rutgers University Press.

Currie, Janet and Enrico Moretti (2006). "Did the Introduction of Food Stamps Affect Birth Outcomes in California?" Paper prepared for the National Poverty Center conference *Health Effects of Non-Health Policy*.

Fraker, Thomas (1990). "Effects of Food Stamps on Food Consumption: A Review of the Literature." Washington, DC: Mathematica Policy Research, Inc.

Fraker, Thomas and Robert Moffitt (1988). "The Effect of Food Stamps on Labor Supply: A Bivariate Selection Model," *Journal of Public Economics*, February.

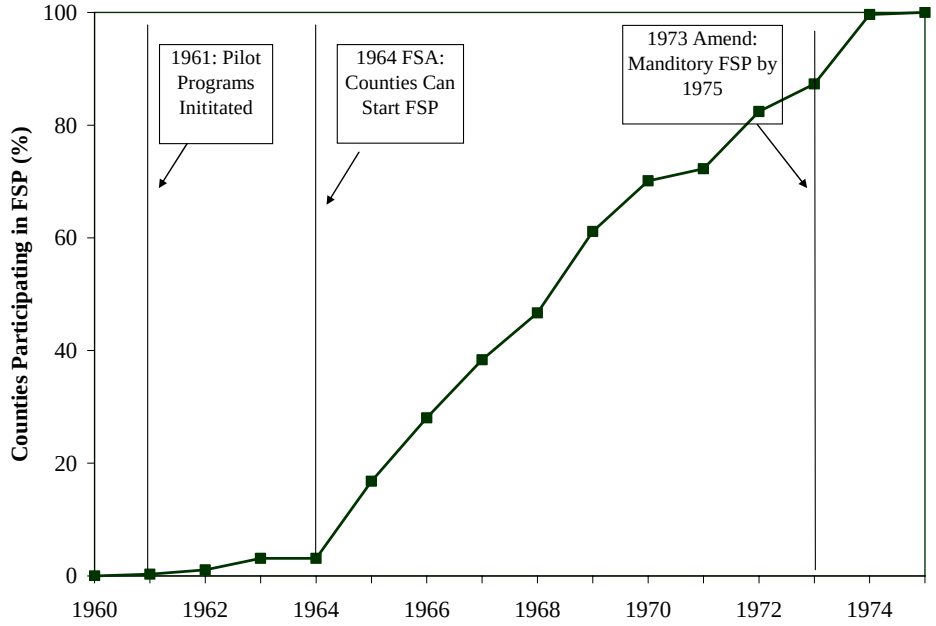
Gruber, Jonathan (1997). "The Consumption Smoothing Benefits of Unemployment Insurance," *The American Economic Review*, Vol. 87, No. 1. (Mar., 1997), pp. 192-205.

Gruber, Jonathan (2000). "Cash Welfare as a Consumption Smoothing Mechanism for Single Mothers," *Journal of Public Economics*, 75(2), February 2000, 157-182.

MacDonald, Maurice 1977. Food, Stamps, and Income Maintenance. Institute for Poverty Research Press: Madison, WI.

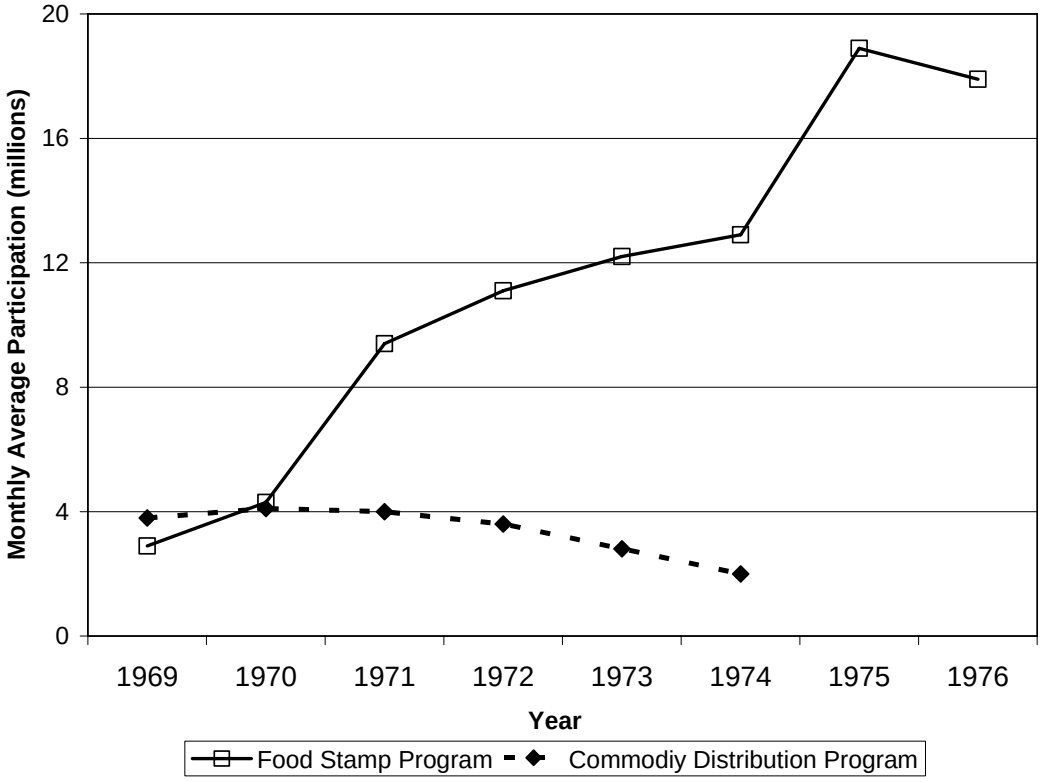
U.S. Department of Agriculture, Food and Nutrition Service (various years). "Food Stamp Program, Year-End Participation and Bonus Coupons Issues."

Figure 1: Cumulative County Participation in FSP, Weighted by 1970 Population



Source: Author's tabulations of county FSP start dates. Counties are weighted by 1970 total population.

Figure 2: Food Assistance Program Participation, 1968-1976



Source: Berry (1984), Table 3.

Figure 3: Food Stamp Program Start Date, By County (1961-1975)

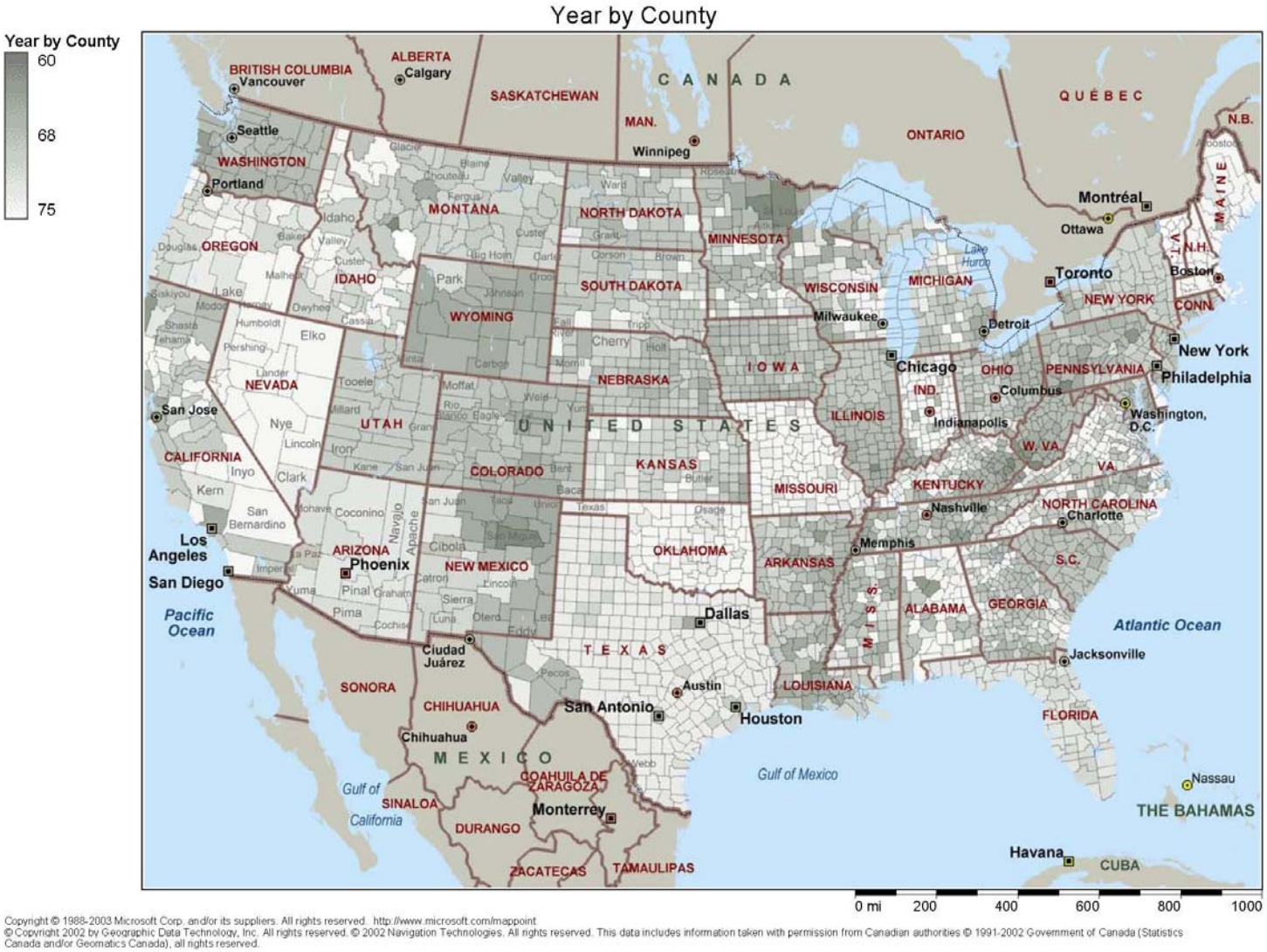
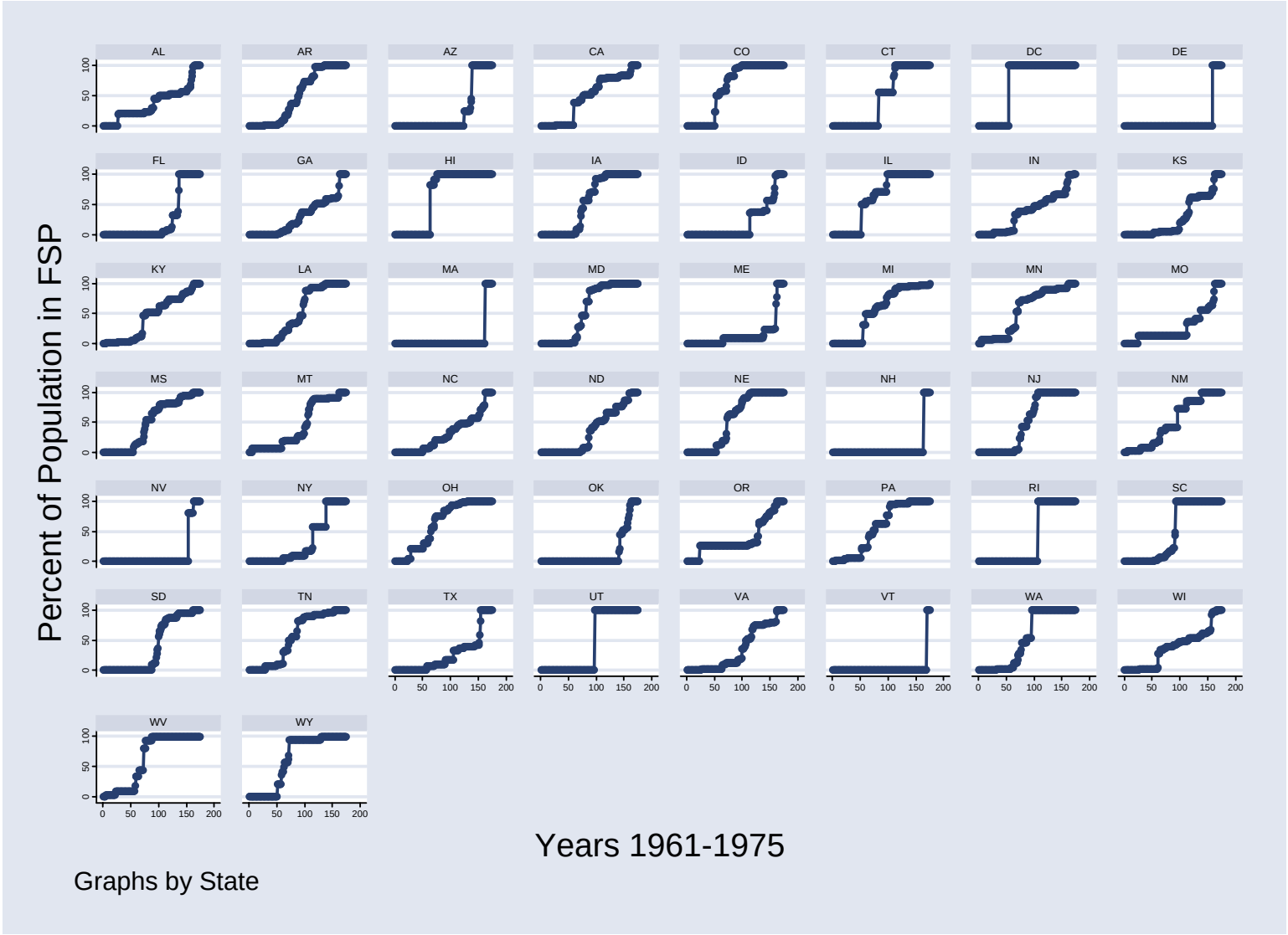


Figure 4: Percent of Population Participating in FSP, By State



Source: Authors' tabulations of county FSP start date. Counties weighted by 1970 population.

Table 1
Determinants of County Level Food Stamp Program Start Date
Analysis Using the 1960 City and County Data Book

	(1)	(2)	(3)
Percent of land in farming	0.033	0.205***	0.216***
	(0.029)	(0.027)	(0.033)
Percent of population with income less than $3,000	0.485***	-0.122	0.422***
	(0.098)	(0.096)	(0.154)
Percent of population urban	-0.103	-0.255***	-0.180***
	(0.041)	(0.035)	(0.047)
Percent of population black	-0.609***	-0.435***	-0.912***
	(0.077)	(0.072)	(0.141)
Percent of population age <5	-3.568**	-3.917***	-5.521***
	(0.737)	(0.635)	(0.826)
Percent of population >65	-0.814***	-1.326***	-3.689***
	(0.425)	(0.395)	(0.551)
South * Percent of land in farming			-0.177***
			(0.061)
South *Percent of population with income less than $3,000			-0.742***
			(0.203)
South * Percent of population urban			-0.075
			(0.073)
South * Percent of population black			0.700***
			(0.166)
South * Percent of population age <5			2.612**
			(1.321)
South * Percent of population >65			4.212***
			(0.806)
State Fixed Effects		X	X
Adjusted R-squared	0.08	0.52	0.53
Number of Observations	2,823	2,823	2,823

Notes: The data is at the county level and the dependent variable is equal to the calendar month (normed to 0 in January 1961) that the county began offering the Food Stamp Program. Sample includes all counties present in 1960 except for Virginia and Alaska which are dropped due to missing data on the food stamp program. We also drop very small counties (with population less than 1,000) because of missing data and counties with percent of land in farming greater than 100 percent. The independent variables come from the City and County Databook for 1960. Estimates are weighted using the 1960 population in the county.

Table 2
Food Stamp Participation Rates by Demographic Group
1980 March Current Population Survey

	Education Group		
	<12	=12	>12
A. All Races			
Single parent with children, nonelderly	0.53	0.29	0.17
Married couple with children, nonelderly	0.15	0.05	0.02
Single, no children, nonelderly	0.16	0.04	0.03
Married, no children, nonelderly	0.03	0.01	0.01
Single, no children, elderly	0.13	0.04	0.01
Married, no children, elderly	0.06	0.01	0.01
B. White			
Single parent with children, nonelderly	0.39	0.21	0.11
Married couple with children, nonelderly	0.12	0.04	0.01
Single, no children, nonelderly	0.12	0.04	0.02
Married, no children, nonelderly	0.02	0.01	0.00
Single, no children, elderly	0.09	0.03	0.01
Married, no children, elderly	0.04	0.01	0.01
B. Black			
Single parent with children, nonelderly	0.68	0.43	0.33
Married couple with children, nonelderly	0.23	0.09	0.04
Single, no children, nonelderly	0.27	0.10	0.06
Married, no children, nonelderly	0.09	0.09	0.02
Single, no children, elderly	0.32	0.19	0.08
Married, no children, elderly	0.18	0.07	0.04

Notes: Tabulations from 1980 Current Population Survey.

Table 3
Estimates of Food Stamp Introduction on Family Consumption, Income and Health
Low Educated Female Headed Households with Children

	(1)	(2)	(3)	(4)
Log(food at home)	0.003 (0.066)	-0.090 (0.065)	-0.056 (0.057)	0.016 (0.069)
Any meals out	-0.004 (0.034)	0.015 (0.036)	-0.029 (0.060)	0.032 (0.044)
Any food stamps	0.073* (0.038)	0.124*** (0.046)	0.130*** (0.042)	0.151*** (0.046)
Log(total food)	0.057 (0.055)	0.056 (0.058)	0.010 (0.052)	0.078 (0.055)
Log(family income)	0.013 (0.060)	-0.021 (0.064)	0.051 (0.091)	-0.001 (0.070)
Head ever ill	-0.053 (0.043)	-0.083* (0.045)	-0.045 (0.051)	-0.098 (0.051)
Demographics	X	X	X	X
1960 County Vars * Linear time	X	X	X	X
Year Fixed Effects	X	X	X	X
County Fixed Effects	X	X		
State x Linear Time		X		
State x Year Fixed Effects			X	
Family Fixed Effects				X
Number of Observations	6,089			

Notes: Each parameter is from a separate regression of the outcome variable on a dummy variable equal to 1 if the county-year observation had a food stamp program in place (or equal to the fraction of the year that the program is in place if this is the year that the program started). Sample includes PSID families with children where the head is an unmarried woman with a high school education or less. Women living in Alaska and Virginia are dropped because of missing data on food stamp program start date. All outcome variables correspond to annual measures for the calendar year prior to the interview. The data includes all families for interview years 1968-1980 (covering calendar years 1967-1979). Demographic controls include dummies for education, number of children, race, urban location and state level unemployment rate. 1960 county variables include percent of land in farming and percent of population black, urban, age<5, age>65 and with income less than $3,000 each interacted with a linear time trend. Estimates are weighted using the PSID weight and clustered on 1968 family ID.

Table 4
Estimates of Food Stamp Introduction on Family Consumption, Income and Health
Low Educated Nonwhite Female Headed Households with Children

	(1)	(2)	(3)	(4)
Log(food at home)	0.010 (0.100)	-0.209*** (0.075)	-0.072 (0.090)	0.042 (0.100)
Any meals out	0.006 (0.043)	-0.001 (0.046)	-0.026 (0.081)	0.015 (0.055)
Any food stamps	0.080 (0.052)	0.193*** (0.062)	0.130* (0.073)	0.195*** (0.051)
Log(total food)	0.149 (0.091)	0.063 (0.067)	0.057 (0.076)	0.152** (0.074)
Log(family income)	0.083 (0.073)	0.015 (0.074)	-0.014 (0.097)	-0.018 (0.083)
Head ever ill	-0.019 (0.062)	-0.001 (0.061)	0.127 (0.087)	-0.164 (0.078)
Demographics	X	X	X	X
1960 County Vars * Linear time	X	X	X	X
Year Fixed Effects	X	X	X	X
County Fixed Effects	X	X		
State x Linear Time		X		
State x Year Fixed Effects			X	
Family Fixed Effects				X
Number of Observations	4,707			

Notes: Each parameter is from a separate regression of the outcome variable on a dummy variable equal to 1 if the county-year observation had a food stamp program in place (or equal to the fraction of the year that the program is in place if this is the year that the program started). Sample includes PSID families with children where the head is an unmarried woman with a high school education or less. Women living in Alaska and Virginia are dropped because of missing data on food stamp program start date. All outcome variables correspond to annual measures for the calendar year prior to the interview. The data includes all families for interview years 1968-1980 (covering calendar years 1967-1979). Demographic controls include dummies for education, number of children, race, urban location and state level unemployment rate. 1960 county variables include percent of land in farming and percent of population black, urban, age<5, age>65 and with income less than $3,000 each interacted with a linear time trend. Estimates are weighted using the PSID weight and clustered on 1968 family ID.

Table 5
Estimates of Food Stamp Introduction on Labor Supply and Income
1960, 1970, 1980 Census STF Analysis

	Female LFPR	Male LFPR	Family Income >$10,000 (1979$)	LFPR Women with children<6
A. All races				
FSP implemented	0.001	0.002	0.005	0.002
	(0.003)	(0.002)	(0.003)	(0.003)
Number of Observations	7,500	7,500	7,500	7,500
Mean of dep variable	0.35	0.73	0.35	0.33
B. Nonwhites				
FSP implemented	0.006	0.002	0.012	n/a
	(0.006)	(0.006)	(0.010)	
Number of Observations	7,029	7,029	7,029	n/a
Mean of dep variable	0.38	0.65	0.52	n/a
1960 County Vars * Decade	X	X	X	X
Decade Fixed Effects	X	X	X	X
County Fixed Effects	X	X	X	X

Notes: Each parameter is from a separate regression of the outcome variable on a dummy variable equal to 1 if the county-year observation had a food stamp program in place in that year. Data is from 1960-1980 Census county level STF files. Counties from Alaska and Virginia are dropped because of missing data on food stamp program start date. 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with census year dummies. Estimates are weighted using the county population.

Table 6
Estimates of Food Stamp Introduction on Labor Supply and Income
1970/1980 IPUMS Analysis
Single Parent Families with a High School Education or Less

	Family Wage Income	Family Total Income	Family Head non-worker	Family Poverty Status
A. All races				
FSP implemented	426	107	0.008	-0.017
	(639)	(666)	(0.013)	(0.015)
Number of Observations	796	796	796	796
Mean of dep variable	14,626	21,166	0.489	0.511
Percent Impact	2.9%	0.5%	1.6%	-3.3%
B. Blacks				
FSP implemented	-1,260	-6	0.020	-0.036
	(1,477)	(1,576)	(0.042)	(0.043)
Number of Observations	692	692	692	692
Mean of dep variable	12,226	18,110	0.54	0.631
Percent Impact	-10.3%	0.0%	3.7%	-5.7%
1960 County Vars * Decade	X	X	X	X
Decade Fixed Effects	X	X	X	X
County Group Fixed Effects	X	X	X	X

Notes: Each parameter is from a separate regression of the outcome variable on a dummy variable equal to 1 if the county group-year observation had a food stamp program in place in that year. Data is from 1970-1980 IPUMS. County groups from Alaska and Virginia are dropped because of missing data on food stamp program start date. 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with census year dummies. Estimates are weighted using the county group population.

Appendix Table 1
Descriptive Statistics for Analysis Using the 1960 City and County Data Book

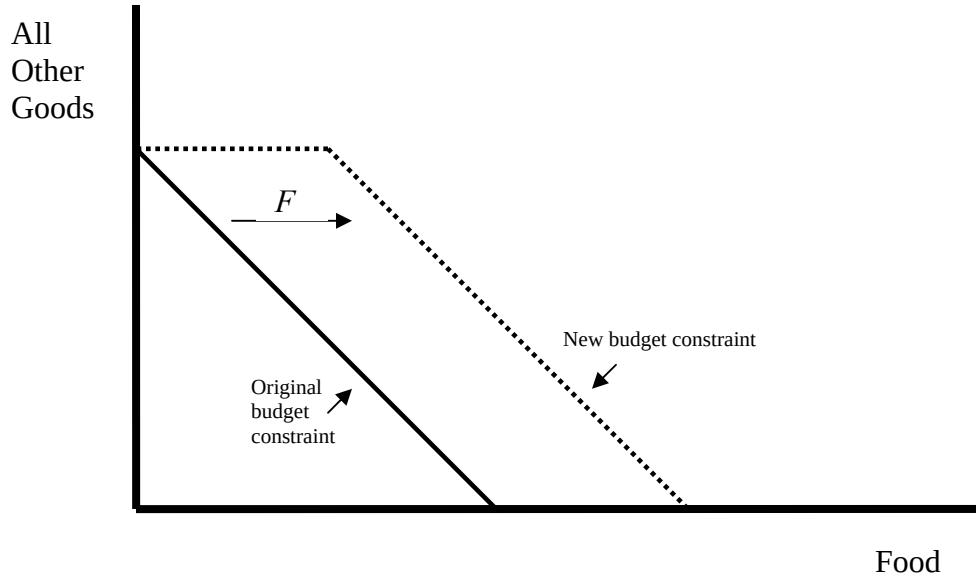
	Mean	Std Dev	Min	Max
Food stamp start date	100.4	37.7	25	175
Percent of land in farming	44.6	29.0	0	100
Percent of population with income less than $3,000	21.4	13.3	2.1	80.8
Percent of population urban	70.2	29.0	0	100
Percent of population black	10.5	12.3	0	83.4
Percent of population age <5	11.3	1.5	4.7	20.4
Percent of population >65	9.3	2.6	1	24.9
Number of Observations	2,823			

Notes: County level data from the 1960 City and County Data Book merged with food stamp start date. Food stamp start date is equal to the calendar month (normed to 0 in January 1961) that the county began offering the Food Stamp Program. Sample includes all counties present in 1960 except for Virginia and Alaska which are dropped due to missing data on the food stamp program. We also drop very small counties (with population less than 1,000) because of missing data and counties with percent of land in farming greater than 100 percent. Statistics are weighted using the 1960 population in the county.

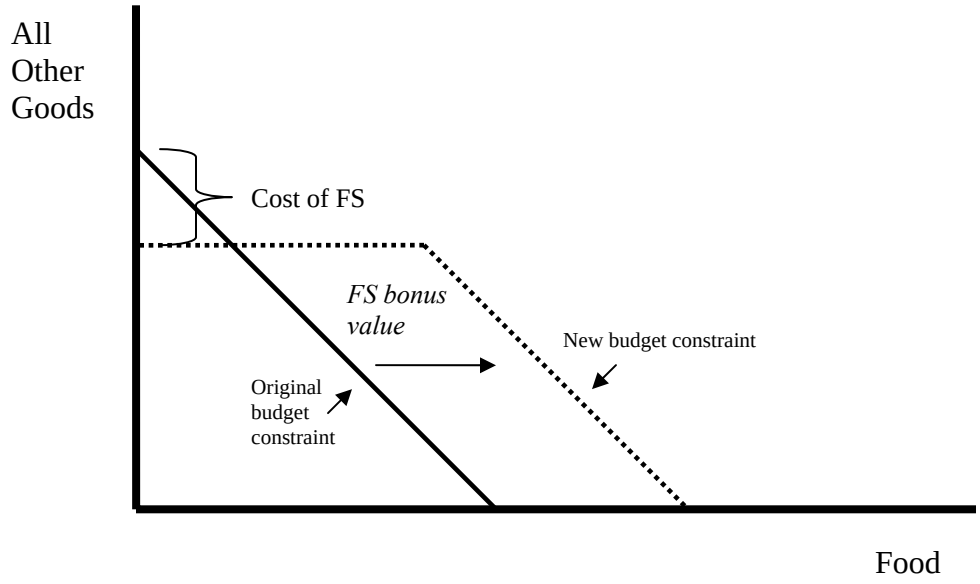
Appendix Table 2
Descriptive Statistics for PSID Data

	Overall	Female heads <=12 years educ with kids	Nonwhite female heads <=12 years educ with kids
	(1)	(2)	(3)
log(food purchased)	8.500	8.410	8.384
	(0.673)	(0.767)	(0.778)
Any food out (1=yes)	0.719	0.455	0.413
	(0.449)	(0.498)	(0.492)
Any food stamps (1=yes)	0.133	0.449	0.502
	(0.339)	(0.497)	(0.500)
log(all food consumed)	8.698	8.738	8.739
	(0.626)	(0.556)	(0.556)
log(real family income)	10.234	9.738	9.657
	(0.885)	(0.710)	(0.712)
Income/poverty	2.285	1.077	0.950
	(1.939)	(0.765)	(0.661)
Head ill last year (1=yes)	0.346	0.276	0.264
	(0.476)	(0.447)	(0.441)
High school dropout (1=yes)	0.464	0.623	0.656
	(0.499)	(0.485)	(0.475)
Urban	0.647	0.780	0.811
	(0.478)	(0.414)	(0.391)
Number of children	1.316	2.518	2.665
	(1.678)	(1.637)	(1.726)
% of years county participates in FSP	0.842	0.893	0.900
	(0.352)	(0.298)	(0.289)
N	57573	6089	4707

Appendix Figure 1: Food Stamps' Impact on Budget Constraint with No Purchase Requirement



Appendix Figure 2: Food Stamps' Impact on Budget Constraint with a Purchase Requirement (Setup Prior to 1978)



Preliminary Tables

The Great Society: Food Stamps and Infant Health

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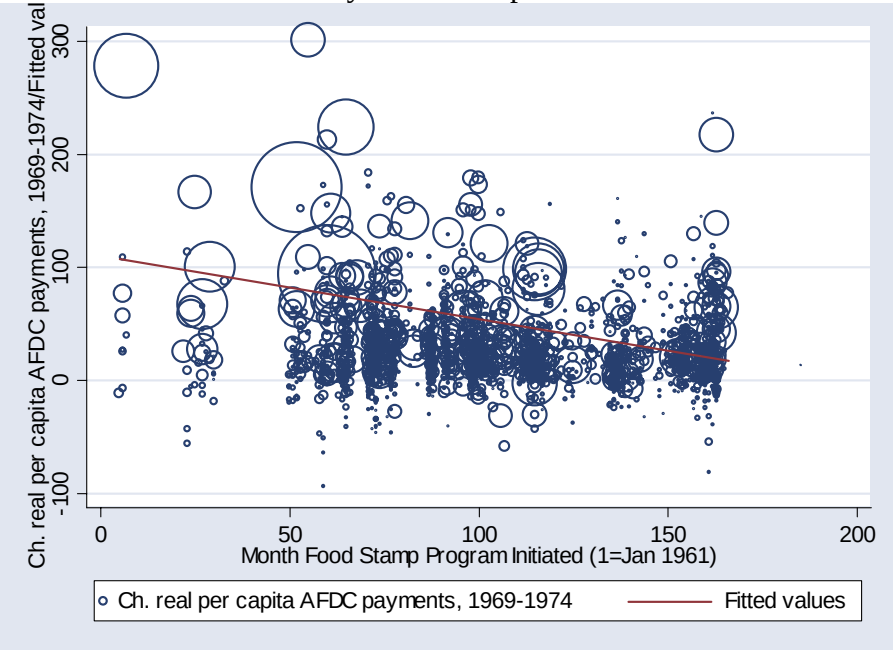
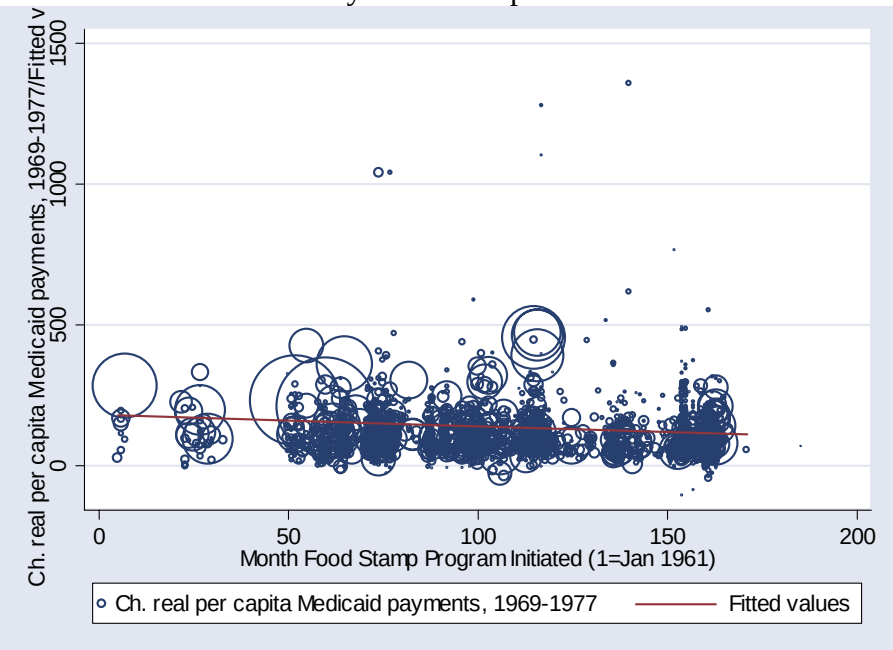
Figure 1
Correlation between County Food Stamp Start Date and Growth in AFDC Expenditures



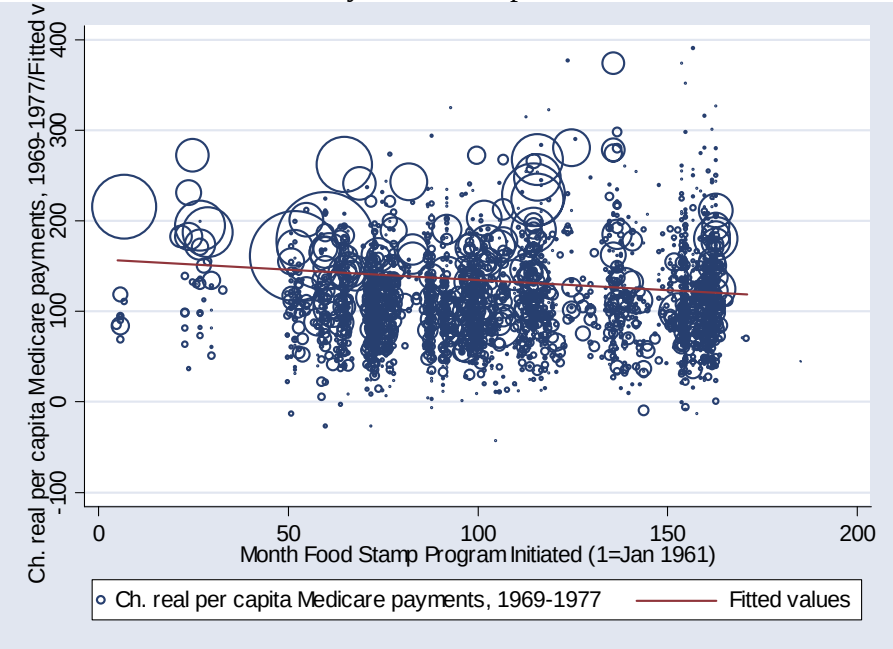
Note: Each data point is a county observation. The x axis is the month that food stamps were introduced in the county (=1 in January 1961) and the y axis the change in real per capita expenditures on "family assistance" (primarily AFDC) between 1969 and 1977. Size of points reflects county population.

Figure 2
Correlation between County Food Stamp Start Date and Growth in Medicaid Expenditures



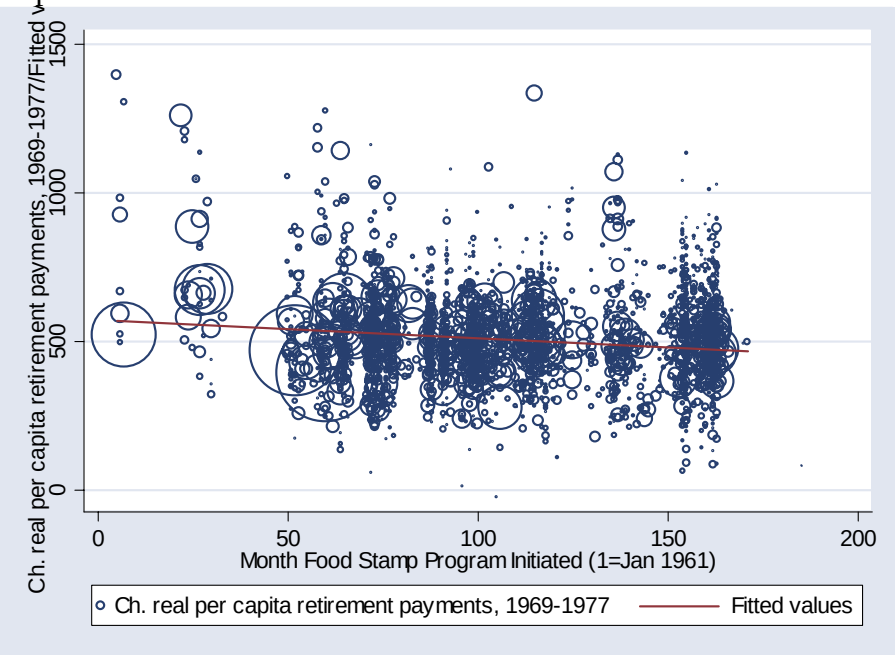
Note: Each data point is a county observation. The x axis is the month that food stamps were introduced in the county (=1 in January 1961) and the y axis the change in real per capita expenditures on "public assistance medical care" (primarily Medicaid) between 1969 and 1977. Size of points reflects county population.

Figure 3
Correlation between County Food Stamp Start Date and Growth in Medicare Expenditures



Note: Each data point is a county observation. The x axis is the month that food stamps were introduced in the county (=1 in January 1961) and the y axis the change in real per capita expenditures on Medicare between 1969 and 1977. Size of points reflects county population.

Figure 4
Correlation between County Food Stamp Start Date and Growth in Retirement and Disability Expenditures



Note: Each data point is a county observation. The x axis is the month that food stamps were introduced in the county (=1 in January 1961) and the y axis the change in real per capita expenditures on retirement and disability programs between 1969 and 1977.

Table 1
The Impact of Food Stamp Introduction on Birth Outcomes using Detailed Natality Data

	Birthweight		Low Birth Weight (<2,500 gms)		Very Low Birth Weight (<1,500 gms)		Gestation Preterm (<37 weeks)	
A. Whites								
FSP implemented	1.392	1.813	-0.0005	-0.0004	-0.0001	-0.0002	-0.0009	-0.0009
	(0.932)	(0.973)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0005)	(0.0006)
Mean of dep variable	3,334	3,334	0.065	0.065	0.009	0.009	0.078	0.078
Percent Impact	0.042%	0.054%	-0.704%	-0.658%	-0.740%	-2.008%	-1.111%	-1.200%
B. Blacks								
FSP implemented	4.087	4.826	-0.002	-0.002	-0.0008	-0.0014	-0.003	-0.003
	(2.665)	(2.472)	(0.001)	(0.001)	(0.0006)	(0.0007)	(0.002)	(0.002)
Mean of dep variable	3,077	3,077	0.136	0.136	0.024	0.024	0.172	0.172
Percent Impact	0.13%	0.16%	-1.67%	-1.55%	-3.14%	-5.58%	-1.57%	-1.56%
CB60 * linear trend	X	X	X	X	X	X	X	X
Year * Month	X	X	X	X	X	X	X	X
County	X	X	X	X	X	X	X	X
State * year		X		X		X		X

Notes: The sample includes one observation for each county-quarter-race covering the period 1968-1977 and is constructed from the Detailed Natality Files (full census of births). The dependent variable is the mean of birth weight or percent of births less than 1,500 or 2,500 grams. Each parameter is from a linear regression of the outcome variable on a dummy variable equal to 1 if the county-quarter observation had a food stamp program in place three months prior to the birth (beginning of third trimester). Estimates are weighted using the number of births in the county-quarter-race cell and clustered on county. Cells with fewer than 25 births are dropped as well as all observations in Alaska (due to missing food stamp data). 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with linear year.

Table 2
Impact of Food Stamp Introduction on Birth Outcomes using Detailed Natality Data
Sensitivity Test: Adding County Transfer Data

	Birthweight		Low Birth Weight (<2,500 gms)		Very Low Birth Weight (<1,500 gms)		Gestation Preterm (<37 weeks)	
A. Whites								
FSP implemented	1.813	1.738	-0.0004	-0.0003	-0.0002	-0.0002	-0.0009	-0.0009
	(0.973)	(1.080)	(0.0003)	(0.0003)	(0.0001)	(0.0002)	(0.0006)	(0.0006)
Mean of dep variable	3,334	3,334	0.065	0.065	0.009	0.009	0.078	0.078
Percent Impact	0.054%	0.052%	-0.658%	-0.429%	-2.008%	-2.536%	-1.200%	-1.200%
Number of Observations	97,825	88,174	97,825	88,174	97,825	88,174	97,825	88,174
B. Blacks								
FSP implemented	4.826	3.591	-0.002	-0.001	-0.0014	-0.0014	-0.003	-0.000
	(2.472)	(2.848)	(0.001)	(0.001)	(0.0007)	(0.0007)	(0.002)	(0.003)
Mean of dep variable	3,077	3,077	0.136	0.136	0.024	0.024	0.172	0.172
Percent Impact	0.16%	0.12%	-1.55%	-0.80%	-5.58%	-5.91%	-1.56%	0.12%
Number of Observations	27,374	24,535	27,374	24,535	27,374	24,535	27,374	24,535
CB60 * linear trend	X	X	X	X	X	X	X	X
Year * Month	X	X	X	X	X	X	X	X
County	X	X	X	X	X	X	X	X
State * year	X	X	X	X	X	X	X	X
Annual County Transfer		X		X		X		X

Notes: The sample includes one observation for each county-quarter-race covering the period 1968-1977 and is constructed from the Detailed Natality Files (full census of births). The dependent variable is the mean of birth weight or percent of births less than 1,500 or 2,500 grams. Each parameter is from a linear regression of the outcome variable on a dummy variable equal to 1 if the county-quarter observation had a food stamp program in place three months prior to the birth (beginning of third trimester). Estimates are weighted using the number of births in the county-quarter-race cell and clustered on county. Cells with fewer than 25 births are dropped as well as all observations in Alaska (due to missing food stamp data). 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with linear year. Annual county transfers from the REIS include separate controls for real per capita spending on AFDC, Medicare, Medicaid, and retirement payments. REIS data are available beginning in 1969 so those models include data from 1969-1977.

Table 3
The Impact of Food Stamp Introduction on Birth Outcomes using Detailed Natality Data
Variation Across Groups

	Birthweight					Low Birth Weight (<2,500 gms)				
	Less than 24	24 or older	Education <=12	Illegit-imate	Legit-imate	Less than 24	25 or older	Education <=12	Illegit-Imate	Legit-imate
A. Whites										
FSP implemented	1.709	1.953	2.722	2.072	1.751	0.0002	-0.0006	0.0002	-0.0011	0.0003
	(1.437)	(1.312)	(1.686)	(7.474)	(1.546)	(0.0005)	(0.0005)	(0.0006)	(0.0042)	(0.0005)
Mean of dep variable	3,294	3,364	3,329	3,198	3,355	0.071	0.061	0.069	0.102	0.062
Percent Impact	0.052%	0.058%	0.094%	0.065%	0.052%	0.127%	-1.030%	0.231%	-1.091%	0.422%
Number of Observations	66,455	64,803	48,947	5,533	53,206	66,455	64,803	48,947	5,533	53,206
Percent of Micro Sample	43%	54%	73%	4%	93%	43%	54%	73%	4%	93%
B. Blacks										
FSP implemented	0.779	7.570	0.714	1.371	-1.431	0.0000	-0.0056	-0.0002	0.0016	-0.0007
	(3.496)	(4.229)	(4.527)	(6.485)	(5.316)	(0.0019)	(0.0021)	(0.0006)	(0.0035)	(0.0026)
Mean of dep variable	3,026	3,149	3,070	3,015	3,130	0.144	0.124	0.139	0.153	0.121
Percent Impact	0.03%	0.24%	0.02%	0.05%	-0.05%	-0.03%	-3.62%	-0.17%	1.03%	0.03%
Number of Observations	18,766	11,692	12,389	7,056	9,758	18,766	11,692	12,389	7,056	9,758
Percent of Micro Sample	58%	35%	86%	41%	52%	58%	35%	86%	41%	52%
CB60 * linear trend	X	X	X	X	X	X	X	X	X	X
Year * Month	X	X	X	X	X	X	X	X	X	X
County	X	X	X	X	X	X	X	X	X	X
State * year	X	X	X	X	X	X	X	X	X	X
Annual County Transfer	X	X	X	X	X	X	X	X	X	X

Notes: The sample includes one observation for each county-quarter-race covering the period 1969-1977 and is constructed from the Detailed Natality Files (full census of births). The dependent variable is the mean of birth weight or percent of births less than 2,500 grams. Each parameter is from a linear regression of the outcome variable on a dummy variable equal to 1 if the county-quarter observation had a food stamp program in place three months prior to the birth (beginning of third trimester). Estimates are weighted using the number of births in the county-quarter-race cell and clustered on county. Cells with fewer than 25 births are dropped as well as all observations in Alaska (due to missing food stamp data). Regressions using education and legitimacy are restricted to the states reporting these data in 1969. 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with linear year. Annual county transfers from the REIS include separate controls for real per capita spending on AFDC, Medicare, Medicaid, and retirement payments.

Table 4
Estimates of Food Stamp Introduction on Birthrates

	Whites		Blacks	
A. Whites				
FSP implemented	0.0000	0.0000	0.0002	0.0001
	(0.0001)	(0.0001	(0.0002)	(0.0002)
Mean of dep variable	0.0177	0.0177	0.0239	0.0239
Percent Impact	0.170%	0.057%	1.006%	0.545%
CB60 * linear trend	X	X	X	X
Year * Month	X	X	X	X
County	X	X	X	X
State * year	X	X	X	X
Annual County Transfer		X		X
Number of observations	122,624	110,324	54,820	51,180

Notes: The sample includes one observation for each county-quarter-race covering the period 1968-1977. The dependent variable is the number of births in the county-quarter-cell divided by the population of women 15-44 in that county-year-race. The births are calculated from the Detailed Natality. Each parameter is from a linear regression of the outcome variable on a dummy variable equal to 1 if the county-quarter observation had a food stamp program in place nine months prior to the birth (at conception). Estimates are weighted using the number of women in the county-quarter-race cell and clustered on county. Cells with fewer than 100 women are dropped as well as all observations in Alaska (due to missing food stamp data). 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with census year dummies. Annual county transfers from the REIS and include separate controls for real per capita spending on AFDC, Medicare, Medicaid, and Retirement payments. REIS data are available beginning in 1969 so those models include data from 1969-1977.

Table 5
The Impact of Food Stamp Introduction on Neonatal Infant Mortality Rate

	Whites					Blacks				
	All causes of death	Nutrition Linked 1	Nutrition Linked 2	Not Nutrition Linked 1 (Accidents)	Not Nutrition Linked 2	All causes of death	Nutrition Linked 1	Nutrition Linked 2	Not Nutrition Linked 1 (Accidents)	Not Nutrition Linked 2
A. Whites										
FSP implemented	0.020	-0.051	-0.040	-0.00005	0.068	-0.144	-0.268	-0.216	-0.029	0.296
	(0.131)	(0.101)	(0.124)	(0.008)	(0.041)	(0.563)	(0.355)	(0.476)	(0.038)	(0.163)
Mean of dep variable	12.30	6.50	9.91	0.046	0.883	22.84	10.44	16.84	0.09	1.54
Percent Impact	0.16%	-0.78%	-0.41%	-0.11%	7.75%	-0.66%	-2.57%	-1.28%	-32.6%	19.28%
CB60 * linear trend	X	X	X	X	X	X	X	X	X	X
Year * Month	X	X	X	X	X	X	X	X	X	X
County	X	X	X	X	X	X	X	X	X	X
State * year	X	X	X	X	X	X	X	X	X	X
Annual County Transfer	X	X	X	X	X	X	X	X	X	X
Number of Observations	68,549	68,549	68,549	68,549	68,549	16,229	16,229	16,229	16,229	16,229

Notes: The sample includes one observation for each county-quarter-race-cause of death category covering the period 1969-1977. The dependent variable is the number of neonatal deaths (deaths in the first month of life) in the calendar quarter divided by the number of live births in the calendar quarter times 1000. Definitions for the cause of death categories are provided in Table 6. The deaths are calculated from the Detailed Mortality Files (full census of deaths) and the live births are calculated from the Detailed Natality Files. Each parameter is from a linear regression of the outcome variable on a dummy variable equal to 1 if the county-quarter observation had a food stamp program in place three months prior to the birth (beginning of third trimester). Estimates are weighted using the number of births in the county-quarter-race cell and clustered on county. Cells with fewer than 25 births are dropped as well as all observations in Alaska (due to missing food stamp data). 1960 county variables include percent of land in farming, percent of population black and percent of population urban each interacted with linear year. Annual county transfers from the REIS include separate controls for real per capita spending on AFDC, Medicare, Medicaid, and retirement payments.

Table 6
List of Cause of Death Codes in Neonatal Mortality Regressions

	Cause of Death	ICD-8 Code (1968-1978)
1	Congenital Anomalies	740-759
2	Respiratory Distress	776.1,776.2
3	Disorders of short gestation and unspecified low birthweight	777
4	Infections specific to the perinatal period	038
5	Pneumonia and influenza	470-474,480-486
6	Newborn affected by maternal complications of pregnancy	769.0-769.2,769.4,769.5,769.9
7	Intrauterine hypoxia and birth asphyxia	776.9
8	Newborn affected by complications of placenta, cord, and membranes	770,771
9	Certain gastrointestinal diseases	004,006-009,535,561,563
10	Diseases of the heart	390-398,402,404,410-429
11	SIDS	795.0
12	Accidents and adverse events	E800-E949
13	Birth trauma	764-768(.0-.3), 772
14	Hemolytic disease of newborn, due to isoimmunization and other perinatal jaundice*	774,775
15	All Other	all other codes

Cause of Death Categories Used in Regressions	Category Numbers
All causes of death	1-15
Nutrition Linked 1	1-5
Nutrition Linked 2	1-10
Not nutrition linked 1 (Accidents)	12
Not nutrition linked 2	11-14