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US Food and Nutrition Programs

Hilary Hoynes and Diane Whitmore Schanzenbach

Concerns about adequate nutrition figure prominently in discussions of the health and well-being of America's disadvantaged populations. In 2014, 15.4 percent of persons and 20.9 percent of children lived in households reported as food insecure—meaning conditions such as worrying about whether food would run out, food not lasting, not being able to afford balanced meals, skipping meals, or not eating enough (Coleman-Jensen et al. 2015). At the same time, Americans' diet quality has been persistently low and unchanging over time (Wang et al. 2014) and more than a third of adults and 17 percent of children are obese (Ogden et al. 2014).

To address these problems, a range of US food and nutrition programs are provided by the US Department of Agriculture. Spending on the largest eight programs totaled $99 billion in 2014; by comparison, the Earned Income Tax Credit cost $64 billion (in 2012). In this survey, we focus on the four largest of these programs, including the Supplemental Nutrition Assistance Program ([SNAP], previously known as food stamps), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the National School Lunch Program (NSLP), and the School Breakfast Program (SBP).

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There are many features that are common to the four food and nutrition programs. The programs are all means tested, that is, they are limited to individuals living in households with limited income (and sometimes limited assets). The programs share the goal of assuring adequate nutrition. Notably, while much of the US social safety net is provided at the state or local level, food and nutrition programs are federal, thus providing a basic floor for protecting individuals and families that is similar across all states.

However, there are also important ways in which the programs differ. First, the programs vary in their targeted populations, from near-universal eligibility for SNAP to the narrowly defined age groups eligible for WIC. Second, the income cutoffs for eligibility vary across the programs with higher income limits (185 percent of the federal poverty line) for WIC compared to SNAP (130 percent of the federal poverty line). Third, the programs also vary by the degree to which the benefits are provided "in kind," from largely unrestricted vouchers in SNAP, to more targeted vouchers in WIC, to direct provision of meals that are required to conform to nutrition guidelines in the school feeding programs. Fourth, the programs vary by whether they phase out gradually (SNAP) or abruptly as income increases (the others). Together, these factors affect how the programs impact the family's budget, and as we describe in section 3.3 below, how they are to be modeled in the canonical means-tested program budget constraint framework. Notably, the programs also layer on top of each other so that a family may be receiving benefits from multiple programs at once, and also may lose access to one or more of them abruptly (e.g., during school vacations, or when a child ages out of WIC).

We begin our survey with a description of these four central food and nutrition programs, their history, the rules under which they operate, as well as providing program statistics. SNAP is by far the largest program at a cost of $74.2 billion in 2014. Nearly one in seven Americans participated in SNAP in 2014, and the program lifted 4.7 million people, including 2.1 million children, out of poverty in 2014 (Short 2014). SNAP is the most universal of the programs, in that there is no additional targeting to specific groups beyond income and asset eligibility criteria. Additionally, SNAP is the most unrestricted as the program provides vouchers that can be used to purchase most foods at grocery stores or other authorized retailers. Average monthly benefits in 2014 amounted to $257 per household, or $125 per person. This translates to benefits worth about $4.11 per person per day.

The WIC program is more narrowly targeted in terms of both population served and types of goods that can be purchased with benefits. In 2014, $6.2 billion was spent on WIC. As the name implies, benefits are targeted to infants, young children, and pregnant and postpartum women. The WIC benefits can be used to purchase infant formula and other specific food items such as milk, cereal, and juice as specified in the WIC bundle. Additionally, WIC provides nutrition education and referrals to health care and other social services. Over half of US infants receive WIC benefits.

The school breakfast and lunch programs (SBP and NSLP) provide free or low-cost meals to low-income children. Students from higher-income families may also participate in the program through the purchase of meals, and these meals receive subsidies (though much smaller ones) as well. Forty percent of school children receive free or reduced price lunches and 56.6 percent of school children overall participate in the NSLP. The combined cost of these programs in 2014 totaled $15 billion.

We go on, in section 3.3, to discuss the theoretical issues around these programs. Each of the food and nutrition programs can be analyzed through standard economic frameworks to explore predicted effects on food consumption and labor supply. The applicable frameworks and predictions differ somewhat due to the design of the programs—such as how "in kind" the benefits are and whether they are phased out gradually or are all or nothing. We pay particular attention to the difference in incentives for programs with "value vouchers" (as in SNAP) versus those with "quantity vouchers" (as in WIC). An important distinction of programs with quantity vouchers is the lack of sensitivity to price, leading to incentives for firm mark up and increases in program costs. More generally, as with other means-tested transfer programs, these programs face the usual trade-off in balancing the protective aspects of the programs to improve dietary intake and reduce food insecurity against their distorting incentives such as reduced labor supply.

In section 3.4 we provide a comprehensive summary of the research on these programs, with particular emphasis on the work published since Currie (2003). We begin by discussing the challenges for identification and an overview of the different empirical approaches taken in the literature. A central challenge for evaluation of the effects of food and nutrition programs is that commonly used quasi-experimental approaches, relying on variation across states and reforms over time, are not easily applied. This stems from the federal structure of these programs and the relatively limited changes over time. Further, a comparison of participants to nonparticipants is problematic due to selection into the program and its relationship to poverty and disadvantage. Additionally, with respect to the food stamp program, the universal nature of the program means there are no ineligible groups to serve as controls, which is another common approach in the quasi-experimental literature. Nonetheless, researchers have found sources of variation—such as exploiting geographic variation in access, sharp differences in eligibility, and program rule changes—to credibly identify program impacts in some cases. We provide a summary of the literature on our four central food and nutrition programs, focusing on studies with credible, design-based approaches. Throughout our review, we pay particular attention to studies that examine the impact and relevance of these programs for the nonelderly population.

Overall, our review of SNAP studies shows that macroeconomic condi-

tions are a key determinant for tracking caseloads and expenditures over time, with less role for changes in program policies. Additionally, studies have investigated the impacts of SNAP on a wide range of economic and health outcomes, including their impacts on food insecurity, dietary quality, consumption patterns, obesity, and labor market participation. In general, the studies with the most credible designs have found results on take-up and consumption that are consistent with economic theory predictions. SNAP increases family resources and studies show that the program leads to increases in food and nonfood spending. Furthermore, the increases in food spending from the relatively unrestricted SNAP benefits appear to be similar to if the program was provided as cash. Studies consistently show that SNAP reduces food insecurity and increases health at birth, and greater exposure to SNAP in early life leads to improvements in medium-term and long-term health. The evidence for effects of SNAP on contemporaneous health for children and adults is more mixed, however.

The literature on WIC is primarily aimed at estimating the effects of the program on health at birth. The most credible design-based studies show consistent evidence that WIC leads to improvements in outcomes such as average birth weight, the incidence of low birth weight, and maternal weight gain. There is much less evidence about how the program affects outcomes for children, who are eligible for benefits through age five. Recent work on firm incentives explores interesting and important issues arising due to the quantity voucher nature of the program.

Most research on the NSLP has focused on how the program impacts dietary intake, and also obesity rates. The results have been somewhat mixed, with generally more positive impacts for lower-income students. The research on the SBP has increased dramatically over the past twenty years, in part taking advantage of the expansion of the program during this time first to schools that previously did not offer the program, and then by expanding access within schools to a wider range of students. The former generally shows positive program impacts, while the latter finds strong improvements in participation but more mixed effects on dietary quality and student outcomes.

We conclude by discussing new developments and current policy discussions. We identify areas that are unexplored and discuss areas that are ripe for future research.

3.1 History of the Programs and Rules

Table 3.1 provides a brief overview of the four food and nutrition programs that we study in this chapter: SNAP (formerly the food stamp program), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), National School Lunch Program (NSLP), and School Breakfast Program (SBP). While all of the programs share the goal of assuring

Table 3.1 Overview of US food and nutrition programs and rules

Program and date of introduction	Federal cost (2014)	Population served	Benefits	Eligibility requirements
Supplemental Nutrition Assistance Program (SNAP) formerly FSP	74.2 billion	Low-income households	Monthly benefit issued electronically via Electronic Benefit Transfer (EBT) card account and calculated based on Thrifty Food Plan	Household gross monthly income < 130 percent of poverty line
1961: pilot 1975: permanent program		46.5 million individuals/ month (2014)	Maximum monthly allotment through 2015: $194 for a one-person household, $511 for a three-person household, and $925 for a six-person household; 2014 average monthly benefit per person = $125.35, per household = $256.98	Meet countable resource limit of $2,250 or $3,250 for elderly or disabled; TANF, SSI, and GA recipients eligible; legal, qualified aliens may be SNAP eligible; some households may be required to meet employment, service, and training requirements; individuals without a Social Security number, most postsecondary students, and strikers are not eligible
2009: ARRA provisions (expired 10/2013)			13.6 percent increase in maximum food stamp benefit	Temporarily allowed states to suspend eligibility time limits on ABAWDs
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)	6.2 billion	Low-income pregnant or postpartum women, infants (< 1), and children (< 5)	Food instrument or cash-value voucher (some states on EBT) to purchase specified nutritious foods rich in protein, iron, calcium, vitamins A, C, and D; nutrition education; screening and referrals to health care and other social services	Pregnant, postpartum, or breastfeeding women, infants, or children < 5; must be individually determined to be at "nutritional risk" by a health professional; meet state residency requirement; gross income ≤ 185 percent of FPL
1972: pilot 1974: permanent program		8.26 million individuals (2014)	Food package assignment varies by situational need	WIC eligibility priority system
National School Lunch Program (NSLP)	11.4 billion	Low-income children	Nutritionally balanced daily lunches conforming to the latest *Dietary Guidelines for Americans* standards; 1/2 daily nutrition requirements	Free lunch if income ≤ 130 percent of poverty line; reduced-price lunch if income ≤ 185 percent of poverty line
1946		19.2 million children receiving free lunch; 2.5 million receiving reduced-price lunch (2014)	Avg. reimbursement rate = $3.06/free meal, $2.66/ reduced-price meal, in schools where 60 percent or more of meals are subsidized and meeting Healthy, Hunger-Free Kids Act requirements (SY14/15)	SNAP recipients automatically qualify for free meals

(*continued*)

Table 3.1 (continued)

Program and date of introduction	Federal cost (2014)	Population served	Benefits	Eligibility requirements
School Breakfast Program (SBP)	3.7 billion	10.6 million children receiving free breakfast; 1.0 million children receiving reduced-price breakfast (2014)	Nutritionally balanced daily breakfast meeting latest *Dietary Guidelines for Americans* standards	Free breakfast if income ≤ 130 percent of poverty line; reduced-price breakfast if income ≤ 185 percent of poverty line
1966: pilot 1975: permanent program			Avg. reimbursement rate = $1.93/free meal, $1.63/reduced-price meal, at school in severe need (SY14/15)	SNAP recipients automatically qualify for free meals
Child and Adult Care Food Program (CACFP)	3.1 billion	3.9 million average daily attendance	Reimbursements for meals and snacks that conform to meal patterns (approved centers receive $1.62/free breakfast; $2.98/free lunch; $2.98/free supper; $0.82/free snack)	Centers are operated by public, private nonprofit, and certain for-profit organizations
1968: day care		Children in day care	(see above)	Centers must provide nonresidential care services and be licensed/approved by state
1976: family care		Children (twelve years of age or younger)	(see above)	Facilities must be licensed/approved and provide nonresidential child-care services in a group or family home setting
1987: adult care		Adults in care (functionally impaired or sixty years of age or older)	(see above)	Centers must provide services to adults who are functionally impaired or over age sixty, provide community-based programs, provide nonresidential services, and be licensed/approved to provide adult day-care services
2010: at-risk care (all states)		At-risk children (age eighteen and younger)	(see above)	Centers must primarily provide care for children after school or on weekends, holidays, or school vacations during school year; provide organized scheduled activities; include education or enrichment activities; be located in area near public school w/ 50 percent or more of income ≤ 185 percent of poverty line

Summer Food Service Program (SFSP)	465.6 million	2.7 million children/day	Free meals that meet nutrition guidelines to all participating children at approved sites; enrichment activities	Child's participation at: open site = 50% or more of families w/ incomes at or below 185% of FPL; enrolled site = 50% or more of children enrolled in activity program are eligible for F/RP school meals; camp site = free meals only to children who qualify for F/RP meals
1968: pilot: 1975: permanent		Low-income children eighteen years old and younger at approved SFSP sites	Reimbursement rates for rural or self-prep sites = $2.08/breakfast, $6.35/lunch or supper, $0.87/snack; for all other sites = $2.04/ breakfast, $3.59/lunch or supper, $0.85/ snack	
Special Milk Program (SMP)	10.5 million	50.0 million half-pints milk served to low-income children	Reimbursement for half-pints milk	Children that meet income guidelines for free meals who attend a school or institution that does not participate in other federal child nutrition meal service programs
1971: permanent program			Reimbursement rate: $0.23/half pint	
Fresh Fruit and Vegetable Program (FFVP)	153.3 million	Children at elementary schools w/a high percentage of F/RP meal eligibles	Free fresh fruit and vegetables for students outside of normal school meal time frames	Elementary school must have high percentage of students certified for F/RP meals and participate in NSLP
2002: pilot 2008: permanent program			Schools receive between $50–$75 per student for the school year	Priority to high-need schools

Source: The SNAP eligibility requirements are from http://www.fns.usda.gov/snap/eligibility; NSLP and SBP reimbursement rates from http://www.fns.usda.gov/sites/default/files/cn/NAPs14–15.pdf; program statistics from http://www.fns.usda.gov/data-and-statistics; WIC eligibility requirements from http://www.fns.usda.gov/wic/wic-eligibility-requirements; WIC benefits from http://www.fns.usda.gov/wic/wic-eligibility-requirements; SNAP benefits from http://www.fns.usda.gov/node/9320; School meal eligibility guidelines from http://www.fns.usda.gov/school-meals/income-eligibility-guidelines; SFSP info from http://www.fns.usda.gov/sfsp/frequently-asked-questions-faqs#4.; SFSP rates from http://www.fns.usda.gov/sfsp-reimbursement-rates; CACFP info from http://www.fns.usda.gov/cacfp/child-and-adult-care-food-program; CACFP rates from http://www.fns.usda.gov/cacfp/reimbursement-rates; SMP data from http://www.fns.usda.gov/sites/default/files/pd/11smhpfy.pdf; SMP expenditures from http://www.fns.usda.gov/sites/default/files/pd/smsummar.pdf; SMP reimbursement rates from http://www.fns.usda.gov/sites/default/files/cn/NAPs14–15.pdf; SMP info from http://www.fns.usda.gov/sites/default/files/SMP_Quick_Facts_0.pdf; and FFVP program info from http://www.fns.usda.gov/sites/default/files/handbook.pdf.

adequate nutritional intake among at-risk populations and each is means tested, the programs differ in terms of the population served, and the nature of the program provided. SNAP is the largest program, reaching an average of 46.5 million persons at a total annual cost of $74.2 billion in 2014. It is the most unrestricted, providing a debit card to facilitate purchases of most food items in the grocery store and extending benefits to the broadest population. On the other hand, WIC is highly prescribed benefit, largely consisting of quantity vouchers to purchase very specific bundles. Additionally, the program is highly targeted, extending benefits only to pregnant and postpartum women, infants, and children under age five. In 2014, WIC served just under 2 million women and 6.3 million children at a cost of $6.3 billion. The school lunch and breakfast programs provide free and reduced-price meals to eligible school-age children. In 2014, the lunch program served 21.7 million low-income children at a cost of $9.6 billion and the breakfast program served 11.6 million low-income children at a total cost of $3.6 billion.[1]

3.1.1 Program History and Rules: SNAP

Overview of Program

SNAP has features consistent with traditional means-tested transfer programs. Eligible households must satisfy income and asset tests. Maximum benefits are assigned based on household size, and actual benefits received are reduced as income increases based on the benefit-reduction rate (or tax rate) calculated through the benefits formula. The similarities with other US means-tested programs end there.

Unlike virtually all means-tested programs in the United States, SNAP eligibility is not limited to certain targeted groups such as families with children, aged, and the disabled.[2] Second, SNAP is a federal program with all funding (except 50 percent of administrative costs) provided by the federal government, eligibility and benefit rules determined federally, and comparably few rules set by the states (particularly prior to welfare reform).[3] Third, the income eligibility threshold and benefits are adjusted for changes in prices each year.[4] Fourth, the benefit-reduction rate is 30 percent of net income (lower than AFDC/TANF) and the program serves both the working and nonworking poor. Its universal eligibility (i.e., eligibility depends

1. These costs only include spending on free and reduced-price meals. In 2014 total spending, including paid meals, was $11.4 and $3.7 billion for lunch and breakfast, respectively.

2. The program is not quite universal: notably undocumented immigrants are not eligible for SNAP. Additionally, as discussed below, there are restrictions on receipt for able-bodied adults age eighteen to forty-nine without dependents.

3. In other public assistance programs such as TANF and Medicaid, states determine fundamental parameters such as the income eligibility cutoffs and (for TANF) benefit levels.

4. Benefits are tied to the cost of a "market basket of foods which if prepared and consumed at home, would provide a complete, nutritious diet at minimal cost," the so-called Thrifty Food Plan, and then indexed for increases in prices.

only on need) combined with the fact that benefits and caseloads rise freely with need (i.e., it expands during recessions, since the program is an entitlement and expenditures are not capped) have elevated SNAP to its status as the fundamental safety net program in the United States.

Benefits take the form of "value vouchers" in that they provide a dollar amount that can be used to purchase most foods from grocery stores that are foods designed to be taken home and prepared. In other words, most grocery store foods can be purchased with the exceptions of goods such as hot foods intended for immediate consumption, vitamins, paper products, pet foods, alcohol, and tobacco. Starting in the late 1980s and completed by 2004, states transitioned to delivery of benefits by Electronic Benefit Transfer (EBT) cards, eliminating the use of paper vouchers. In 2008, the program name was changed from the food stamp program to the Supplemental Nutrition Assistance Program (SNAP). Some states have different names for the program, such as California's "CalFresh."

Eligibility and Benefits

Like other safety net programs, SNAP is designed to ensure a basic level of consumption in low-income families. Consequently, a traditional income-support program will feature a "guarantee"—that is, a benefit level if the family has no income. As earnings or income increases, benefits are reduced resulting in an implicit tax rate on earnings (called the benefit-reduction rate or BRR).

Unlike most means-tested benefit programs in the United States, SNAP is broadly available to almost all households with low incomes. The eligibility rules and benefit levels vary little within the United States, and are largely set at the federal level. Eligible households must meet three criteria: gross monthly income does not exceed 130 percent of the poverty line, net income (income after deductions) does not exceed the poverty line, and "countable" assets do not exceed $2,250 (or $3,250 for elderly, disabled).[5] Additionally, most nonworking, nondisabled childless adults ages eighteen to forty-nine (referred to as able-bodied adults without dependents or ABAWD) are limited to three months of benefits within a three-year period. The eligibility unit is the "household unit" and consists of people who purchase and prepare food together. After initial eligibility, households must be recertified every six to twenty-four months.

A stylized version of the benefit formula is presented in figure 3.1 for a family of a fixed size. A key parameter of the formula is the cost of food under the USDA's Thrifty Food Plan, which we also term the "needs standard." The maximum SNAP benefit amount (represented as the horizontal

5. As described below, the gross income test rules have recently been relaxed through expansions in categorical eligibility. For SNAP, countable assets exclude homes and retirement plans, and the extent to which vehicles are counted varies across states. The SNAP recipients who receive SSI or TANF are excluded from the SNAP asset test.

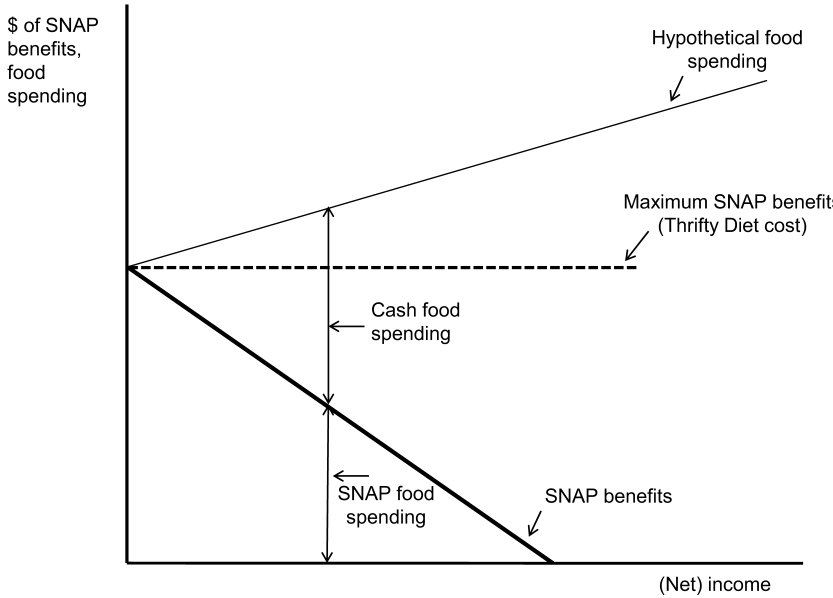

Fig. 3.1 Stylized representation of SNAP benefit formula
Source: Hoynes, McGranahan, and Schanzenbach (2015).

line in the figure) is typically set equal to the needs standard.[6] The SNAP benefit is designed to fill the gap between the needs standard and the cash resources available to a family to purchase food. A family with no income receives the maximum benefit amount, and is expected to contribute nothing out of pocket to food purchases. Total food spending, depicted by the upward-sloping line labeled "hypothetical food spending" increases with income since food is a normal good.[7] Total food spending thus equals the maximum benefit level for a family with no other income source. As a family's income increases, they are expected to be able to spend more of their own cash on food purchases, and SNAP benefits are reduced accordingly. The slope of the SNAP benefits line in figure 3.1 is the BRR, which is currently set at 0.3. The benefit formula is thus as follows:

$$\text{Benefits} = \text{Max\_Benefit} - 0.3 * (\text{Net\_Income}). \quad (1)$$

The SNAP benefit level as a function of net family income is represented by the downward-sloping line in the figure. Finally, the family's out-of-

6. Congress can set maximum benefits equal to some multiple of the needs standard. For example, the American Recovery and Reinvestment Act of 2009 temporarily raised maximum benefits to be 113.6 percent of the needs standard.

7. As drawn here, we assume the marginal propensity to consume food out of income is lower than the marginal tax rate, and we assume that SNAP is valued the same as cash for food purchases.

pocket spending on food is the vertical distance between the SNAP benefits line and the food spending line.

Net income is calculated as cash pretax income less the following deductions: a standard deduction, a 20 percent deduction from earned income, an excess shelter cost deduction, a deduction for child-care costs associated with working/training, and a medical cost deduction that is available only to the elderly and disabled. Because of these deductions, in practice the benefit-reduction rate (the effective tax rate) out of gross income is lower than 0.3 (we present data on this below). Notably, the income measures used for SNAP eligibility use a *cash, pretax* measure and therefore do not include in-kind benefits (e.g., housing assistance) or tax credits including the EITC or the Child Tax Credit. Net income does include cash transfers such as Social Security, disability income, unemployment insurance, and TANF.

Central policy issues include whether the needs standard is set at an appropriate level, and whether the benefit-reduction rate is appropriate (Institute of Medicine [IOM] 2013). It is worth pointing out that this 0.3 (statutory) benefit-reduction rate is substantially lower than that experienced by other safety net programs such as disability and TANF.

History, Reforms, and Policy Changes

Currie (2003) provides a detailed history of the food stamp program. We briefly touch on some of the important elements of the history and discuss more recent policy changes.

The modern food stamp program began with President Kennedy's 1961 initiation of pilot food stamp programs in eight impoverished counties.[8] The pilot programs were later expanded to forty-three counties in 1962 and 1963. The success with these pilot programs led to the Food Stamp Act of 1964, which gave local areas the authority to start up the food stamp program in their county. As it remains today, the program was federally funded and benefits were redeemable at approved retail food stores. In the period following the passage of the Food Stamp Act, there was a steady stream of counties initiating food stamp programs and federal spending on the FSP more than doubled between 1967 and 1969. Support for requiring counties to participate in FSP grew due to a national spotlight on hunger (Berry 1984). This interest culminated in the passage of 1973 Amendments to the Food Stamp Act, which mandated that all counties offer FSP by 1975.[9]

Figure 3.2 plots the population-weighted percent of counties with a FSP

8. A more detailed history timeline can be found here: http://www.fns.usda.gov/sites/default/files/timeline.pdf.

9. Prior to the food stamp program, some counties provided food aid through the 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. The CDP was far from a universal program. It never reached all counties. The food basket contained a limited range of products, the distribution was infrequent, and distribution centers were difficult to reach.

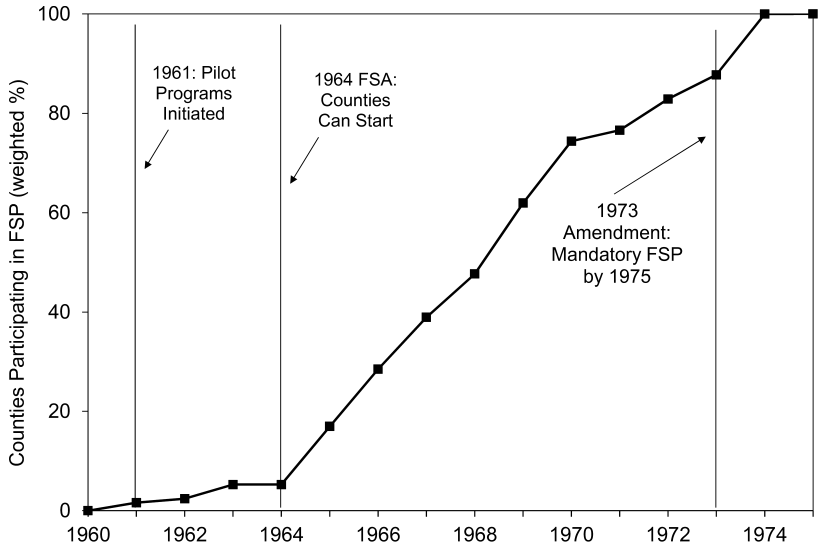

Fig. 3.2 Cumulative percent of counties with Food Stamp Program, 1960–1975
Source: Hoynes and Schanzenbach (2009). Weighted by 1970 county population.

from 1960 to 1975.[10] During the pilot phase (1961–1964), FSP coverage increased slowly. Beginning in 1964, program growth accelerated; coverage expanded at a steady pace until all counties were covered in 1974. There was substantial heterogeneity in timing of adoption of the FSP, both within and across states. The map in figure 3.3 shades counties according to date of FSP adoption (with darker shading denoting a later start-up date).

Compared to the dramatic reforms (AFDC) and expansions (EITC) of income support programs that have characterized the last two decades, the programmatic aspects of food stamps have remained fairly stable over time. A major change took place in the 1977 Food Stamp Act reauthorization with the elimination of the purchase requirement. Prior to this law change, families were required to make cash payment upfront (the "purchase requirement") to receive their food stamp benefits. The presence of (or elimination of) this feature did not change the net value of the benefits a family received, yet food stamp caseloads increased substantially after the removal of the purchase requirement.[11]

The 1996 welfare-reform legislation left the core structure of the food stamp program relatively unaffected, but did limit benefits for legal immi-

10. Counties are weighted by their 1970 population. Note this is not the food stamp caseload, but represents the percent of the US population that lived in a county with a FSP.

11. That is, if the family was deemed able to afford to spend $60 on food, but the cost of the thrifty food plan was $80, the family could purchase $80 in food stamps for the cash price of $60. Under today's program, a similar family would simply receive $20 in food stamps and would not have to outlay any cash.

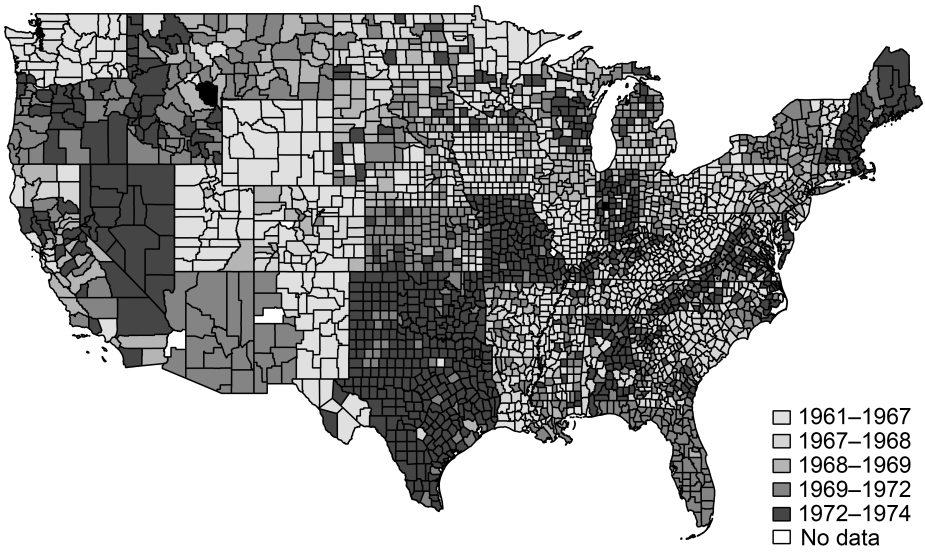

Fig. 3.3 Food stamp start date, by county
Source: Hoynes and Schanzenbach (2009).

grants (who were deemed ineligible until they accumulated ten years of work history)[12] and able-bodied adults without dependents eighteen to forty-nine (who were typically limited to three months of benefits in a three-year period) and eliminated benefits for convicted drug felons.[13] The legislation included a temporary waiver of the time limits in places with high unemployment rates or "insufficient jobs." A 1998 agriculture bill restored food stamp eligibility to some legal immigrant children, disabled persons, the blind, and the elderly (those who had arrived in the United States prior to welfare reform). Later, the 2002 Farm Bill restored food stamp eligibility to all legal immigrant children and disabled persons, regardless of their time of residence in United States, and to legal immigrant adults in the country for five

12. The CBO estimated that welfare reform's changes to food stamps that did not address immigrants would reduce spending on food stamps by $23 billion from 1997 to 2002. Most of the savings came from imposing the work requirement, reducing maximum benefits across the board, and changing allowable deductions when calculating net income. See http://www.cbo.gov/sites/default/files/1996doc32.pdf.

13. As discussed in Bitler and Hoynes (2013), prior to welfare reform, there was a "bright line" that distinguished between legal immigrants and unauthorized residents in determining eligibility for safety net programs. Legal immigrants were eligible for most safety net programs on the same terms as citizens while unauthorized immigrants were not. There were exceptions: unauthorized immigrants maintained eligibility for free and reduced-price school lunch and breakfast, WIC, emergency Medicaid, and state-funded emergency programs. In addition, refugees and asylum seekers also sometimes faced different rules than others. Finally, in response to the postwelfare reform reductions in immigrant eligibility for food stamps, some states chose to maintain coverage for legal immigrants with state-funded replacement coverage (known as "fill-in" programs).

or more years. Additionally, welfare reform reduced the maximum benefit, froze many deductions used in calculating net income, and mandated that states adopt Electronic Benefit Transfer.

Beginning with regulatory changes in 1999 and continuing with the 2002 Farm Bill, the USDA has allowed states to implement policies aimed at improving access to benefits, particularly for working families. This came from the observation that the process of signing up for food stamps takes considerable time and, in particular for working families, getting to the benefits office can be a significant barrier to access to the program. This has led to redesigning income-reporting requirements (increasing the time between recertifications, reducing income reporting between recertifications), moving away from in-person meetings for determining eligibility (instead using call centers and online applications), as well as relaxing of asset limits (such as vehicle ownership). Additionally, during this time states also expanded "broad-based categorical eligibility" (US GAO 2007) whereby states extend SNAP eligibility to households whose gross income is above 130 percent of the poverty line (above gross income test), but with disposable income below the poverty line (meet the net income test). They also can relax the asset limits. However, the benefit formula remained fixed (as the maximum benefit less 30 percent of net income); this implies that any expanded eligibility would be for those with large deductions to gross income (such as families with high child care and shelter costs).

In 2008, the food stamp program was renamed the Supplemental Nutrition Assistance Program (SNAP). Legislative reforms at that time also included excluding certain tax-preferred education savings and retirement accounts from the calculation of the asset test, and indexing of the asset limits to inflation.

The American Recovery and Reinvestment Act of 2009 (federal stimulus or ARRA) increased the maximum SNAP benefit by 13.6 percent. Due to ordinary SNAP nominal benefit changes and additional legislation, the benefit increase was sunset in October 2013. In addition, because unemployment rates rose to high levels during the Great Recession, in most states the three-month time limit on able-bodied childless adults was temporarily suspended as allowed at state option during periods of high unemployment under the rules adopted with welfare reform.

3.1.2 Program History and Rules: WIC

Overview of Program

The goal of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is to improve the nutritional well-being of low-income pregnant and postpartum women, infants, and children under the age of five who are at nutritional risk by providing nutritious foods to supplement diets, nutrition education, and referrals to health care and social

services. More specifically the program aims to improve birth outcomes, support the growth and development of infants and children, and promote long-term health in all WIC participants. The WIC program also provides nutritional services and education.

Eligibility and Benefits

Eligibility for WIC requires satisfying categorical eligibility and income-eligibility requirements. Five types of individuals are categorically eligible for WIC: pregnant women, postpartum women for six months after birth, breastfeeding women with an infant under twelve months, infants, and children under age five. Benefits are assigned separately for each group, so, for example, an income-eligible family consisting of a pregnant woman, infant, and child under age five would receive three WIC benefits. Income eligibility dictates that participants must live in households with family incomes below 185 percent of the poverty line or become eligible through participation in another welfare program (with income eligibility below 185 percent of poverty line) such as TANF or SNAP. Under the federal rules, immigrants are eligible for WIC under the same circumstances as natives.[14] Additionally, participants must be deemed to be at nutritional risk; risk factors include low maternal weight gain, inadequate growth in children, anemia, dietary deficiencies, heavy weight, and other nutrition-related medical conditions.[15] However, virtually all financially eligible persons appear to satisfy this requirement (Ver Ploeg and Betson 2003). After initial eligibility, recertification is generally required every six months. Like SNAP, WIC benefits take the form of vouchers and many states currently use (or are in planning stages to use) debit cards for distributing benefits. The vast majority of WIC participants access the food packages by redeeming vouchers or using EBT at participating retail outlets.[16]

The WIC benefits differ from food stamp benefits in two key ways. First, the WIC benefit does not vary with countable income, and thus there is no benefit-reduction rate that reduces the benefit as countable income rises. Instead, as with programs such as Medicaid, recipients who are income and categorically eligible receive the full WIC benefit (an "all or nothing" benefit package). Second, the WIC bundle is restricted to specific items; the WIC approved foods are chosen because they contain substantial amounts of protein, calcium, iron, or vitamins A or C. The approved foods include juice, fortified cereal, eggs, cheese, milk, dried legumes or peanut butter, and canned fish. Table 3.2 summarizes the current elements of the food package

14. States have the discretion to deny benefits to immigrants, though as of this writing none have implemented explicit restrictions (http://www.fns.usda.gov/sites/default/files/wic/WICRegulations-7CFR246.pdf).

15. Risk factors can also include homelessness and migrancy, drug abuse, and alcoholism.

16. Alternatively, a few state agencies purchase the items in bulk and make them available through distribution centers or through home delivery.

Table 3.2 WIC food packages (maximum monthly allowances)

Food package	Recipient	Food
I	Infants, fully formula fed (birth to five months)	WIC formula: 823 fl. oz. reconstituted liquid concentrate (birth to three months) WIC formula: 896 fl. oz. reconstituted liquid concentrate (four to five months)
	Infants, partially breastfed (birth to five months)	WIC formula: 104 fl. oz. reconstituted powder (birth to one month) WIC formula: 388 fl. oz. reconstituted liquid concentrate (one to three months) WIC formula: 460 fl. oz. reconstituted liquid concentrate (four to five months)
II	Infants, fully formula fed (six to eleven months)	WIC formula: 630 fl. oz. reconstituted liquid concentrate Infant cereal: 24 oz. Baby food fruits and vegetables: 128 oz.
	Infants, partially breastfed (six to eleven months)	WIC formula: 315 fl. oz. reconstituted liquid concentrate Infant cereal: 24 oz. Baby food fruits and vegetables: 128 oz.
	Infants, fully breastfed (six to eleven months)	Infant cereal: 24 oz. Baby food fruits and vegetables: 256 oz. Baby food meat: 77.5 oz.
III	Infants, fully formula fed (birth to eleven months)	WIC formula: 823 fl. oz. reconstituted liquid concentrate (birth to three months) WIC formula: 896 fl. oz. reconstituted liquid concentrate (four to five months) WIC formula: 630 fl. oz. reconstituted liquid concentrate (six to eleven months) Infant cereal: 24 oz. (six to eleven months) Baby food fruits and vegetables: 128 oz. (six to eleven months)
	Infants, partially breastfed (birth to eleven months)	WIC formula: 104 fl. oz. reconstituted powder (birth to one month) WIC formula: 388 fl. oz. reconstituted liquid concentrate (one to three months) WIC formula: 460 fl. oz. reconstituted liquid concentrate (four to five months) WIC formula: 315 fl. oz. reconstituted liquid concentrate (six to eleven months) Infant cereal: 24 oz. (six to eleven months) Baby food fruits and vegetables: 128 oz. (six to eleven months)
IV	Children: one to four years old	Juice, single strength: 128 fl. oz. Milk: 16 qt.* Breakfast cereal: 36 oz. Eggs: 1 dozen Fruits and vegetables: $8.00 in cash value voucher Whole wheat bread: 2 lb.** Legumes, 1 lb. dry or 64 oz. canned OR peanut butter, 18 oz.

Table 3.2 (continued)

Food package	Recipient	Food
V	Pregnant and partially breastfeeding women (up to one year postpartum)	Juice, single strength: 144 fl. oz. Milk: 22 qt.* Breakfast cereal: 36 oz. Eggs: 1 dozen Fruits and vegetables: $10.00 in cash value voucher Whole wheat bread: 1 lb.** Legumes, 1 lb. dry or 64 oz. canned AND peanut butter, 18 oz.
VI	Postpartum women (not breastfeeding, up to six months postpartum)	Juice, single strength: 96 fl. oz. Milk: 16 qt.* Breakfast cereal: 36 oz. Eggs: 1 dozen Fruits and vegetables: $10.00 in cash value voucher Legumes, 1 lb. dry or 64 oz. canned OR peanut butter, 18 oz.
VII	Fully breastfeeding women (up to one year postpartum)	Juice, single strength: 144 fl. oz. Milk: 24 qt.* Breakfast cereal: 36 oz. Cheese: 1 lb. Eggs: 2 dozen Fruits and vegetables: $10.00 in cash value voucher Whole wheat bread: 1 lb.** Fish, canned: 30 oz.*** Legumes, 1 lb. dry or 64 oz. canned AND peanut butter, 18 oz.

Source: USDA Federal Register/vol. 79, no. 42/March 2014/; Rules and Regulations accessed http://www.fns.usda.gov/sites/default/files/03–04–14_WIC-Food-Packages-Final-Rule.pdf.

* Allowable options for milk alternatives are cheese, soy beverage, tofu, and yogurt (partially). No whole milk for > 2 years.

** Allowable options for whole wheat bread are whole grain bread, brown rice, bulgur, oatmeal, whole-grain barley, soft corn, or whole wheat tortillas.

*** Allowable options for canned fish are light tuna, salmon, sardines, mackerel, and Jack mackerel.

and the specified maximum monthly allowance of WIC foods (separately for each eligibility group). For example, children ages one to four receive vouchers for juice (128 fluid ounces), milk (16 quarts), breakfast cereal (36 ounces), eggs (one dozen), whole wheat bread (2 pounds), and legumes/peanut butter. Infants are eligible for formula (if not exclusively breast fed), infant cereal, and baby food. Postpartum women have access to breastfeeding services. In addition, in 2009 WIC added a "cash value voucher" (CVV), here shown as $8 ($10) for fruits and vegetables for children (women).

This discussion makes clear that WIC then is primarily a quantity voucher and thus households do not face price incentives for these goods (the exception is the CVV for fruits and vegetables). In part to address this, an increasing number of states require participants to limit purchases to the

cheapest available items or store brands in the authorized grocery outlet. More generally, WIC purchases may be limited by product type, product size, and brand. An important special case of this is for infant formula, which is a large part of WIC food costs. In 2010, spending on formula for WIC totaled almost $1 billion out of a total program food cost of $4.6 billion (USDA FNS 2013). Under current regulations, state WIC agencies typically award a contract to a single manufacturer of infant formula in exchange for a rebate for each can of infant formula purchased by WIC participants. These rebates are very high, ranging from 77 to 98 percent of the wholesale price. The formula market is highly concentrated—with only three firms—and more than half of all formula sold in the United States goes to WIC participants (Oliveira, Frazão, and Smallwood 2013).

In addition to the food benefits, WIC provides participants with health screenings, nutrition education, and referrals to other social services.

Importantly, WIC is not an entitlement program; SNAP on the other hand has been a fully funded entitlement program since it went national in 1975. Congress makes appropriations for WIC, which in principle could lead to shortfalls in the number of people that can be served. In recent times (since 1997), these allocations have been sufficient to meet demand for the program and thus in practice it has operated as an entitlement program.

Also, WIC has an unusual administrative structure that operates at the federal, state, and local levels. The program is federally funded and operated through the USDA. The USDA provides grants to support food benefits, nutrition services, and administration to ninety WIC agencies (covering the fifty states, Washington, DC, US territories, and Indian Tribal Organizations). The state agencies then contract with local WIC-sponsoring agencies located primarily in state and county health departments. These local sponsoring agencies then provide benefits directly or through local services sites at community health centers, hospitals, schools, mobile vans, and other locations.

History, Reforms, and Policy Changes

Currie (2003) provides a detailed history of WIC. We briefly touch on some of the important elements of the history and discuss more recent policy changes.[17]

The WIC program was first established as a pilot program in 1972 as an amendment to the Child Nutrition Act of 1966. The program was developed in direct response to policy recommendations highlighting health deficits among low-income individuals that might be reduced by improving their access to food. It was further recognized that, by providing food at "critical times of development" to pregnant and lactating women and young children, it might be possible to prevent a variety of health problems (Oliveira

17. Much of this section is drawn from Oliveira et al. (2002).

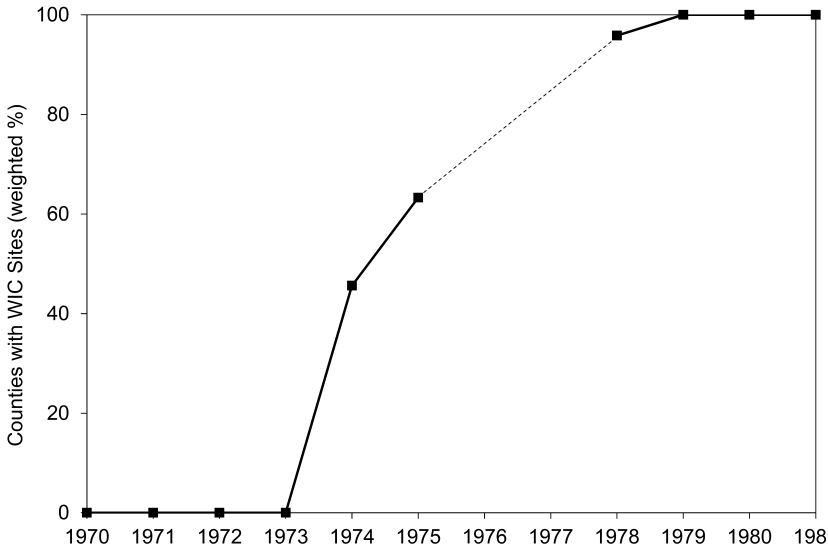

Fig. 3.4 Cumulative percent of counties with WIC programs, 1970–1981
Source: Hoynes, Page, and Stevens (2011). Weighted by 1970 county population. Missing data for 1976 and 1977.

et al. 2002). The program became permanent in 1975. The WIC program was intended to provide targeted benefits to its eligible population, and was not intended to replace food stamp benefits for them. The authorizing legislation specifically did not preclude a person from WIC participation if they were already receiving food stamps.

The WIC sites were established in different counties between 1972 and 1979, with legislation requiring that the program be implemented first in "areas most in need of special supplemental food" (Oliveira et al. 2002). The first WIC program office was established in January 1974 in Kentucky, and had expanded to include counties in forty-five states by the end of that year.[18] Figure 3.4 shows the population-weighted percent of counties with WIC programs in place. The graph shows steady expansion in the program between the years 1974–1978.

The Child Nutrition and WIC Reauthorization Act of 1989 established automatic eligibility for WIC for families participating in food stamps, Medicaid, or Aid to Families with Dependent Children. At this time, the WIC income-eligibility limits exceeded the limits in these other programs. The policy change led to an expansion of WIC and in some ways turned

18. Participation in the commodity distribution program, however, disqualified individuals from WIC participation (Oliveira et al. 2002). The CDP was being phased out during the 1970s as the FSP expanded to a national program.

it into a "gateway program through which many low-income households enter the public health system" (Macro International 1995). Additionally, the act required WIC agencies to use competitive bidding or other cost-containment policies to reduce costs of infant formula. Finally, the act required the USDA to promote breastfeeding.

For the first thirty-plus years of the program, there was little change in the WIC food package. The food packages throughout this period included a very limited number of items: juice, infant cereal, milk, cheese, eggs, dried beans, and peanut butter. The only major change to the food package in this period was in 1992 with the addition of an enhanced WIC food package including canned tuna and carrots for fully breastfeeding mothers, which was part of a growing desire to encourage breastfeeding among the WIC population.

In the late 1990s and early in the twenty-first century there was a growing view that this very narrow food package did not adequately meet current dietary guidelines (which are updated every five years). Additionally, concerns grew about significant changes in the food supply at grocery outlets (such as the increased availability of low-cost, energy-dense foods), the growing prevalence of obesity, and whether WIC foods were culturally appropriate for all participants. The USDA's Food and Nutrition Service set a goal to determine cost-neutral changes to WIC food packages based on information about the nutrition needs of WIC participants. This led to a report by the Institute of Medicine (IOM 2005), with new food packages introduced in 2009 and adopted in 2014. The IOM report identified that WIC packages should increase their coverage of nutrients such as iron, vitamin E, potassium, and fiber, and also provide more access to fruits and vegetables. Particular attention was aimed at encouraging breastfeeding through expanding the food package for breastfeeding mothers. The modified rules added flexible vouchers for fruit and vegetables (e.g., $8.00 per month for a child, $10.00 for pregnant and breastfeeding women), decreased juice and milk allotments, and added milk alternatives (cheese, yogurt, tofu) and whole grains. Table 3.2, as presented above, describes this recently adopted WIC food bundle. The Institute of Medicine is now reviewing the WIC food package to update it to reflect the latest nutrition science and dietary guidelines for Americans.

3.1.3 Program History and Rules: National School Lunch Program

Overview of Program

The school lunch program provides federal cash and commodity support for meals served to children at public and private schools, and other qualifying institutions. There is a three-tiered system based on a child's household income that determines the level of federal payments made to

schools. Unless the school has adopted a universal free-meals plan, this system also typically determines the student's price category (free, reduced price, or paid).

Schools receive both cash and in-kind payments for meals served. In 2014/15, schools received federal cash subsidies equal to $2.98 per free lunch, $2.58 per reduced-price lunch, and $0.28 per paid lunch.[19] If the share of free or reduced-price lunches served at the school exceeds 60 percent (in a base year two years prior to the current year), then per-meal cash subsidies are increased by two cents per meal.[20] As described below, schools are eligible for additional payments of six cents per meal if they document that their lunches meet nutritional guidelines. In addition, schools receive commodity foods worth $0.2475 for each lunch served, regardless of the price category. Schools may also receive bonus commodities from the USDA's purchase of surplus commodities if they are available.

Benefits and Eligibility

Under traditional eligibility, children from households with incomes less than 130 percent of the federal poverty line receive lunches free of charge, while those from households with incomes between 130 percent and 185 percent of the federal poverty line are eligible for reduced-price meals, which have a maximum allowable price charged to students of $0.40. Children from households with incomes above 185 percent of the federal poverty line may purchase so-called "paid meals." Individual school districts have discretion to set their own prices for paid lunches, which are priced on average less than $2.50 per meal. Some children are additionally eligible for free meals based on categorical eligibility criteria, or if their school has adopted a universal free-meal program. Regardless of household income, children are deemed to be categorically eligible for free meals if their family receives benefits through SNAP or the Food Distribution Program on Indian Reservations (FDPIR), TANF, if the child is a foster, homeless, runaway, or migrant, or if the child is in Head Start. Students are offered the same components of school lunch regardless of their price category, and are allowed some choice to refuse components they are offered.

In recent years, there has been expansion in the use of direct certification of students for free meals using other data sources instead of requiring families to fill out application forms at schools. Direct certification can take the form of data matching or, in the case of homeless, migrant, runaway, or foster children, using a list provided to the school meals program by an appropriate official. States are required to conduct direct certification using SNAP data, but are not required to conduct direct certification using other

19. Payment levels are higher in Alaska and Hawaii.
20. Some states provide additional supplementary funding.

sources (e.g., TANF or FDPIR rolls).[21] The 2010 Healthy, Hunger-Free Kids Act provides incentives to states that show "outstanding performance" or "substantial improvement" in directly certifying students for free meals through these methods. In addition, as described below, students who are not income eligible or categorically eligible for free meals may receive them for free if their school has adopted a universal free-lunch program.

History, Reforms, and Policy Changes

Predecessors to the National School Lunch Program (NSLP) date back to the Great Depression, when the government began to distribute surplus farm commodities to schools with large populations of malnourished students. In 1946 Congress passed the National School Lunch Act (Gunderson 1971, see also table 3.3). The act's statement of purpose indicates that a nonprofit school lunch program should be established "as a measure of national security" with the dual purposes "to safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other food." Under the act, commodities were distributed and cash payments were made to states according to a formula that was a function of per capita income and population. The NSLP was significantly amended in 1962 to adjust the funding formula to become a function of both the program participation rate and the "assistance need rate" that was a function of the state's average per capita income (Hinrichs 2010).

In recent years there have been legislative changes both regarding payment formulas and nutrition standards. In terms of payment formulas, there have been several recent efforts to reduce administrative costs for the payment process. Under the typical approach to eligibility, families are required to apply for the lunch subsidy, and then schools must track daily meal participation by price category. The alternative reimbursement provisions save schools the administrative costs of both processing applications and also daily tracking of meals served by price category. One such provision available to schools is the Community Eligibility Provision (CEP), which was phased in starting in 2011 and became available nationally in the 2014/15 school year. This policy allows schools to provide free meals to all of its students if they can document that at least 40 percent of their students are categorically eligible for free meals. If a school opts for the CEP, the federal government reimburses X percent of school meals at the free rate, where X equals 1.6 times the share of students who are categorically eligible at the school. Remaining meals served are reimbursed at the paid-lunch rate, and schools must cover any shortfall between costs and reimbursements with

21. Under USDA demonstration projects, a few states are allowed to use Medicaid data for direct certification, but only if the household's income is at or below 133 percent of the federal poverty line (Levin and Neuberger 2014).

Table 3.3 NSLP and SBP history

1946	National School Lunch Act
	Congress passes to make school lunch program permanent
	A. Serve lunches meeting the minimum nutritional requirements prescribed by Secretary of Agriculture
	B. Serve meals without cost or at reduced cost to children of need
	C. Operate program on a nonprofit basis
	D. Utilize commodities declared by the secretary to be in abundance
	E. Utilize commodities donated by the secretary
	F. Maintain proper records of all receipts and expenditures to be reported to state agency
1952	1st Amendment to change appropriations in AK, HI, P.R., V.I., and Guam
1962	Amended fund to be apportioned on basis of participation rate and assistance need rate
1966	Child Nutrition Act
	A. Program expanded and strengthened
	B. Special Milk Program added
	C. School Breakfast Program two-year pilot begins
1971	Congress specifies SBP to target schools in which there are children of working mothers and from low-income families
1973	SBP restructured reimbursement from grant to a specific per-meal reimbursement
1975	SBP becomes permanent with emphasis on schools in severe need
1998	Child Nutrition Reauthorization Act increases federal subsidies for child nutrition programs
2004	Child Nutrition and WIC Reauthorization Act of 2004
	A. Required all school districts receiving federal funds for meal programs to create wellness policies
2010	Healthy, Hunger-Free Kids Act
	A. Improves nutrition with a focus on childhood obesity reduction
	B. Increases access
	C. Increases program monitoring
	D. Increases funding

Source: NSLP history from http://www.fns.usda.gov/sites/default/files/NSLP-Program%20History.pdf; SBP history from http://www.fns.usda.gov/sbp/program-history.

nonfederal funds. Under the CEP, a school must provide both breakfast and lunch free to all students.

Two alternatives (referred to as "Provision 2" and "Provision 3") allow schools to serve free meals to all students enrolled at the school, while only requiring the collection of applications for free or reduced-price eligibility every four years. Provision 2 allows a school to determine the fraction of meals it serves at each price tier during one base year, then applies the same ratio of reimbursement rates to all meals served for the following three years. Under the Provision 3 option, a school counts meals served by type during the base year, and then may receive the same level of cash payments and commodities in the subsequent three years regardless of the number of meals served. Under these provisions, a school may decide to provide lunch, breakfast, or both meals for free to all students. Likely in part due

to these administrative alternatives, the share of schools offering universal free lunches has increased.

The 2010 Healthy, Hunger-Free Kids Act made major changes to nutrition standards for school lunches, as shown in table 3.4. Under prior nutrient standards, schools were required to serve at least a minimum number of calories per meal, and the standard varied by student age from 633 calories in grades K–3 to 785 calories in grades 4–12. Schools were also required to insure that no more than 10 percent of calories came from saturated fats. There were also requirements for minimum levels of daily fruits and vegetables, meats, grains, and milk. Updated program rules have imposed new calorie guidelines, imposing both minimum and maximum calorie rules.

Table 3.4 **Current NSLP and SBP rules (post Healthy, Hunger-Free Kids Act implementation)**

I.		New dietary guidelines established by USDA
	A.	Fluid milk restrictions: unflavored milk can be 1 percent or fat free; flavored milk must be fat free
	B.	No added trans fat or zero trans fat
	C.	Avg. saturated fat content per meal (averaged across week) must be less than 10 percent of total calories
	D.	Fruits and vegetables minimum requirement increase
	E.	Avg. calories per meal (averaged across week) must fall within defined ranges for each age/grade group
	F.	Serve a variety of vegetables from each of these groups every week: dark green, red/orange, legumes, starchy and "all other"
	G.	Half of grain items offered must be "whole grain rich"
	H.	Number of servings of grain items and meat/meat alternates offered must be within the weekly ranges for each age/grade group
	I.	Minimum daily portion sizes and minimum weekly serving requirements for each food group
	J.	Reduce sodium content
II.		Simplifications to direct certification process and increased access
	A.	Foster children automatically eligible
	B.	Community eligibility: areas of high poverty qualify for universal free meals
III.		Payments and reimbursement changes
	A.	Increased lunch reimbursement rate by six cents for meals that meet nutrition standards
	B.	Requires school districts to gradually increase price of paid lunches to offset new costs
IV.		Increased authority to USDA
	A.	Regulation of competitive foods
	B.	Nutritional standards applicable to all food sold in schools
V.		Requires schools to make free potable water where meals are served
VI.		Increased program monitoring
VII.		Privacy protection for individual completing application

Source: USDA Comparison of Previous and Current Regulatory Requirements under Final Rule, http://www.fns.usda.gov/sites/default/files/comparison.pdf; Summary of the Healthy, Hunger-Free Kids Act of 2010 from http://www.fns.usda.gov/sites/default/files/PL111–296_Summary.pdf.

Table 3.5 **Previous and current school meal caloric standards**

Previous (pre-HHFKA)	Current (post-HHFKA)
Lunch	
Grades K–3	Grades K–5
Min: 633	Min: 550
Max: none	Max: 650
Grades 4–12	Grades 6–8
Min: 785	Min: 600
Max: none	Max: 700
Grades 7–12 (optional)	Grades 9–12
Min: 825	Min: 750
Max: none	Max: 850
Breakfast	
Grades K–12	Grades K–5
Min: 554	Min: 350
Max: none	Max: 500
	Grades 6–8
	Min: 400
	Max: 550
	Grades 9–12
	Min: 450
	Max: 600

Source: Comparison of previous and current regulatory requirements under final rule from Nutrition Standards in the National School Lunch and School Breakfast Programs (published January 26, 2012).

For many grades, the new maximum allowable calories were set below the previous calorie floor (see table 3.5). The new rules also include stronger requirements for daily and weekly food group servings, including weekly requirements for a variety of vegetables (such as dark green, red/orange, and starchy), restrictions on the fat content of milk, and a phased-in requirement to use only whole grain rich grains. Schools that meet these enhanced nutrition requirements receive an additional six-cent payment per meal. In addition, the act gave the USDA authority to set nutritional standards for all foods sold in school during the school day, including in vending machines, school stores, and a la carte lunch items. The research literature evaluating the impacts of the policy changes on participation in the program at the individual or school level is sparse to date.

3.1.4 Program History and Rules: School Breakfast Program

Overview of Program

The school breakfast operates in a similar manner to the lunch program, though participation is lower. The SBP provides federal cash support (but, unlike the NSLP, no additional commodity support) for meals served to children at public and private schools and other qualifying institutions. The

same approach is employed as in the NSLP, in which a three-tiered system based on a child's household income determines the level of federal payments made to schools, and typically also determines the student's price category.

In 2014/15, schools received federal cash subsidies equal to $1.62 per free breakfast, $1.32 per reduced-price breakfast, and $0.28 per paid breakfast.[22] If the share of free or reduced-price breakfasts served at the school exceeds 40 percent (in a base year two years prior to the current year), then the school is eligibility for "severe need" payments, which increase the per-meal cash subsidies by thirty-one cents per meal for free and reduced-price meals. About three-quarters of breakfasts served in the SBP receive this "severe need" payment.

Benefits and Eligibility

The eligibility rules are the same for breakfast and lunch, and a single eligibility determination is made for each child that covers both meals. The current maximum allowable price for reduced-price breakfast is $0.30. Children from households with incomes above 185 percent of the federal poverty line may purchase so-called "paid meals." The categorical eligibility criteria (whereby participation in selected means-tested transfers automatically confer eligibility for SBP) are the same as they are for the school lunch program.

History, Reforms, and Policy Changes

The SBP was established in 1966 as a two-year pilot program. It originally provided categorical grants to provide payments to schools that served breakfast to "nutritionally needy" students. In 1973, the program was amended to replace the categorical grant with the per-meal payment system used today. It was permanently authorized in 1975.

New program rules adopted after the 2010 Healthy, Hunger-Free Kids Act made substantial changes to breakfast standards. Under prior nutrient standards, schools were required to serve at least 554 calories at breakfast. Under the new standards, breakfast calories were required to fall within a specified range, from 350–500 for grades K–5 to 450–600 for high school students. Similar to the changes made to the lunch nutrient standards, new rules required more fruits and vegetables, a switch to whole grains, and imposed restrictions on the fat content of milk. The act also authorized grants that can be used to establish or expand school breakfast programs.

Other Food and Nutrition Programs

There are four other child nutrition programs (see table 3.1), and together they comprise about 4 percent of spending on food and nutrition programs overall or about one-quarter of the total federal spending on child nutrition

22. Reimbursements are higher in Alaska and Hawaii.

programs). These programs provide meals for children and other vulnerable groups outside of school and during the summer, or provide additional food items to children.

The Child and Adult Care Food Program (CACFP) provides meals and snacks to children in day care facilities, as well as to functionally impaired adults receiving care in nonresidential adult day care centers and to the elderly (e.g., through Meals on Wheels). Participation in 2014 totaled 3.9 million children and adults, and total federal spending was $3.1 billion. The Summer Food Service Program (SFSP) supports meals and snacks served to children at schools, camps, and other organizations during the summer when school is not in session. In 2014, the program served 160 million meals to 2.7 million children (measured in July, the peak participation month) at a cost of $465.6 million. The Fresh Fruit and Vegetable Program (FFVP) provides resources for elementary schools to serve fresh fruits and vegetables as snacks outside of regular lunch and breakfast times. Schools apply to participate in the program, which is targeted to schools with high enrollments of free- and reduced-price-meal-eligible students. Participating schools receive an annual allotment of $50 to $75 per student. In 2014/15, the FFVP had $153 million in spending. The Special Milk Program (SMP) provides subsidized milk, primarily to schools, childcare institutions, and camps that do not participate in other federally subsidized child nutrition programs. The cost in 2014 was $10.5 million.

3.2 Program Statistics and Recipient Characteristics

3.2.1 Program Statistics: SNAP

In 2014, SNAP expenditures totaled $74.2 billion and served 46.5 million persons (or 22.7 million households). This translates to participation by more than one out of seven Americans. The average monthly benefit in 2014 amounted to $257 per household, $125 per person, or $4.11 per person per day. Overall, SNAP is the largest cash or near-cash means-tested safety net program in the United States.

Table 3.6 presents data on SNAP participation and expenditures over time. Total expenditures (in real 2014 dollars) increased from $28.0 billion in 1990 to $74.2 billion in 2014. Average monthly participation follows a similar path, moving from 20 million persons in 1990 to 46.5 million in 2014. The bottom of the table presents SNAP participants as a percent of the total US population—it has ranged from 8.1 percent in 1990 down to 6.2 percent in 2000, to 14.8 percent in 2014.

The take-up rate of SNAP, calculated as the fraction of the eligible population that is participating in the program, is fairly high at 79 percent in 2011 (Cunnyngham 2014). The take-up rates vary significantly across groups, with elderly individuals having considerably lower take-up rates than other groups. The take-up rates also vary substantially across states in the United

Table 3.6 Expenditures and caseload in food and nutrition programs

	1990	1995	2000	2005	2010	2012	2013	2014
Expenditures (billions $2014)								
SNAP	28.0	38.2	23.4	37.7	74.1	80.9	81.2	74.2
WIC	3.8	5.3	5.4	6.0	7.0	6.9	6.5	6.2
NSLP	5.8	6.9	7.6	8.6	10.6	10.7	11.2	11.4
SBP	1.1	1.6	1.9	2.3	3.1	3.4	3.6	3.7
Average monthly participation (millions persons)								
SNAP	20.0	26.6	17.2	25.6	40.3	46.6	47.6	46.5
Annual participation (millions persons)								
WIC (total)	4.5	6.9	7.2	8.0	9.2	8.9	8.7	8.3
Women	1.0	1.6	1.7	2.0	2.1	2.1	2.0	2.0
Infants	1.4	1.8	1.9	2.0	2.2	2.1	2.0	2.0
Children	2.1	3.5	3.6	4.0	4.9	4.7	4.6	4.3
NSLP (total free, reduced, and full paid meals)	24.1	25.7	27.3	29.6	31.8	31.7	30.7	30.5
Free meals	9.8	12.4	13.0	14.6	17.6	18.7	18.9	19.2
Reduced-price meals	1.7	1.9	2.5	2.9	3.0	2.7	2.6	2.5
SBP (total free, reduced, and full paid meals)	4.1	6.3	7.6	9.4	11.7	12.9	13.2	13.6
Free meals	3.3	5.1	5.7	6.8	8.7	9.8	10.2	10.6
Reduced-price meals	0.22	0.37	0.61	0.86	1.0	1.0	1.0	1.0
Caseload (as % relevant population)								
SNAP	8.1	10.1	6.2	8.7	13.2	15.0	15.2	14.8
WIC								
Women (as % of all women ages 18–44)	1.9	2.9	3.1	3.6	3.9	3.7	3.6	3.5
Children 1–4	13.5	21.7	23.0	24.6	28.3	29.6	28.5	26.9
Infants < 1	35.3	46.5	48.5	50.5	52.9	53.4	53.8	51.9
NSLP (as % of children ages 5–17)								
Free and reduced-price meals	25.0	28.0	29.1	32.6	38.4	39.5	39.7	40.0
Free meals	21.4	24.4	24.5	22.7	32.8	34.5	35.0	35.4
All meals	52.5	50.2	51.5	55.3	59.2	58.3	56.6	56.2
SBP (as % of children ages 5–17)								
Free and reduced-price meals	7.6	10.7	12.0	14.3	18.1	19.9	20.6	21.3
Free meals	7.2	10.0	10.8	12.7	16.2	18.0	18.8	19.5
All meals	8.8	12.4	14.3	17.4	21.7	23.7	24.4	25.2

Sources: http://www.fns.usda.gov/sites/default/files/pd/SNAPsummary.xls; CPI is from EROP http://www.gpoaccess.gov/eop/tables10.html; population is from EROP http://www.gpoaccess.gov/eop/2010/B34.xls and Census Department http://www.fns.usda.gov/sites/default/files/pd/17SNAPfyBEN$.xls; http://www.fns.usda.gov/sites/default/files/pd/SNAPsummary.xls. Additional spreadsheets provided by Candy Mountjoy (Candy.Mountjoy@fns.usda.gov), Maeve Myers (maeve.myers@fns.usda.gov), and Gene Austin (Gene.Austin@fns.usda.gov); http://www.fns.usda.gov/sites/default/files/pd/10sbcash.xls, http://www.fns.usda.gov/sites/default/files/pd/16SNAPpartHH.xls; http://www.fns.usda.gov/sites/default/files/pd/34SNAPmonthly.xls, http://www.fns.usda.gov/sites/default/files/pd/15SNAPpartPP.xls; and http://www.fns.usda.gov/sites/default/files/pd/06slcash.xls.

States with higher rates in New England, the upper Midwest and the Pacific Northwest, and lower rates in the Mountain Plains, the Far West, and Texas (Cunnyngham 2014). Take-up rates have varied substantially over time: from 75 percent in 1994, down to 59 percent after federal welfare reform (in 2000), to 54 percent in 2002, then increasing to 67 percent in 2006 and

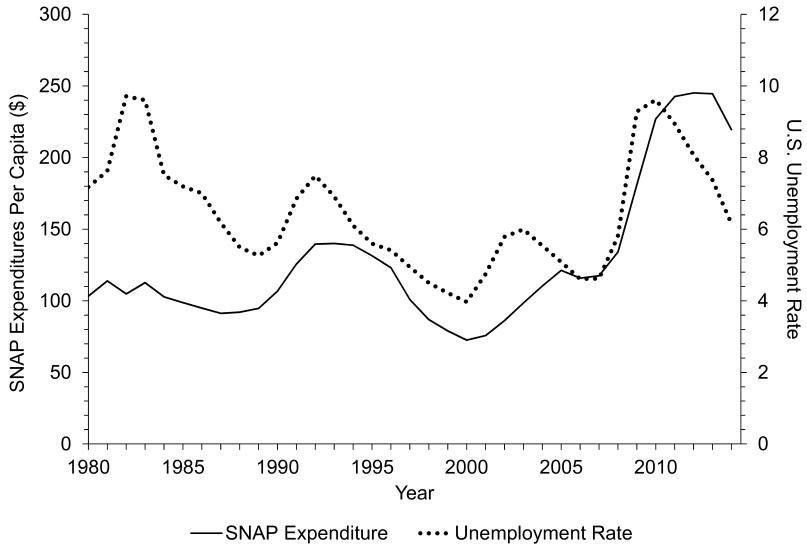

Fig. 3.5 Real per capita expenditures for SNAP, 1980–2014 (real 2014 dollars), with US unemployment rate

Source: USDA SNAP data: http://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap. Unemployment rates from http://data.bls.gov/pdq/SurveyOutputServlet. For definitions of recessionary periods, see Bitler and Hoynes (2016).

Note: Per capita SNAP expenditures are calculated using the US population as the denominator (not per SNAP recipient) and inflation adjusted using the US Bureau of Labor Statistics' CPI inflation calculator.

79 percent in 2011 (Cunnyngham 2002, 2010; Cunnyngham, Sukasih, and Castner 2014).

Figure 3.5 plots annual SNAP expenditures from 1980 to 2014, in real 2014 dollars. We normalize by the total US population in each year, thereby generating real per capita (not per recipient) expenditures. The figure also includes the annual US unemployment rate. During this period, per capita real spending on SNAP was relatively flat in the 1980s, increased in the early 1990s, and then fell dramatically through the late 1990s. Since that time, spending has increased steadily. Overall, the program shows a countercyclical pattern, increasing in the recessions in the early 1990s, early 2000s, and especially notable, in the Great Recession.

Table 3.7 presents summary characteristics for SNAP recipient units and how they vary over time. The top panel of the table relates to all SNAP recipients and the bottom panel limits to SNAP recipient units without any elderly (age sixty or more) individuals. These tabulations are based on administrative data from the USDA Quality Control (QC) files. In 2012, about 45 percent of SNAP recipient units included children, down from about 60 percent in 1996. Female-headed households with children as a

Table 3.7 Characteristics of SNAP recipients

	1996	2000	2005	2010	2012
All food stamp households					
Share with children	60	54	54	49	45
Share female heads with children	39	35	32	26	24
Share with elderly members	16	21	17	16	17
Share of individuals < 18	47	47	47	44	43
Share of individuals > = 65	9	10	7	5	6
Share no elderly, no kids, no disabled	15	11	16	24	25
Share with gross monthly income below poverty	91	89	88	85	82
Share with no cash income	10	8	14	20	20
Share with any earnings	23	27	29	30	31
Share with no net income	25	20	30	38	38
Multiple program participation; share with income from:					
AFDC/TANF	37	26	15	8	7
General assistance	6	5	6	4	3
SSI	24	32	26	21	20
Social Security	19	25	23	21	23
Unemployment insurance	2	2	2	7	5
Veterans benefits	1	1	1	1	1
Food stamp households without elderly members					
Share with children	70	67	64	57	54
Share female heads with children	46	43	38	30	29
Share with elderly members	0	0	0	0	0
Share with gross monthly income below poverty	92	89	89	87	85
Share with no cash income	12	10	16	22	23
Share with any earnings	26	33	35	34	37
Multiple program participation; share with income from:					
AFDC/TANF	43	32	17	9	8
General assistance	7	5	6	4	3
SSI	17	24	20	16	16
Social Security	9	14	14	13	14
Unemployment insurance	2	2	2	8	6
Veterans benefits	1	1	1	1	0
Effective tax rate on:					
Earned income	18	15	16	15	15
Unearned income	19	17	17	17	16

Source: Authors' tabulations of SNAP Quality Control Data. Available at http://hostm142.mathematicampr.com/fns/.

share of the total caseload are also falling over time, from 39 percent in 1996 to 24 percent in 2012. About 17 percent contain an elderly individual, and that share has not changed much over time. The share with no children, elderly, or disabled persons (a proxy for the able-bodied adults without dependents) has increased from 15 percent in 1996 to 25 percent in 2012. An increasing share of the caseload combines benefit receipt with employment. About 31 percent of households currently have earned income, a rate that is up 8 percentage points since 1996. On the other hand, some 20 percent have

no cash income, up from 10 percent in 1996 (for an in-depth analysis of this issue, see Peterson et al. [2014]). Thirty-eight percent of households have no net income (income after allowable deductions), up from 25 percent in 1996.

At the bottom of the bottom panel of table 3.7, we present the effective tax rates faced by (nonelderly) SNAP recipients. These are calculated using the QC data and follow the methods used in Ziliak (2008). The effective tax rate is the average of the marginal tax rates faced by SNAP households—marginal because it is calculated on their observed income amounts, and average because it is averaged over households. Table 3.7 shows that the effective tax rate on earned income is 15 percent in 2012, down slightly from 18 percent in 1996. The tax rate on unearned income is somewhat higher at 16 percent in 2012. In light of the discussion above, it is important to point out that this is the tax rate within SNAP only (as opposed to the cumulative tax rate experienced across multiple programs). To the extent that SNAP recipients have children and very low earnings, then the negative marginal tax rates in the EITC will reduce the cumulative tax rates below the SNAP effective tax rate. On the other hand, those with higher earnings (e.g., perhaps in the phaseout of the EITC) would experience cumulative tax rates in excess of the SNAP effective tax rate. See Moffitt (2015) for further discussion of multiple participation rates.

Given the patchwork of US means-tested programs, it is of interest to examine the propensity to participate in multiple programs, especially in light of concerns about cumulative work disincentives (Congressional Budget Office 2012; Mulligan 2012).[23] It is also interesting to examine this over time given welfare reform and the many changes in the safety net. The food stamp quality control data (table 3.7) track all resources that count as income for determining SNAP benefits, practically this translates to *cash* income programs. In 2012, only 7 percent of SNAP recipients have income from TANF, down from 37 percent in 1996 on the eve of welfare reform. The share with income from SSI and Social Security has stayed relatively steady; in 2012, 20 and 23 percent of SNAP units received SSI and Social Security, respectively. If you limit to recipient units without elderly individuals, the share with Social Security (which we interpret as likely including SSDI) has increased, from 9 percent in 1996 to 14 percent in 2012. Few food stamp recipients have income from UI (5 percent), general assistance (3 percent), or veteran's payments (1 percent). Although receipt of UI among SNAP recipients units is low, the data show a notable increase in the Great Recession (from 2 percent in 2005 to 7 percent in 2010). While the QC data are valuable, they are limited because they only track sources of income relevant for determining SNAP benefits. Moffitt (2015) uses the Survey of Income and

23. As discussed in Moffitt (2015), Parrott and Greenstein (2014), and elsewhere, in many analyses citing high cumulative marginal tax rates, the calculations assume that families are participating in all programs. This, as we discuss below, it not consistent with the data.

Table 3.8 Food stamps maximum benefits by household size (2014)

Household size	Net income (100% of poverty line) ($)	Gross income (130% of poverty line) ($)	Maximum benefit ($)
1	973	1,265	194
2	1,311	1,705	357
3	1,650	2,144	511
4	1,988	2,584	649
5	2,326	3,024	771
6	2,665	3,464	925
7	3,003	3,904	1,022
8	3,341	4,344	1,169
Each additional person	(+) 339	(+) 440	(+) 146

Source: Income eligibility standards from http://www.fns.usda.gov/sites/default/files/FY15_Income_Standards.pdf; maximum allotments from http://www.fns.usda.gov/sites/default/files/FY15_Allot_Deduct.pdf.

Notes: Includes contiguous states, District of Columbia, Guam, and the Virgin Islands. Does not include Hawaii or Alaska.

Program Participation and studies multiple program participation across a wider range of programs. He finds that (in 2008) 30 percent of nondisabled, nonelderly SNAP families receive WIC, more than half receive the EITC, and 21 percent receive subsidized housing.

Table 3.8 presents maximum monthly SNAP benefits by household size for 2014. A household of four has a maximum monthly benefit of $649, while a household of size two has a maximum benefit of $357. Annualizing these amounts, maximum benefits correspond to between 27 and 33 percent of the federal poverty line.

As discussed above in section 3.1.1, the SNAP benefit formula has changed little over time, other than adjusting for annual changes in the price of food. Interest in the adequacy of the SNAP benefit has increased over time and led to a recent Institute of Medicine report (IOM 2013). Hoynes, McGranahan, and Schanzenbach (2015) explore SNAP benefit adequacy by examining the food spending patterns across families of differing income and composition. They argue that the maximum benefit level is inappropriate on at least two fronts: the Thrifty Food Plan (TFP) is based on outdated assumptions, and the family size adjustment does not reflect differences in spending patterns. First, consider the TFP, which is set at $632 per month for a typical family of four in 2013. Recall that maximum benefits are set based on the TFP, and the program aims to ensure that households have adequate resources to purchase this "target" spending level. Based on an analysis of the Consumer Expenditure Survey, they show that over the past twenty years, the majority of families with incomes below 200 percent of the poverty line spent more than the TFP amount. They argue this is in part due to the fact that the TFP is based on assumptions regarding how much cooking is done from scratch

that are increasingly unrealistic and out of line with time-use data. Second, they show that differences in actual spending patterns across family size are much steeper than are accounted for by the benefit multipliers. Since the average SNAP household size is 2.3, this suggests that many families are receiving benefits based on a formula that understates their needs.

3.2.2 Program Statistics: WIC

In 2014, WIC expenditures totaled $6.2 billion and served 8.3 million persons. The costs break down into $4.3 billion for food and $1.9 billion for nutrition services and administration.[24] Average monthly federal food cost per person in 2014 amounted to $43.65, or $1.44 per person per day. The WIC caseload breaks down to be 10 percent pregnant women, 13 percent postpartum or breastfeeding women, 24 percent infants, and 53 percent children (USDA 2014). The average cost per recipient varies little across groups, from $49.36 per infant, to $49.16 per breastfeeding woman, to $36.94 per child (USDA 2014). A given family may have multiple members with WIC benefits (for example, a pregnant mother, her infant, and her child age three would have three WIC packages) and the total value of the WIC package to a family accumulates across individuals.

Table 3.6 presents data on WIC participation and expenditures over time. The WIC program has increased over this period from 4.5 million recipients in 1990 to 8.3 million in 2014. The total cost increased from 3.8 billion (2014$) in 1990 to 6.2 billion in 2014. The growth seems to be fairly similar across the subgroups of women, infants, and children. The bottom of table 3.6 presents program participation rates, where we express the number of participants as a percent of the relevant demographic group. So, for example, the WIC infant (child) caseload is a percent of all persons less than one year (between one and four).[25] We express the women caseload as a share of women ages eighteen to forty-four. Both infant and child caseloads have increased over this period. Fully 26.9 percent of children ages one to four received WIC in 2014, up from 13.5 percent in 1990. Participation is higher for infants, likely due to the high cost of infant formula, more than half of infants in the United States in 2014 received WIC benefits. In 2014, 3.5 percent of women ages eighteen to forty-four received WIC, though this figure is an underestimate of potential participation since we do not condition on pregnant, postpartum, or breastfeeding women in the denominator.

Figure 3.6 plots the real spending on WIC annually from 1980 to 2014. Again, we normalize by the total US population to create a per capita (not per participant) measure. The WIC expenditures exhibit a fairly steady rise in the 1990s consistent with the expansions in the 1989 WIC reauthorization

24. We omit additional WIC spending on items other than food and nutrition services, including program evaluation, special projects, and infrastructure.

25. These are participation rates, not take-up rates, because they do not condition on income eligibility.

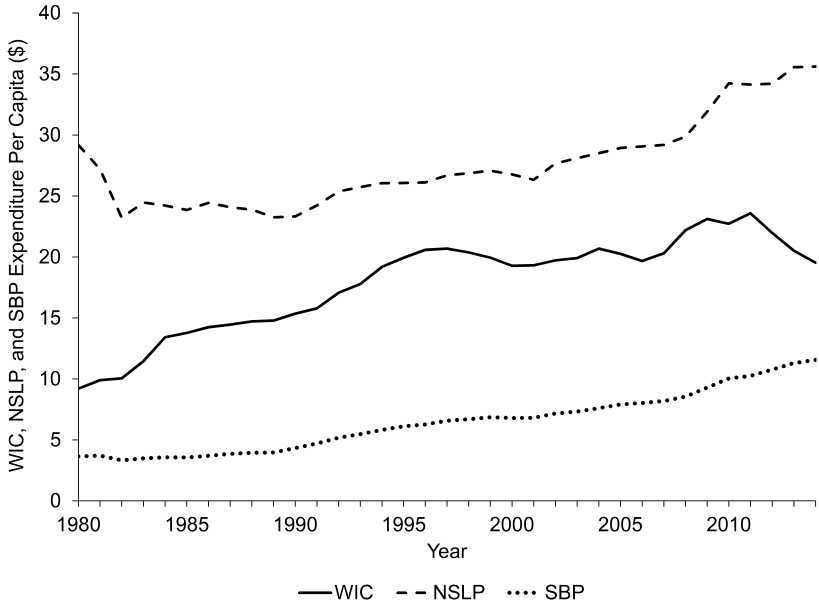

Fig. 3.6 Real per capita expenditures for WIC, NSLP, and SBP, 1980–2014 (real 2014 dollars)

Source: USDA WIC, NSLP, and SBP program data, http://www.fns.usda.gov/pd/wic-program and http://www.fns.usda.gov/pd/child-nutrition-tables.

Note: Per capita expenditures are calculated using the US population as the denominator (not per program recipient) and inflation adjusted using the US Bureau of Labor Statistics' CPI inflation calculator.

act. Costs slowed in the late 1990s, perhaps due to welfare reform (and the overall "chilling" effect that followed) as well as the strong labor market. After a relatively flat period, a countercyclical pattern with the Great Recession and recovery is evident at the end of the period.

Table 3.9 presents summary characteristics for WIC recipient units in 2012 (the most recent year available) and, for comparison, 1994. Despite the income-threshold of 185 percent of the poverty line (higher than SNAP, for example), fully 37 percent of WIC recipients have income below 50 percent of the poverty line ("extreme poverty"). Seventy-three percent have incomes below 100 percent of the poverty line, and 92 have income below 150 percent. The distribution of recipients by income has not changed much between 1994 and 2012. One notable change in the caseloads is the rise of breastfeeding women as a share of all women on the program, which has increased from 17 percent in 1994 to 29 percent in 2012. We also explore the extent of multiple-program participation among WIC recipients. In 2012, only 9 percent of WIC recipients have income from TANF, down from 29 percent in 1992 (prior to welfare reform). The share with income from SNAP has been

Table 3.9 Characteristics of WIC recipients

	1994	2012
Income below 50% FPL	42	37
Income below 100% FPL	74	73
Income below 150% FPL	91	92
Percent of women participants who are:		
Pregnant	52	43
Breastfeeding	17	29
Postpartum	31	28
	100	100
Multiple program participation; percent with income from:		
TANF	29	9
SNAP	40	37
Medicaid	58	72
SNAP and Medicaid	35	33
No TANF/SNAP or Medicaid	36	24

Source: "WIC Participant and Program Characteristics 2012: Final Report" FNS, USDA, December 2013 and "WIC Participant and Program Characteristics 1994" FNS, USDA. Observations with missing data are excluded from the tabulations.

relatively steady; in 2012, 37 percent of WIC units received SNAP compared to 40 percent in 1992. Participation in Medicaid among WIC recipients was very high at 72 percent in 2012, up from 58 percent in 1992, reflecting the substantial expansions in Medicaid for pregnant women and children.

3.2.3 Program Statistics: NSLP

The National School Lunch Program (NSLP) serves lunch to almost 30 million students—56 percent of the total student population (see table 3.6). Almost all public schools offer the NSLP, which in 2014 cost $11.4 billion with average participation of 19.2 million children in free, 2.5 children in reduced-price, and 8.8 million in paid lunch. Overall, including the free, reduced-price, and paid categories, over 5 billion lunches were served. As shown in the bottom of table 3.6, 40 percent of all school-age children received free or reduced-price lunch in 2014, up from 25 percent in 1990. The share of students receiving school lunch for free (among those eating school lunch) has grown over time from 41 percent in 1990 to 63.6 percent in 2014. Overall, participation (free, reduced price, or paid as share of all school-age children) has edged down somewhat in the last few years from its historic peak of 59 percent in 2010.

After adjusting for inflation, spending on NSLP has almost doubled since 1990. This reflects an increase in the number of school-age children, an increase in spending per lunch, and a trend toward increased participation rates. The increased spending per lunch has been driven by a combination of increased costs and policy changes. Per-meal spending on child nutrition

programs increases annually because payment levels are indexed according to the Food Away from Home series of the CPI-U. Commodity payments are inflated according to the Price Index of Foods used in schools and institutions. (Payments are legislated not to decrease, so if food prices decline in a year, there is no adjustment to these costs). In recent years, the price index for food away from home has grown more quickly than overall inflation (measured by the price index for personal consumption expenditures). In addition, the 2010 Healthy, Hunger-Free Kids Act increased cash payments by six cents per meal for schools that meet the new, more stringent nutrition requirements.

3.2.4 Program Statistics: SBP

There have been recent—and highly successful—attempts to expand access to the SBP. As shown in table 3.6, between 1990 and 2014 the total number of students receiving the SBP more than tripled (compared to a 27 percent increase in the number of NSLP participants). At the same time, the share of school-age children receiving free or reduced-price breakfast also increased sharply, from 7.6 percent in 1990 to 21.3 percent of children in 2014. Some of this has been driven by increases in participation rates of schools in the program in 2014. Schanzenbach and Zaki (2014) calculate from the NHANES that in 2009/10 almost three-quarters of children attended a school that offered the SBP, up from approximately half of students in the 1988–1994 wave. An additional portion has been driven by policies to expand take-up by students, including providing breakfast for free to all students before school or introducing Breakfast in the Classroom programs. In 2014, 85 percent of participants received the SBP either for free or at reduced price.

3.2.5 Summary Measures across Programs

Figure 3.7 summarizes the programs, presenting the total program costs and total program recipients in 2014. Considering our four central food and nutrition programs (SNAP, WIC, NSLP, and SBP) as well as the other smaller programs in table 3.1, total spending amounted to about 100 billion dollars in 2014 and about 95 million total participants benefited from these programs. (Given multiple program participation, the total unique recipients would be less than 95 million.) Considering the programs together, figure 3.7 shows that SNAP is clearly the largest program—in terms of both people reached and program cost. In 2014, expenditures on SNAP were over six times as large as the NSLP and almost twelve times as large as WIC. The number of SNAP recipients was about two times those receiving free or reduced-price NSLP and over five times WIC. However, these comparisons ignore the fact that SNAP is universal, while NSLP and WIC are targeted on specific demographic groups. Using this lens, the figures in the bottom of table 3.6 show that SNAP has the *smallest* reach among the programs.

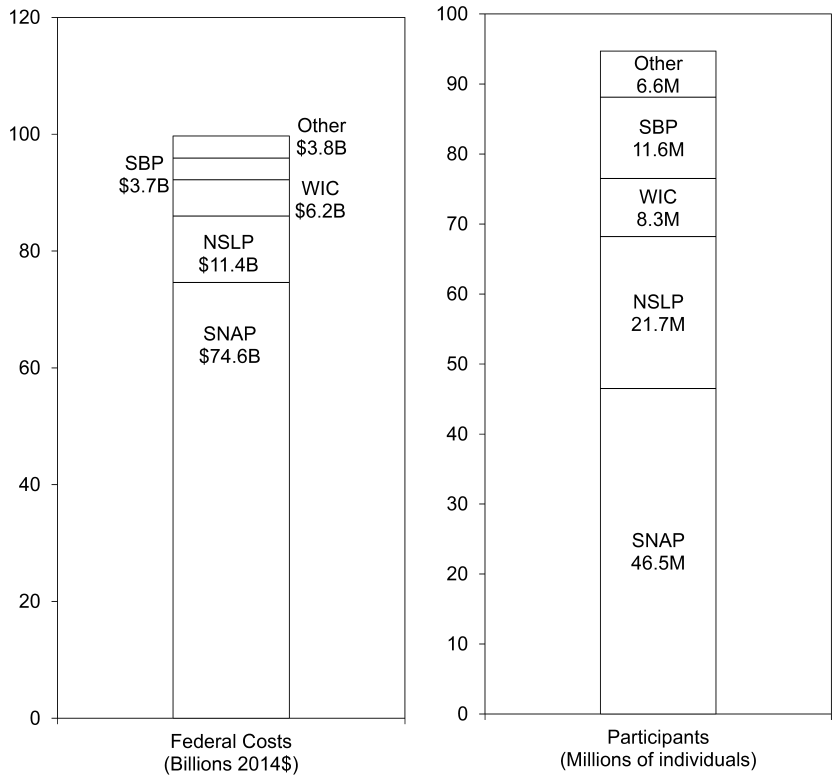

Fig. 3.7 Federal expenditures and number of recipients by program (2014)

Note: "Other" includes the Child and Adult Care Food Program (CACFP), the Summer Food Service Program (SFSP), the Special Milk Program (SMP), and the Fresh Fruit and Vegetable Program (FFVP). Participation for NSLP and SBP only includes free and reduced-price lunch participants. Participation data is missing from SMP and FFVP and is not included in this graph.

Half of all infants and almost 30 percent of children ages one to four receive WIC, over 20 percent of school-age children receive free or reduced-price breakfast, and 40 percent receive free or reduced-price lunch. By contrast, SNAP is received by 15 percent of the population.

Figure 3.8 shows how program participation for the food and nutrition programs varies by income level. In particular, the figure plots household participation in SNAP, NSLP, and WIC (alongside EITC as a comparison) as a function of household private income to poverty level (truncating at eight times income to poverty).[26] The figure is based on tabulations of the 2014 Current Population Survey corresponding to data for calendar year

26. The figure is adopted using the approach in Bitler and Hoynes (2016). See that paper for details on the sample and measurement.

2013, and is limited to households with children headed by a nonelderly person. Overall, SNAP and NSLP have the highest household participation rates, with lower household participation rates for WIC. Of course, this lower WIC participation rate reflects the fact that eligibility is limited to pregnant women and children through age four. Participation in SNAP is most concentrated at the lower income levels, reflecting its lower income eligibility limits. The WIC program has a much flatter profile with respect to income, reflecting the higher income eligibility limits.

Figure 3.9 compares antipoverty effects of the programs. The calculations are based on the Supplemental Poverty Measure (SPM), first released by the census in 2011 (Short 2011). The SPM provides an alternative to the official poverty measure and is based on a comprehensive after-tax and transfer-income resource measure that includes the value of noncash government transfers. Here we use the 2014 SPM (Short 2014) and plot the number of children removed from poverty for all government tax and transfer programs tracked in the SPM. This is a static calculation, essentially zeroing out the income source and recalculating family income and poverty status assuming all else (e.g., earnings, other income sources) remain constant. SNAP removes 2.1 million children from poverty, second only to the combined

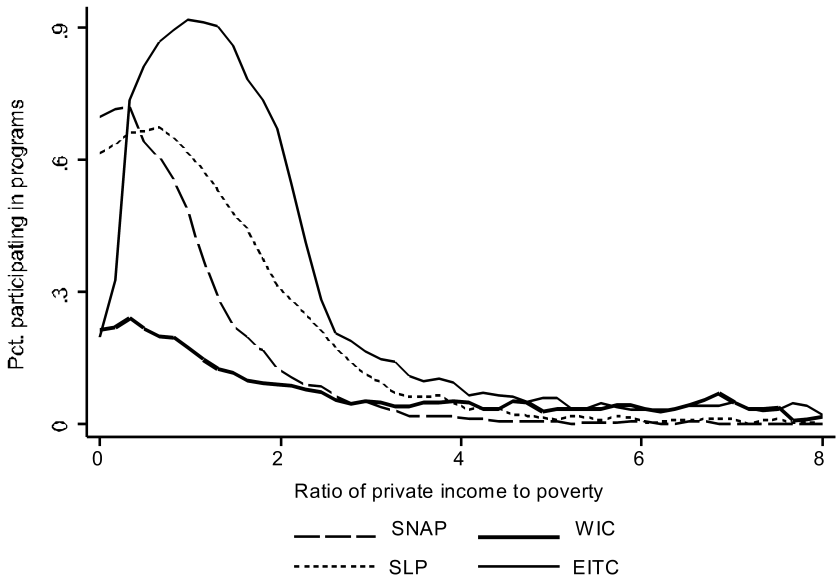

Fig. 3.8 Household participation in food and nutrition programs by household income to poverty, households with children headed by nonelderly individual (2013)

Source: Adapted from Bitler and Hoynes (2016). Authors' tabulations of 2014 Current Population Survey capturing data for 2013 calendar year. Kernel density plot of household program participation, by ratio of household private income to poverty. Sample includes nonelderly household heads in households with children.

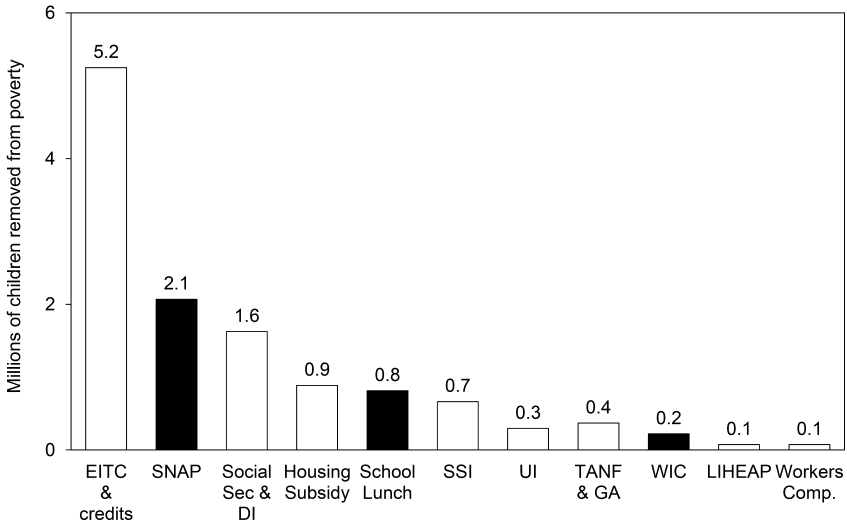

Fig. 3.9 Millions of children removed from poverty by program, 2014
Source: Authors' tabulation of Short (2014).

effects of the EITC and Child Tax Credit that together remove 5.2 million children from poverty. By comparison, the NSLP removes 0.8 million children from poverty and WIC removes 0.2 million children from poverty.[27] Although not shown here, calculations for the entire population show that SNAP removes a total of 4.7 million people from poverty, making SNAP the third largest US antipoverty program after Social Security and the Earned Income Tax Credit.

3.3 Review of the Issues Surrounding the Programs

Each of the food and nutrition programs can be analyzed through standard economic frameworks. The applicable frameworks differ somewhat, though, because the programs differ in terms of the degree to which the benefits are provided in kind. Closest to cash, SNAP takes the form of a value voucher and can be used to purchase most foods, while the more targeted WIC takes the form of a quantity voucher limited to specific foods, and the school meals programs offer meals directly. As with other means-tested transfer programs, these programs face the usual trade-off in balancing the protective aspects of the programs to improve dietary intake and reduce hunger and food insecurity against their distorting incentives such as reduced labor supply. We start by discussing SNAP because it is the largest program and has been

27. With underreporting of SNAP and other food and nutrition programs, these are underestimates of the total antipoverty effects (Tiehen, Jolliffe, and Smeeding 2013).

most researched, and follow with discussions of the other programs and how the basic economic framework can be adapted to analyze them.

3.3.1 Effects of In-Kind Benefits on Food Consumption

We begin by presenting the neoclassical model of consumer choice and use this to discuss predictions for the effects of SNAP on family spending patterns.[28] Figure 3.10, panel (A) presents the standard Southworth (1945) model, in which a consumer chooses to allocate a fixed budget between food and all other goods. The slope of the budget line is the relative price of food to other goods. In the absence of SNAP, the budget constraint is represented by the line AB. When SNAP is introduced, it shifts the budget constraint out by the food stamp benefit (divided by food price) B_F/P_F to the new budget line labeled ACD. The first, and most important, prediction of the neoclassical model is that the presence of, or increase in the generosity of, the SNAP transfer leads to a shift out in the budget constraint. The transfer does not alter the relative prices of different goods, so can be analyzed as a pure income effect, and predicts an increase in the consumption level of all normal goods. Thus, the central prediction is that food stamps, like an increase in disposable income or a cash transfer, will increase both food spending and nonfood spending.

However, SNAP benefits are provided as a voucher that only can be used toward food purchases. Canonical economic theory predicts that in-kind transfers like SNAP are treated as if they are cash as long as their value is no larger than the amount that a consumer would spend on the good if she had the same total income in cash. Returning to figure 3.10, panel (A), there is a portion of the budget set that is not attainable with SNAP that would be attainable with the cash-equivalent value income transfer. (We are assuming that the resale of these vouchers is not possible.) In other words, because the benefits B_F are provided in the form of a food voucher, this amount is not available to purchase other goods, and thus we would expect a consumer to purchase at least B_F amount of food. Thus paying benefits in the form of a food voucher leads to a budget constraint with a kink point.

Figure 3.10, panel (B) illustrates how consumption responds to the receipt of SNAP benefits. In the absence of SNAP, a typical consumer purchases some mix of food and nonfood goods, choosing the bundle that maximizes her utility and exhausts her budget constraint. This is represented as point A_0*, with the consumer purchasing food in the amount F_0. After SNAP is introduced, the budget constraint shifts outward and the consumer chooses the consumption bundle represented by point A_1*. Note that consumption of both goods increases and food consumption goes up by less than the full

28. See also Currie and Gahvari (2008) for an excellent overview of the economics of in-kind transfer programs.

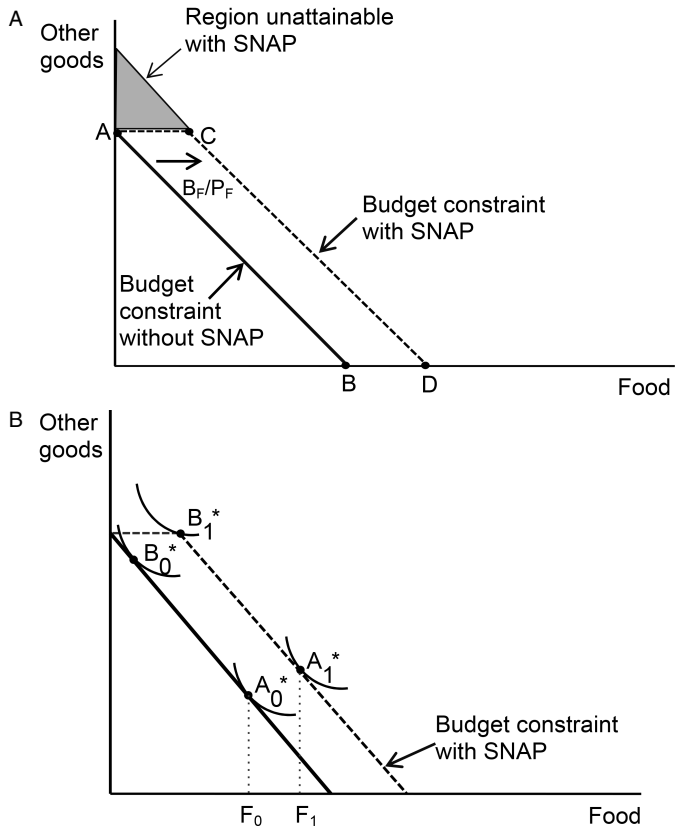

Fig. 3.10 Effects of SNAP on consumption

Note: Panel (A): budget set shift; panel (B): consumer's utility maximization response to SNAP.

SNAP benefit amount. Such a consumer is termed "inframarginal" and the canonical model predicts that SNAP will increase food spending the same amount as if the SNAP benefits were paid in cash. As discussed further below, the predicted impacts of proposed policy changes, such as calls to restrict purchases of certain goods with SNAP benefits, hinges on what proportion of recipients are inframarginal.

There are two important exceptions to the SNAP-as-cash model, though. The first is for consumers that prefer relatively little food consumption. In the absence of SNAP, such a consumer may choose the consumption bundle labeled B_0* in panel (B). When SNAP is introduced, this consumer spends only his benefit amount on food, preferring to use all available cash resources to purchase other goods as represented at point B_1*. If benefits were paid in cash instead of as a food voucher, the consumer would opt to purchase less

food and could obtain a higher level of utility. As a result, for this type of consumer, the canonical model predicts that SNAP will increase food spending by more than an equivalent cash transfer would. Another exception to the standard model comes from behavioral economics and predicts that SNAP may not be equivalent to cash if households use a mental accounting framework that puts the benefits in a separate "category."[29]

We can extend this approach to consider the effects of the WIC program. There are two important distinctions. First, WIC is a quantity voucher, not a value voucher. So while SNAP would award, for example, $100 to purchase food, WIC instead gives a voucher for sixteen quarts of milk (and other items). Second, there are specified goods that are provided by the voucher (this can also include a restriction on the allowable package sizes in the WIC package). We present the WIC budget constraint in figure 3.11 and adapt the SNAP graph by putting "targeted subsidized goods" (e.g., items in table 3.2) on the x axis and all other goods (which also includes much of the food budget as well as nonfood goods) on the y axis. The no program budget constraint again is AB, and the budget set shifts out by the WIC quantity voucher Q_W. Note the contrast to SNAP, where the value voucher shifts out the budget constraint by B_F/P_F. Thus, for SNAP, the recipient faces price incentives: choosing lower-priced goods increases the value of the SNAP benefit. In contrast, with WIC, recipients are price insensitive; their budget constraint (and potential increase in utility due to the program) is affected only by the quantity Q_W, regardless of the price of those goods P_W.

As with SNAP, there is a region that would be attainable with a cash transfer that is not attainable with WIC, and there are inframarginal consumers and constrained consumers. However, because WIC is such a specified bundle, we expect that a larger share of WIC participants (compared to SNAP recipients) will be constrained and at point C.

Additionally, as discussed in Meckel (2014), vendors face incentives to charge WIC recipients a mark up on the WIC packages (because of recipients' price inelasticity). This would amount to fraud and could be sanctioned if caught. Vendors may also choose to compete on products (quantity and diversity) to gain market share given that price competition is not available (McLaughlin 2014).

School lunch and breakfast programs are even more specified. We model

29. There are other reasons that may explain why SNAP leads to different effects on food consumption compared to ordinary case income. It is possible that the family member with control over food stamp benefits may be different from the person that controls earnings and other cash income. If the person with control over food stamps has greater preferences for food, then we may find that food stamps lead to larger increases in food consumption compared to cash income. Alternatively, families may perceive that food stamp benefits are a more permanent source of income compared to earnings. Finally, Shapiro (2005) finds evidence of a "food stamp cycle," whereby daily caloric and nutritional intake declines within weeks since their food stamp payment suggests a significant preference for immediate consumption.

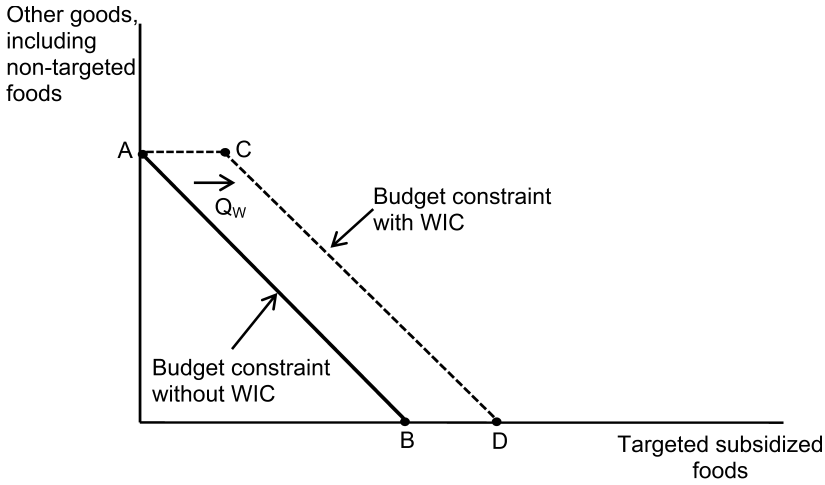

Fig. 3.11 Effects of WIC on consumption

these as "take it or leave it" benefits—if you are eligible for a free lunch then you have the choice to consume the lunch or use private resources for lunch.[30] This is illustrated in figure 3.12 with the targeted subsidized good (e.g., school lunch) on the x axis and all other goods on the y axis. We represent the school lunch option as a single point, and as the quality of the lunch increases the point shifts out. Some consumers will chose the private option, and others will chose the public option. As the quality of the public option increases, more will switch into the lunch program.

Unlike SNAP, the WIC and school feeding programs are explicitly targeted at certain groups (pregnant women, infants, children age one to four, school-age children). In the context of families, it is possible—perhaps likely—that the program will have spillover benefits to other family members who are not explicit recipients. This could happen with WIC because the goods purchased with the vouchers could be shared with the family. Additionally, since the programs shift out the family's total budget constraint, this "income effect" could lead to an increase in consumption of other foods or other goods that benefit the family more broadly. Additionally, WIC's nutrition education component may lead to changes in the composition of food consumption for the entire family.

30. In their chapter on housing programs in volume 2, Ellen and Ludwig discuss the possibility that a take-it-or-leave-it benefit will reduce consumption of the targeted good. While theoretically possible in the case of food consumption, we think this is not likely. Food consumption is more straightforward to top up (e.g., snacks, supplemental lunch foods brought from home or purchased) than housing is.

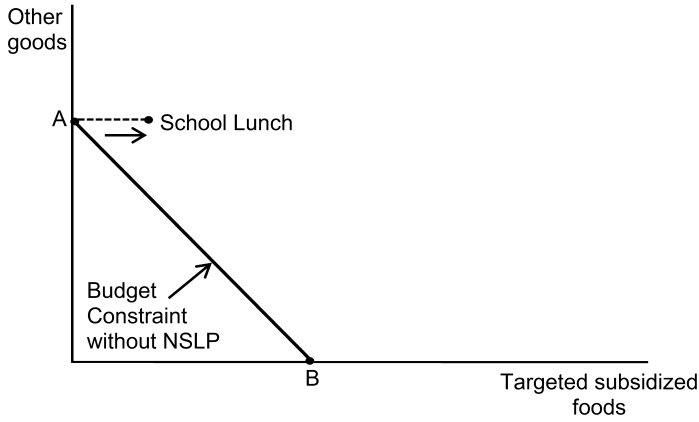

Fig. 3.12 Effects of NSLP on consumption

3.3.2 Effects of FNP on Food Insecurity, Diet, and Health

As discussed above, SNAP and the other food and nutrition programs increase household resources. If health is a normal good, then increases in resources due to food and nutrition programs should increase health. With this framing, an increase in resources could lead to changes in health through many channels. One obvious channel is through improvements in nutrition. The income effect, in principle, could also encourage behaviors that could harm health, such as smoking or drinking.[31] Health improvements may work through other channels as well, for instance improving nutrition education, increasing services (for WIC), and reducing stress (e.g., financial stress).

There also may be linkages between access to food and nutrition programs in utero and in childhood and later-life health and human capital outcomes. Causal mechanisms by which early childhood events affect later life are best understood for nutrition. For example, undernourished children may suffer from anemia and listlessness. This may reduce their ability to invest in learning during childhood and may harm their long-run earnings and other outcomes. Poor early-life nutrition may also directly harm long-run outcomes through altering the body's developmental trajectory. There is an emerging scientific consensus that describes critical periods of development during early life that "program" the body's long-term survival outcomes (Barker 1997; Gluckman and Hanson 2004). During development the fetus (and postnatally the child) may take cues from the current environment to predict the type of environment it is expected to face in the long run, and in some cases adapts its formation to better thrive in the expected environ-

31. Even though recipients cannot purchase cigarettes directly with FSP benefits, the increase in resources to the household may increase cigarette consumption.

ment (Gluckman and Hanson 2004). A problem arises, however, when the realized environment differs substantially from the predicted environment. For example, if nutrients are scarce during the prenatal (or early postnatal) period, the developing body therefore predicts that the future will also be nutritionally deprived. The body may then invoke (difficult-to-reverse) biological mechanisms to adapt to the predicted future environment. For example, the metabolic system may adapt in a manner that will allow the individual to survive in an environment with chronic food shortages. This pattern is termed the "thrifty phenotype" and is sometimes referred to as the Barker hypothesis. The problem arises if, in fact, there is not a long-run food shortage and nutrition is plentiful. In that case, the early-life metabolic adaptations are a bad match to the actual environment and will increase the likelihood that the individual develops a metabolic disorder, which can include high blood pressure (hypertension), type 2 diabetes, obesity, and cardiovascular disease. To summarize, a lack of nutrition in early life leads to higher incidence of metabolic syndrome, thus greater access to food and nutrition programs in early life and childhood may reduce metabolic syndrome in adulthood.

3.3.3 Effects on Labor Supply

We begin by considering the effect of SNAP on labor supply. As discussed above, SNAP benefits have the structure of a traditional income support program, with a guaranteed income benefit that is reduced with family income at the legislated benefit-reduction rate. Recipients are allotted a benefit amount B equal to the difference between the federally defined maximum benefit level for a given family size (i.e., G, the guarantee amount) and the amount that the family is deemed to be able to afford to pay for food on its own according to the benefits formula (30 percent of cash income, less deductions). We illustrate the labor-leisure trade-off with and without food stamps in figure 3.13. Like other means-tested programs, SNAP alters the household's labor-leisure trade-off increasing after tax and transfer income at earnings up to the break-even point. The SNAP benefits are largest at zero hours of work, and benefits are reduced as income and earnings are increased, leading to an implicit tax rate on earned income. The benefit-reduction rate in the food stamp program is 30 percent.

In figure 3.13, the x axis measures the amount of leisure consumed, and the y axis measures total income including the SNAP benefit.[32] The "no benefit" budget constraint is a straight line with a slope equal to the individual's wage w. The individual has a certain amount of unearned income (U), and the budget constraint is represented by the line CAL. The simple static labor-

32. By shifting out the budget constraint by the full SNAP benefit we assume households treat the benefit as cash. We also assume, for simplicity, that there are no other welfare programs in place.

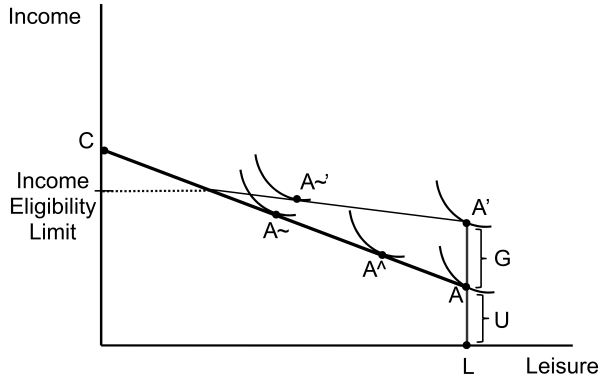

Fig. 3.13 Income-leisure trade-offs and SNAP
Source: Hoynes and Schanzenbach (2012).

supply model states that an individual maximizes her utility subject to this budget constraint, and assuming a positive labor-supply choice, chooses some combination of consumption of goods and leisure at points illustrated for consumers with different preferences by $A^{\sim}$ and $A^{\wedge}$. If her offer wage is below her reservation wage (the slope of the indifference curve at zero hours of work), then it will be optimal to remain out of the labor force, as illustrated by point A (at maximum leisure choice L, or hours = 0).

Adding SNAP alters the budget constraint to line $CA'L$ by adding nonlabor income G (the maximum benefit level or the "guarantee"), and rotating the slope of the budget constraint to $w(1 - t)$ where t is the benefit reduction rate (that is, the tax rate on benefits) as income increases ($t = 0.3$). For the individual supplying zero hours of work and consuming only leisure, consumption opportunities increase by the SNAP "guarantee" amount G. At the income eligibility threshold (labeled on the y axis) you earn enough such that benefits have been fully taxed away.

As is well known, this combination of a guaranteed income and benefit-reduction rate leads unambiguously to predictions of reductions in the intensive and extensive margins of labor supply. In this case, both the income effect of the benefit as well as the income and substitution effect from the benefit-reduction rate leads, unambiguously, to a predicted decline in employment (extensive margin), hours worked (intensive margin), and (if wages are fixed) earnings. In addition, family *cash* income (which as measured does not include food stamp benefits) would also be predicted to fall. Of course, family total after transfer income including food stamps is likely to increase.

Referring back to figure 3.13, our representative individual who was, prior to the introduction of the food stamp program, in the labor force and consuming at point $A^{\sim}$ is predicted to increase their leisure (reduce their hours worked), choosing a consumption bundle $A^{\sim'}$. Alternatively, it is possible

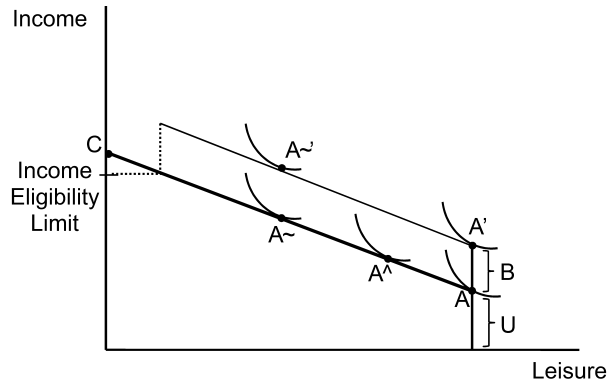

Fig. 3.14 Income-leisure trade-offs and WIC/NSLP

that the combination of the negative income and substitution effects can push them out of labor market to point *A*'.

Figure 3.14 adapts the labor-leisure diagram to model WIC and the school feeding programs. For these programs a household receives a fixed benefit *B* for all income levels up to the eligibility limit (e.g., 185% of poverty line for WIC). Thus the budget set shifts out by a constant amount and creates a "notch" or cliff where the household reaches the eligibility limit. The qualitative predictions for labor supply are the same as for SNAP—reductions in the intensive and extensive margins of labor supply. In this case, many households face a pure income effect while higher-income households face the incentive to reduce their labor supply to obtain eligibility.[33]

Additionally, as discussed in Currie and Gahvari (2008), in-kind programs such as SNAP or WIC might *increase* labor supply, depending on the degree of complementarity between the subsidized good (here food and nutrition) and labor supply. This has had limited testing in the empirical literature.

3.4 Review of Results of Research on the Programs

3.4.1 Challenges for Identification and Overview of Empirical Approaches

A central challenge for evaluation of the effects of food and nutrition programs is that commonly used quasi-experimental approaches are not easily applied. First, food and nutrition programs are federal and exhibit little variation across states such as been used in the analysis of AFDC and TANF. Second, the programs have not seen repeated reform or expansions

33. For the NSLP, there would be one notch at 130 percent of poverty where the household goes from free lunch to reduced-price lunch, then a cliff at 185 percent of poverty, where they lose eligibility for reduced-price lunch.

such as has been used in analysis of the Earned Income Tax Credit. Finally, with respect to the food stamp program, the universal nature of the program means there are no ineligible groups to serve as controls, which is another common approach in the quasi-experimental literature.

Early studies use comparisons between participants and nonparticipants to estimate the effect of food and nutrition programs. Many researchers (Bitler 2015; Currie 2003; Bitler and Currie 2005; Ludwig and Miller 2005) have drawn attention to the fact that selection into participation in these programs is nonrandom. If program recipients are healthier, more motivated, or generally positively selected, then comparisons between the participants and nonparticipants could produce positive program estimates even if the true effect is zero. Conversely, if program participants are more disadvantaged, or generally negatively selected than nonrecipients, such comparisons may understate the program's impact.

Bitler (2015) provides a recent analysis to examine the selectivity of SNAP recipients. She examines detailed health data from NHANES and NHIS and shows that SNAP recipients have worse diets and nutritional intake, higher levels of obesity and underweight, and worse child health and adult health when compared to all nonrecipients or income-eligible nonrecipients. Thus, it seems clear that SNAP recipients are negatively selected. Bitler and Currie (2005) provide evidence that WIC recipients are negatively selected among a sample of Medicaid recipients, in terms of their education, marital status, smoking behavior, obesity, labor market, and program participation.

There are several approaches to solving this fundamental identification problem. First, some studies make use of the limited policy variation across areas. For SNAP, this includes variation due to welfare reform (especially for examining immigrants versus natives) and state SNAP policies (length of recertification periods, fingerprinting, vehicle asset exemptions, and broad-based categorical eligibility). In some cases, these state policy rules may not change much from year to year, which limits their suitability as instruments. This approach is used in instrumental variable settings, essentially providing instrument-driven variation in program participation. Policy variation is also used in reduced-form approaches.

Second, other studies take a historical approach and use program introduction, relying on variation across areas during the rollout years of the program. As discussed above, both the food stamp program and WIC were introduced at different points across counties in the United States. This allows for an event study or difference-in-difference approach to evaluate the programs, essentially using untreated counties as controls for treated counties. The validity of this approach relies on the exogeneity of the timing of the rollout across areas.[34]

34. This approach has also been used to analyze many other aspects of the Great Society and Civil Rights era (Ludwig and Miller 2007; Finkelstein and McKnight 2008; Bailey 2012; Cascio et al. 2010; Almond, Chay, and Greenstone 2006; Goodman-Bacon 2014).

A third approach is to use longitudinal data and control for family, person, or sibling fixed effects. This approach nets out time-invariant effects. For example, in an analysis of siblings, family fixed effects generate estimates by comparing outcomes among siblings who participated in the program compared to outcomes among those who did not. There are drawbacks to this approach. Between-birth changes in economic or health conditions of other family members may be correlated with between-sibling differences in program participation. Additionally, within-family comparisons are likely to exacerbate measurement-error problems that bias estimates toward zero (Griliches 1979). There also may be spillover effects from the participating sibling to the nonparticipating sibling, which will lead to underestimates of the program's true effect. In such cases, selection biases will not be eliminated. Another longitudinal differencing approach uses an individual fixed effects estimator, which compares outcomes for those who switch (into or out of) program participation. Of course, there could be some third factor that affects both transitions into (or out of) program participation and outcomes.

Fourth, some studies use regression discontinuity approaches, comparing those in a small band above the eligibility threshold to those in a small band below the eligibility threshold. The validity of the approach requires a sharp change in participation at the discontinuity that is not correlated with other changing variables. This approach can be applied to income eligibility for WIC and school feeding programs where a recipient is either eligible or not eligible for the entire bundle of benefits. This approach would not generally be appropriate for SNAP because, empirically, participation smoothly falls as income rises (the benefit falls as income rises). It also can be applied to age discontinuities in eligibility for the other food and nutrition programs. In practice, regression discontinuity studies based on differences across income-based eligibility criteria may not be valid given that income can be manipulated, which invalidates the RD approach (one no longer has randomness across the threshold).

Fifth, randomized experiments could in principle capture the effect of food and nutrition programs (or more likely, changes in program policies). In practice, in the past decades there is not much such evidence, with notable exceptions in the Healthy Incentives Pilot (Bartlett et al. 2014) and School Breakfast Program Pilot Project (Bernstein et al. 2004), both further described below. Finally, another approach uses matching methods to control for selection, essentially relying on "selection on observables."

In order to focus our review of the literature on the studies with the most credible evidence, we limit our discussion to papers that use the "design-based" approaches discussed above. The most common study that would not pass this criterion would be simple comparisons, either with or without regression controls, of FNP recipients and nonrecipients.

3.4.2 Research on Food Stamp Program

SNAP Participation

As we showed in table 3.6 and figure 3.5, participation in and expenditures on SNAP have varied significantly over time. One consistent strand in the literature seeks to understand the determinants of these changes in the program (table 3.10 provides a catalog of the papers we review). The literature has explored the role of the macroeconomy, changes in SNAP policies, changes in related program policies (especially welfare reform), and changes in demographics. The papers in this area typically leverage variation across states and over time in labor market conditions (e.g., unemployment rates, employment-to-population ratios) and program polices. As outlined above, SNAP is primarily a federal program and has less variation across states than other parts of the US means-tested safety net (such as Medicaid or TANF). The available state-varying policies for SNAP include length between required recertification, immigrant eligibility following welfare reform, presence or absence of restrictions for ABAWD, and the broad-based categorical eligibility expansions of the early twenty-first century.

Overall, the macroeconomy consistently ranks as the largest contributor to changes in SNAP caseloads. However, SNAP and welfare policies have also played a role. Welfare reform and reductions in SNAP certification periods led to reductions in SNAP caseloads in the 1990s (Currie and Grogger 2001; Kabbani and Wilde 2003; Ziliak, Gundersen, and Figlio 2003; Figlio, Gunderson, and Ziliak 2000). Additionally, changes in immigrant access to the safety net during the welfare reform period also led to reductions in SNAP participation (Borjas 2004; Haider et al. 2004; Kaestner and Kaushal 2005; Bitler and Hoynes 2013).

Ganong and Liebman (2013) examine the large increase in SNAP caseloads in the Great Recession and find that local economic conditions explain about two-thirds of the increase in SNAP with a much smaller role for SNAP policy changes (e.g., expansions for broad-based categorical eligibility).[35] Ziliak (2015) finds a larger role for policy, perhaps accounting for 30 percent of the caseload change. Bitler and Hoynes (2016) find that the countercyclical effect of SNAP as measured by the effect of the unemployment rate on the SNAP caseload was larger in the Great Recession compared to the early 1980s recession (although the difference was not statistically significant).

SNAP and Consumption

The first-order prediction is that SNAP, by shifting out the budget set, should lead to an increase in food (and nonfood) spending. This is confirmed

35. When examining the earlier period, especially the Bush expansions in the early twenty-first century, Ganong and Liebman (2013) find more of a role for policy changes in explaining the growth of food stamp caseloads.

Table 3.10 Studies of the Supplemental Nutrition Assistance Program

Study	Data	Design	Results
		Studies of determinants of SNAP participation	
Bitler and Hoynes (2016)	Administrative data: SNAP caseloads by state and month 1980–2013, normalized by state × year population	State panel fixed effects model Main independent variable: UR and interactions for subperiods	For full period a 1 percentage point increase in the UR leads to a 3.4 percent increase in caseloads per capita; larger effects (though not statistically different) in the Great Recession
Currie and Grogger (2001)	CPS 1981–1999 and administrative data on state-year SNAP caseloads	State panel fixed effects model Main independent variables: UR, SNAP policy variable (recertification length), welfare reform	Caseload decreases due to welfare reform, reduction in UR, and reductions in recertification period
Figlio, Gundersen, and Ziliak (2000)	Administrative data: food stamp caseloads, state × year 1980–1998	State panel fixed effects model Main independent variables: UR (and lags), growth of EPOP (and lags), SNAP policies, welfare policies	Reduction in SNAP in 1990s due primarily to economy and less to welfare reform
Ganong and Liebman (2013)	SIPP 2007–2011 Administrative county SNAP data: 1990–2011	State (or county) fixed effects model, including models with lags Independent variables include: UR (and lags), SNAP policy, welfare policy	Most of the increase in SNAP between 2007–2011 is due to the macroeconomy; SNAP relaxing of income and asset limits in early twenty-first century (broad-based categorical eligibility) accounts for 8 percent of the increase in enrollment; relaxing of ABAWD accounts for 10 percent
Kabbani and Wilde (2003)	Administrative data: Food Stamp Quality Control Data, 1990–2000, state × year	State panel fixed effects model Main independent variables: UR (and lags), SNAP policy variable (share of persons facing recertification periods ≤ 3 months)	Increase in 10 pp. of share ≤ 3 months leads to a 2.7 percent reduction in caseload/pop; reduced error rates by 0.8 pp.
Ziliak (2013)	CPS 1980–2011 N = 5,552,486 individuals residing in 2,053,018 households pooled across all years (173,515 persons in a typical yr. across sample period)	State fixed effects model, including models with lags Independent variables include: UR (and lags), SNAP policy, welfare policy	Increase in participation from 2007–2011—50 percent due to higher UR, 30 percent due to policy changes, remainder due to demographics and other
Ziliak, Gundersen, and Figlio (2003)	Administrative data: annual state caseloads 1980–1999	State panel fixed effects model; estimated static and dynamic (including lags) Main independent variables include: state-year UR, welfare policies	A 1 percentage point increase in the unemployment rate leads to a 2.3 percent increase after one year and 8 percent decrease in the long run; a 10-percentage-point increase in the share of a state's population waived from rules limiting food stamp receipt among ABAWDs results in a 0.5 percent increase in contemporaneous caseloads

(*continued*)

Table 3.10 (continued)

Study	Data	Design	Results
		Studies of impact on consumption	
Beatty and Tuttle (2014)	CEX 2007–2010; limit sample to households with total expenditures ≥ 150 percent of average expenditures of SNAP recipients N = 29,000 household quarters	Difference-in-difference design comparing SNAP recipients to nonrecipients before and after SNAP benefit increases (the ARRA 2009 increase in SNAP benefits being the largest increase); matching method used to improve control group; model the effect of an increase in benefits using an Engel curve approach	The ARRA policy change (increase in SNAP benefit of 13.6 percent) led to a 6.0 percent increase in food at home; no significant effects on food away from home
Blundell and Pistaferri (2003)	PSID 1978–1992; male-headed married couples age twenty-five to sixty-five in stable households N = 2,469 unique households	Panel data model with household fixed effects and parametric modeling for error (permanent income shock, measurement error in income, measurement error in consumption and taste); framework allowed for self-insurance, in which consumers smooth idiosyncratic shocks through saving; also considered the complete markets assumption in which all idiosyncratic shocks are insured	The effect of permanent income shocks on consumption declines by about one-third with SNAP
Bruich (2014)	Grocery store-level scanner data from 2012–2014; 431 grocery stores from Los Angeles, CA, Atlanta, GA, and Columbus, OH	Difference-in-difference model (using variation in SNAP share at the stores) to examine the expiration of the SNAP benefits in ARRA	Due to 2013 SNAP benefit cuts, on average, SNAP households in CA, GA, and OH lost $20 dollars in benefits (per month), resulting in a $5.91 decline in SNAP households monthly spending; each $1 of cuts reduced grocery store expenditure by $0.37, implying a marginal propensity to consume food out of food stamps of 0.30
Gundersen and Ziliak (2003)	PSID 1980–1999, household heads, at risk of SNAP samples: (a) income < 130 percent FPL, (b) income over < 130 percent FPL, (c) average income in bottom quartile of sample average income N = 8,485 unique households	Panel data model with household fixed effects; model 1 is first difference in log income, with an analysis of variance of the residual; model 2 is an IV of change in log consumption on the change in log income (instruments are changes in the head's labor supply)	Among families at risk of SNAP receipt, food stamps reduced income volatility by about 12 percent and food-consumption volatility by about 14 percent

Hoynes and Schanzenbach (2009)	PSID 1968–1978; three samples: (a) all nonelderly headed households, (b) nonelderly headed household with < twelve years of education, (c) female-headed households N = 39,623 family-year observations	Difference-in-difference and event-study model using rollout of SNAP across counties between 1961 and 1975; triple difference using across-group variation (e.g., high vs. low potential SNAP participation) as third differencing	Total food consumption increases with introduction of FSP; MPC out of FSP is 0.163 and MPC out of cash income is 0.087
Kim (2014)	CEX 2007–2011	Difference-in-differences model; month and year fixed effects; low-income households as a treatment group	The increase in SNAP benefits due to ARRA leads to increases in food spending and increases in spending on nonfood (housing, transportation, entertainment), the increase in food expenditure is slightly less than the full SNAP benefit increase ($18–$24/person monthly benefit increase and $13/person expenditure increase)
		Studies of impact on food insecurity	
Borjas (2004)	CPS-FSS 1995–1999	Estimate effect of public assistance receipt on FI using welfare reform in two-sample IV, comparing noncitizens versus natives Instrument = triple difference between state × year × citizenship status	Reduction in proportion of welfare recipients by 10 percentage points increased FI by about 5 percentage points
DePolt, Moffitt, and Ribar (2009)	Longitudinal data from the Three-City Study (Boston, Chicago, and San Antonio); low-income families (below 200 percent of the poverty line) N = 2,973 person-year observations	Use household fixed effect model, identifying effects of SNAP participation of off switchers (on or off program); multiple-indicator, multiple-cause models	Participation in SNAP is associated with fewer food hardships
Gibson-Davis and Foster (2006)	ECLS-K, fall 1998 and spring 1999; households with incomes < 130 percent of FPL N = 4,276	Propensity score matching with two models	Food stamps do not decrease the probability of being food insecure, although they lessen the severity of the problem according to some models
Gregory, Rabbitt, and Ribar (2013)	CPS-FSS 2009–2011, households ≤ 130 percent FPL	Three designs to estimate effect of SNAP on FI: (a) propensity-score matching, (b) one year apart longitudinal estimators, (c) IV (instruments: household head being a noncitizen, SNAP certification interval in state)	Propensity score and longitudinal models show positive effect of SNAP on FI; inconsistent results for IV

(*continued*)

Table 3.10 (continued)

Study	Data	Design	Results
Mykerezi and Mills (2010)	1999 PSID; samples: (a) ≤ 150 percent FPL (N = 1,608), (b) ≤ 200 percent FPL (N = 2,237), (c) ≤ 250 percent FPL (N = 2,837)	IV model, estimate of SNAP on FI; also relate loss of SNAP (involuntary, "due to government office decision") to change in FI Instrument: state SNAP underpayment rate and overpayment rate	FSP participation lowers FI by 19 percent (cross-section IV using state policy variables could capture other aspects of state)
Ratcliffe, McKernan, and Zhang (2011)	1996, 2001, 2004 SIPP panels; low-income households (< 150 percent of poverty threshold)	IV using state SNAP policies as instrument: use of biometric technology, outreach spending, full immigrant eligibility, and partial immigrant eligibility	SNAP reduces the likelihood of being food insecure by 30 percent and very food insecure by 20 percent
Schmidt, Shore-Sheppard, and Watson (2015)	CPS 2001–2009, families w/at least one child under eighteen, < 300 percent of the poverty line, no immigrants, particular focus on single-parent families N = 28,189 (first stage, December) N = 68,702 (second stage, March)	IV approach, effect of program benefits on FI; instrument actual benefits with simulated benefits eligibility and potential benefit calculator	$1,000 in potential benefits (benefits for which a family is eligible) reduces low food security by 2 percentage points on a base rate of 33 percent; a treatment on the treated $1,000 in benefits reduces low food security by 4 percentage points
Shaefer and Gutierrez (2013)	SIPP 1996, 2001, 2004, households with children and < 150 percent FPL	IV with instrument: state-year share < three-month short recertification; implementation of biometric technology	SNAP reduces household food insecurity by 12.8 percentage points
Wilde and Nord (2005)	CPS-FSS 2001–2002, longitudinally linked N = 17,331 matched households	Household fixed effects using transitions onto and off of SNAP	Transitions into SNAP associated with transitions into FI
Yen et al. (2008)	1996–1997 National Food Stamp Program Survey N = 2,179 households	IV approach to estimate effect of SNAP participation on FI Instruments: state policy variables (recertification length, EBT availability), pop. share of immigrants and four dummy variables on stigma to capture the effect of welfare stigma: whether the individual had avoided telling (people about receiving food stamps), shopped at stores where (they are) unknown, (been treated with) disrespect shopping (with food stamps), or (been treated with) disrespect telling (people about being on food stamps)	Participation in SNAP reduces FI by 0.4 percentage points (7 percent)

		Studies of impacts on child health outcomes	
Almond, Hoynes, and Schanzenbach (2011)	National Vital Statistics data on births 1968–1977	Difference-in-difference and event study analysis of food stamp program rollout; examine effects of exposure to SNAP on birth outcomes, low birth weight	SNAP exposure leads to significant reduction in low birth weight births; no significant effects for infant mortality
Currie and Moretti (2008)	Vital statistics data on California births 1960–1974	Difference-in-difference analysis of food stamp program rollout in California; examine effects of exposure to SNAP on birth weight	SNAP exposure leads to reduction in birth weight
East (2015a)	National Vital Statistics data on births 2000–2007; NHIS 1998–2013, children ages six to sixteen	Difference-in-difference using immigrants' eligibility across states and over time; triple difference with children of natives; examine effect of exposure to SNAP in utero on health at birth, and exposure from time in utero to age five on health outcomes at ages six to sixteen	SNAP increases average birth weight and reduces low birth weight; early-life access improves parent-reported health at ages six to sixteen and insignificant estimates on school days missed, doctor visits, and hospitalizations but signs indicate improvements
Gibson (2004)	NLSY-79 child sample N = 3.831 (girls) N = 4,012 (boys), person-years	Examine effects of SNAP participation over past five years on overweight, by gender and age; family and child fixed effects	Mostly insignificant effects, but signs indicate reduction in overweight for boys and increase in overweight for girls
Kreider et al. (2012)	NHANES 2001–2006, children 2–17 in households w/income < 130% FPL N= 4,418	Partial identification bounding methods to address selection and measurement error (underreporting) of SNAP; range of models with weaker and stronger assumptions	Under weakest nonparametric assumptions, cannot rule out positive or negative effects of SNAP on obesity; tightest bounds indicate beneficial effects of SNAP
Schmeiser (2012)	NLSY-79, children ages five to eighteen N = 8,409 (boys) N = 8,144 (girls)	Examine effects of SNAP participation over past five years on distribution of BMI via IV Instruments: state-level SNAP policies including recertification period length, fingerprinting, and vehicle asset exclusions	SNAP participation significantly reduces BMI for most child gender-age groups
Vartanian and Houser (2012)	PSID 1968–2005	Sibling fixed effects model to relate childhood participation in SNAP to adult BMI	Positive effect of childhood SNAP participation on adult BMI
		Studies of impact on adult health outcomes	
Fan (2010)	NLSY79 1985–1988 N = 6,111	Use propensity score weighting to construct control group along with within-person variation in SNAP participation; estimate both short-term (one-year participation) and long-term (three-year participation) treatment effects	No significant effects of SNAP on obesity rate, overweight rate, or BMI

(*continued*)

Table 3.10 (continued)

Study	Data	Design	Results
Gibson (2003)	NLSY79, ages twenty to forty $N = 13{,}390$	Examine effects of SNAP participation (past year, past nine years) on obesity; individual fixed effects	Current and longer-term SNAP participation increased obesity for women
Hoynes, Schanzenbach, and Almond (2016)	PSID 1968–2009	Difference-in-difference and event study analysis of food stamp program rollout; examine effects of childhood exposure to SNAP on adult health and economic outcomes	SNAP exposure, especially in early childhood (age ≤ 4) leads to significant reduction in metabolic syndrome in adulthood; SNAP exposure throughout childhood leads to improvements in economic outcomes for women but not men
Kaushal (2007)	NHIS 1992–2000	Estimate effect of SNAP on obesity using welfare reform in two-sample IV, comparing immigrants to natives Instrument: triple difference between state × year × citizenship status	Insignificant effect of SNAP on obesity
Meyerhoefer and Pylypchuk (2008)	Medical Expenditure Panel Survey 2002–2003, adults age eighteen to sixty-four eligible for FSP $N = 6{,}644$	Individual fixed effects and IV instruments: state-level SNAP policies including expenditures on outreach, fingerprinting, recertification length	SNAP leads to increase in overweight and obesity for women; no significant effects for men (instrument does not vary over time, so could capture cross-sectional geographic effects)
		Studies of impact on labor supply	
East (2015b)	Current Population Survey 1995–2007, Working-age adults with high school education or less	Difference-in-difference analysis of immigrants' eligibility across states and over time; triple difference with natives	For married and single women employment declines; for married men employment not affected but hours of work declines
Hoynes and Schanzenbach (2012)	PSID 1968–1978, family head < 65 $N = 48{,}168$ family-years Three samples: (a) all nonelderly headed households, (b) nonelderly headed household with < 12 years of education, and (c) female-headed households	Difference-in-difference and event study model using rollout of SNAP across counties between 1961 and 1975; triple difference using across-group variation (e.g., high vs. low potential SNAP participation) as third differencing	Hours of work and employment decline with SNAP introduction, with the largest effects for female-headed households

in the empirical literature. The model also predicts that for inframarginal households, SNAP should lead to a similar increase in food spending compared to equal-sized cash transfer. There was significant attention to this question in the 1980s and 1990s, typically using observational approaches (comparing recipients to nonrecipients) and suffering from the biases due to selection discussed above. Overall, many of these early papers found that SNAP recipients consume more food out of SNAP than they would with an equivalent cash transfer (Currie 2003).

More recent papers, however, based on research designs that are able to isolate causality have found evidence more consistent with the canonical model. As reviewed in Currie, RCTs on "cash-out" experiments in the 1990s found little difference in food spending between the group receiving benefits in cash versus in food vouchers. The reanalysis by Schanzenbach (2007) finds that the mean treatment effect is a combination of no difference in food spending among inframarginal recipients, and a substantial shift in consumption toward food for the relatively small group of stamp recipients who are constrained. Overall, these experiments provide evidence on the difference between cash and vouchers, but do not provide estimates for the broader question of how providing SNAP benefits (by increasing family disposable income) affects food spending or consumption more broadly.

Hoynes and Schanzenbach (2009) use the initial rollout of the food stamp program to quasi-experimentally examine the effects on food spending. As discussed above, the program's introduction took place across the approximately 3,000 US counties between 1961 and 1975. Consistent with the theoretical predictions discussed in section 3.3.1, they find that the introduction of FSP leads to a decrease in out-of-pocket food spending and an increase in overall food expenditures. They estimate a marginal propensity to consume food out of food stamps of 0.16 for all nonelderly and 0.30 for female-headed households. The estimated marginal propensity to consume food out of food stamp income is close to the marginal propensity to consume out of cash income. In addition, consistent with economy theory those predicted to be constrained (at the kink in the food/nonfood budget set) experience larger increases in food spending with the introduction of food stamps.

Several recent studies have used the changes in SNAP benefits from the economic stimulus (ARRA) whereby benefits were temporarily increased between April 2009 and October 2013. Beatty and Tuttle (2014) use a difference-in-difference approach, and using nonrecipients as controls (with matching methods) they find using the Consumer Expenditure Survey that the 13.6 percent increase in benefits leads to a 6 percent increase in food at home. Kim (2014) uses the same approach and data and finds that, consistent with the theoretical predictions, the increase in SNAP benefits leads to increases in food spending and increases in spending on nonfood (housing, transportation, entertainment). Bruich (2014) uses grocery-store-level scanner data and a difference-indifference model (using variation in SNAP share

at the stores) to examine the expiration of the ARRA increase in SNAP benefits. On average, SNAP households lost $17 dollars in benefits (per month) and Bruich's estimates imply a marginal propensity to consume food out of food stamps of 0.30.

A second set of studies examines the effects of food stamps on consumption, with the focus on estimating the insurance effects of the program. Blundell and Pistaferri (2003) use longitudinal data from the PSID to examine how SNAP mitigates the effect of shocks to permanent income on consumption and income volatility. Gundersen and Ziliak (2003) use an IV approach to examine how log income changes affect log consumption. Both studies show that SNAP provides important consumption protection. Gundersen and Ziliak find that SNAP receipt reduced income volatility by 12 percent and food consumption volatility by 14 percent. Blundell and Pistaferri find that the effect of permanent income shocks decline by about one-third with SNAP.

SNAP and Food Insecurity

Food hardship measures were developed by the USDA in response to the National Nutrition Monitoring and Related Research Act of 1990 with an interest in "access at all times to enough food for an active, healthy life" (Coleman-Jensen et al. 2012). The first measures were released in 1995 and currently a household's "food security" (or insecurity) status is determined through a battery of questions asked during the December CPS as part of the Food Security Supplement (CPS-FSS). There are ten questions asked of all households, and an additional eight questions asked of households with children. There are four kinds of questions: those that capture anxiety or perception that the food budget or supply is inadequate in quantity. There are also questions that capture whether food is perceived to be inadequate in quality. A group of questions are more quantitative in nature, asking about instances where food intake was reduced or weight loss occurred associated with reduced food intake. One set of these questions pertains to adults and the other to children in the household. Answering more of these questions affirmatively indicates a more severe degree of food insecurity. For example, a household is considered to have "very low food security among children" if five or more of the eight child-centered food security questions are answered affirmatively (Nord 2009).

There are several existing reviews of the literature of SNAP and food insecurity [FI] (e.g., Currie 2003; Gregory, Rabbitt, and Ribar 2015). Here we focus on the research since Currie's review that meets our research design criteria.

One set of studies use instrumental variable approaches, typically using state SNAP policies as instruments (Yen et al. 2008; Mykerezi and Mills 2010; Shaefer and Gutierrez 2013; Ratcliffe, McKernan, and Zhang 2011). A commonly employed instrument is the state's SNAP certification length,

and while it is not a very strong instrument it may be valid on excludability grounds. A second instrument leverages variation in state policies toward immigrant SNAP coverage or overall immigrant participation in the program. This is more powerful but less likely to be excludable. The results vary across studies, typically finding that SNAP participation leads to decreases in FI (that is, they improve outcomes) but many are not statistically significant.

Two studies use IV approaches but broaden the analysis to examine effects of public assistance (rather than only SNAP). Borjas (2004) uses welfare reform and the relatively large reduction in program participation among immigrants in a triple-difference IV, essentially using state by year by citizenship status as the instrument. Schmidt, Shore-Sheppard, and Watson (2015) use a simulated program benefit (using detailed benefit calculators) as an instrument for actual benefits to identify the effects of benefit income on FI. Both studies find that program participation (or benefits) leads to reductions in FI.

A second approach uses a household fixed effects and longitudinal data, essentially identifying the effects of SNAP on FI using switchers into and out of SNAP (Depolt, Moffitt, and Ribar 2009; Wilde and Nord 2005). This approach may not be credible, given that transitions into SNAP may be correlated with other factors that negatively affect FI. Compared to the IV approach, these studies are more likely to find a positive association between SNAP and FI. A final approach uses propensity score matching (e.g., Gibson-Davis and Foster 2006), often finding a positive association between SNAP and FI.

Overall, the literature on SNAP and FI finds a wide range of results, some finding positive association, some negative, and some insignificant. This range is well illustrated in the recent review and replication work in Gregory, Rabbitt, and Ribar (2015) showing a range of estimates for propensity score matching, longitudinal and IV approaches in one sample. The range of estimates illustrates well the challenge for causal identification in evaluating the effects of food and nutrition programs.

SNAP and Child and Adult Health

The literature on child and adult health takes a similar path to the literature on food insecurity. Studies use family and child fixed effects, instrumental variables, and propensity score matching. In this setting there are also studies that leverage the historical rollout of SNAP. As above, we review the studies since Currie (2003) that meet our research design criteria. The recent review by Meyerhoefer and Yang (2011) is also a useful reference.

Studies of the effect of SNAP on child BMI find varying effects, depending to some degree on the estimation approach. Gibson (2004) uses child and family fixed effects and finds SNAP leads to a reduction in overweight for boys but an increase for girls. Vartanian and Houser (2012) use a similar

approach but relate childhood exposure to adult BMI, finding a beneficial effect of SNAP. Schmeiser (2012) uses an IV approach, with state SNAP policies (recertification period, fingerprinting, vehicle asset exemptions) as instruments, and finds that SNAP reduces BMI for most gender-age groups. Kreider et al. (2012) address selection into and measurement error of SNAP using a bounding approach and find quite substantial bounds that generally cannot rule out positive or negative effects of SNAP on BMI.

Similar approaches are used to examine effects on adult health. Gibson (2003) uses an individual fixed effects approach and finds SNAP participation increased obesity among women, though as noted above the fixed effects approach may not be credible if transitions into SNAP are correlated with other factors that directly affect health. Fan (2010) extends this approach and adds propensity score matching and finds no significant effect of SNAP on obesity, overweight, or BMI. Meyerhoefer and Pylypchuk (2008) combine individual fixed effects and IV and find SNAP leads to increases in obesity for women but no significant effects for men. Their instruments—state SNAP policies—do not vary over time so these effects could be capturing state cross-sectional correlations. Kaushal (2007) extends Borjas's (2004) study and uses welfare reform as an instrument for SNAP; she finds insignificant effects of SNAP on obesity of immigrants.

There is a small set of studies that examine the effect of SNAP on birth outcomes; thereby examining the effects of SNAP on pregnant women. Currie and Moretti (2008) use the county roll out of FSP in California and find that FSP introduction was associated with a *reduction* in birth weight, driven particularly by first births among teens and by changes for Los Angeles County. Almond, Hoynes, and Schanzenbach (2011) extend that work and examine the effects of the program rollout across all counties in the United States, finding that infant outcomes improve with FSP introduction. Changes in mean birth weight were small, but impacts were larger at the bottom of the birth weight distribution, reducing the incidence of low birth weight among the treated by 7 percent for whites and 3 percent for blacks. They also find that the FSP introduction leads to a reduction in neonatal infant mortality, although these results rarely reach statistical significance. East (2015a) utilizes changes in immigrants' eligibility across states and over time as the result beginning with 1996 welfare reform and extending through subsequent legislation in the early twenty-first century. She finds that parental access to SNAP in utero improves health at birth. Additionally, she finds that increases in SNAP access between conception and age five improves parent-reported health at ages six to sixteen (with suggestive evidence of reductions in school days missed, doctor visits, and hospitalizations at ages six to sixteen).

Hoynes, Schanzenbach, and Almond (2016) extend their SNAP rollout design and estimation approach to estimate the relationship between childhood access to the food stamp program and adult health and human capital

outcomes. They find that access to the FSP in utero and in early childhood leads to a large and statistically significant reduction in the incidence of "metabolic syndrome" (obesity, high blood pressure, heart disease, diabetes) as well as an increase in reporting to be in good health. The results show little additional protection beyond the age of four, consistent with the importance of early life in the development of the metabolic system. They also find for women, but not men, that access to food stamps in early childhood leads to an increase in economic self-sufficiency.

Overall, we have more confidence in the approaches using instruments based on state policies and the quasi-experimental estimates from program rollouts, and these studies tend to find positive or null impacts of SNAP on health. The estimates relying on within-family or within-individual variation in SNAP participation are more likely to find harmful estimates, and are subject to the concern that changes in unobservables are simultaneously driving SNAP participation and negative health outcomes.

SNAP and Labor Supply

Hoynes and Schanzenbach (2012) use county variation in the rollout of food stamps to identify the impact of food stamps on labor supply. Using the PSID, they use a difference-in-difference approach (using counties without food stamps as controls) and find no significant impacts on the overall sample, but among single-parent households with a female head—a group much more likely to participate in the program—they find a significant intent-to-treat estimate of a reduction of 183 annual hours (treatment-on-the-treated reduction of 505 annual hours). They find no significant impacts of the FSP on earnings or family income, though the estimates are imprecise.

Using variation across states and over time in immigrants' eligibility for SNAP, East (2015b) studies the effect on the labor supply of foreign-born single women and married couples, who both participate in the program at high rates. She finds individuals reduce labor supply when eligible: the largest effects are among married and single women who reduce employment, whereas the effects for married men are smaller and are concentrated along the intensive margin (hours of work). Other than East (2015b), to our knowledge, there is no other study that meets our research design criteria that estimates the impact of SNAP on labor supply in the era after welfare reform and the expansion of EITC.

3.4.3 Research on WIC

Given the targeted nature of WIC, the literature naturally focuses on the impact of WIC on birth outcomes, breastfeeding, and nutritional intake. (See table 3.11 for the catalog of the WIC studies we review.) There is also attention on the health of pregnant women and children less than age five. In the earlier volume, Currie (2003) reviews the literature and it generally concludes that women who participate in WIC give birth to healthier

Table 3.11 **Studies of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)**

Study	Data	Design	Results
	Studies of determinants of WIC participation and selection		
Bitler and Currie (2005)	Pregnancy Risk Assessment Monitoring System (PRAMS), 1992–1999, Medicaid paid births *N* = 60,731	Comparison of WIC versus non-WIC within sample of Medicaid-funded births; examine impacts on WIC participation and effect of WIC on birth outcomes	WIC participants are negatively selected w/adverse measures for education, age, marital status, presence of father, smoking, obesity, employment, and housing characteristics; WIC participation is associated w/improved birth outcomes: 6–7 percent more likely to have begun prenatal care in the first trimester; 2 percent less likely to bear infants who are below the 25th percentile of weight given gestational age or to bear infants of low birth weight
Bitler, Currie, and Scholz (2003)	CPS survey 1998–2001, administrative WIC counts 1992–2000	State fixed effects panel analysis using variation in labor market characteristics and WIC policies by state and year	State unemployment rates and poverty rates are not important determinants of state WIC caseloads; the presence of WIC policies such as requiring proof of income (before required nationally) and stricter program rules lower participation
Corsetto (2012)	Administrative WIC counts, 1990–2010	State fixed effects panel analysis using variation in unemployment rate by state and year	No relationship between state unemployment rates and WIC participation for full period (1990–2010); modest countercyclical effect for 2000–2010
Rossin-Slater (2013)	Administrative birth records, Texas, 2005–2009, linked to administrative records on openings and closings of WIC clinics *N* = 612,694	IV-maternal fixed effect model Instrument: ZIP Code presence of WIC clinics	The presence of a WIC clinic in a mother's ZIP Code of residence during pregnancy increases her likelihood of WIC food receipt by about 6 percent; access to WIC increases pregnancy weight gain, birth weight (by 22–32 g), and breastfeeding (4 percentage points for mothers with high school degree or less)

Studies of effects on pregnancy and birth outcomes

Bitler and Currie (2005)	Pregnancy Risk Assessment Monitoring System (PRAMS), 1992–1999, Medicaid paid births *N* = 60,731	Comparison of WIC versus non-WIC within sample of Medicaid-funded births; examine impacts on WIC participation and effect of WIC on birth outcomes	WIC participants are negatively selected with adverse measures for education, age, marital status, presence of father, smoking, obesity, employment, and housing characteristics; WIC participation is associated with improved birth outcomes: 6–7 percent more likely to have begun prenatal care in the first trimester, and 2 percent less likely to bear infants who are below the 25th percentile of weight given gestational age or to bear infants of low birth weight
Currie and Ranjani (2014)	Administrative birth records, New York City, 1994–2004 *N* = 1.2M	Maternal fixed effects model	WIC leads to improved birth outcomes: increased birth weight and reduced preterm birth, small for gestational age, and low weight gain; effects found for subsample of full-term births (to address gestational age bias)
Figlio, Hammersma, and Roth (2009)	Administrative birth data, Florida, 1997–2001, women age eighteen to forty-four, matched to school records of their older siblings (to identify "marginally eligible" and "marginally ineligible" families) and WIC records (to identify date of WIC participation) N = 2,530 marginally ineligible and 1,744 marginally eligible (multiple-birth families where there is at least a six-year gap in age between two siblings)	Difference-in-differences and event study approach, using variation in eligibility (marginally ineligible versus marginally eligible, using longitudinal data on free and reduced-price lunch status of older sibling) and a policy change (increasing income-reporting requirement); also estimated as IV where the instrument is the interaction of postpolicy change and marginal eligibility	WIC reduces low birth weight but has no effect on average birth weight, gestational age, or premature birth

(*continued*)

Table 3.11 (continued)

Study	Data	Design	Results
Hoynes, Page, and Stevens (2012)	National Vital Statistics data on births 1971–1975, 1978–1982	Difference-in-differences and event study analysis of county-level WIC program rollout; examine effects of exposure to WIC on birth outcomes, low birth weight	WIC exposure leads to significant increase in average birth weight and a decrease in low birth weight births; effect on average birth weight range from 2–7 grams among infants born to mothers with low education levels (treatment on the treated effects of 18–29 grams)
Joyce, Gibson, and Colman (2005)	New York City administrative birth data, 1988–2001, Medicaid paid births $N > 800{,}00$ births	Comparison of WIC versus non-WIC within sample of Medicaid-funded births; examine impacts on WIC participation and effect of WIC on birth outcomes	WIC participation leads to improvements in birth weight, low birth weight, and gestational age; no impacts on weight for gestational age; largest effect for African Americans
Rossin-Slater (2013)	Administrative birth records, Texas, 2005–2009, linked to administrative records on openings and closings of WIC clinics $N = 612{,}694$	IV-maternal fixed effects model Instrument: ZIP Code presence of WIC clinics	The presence of a WIC clinic in a mother's ZIP Code of residence during pregnancy increases her likelihood of WIC food receipt by about 6 percent; access to WIC increases pregnancy weight gain, birth weight (by 22–32 g), and breastfeeding (4 percentage points for mothers with high school degree or less)
		Studies of the effects of WIC vendors	
McLaughlin (2014)	In-store product survey for California A50 vendors; individual vendor FI redemptions for California; locations of WIC vendors in California; wholesale costs of WIC goods	Two-part modeling approach: (a) establish incentives for brand competition, and (b) test intensity of brand competition using IV	Vendors compete on products (brand profile, range, and diversity of products) as well as choosing locations consistent with Hotelling-like incentives
Meckel (2014)	Nielsen Consumer Panel 2005–2009; administrative data on WIC groceries in Texas; Texas birth certificates	Difference-in-difference design using variation in the timing of EBT rollout across counties to assess causal effects	With EBT implementation, prices charged to non-WIC recipients increase; vendor participation and individual participation in WIC declines

infants than nonparticipants. Here, we update the literature since the Currie review, again limiting to studies that meet our research design criteria.

WIC Participation

We begin our review with studies on the determinants of WIC participation. As with the early SNAP literature, the early WIC literature often relied on comparisons of the birth outcomes of women participating in WIC versus not participating. To explore the validity of this approach, several studies explore the characteristics of WIC participants. Bitler and Currie (2005) found that WIC participants (among women with Medicaid-funded births) are negatively selected revealed through measures of education, age, marital status, presence of father, smoking, obesity, employment, and housing characteristics.[36] Currie and Rajani (2014) extend this analysis and examine the characteristics of WIC participation among mothers who switched WIC participation status between births. They found that women receive WIC when they are younger, unemployed, or unmarried. Identifying these changes are important for evaluating the validity of the maternal fixed effects design. Rossin-Slater (2013), examining variation due to the openings and closings of WIC clinics, finds evidence that participation increases with proximity to a clinic. Two studies examine the cyclicality of WIC participation, finding little relationship between state unemployment and poverty and state WIC caseloads (Bitler, Currie, and Scholz 2003; Corsetto 2012).

WIC and Health Outcomes

The next panel reviews the literature on pregnancy and birth outcomes. Recent studies have used several different approaches to address the fundamental selection problem. One approach taken is to compare outcomes among more narrowly defined treatment and control groups (e.g., Bitler and Currie 2005; Joyce, Gibson, and Colman 2005; Joyce, Racine, and Yunzal-Butler 2008; Figlio, Hamersma, and Roth 2009). Bitler and Currie (2005) create a control group based on Medicaid-funded births and find that WIC leads to higher average birth weight and a reduction in being small for gestational age. Figlio, Hamersma, and Roth (2009) identify groups marginally eligible versus marginally ineligible for WIC (obtained by matching birth records to older sibling free and reduced-price lunch records). They find WIC reduces the incidence of low birth weight but has no effect on average birth weight, gestational age, or premature birth.

Another approach employs maternal fixed effects models, controlling for unobserved family background characteristics by comparing outcomes among siblings who participated in WIC to outcomes among those who did not. Currie and Rajani (2014) use a maternal fixed effects model applied to

36. Women eligible for Medicaid are categorically eligible for WIC. Limiting to Medicaid-funded births identifies a sample where all women are eligible for WIC.

administrative data from NYC from 1994–2004 and find that WIC leads to reductions in low birth weight and being small for gestational age, but an increase in medical care use.

Joyce, Racine, and Yunzal-Butler (2008) discuss the possibility of a *gestational age bias* in this literature. They point out that women whose pregnancies last longer have more opportunity to enroll in WIC. If this is true (which they demonstrate using administrative data), then it leads to a mechanical relationship between WIC participation and longer gestation, biasing the results toward a positive effect of WIC. Currie and Rajani (2014) address this concern by estimating results on the subsample of full term births; they find smaller effects but still conclude that WIC improves birth outcomes.

An alternative approach is to use the introduction of WIC in the 1970s. Hoynes, Page, and Stevens (2011) use differences in the timing of rollout by county to examine impacts of WIC on infant health. Using a difference-in-differences analysis, where the control counties have not yet adopted WIC, they find that rollout of the WIC program led to an increase birth weight and a decline in low birth weight. Rossin-Slater (2013) extends this analysis by combining geographic access with a maternal fixed effects approach. In particular, she uses administrative data from Texas combined with detailed information about the opening and closing of WIC clinics from 2005 to 2009; her approach is identified across mothers who had varying access to WIC clinics across births. She finds WIC improves pregnancy weight gain, birth weight, and breastfeeding initiation.

There are few studies that leverage variation in WIC policy changes. This is in large part due to the minimal variation across states and over time in the program rules. Bitler and Currie (2005) find lower take-up for states in which proof of income is required (prior to the federal mandate) and higher take-up for states with higher WIC package prices. However, they find these to be relatively weak instruments. With the more recent changes to WIC, it might be reasonable to reexamine the potential for using state policy variation to identify the effects of WIC.

The studies above are all focused on pregnant women and outcomes at birth. Yet pregnant women account for less than a quarter of WIC participants (table 3.9), half are children ages one to four, and another quarter are infants. There are many outcomes of interest here, notably rates of breastfeeding, nutritional intake, food security, child weight gain, and general health. However, there is a dearth of studies that use credible designs to evaluate WIC on children. Reflecting on the designs used in the analysis of birth outcomes (e.g., maternal fixed effects, geographic and time variation in presence of WIC clinics), it appears possible to apply similar approaches to examine child health. However, this would likely require rich administrative data, combining child health records, linked across siblings, and family WIC participation. The birth records data, with fine geographic identifiers, and WIC participation data, with the ability to link births across mothers, pro-

vide this information. But it is much less common to have these linkages for child health data. Any analysis of the effects of WIC on child health would have to grapple with the interesting question as to the possibility of spillovers to other noncovered family members. This could occur either though the sharing of WIC bundles or an income effect of WIC benefits. It could also possibly work through the nutritional education component of the program.

WIC and Market Factors

The supply side of the WIC market is less developed in the literature. There is a small literature on the infant formula market that starts with the stunning fact that over half of all US infant formula is purchased through the WIC program (Oliveira, Frazão, and Smallwood 2013). Further, because WIC is a quantity voucher benefit, recipients are not sensitive to price. This creates clear incentives for producers to price above marginal cost, especially in this highly concentrated market. Amid concerns about the rising costs of formula, the WIC program moved to a system whereby manufacturers bid on the contract to be the formula provider for the state. In exchange for the right, manufacturers pay a rebate on the formula; in practice the rebates are large, averaging 85–90 percent of wholesale price. Recent studies find that market shares increase substantially for firms that land the state contract (Huang and Perloff 2014; Oliveira, Frazão, and Smallwood 2013), and Davis (2012) finds that the winning firm sees its share of the sales to non-WIC customers increase by 50–60 percent.

Meckel (2014) examines the incentives for vendor fraud with WIC. Because WIC recipients are price insensitive, vendors face incentives to price discriminate by charging higher prices to WIC recipients. She uses the roll-out of EBT in WIC across Texas counties and finds that with EBT (which makes it harder to engage in fraud), prices charged to non-WIC recipients increase. Additionally, EBT sparks a decline in both vendor participation and individual participation in WIC. McLaughlin (2014) explores vendor competition given that they cannot compete on price (due to price insensitivity of WIC participants). Using a sample of WIC vendors in California, he finds that vendors compete on products (brand profile, range, and diversity of products) as well as choosing locations consistent with Hotelling-like incentives.

Another aspect to the supply side has to do with the nature of foods available in stores where WIC recipients shop. Andreyeva (2012) provides an interesting case study analysis of how product stock changed in WIC-authorized grocery and convenience stores after the recent alteration of the WIC packages. There was a substantial increase in stocking of healthy foods; for example, 8 percent of WIC-authorized convenience and grocery stores had any whole wheat/whole grain bread at baseline, while 81 percent did so after the revisions took effect (over the same time, non-WIC stores increased whole wheat/whole grain bread from 25 percent to 35 percent).

3.4.4 Research on NSLP

Most research on the National School Lunch Program has focused on how the program impacts dietary intake and obesity rates. Because the NSLP is virtually universally available, and most policy changes are implemented at the federal level, there are relatively few examples of credible quasi-experiments in the literature. Most of the research employs difference-in-difference between siblings, or across periods when the NSLP is or is not available. It is worth noting that none of the studies reviewed in this section have used data collected after the 2012–2013 implementation of the Healthy, Hunger-Free Kids Act that dramatically overhauled nutrition standards for school meals. Table 3.12 catalogs the studies we review.

NSLP and Dietary Quality

Gleason and Suitor (2003) compare observations of dietary intake for an individual across multiple days that vary by whether the student does or does not receive a school lunch, and find mixed evidence on nutrition intake. They find that NSLP increases the consumption of fat, protein, and six types of vitamins and minerals, but that it has no overall impact on total calories eaten at lunch or over a twenty-four-hour period. Nord and Romig (2006) compare intake during the summer versus the school year for families with school-age versus preschool-age children, and find that NSLP availability significantly reduces the rate of food insecurity.

NLSP and Child Health and Education Outcomes

Several papers have investigated the relationship between NSLP participation and childhood obesity. The results are estimated at different ages and at different points on the income distribution, and find mixed results. Schanzenbach (2009) finds that children ineligible for a free or reduced-price lunch who go on to consume school lunch enter kindergarten with similar body weights when compared to children who do not consume school lunch, but that NSLP participants become comparatively heavier as their exposure to school lunch increases. In addition, she uses the income cutoff for receipt of reduced-price lunch and finds that both NSLP participation and body weight discretely increase at the cutoff. Millimet, Tchernis, and Husain (2010) find similar results using the same data.

On the other hand, Gundersen, Kreider, and Pepper (2012) use a Manski-style partial identification approach and find that receipt of free or reduced-price lunch improves child health and substantially reduces obesity rates. Mirtcheva and Powell (2013) use children who change their participation in NSLP between waves in the PSID, and find that NSLP has no effect on body weight in either direction.

Dunifon and Kowaleski-Jones (2003) compare siblings who differ in their NSLP participation decisions. In the ordinary least squares (OLS), NSLP

Table 3.12 Studies of the National School Lunch Program

Study	Data	Design	Results
		Studies of impact on dietary quality and food insecurity	
Gleason and Suitor (2003)	CSFII 1994–1996, individual dietary recall data, children age six to eighteen	Individual fixed effects, comparing dietary intake on day ate school lunch with day did not eat school lunch	No impact on calories at lunch or over twenty-four hours; increased consumption of fat and protein; decreased consumption of added sugars; increased intake of six vitamins and minerals
Nord and Romig (2006)	CPS-FSS 1995–2001, survey alternates monthly in year	Difference-in-differences estimate of food insecurity during summer versus school year for families with preschool versus school-age children	Food insecurity relatively higher in the summer for households with school-age children; difference smaller in states that provide more summer food service lunches
		Studies of impact on child health outcomes	
Gundersen, Kreider, and Pepper (2012)	NHANES 2001–2004, individual data	Nonparametric partial identification	Receipt of free and reduced-price lunches reduces the incidence of poor health by at least 3.5 percentage points, and reduces obesity by at least 4 percentage points
Mirtcheva and Powell (2013)	PSID Child Development Supplement 1997 and 2003, individual panel data, children ages six to eighteen	Individual-level fixed effects, change in participation across waves	No significant effect of NSLP participation on body weight for the full sample or by gender
Schanzenbach (2009)	Early Childhood Longitudinal Data, K–5, individual panel data	Change over time; regression discontinuity at eligibility for reduced-price lunch	NSLP increases obesity rates by 1 pp./year in change regression; increases obesity in RD
		Studies of impact on student achievement	
Dunifon and Kowaleski-Jones (2003)	PSID Child Development Supplement 1997, individual data, children age six to twelve	Sibling fixed effects, comparing health, behavior, and achievement outcomes across siblings who differ in NSLP participation	Negative OLS relationship between NSLP participation and child outcomes appears to be driven by unmeasured family-specific factors; no between-sibling differences in outcomes predicted by NSLP participation
Hinrichs (2010)	Outcomes from 1976–1980 NHIS and 1980 census, state-level factors predicting treatment including funding, participation, per capita income, and population ages five to seventeen	IV exploiting change in funding formula over time, across states	Increasing NSLP exposure by 10 percentage points increased completed education by .365 years for women, and nearly one year for men

participation predicts more behavioral problems, increased health limitations, and lower math test scores. When sibling comparisons are employed, the coefficients decline in magnitude and are no longer statistically significant, suggesting the OLS correlations in part reflect unobserved family characteristics.

In the spirit of the program rollout literature described in the SNAP section above, Hinrichs (2010) leverages changes in NSLP funding formulas during the early years of the program to estimate the long-run impacts of the expansion of the program. He finds that increasing NSLP exposure in a state by 10 percentage points increases completed education by nearly one year for males, and one-third of a year for females. On the other hand, NSLP did not appear to have long-term health impacts.

3.4.5 Research on SBP

As shown in table 3.6, participation in the SBP has increased dramatically over the past twenty years. In particular, many more schools have adopted the program during this time period, or have adopted policies aimed at increasing availability and take-up of the program. The literature has been active in recent years, and table 3.13 lists the studies we review.

Bhattacharya, Currie, and Haider (2006) use variation in school participation in the SBP prior to the recent increase in participation to identify the impacts of the program on children and their families. Using a difference-in-differences setup, they compare students observed during the school year versus when they are on school vacation, by whether or not their school offered the SBP. They find that SBP does not impact the number of calories consumed nor the likelihood that a student eats breakfast, but it does improve dietary quality as measured by the Healthy Eating Index and in blood serum. The income transfer implied by the SBP does not appear to spill over and improve dietary quality for other household members, however. Modeling school selection into the SBP and bounding the potential for individual-level unobservables to confound the effect, Millimet, Tchernis, and Husain (2010) find that the SBP reduces childhood obesity.

Some states have statutes requiring participation in the SBP for schools that meet at least some threshold (which varies across states, typically between 10 and 40 percent) of eligibility for free or reduced-price meals. Frisvold (2012) uses these thresholds to construct difference-in-differences and RD estimates of the impact of SBP for schools near the thresholds. He finds that SBP improves achievement in math and reading, and that participation improves the nutritional content of breakfast.

Evidence on the SBP has increased recently as researchers have used policy changes aimed at expanding the program to identify its impacts. In particular, to address (perceived) stigma associated with participation in the school breakfast program and in response to incentives from the USDA, some districts have begun (or stopped) offering universal free school breakfast instead of the standard program that provides free breakfast only to

Table 3.13 Studies of the School Breakfast Program

Study	Data	Design	Results
		Studies of determinants of participation	
Leos-Urbel et al. (2013)	Individual data: test scores, attendance, meal participation NYC public elementary and middle schools, 2002–08	Triple-difference approach, using difference in timing of introduction of universal free breakfast and difference across student eligibility for free meals prior to policy change	Universal free breakfast increased breakfast participation both for students who experienced a decrease in the price of breakfast and for free-lunch-eligible students who experienced no price change; small positive effect on attendance for black and Asian students; no impacts on student test scores
Ribar and Haldeman (2013)	Individual data: test scores and attendance in Title I Elementary schools in Guilford County, North Carolina	Difference-in-difference study of termination of UFB program in some schools	Termination of UFB reduced SBP participation substantially; largest reductions for students not eligible for free or reduced-price meals; no change in test scores
Schanzenbach and Zaki (2014)	Individual data: participation and outcomes, students grades 2–6 in 153 elementary schools in six districts	Random assignment within matched-pair schools to universal free breakfast or traditional program; compare within matched-pair schools that opt for cafeteria breakfast or breakfast in classroom	Universal free breakfast increases participation in SBP, larger participation effects for BIC; no change in likelihood of eating breakfast; few impacts on measures of dietary quality, health, or achievement outcomes
		Studies of impacts on dietary quality and food insecurity	
Bhattacharya, Currie, and Haider (2006)	NHANES-III 1988–1994, five- to sixteen-year-olds, individual data	Difference-in-differences comparing students in school to those on school vacation, across schools that do and do not offer SBP	No impact of SBP on the calories consumed or on probability student eats breakfast; improves nutritional quality as measured on HEI and in blood serum; no measured positive spillover effects for other household members
Crepinsek et al. (2006)	Individual data: dietary recall study, students grades 2–6 in 153 elementary schools in six districts	Random assignment within matched-pair schools to universal free breakfast or traditional program	Treatment school students more likely to consume a nutritionally substantive breakfast; no change in twenty-four-hour dietary intakes or in the rate of breakfast skipping
Millimet, Tchernis, and Husain (2010)	Early Childhood Longitudinal Data, K–5 1998–99 $N = 13,531$	Growth from kindergarten entry; selection model for school participation in SBP; Altonji et al. approach to assess selection on unobservables	School breakfast decreases obesity; school lunch increases obesity
		Studies of impact on student achievement	
Dotter (2012)	Individual data: achievement, attendance, behavior in San Diego elementary schools, 2002–2011	Difference-in-differences on UFB and BIC introduction across schools that were versus were not treated	UFB increased achievement in math (0.15 SD) and reading (0.10 SD); larger gains where fewer students were previously participating; no incremental effect of BIC versus UFB
Frisvold (2012)	Test score data from 2003 National Assessment of Educational Progress; school SBP availability, consumption, attendance, and behavior from ECLS-K	States require schools to participate in SBP if the school exceeds a threshold percent eligible for free/reduced-price meals; thresholds differ across states; difference-in-difference and RD around thresholds	SBP improves test scores in math (0.09 SD) and reading (0.05–0.12 SD), and improves the nutritional content of breakfast
Imberman and Kugler (2014)	Individual data: test scores and attendance (2003–2010) and BMI (2009–2010) in a large urban school district in the southwest United States	Difference-in-difference using quasi-random timing of introduction of new Breakfast in the Classroom program; all schools eventually treated	Exposure to BIC for one or more weeks increases achievement in math by 0.09 SD and reading by 0.06 SD; no impact on grades or attendance

students who are income eligible for a subsidy. There is substantial evidence that universal free breakfast (UFB) has increased participation rates. Leos-Urbel et al. (2013) find that expansion of the UFB program in New York City schools increased participation rates for those previously ineligible for breakfast subsidies, and also for free-breakfast students. This suggests that the UFB program may also reduce stigma associated with participation. They find small positive impacts of the program on attendance rates, but no impact on test scores. Ribar and Haldeman (2013) use the termination of UFB in some schools but not others in a North Carolina district, and find a decline in participation that was largest for students who were not income eligible for free breakfasts.

The USDA sponsored a large randomized-controlled trial of UFB, and collected information on impacts on participation, dietary intake, health, behavior, and achievement. Crepinsek et al. (2006) analyze the experimental data and find that students who attend a school randomly assigned to receive UFB are more likely to consume a nutritionally substantive breakfast; the program has no impact on twenty-four-hour dietary intakes or on the rate of breakfast skipping.

While UFB increases take-up rates, the limitation remains that in order to participate in the breakfast program a student generally has to arrive at school prior to the start of classes. To remove this barrier, another recent policy innovation has been to serve breakfast in the classroom (BIC) during the first few minutes of the school day. The BIC eliminates the need for students to arrive to school early to participate in the school breakfast program, and dramatically increases participation in the SBP. This program has recently gained momentum, with major expansions in cities such as Washington, DC, Houston, New York City, Chicago, San Diego, and Memphis, and a flurry of research studies on the impacts of the program.

Imberman and Kugler (2014) investigate the very short-term impacts of the introduction of a BIC program in a large urban school district in the southwestern United States. The program was introduced on a rolling basis across schools, and the earliest adopting schools had the program in place for up to nine weeks before the state's annual standardized test was administered. They find increases in reading and math test scores on the order of 0.06 and 0.09 standard deviations, respectively, but no impact on grades or attendance. Additionally, there was no difference in impact on test scores between those schools that had adopted the program for only one week versus those that had the program for a longer time. The pattern in the results led the authors to speculate that the test score impacts were driven by short-term cognitive gains on the day of the test due to eating breakfast and not underlying learning gains.

Schanzenbach and Zaki (2014) reanalyze the USDA's experimental data described above to separately investigate the impact of the BIC program. They find few positive impacts on measures of dietary quality, and no posi-

tive impacts on behavior, health, or achievement measured after one to three years of treatment. They find some evidence of health and behavior improvements among specific subpopulations. Dotter (2012), on the other hand, finds stronger impacts of the staggered introduction of a BIC program in elementary schools in San Diego. Using a difference-in-differences approach based on the introduction of the program, he finds that BIC increases test scores in math and reading by 0.15 and 0.10 standard deviations, respectively. He finds no test score impacts on schools that previously had universal free breakfast, and no impacts on attendance rates.

3.5 Conclusions and Future Directions

A pressing concern for policymakers is whether food and nutrition programs are doing an adequate job of enhancing and protecting the nutrition status of Americans. Despite the patchwork of nutrition programs available, many recipients either suffer food insecurity, consume diets that fall short of dietary guidelines, or both. There are many holes in the research literature, and better answers to these unresolved questions could give policymakers guidance on ways to potentially improve the programs. We conclude this chapter with our thoughts on open research questions. We organize these comments into three categories: programs and policy (basic program impacts), the role of market incentives, and potential insights from behavioral economics to enhance the effectiveness of the programs.

3.5.1 Programs and Policy

As described in the sections above, while there have been recent strides in our understanding of the causal impacts of food and nutrition programs, there are many holes to be filled in terms of our knowledge about what food and nutrition programs do. For example, although over three-quarters of WIC participants are infants and children, little is known about the health impacts of WIC on these populations. In addition, little is known about the effects of the $388 million in nutrition education or $100 million in employment and training programs in SNAP (figures from CBO [2012]). Recent policy changes also need evaluation; for example, the impacts of stricter nutrition standards for school meals adopted under the Healthy, Hunger-Free Kids Act on participation and outcomes are yet to be understood. The act also imposed restrictions on "competitive foods" sold in schools that could have important impacts on participation, child health, and educational outcomes. Similarly, the impacts of the recent change in the WIC food basket on take-up and participant outcomes need study. In addition, the impacts of the relaxation of the gross income test in SNAP—which expanded eligibility to households with earnings above 130 percent of the poverty line that have high deductions for shelter costs, child care, and medical costs—are in need of study.

In addition, the interactions between these and other safety net programs are not well understood. Bitler and Hoynes (2016) show that in the post-welfare reform world, SNAP played a large and important role in protecting families from falling into poverty in the Great Recession. Further, they find that TANF is providing much less protection in response to economic downturns than it did prior to welfare reform (when the program was called AFDC). As a result, SNAP's role in insuring consumption in the face of economic downturns appears to be evolving and growing. Have the responses to the work disincentives of SNAP changed in the era after welfare reform, in which TANF's role in the safety net has been displaced by the EITC? How have the time limits on ABAWD participants in SNAP changed work incentives? Does SNAP play a more important role in alleviating food insecurity and other measures of material hardship because it is paid out monthly instead of the EITC's annual lump-sum payment? In a broader sense, is it optimal to have the current patchwork of programs, or would it be better to combine or streamline the programs somehow?

There is a recent and growing literature on the medium- and long-run effects of providing food and nutrition programs in utero and in early childhood. We have much more to learn about the potential benefits of these programs on health and well-being in the long run, and when in the life cycle is the most important time to provide these benefits.

A few recent papers focus on understanding the recent SNAP caseload dynamics, as motivated by the increase in SNAP in the Great Recession. Studies by Bitler and Hoynes (2016) and Ganong and Liebman (2013) show that a significant share of the increase in SNAP in the Great Recession can be explained by the severity of the labor market contraction. As of this writing, as the labor market is recovering, SNAP caseloads are declining. It will be of interest to understand whether these dynamics continue. Relatively little is understood about the duration and frequency of participation spells. What are the income dynamics that correlate with households' entry to and exit from the program? Given the trade-offs between incentives, protection, and the administrative costs of enrolling a household in SNAP, are the program rules set optimally?

In addition, the Institute of Medicine (IOM 2013) set out a variety of research questions on the adequacy of SNAP benefits that have not been answered. Since a high proportion of SNAP recipients experience food insecurity at some point during the year, are there changes that could enhance the program's effectiveness in this regard? For example, are the funding formula's parameters set appropriately? Important areas of study include whether the earnings disregard is adequate, the impact of the cap on the shelter-cost deduction to net income, and whether the assumptions of the amount of home production of meals implicit in the Thrifty Food Plan are reasonable in an era with higher shares of the caseload employed.

3.5.2 The Role of Market Incentives (for Participants and Firms)

More work is also needed in understanding the price elasticity of demand for various goods (e.g., healthy foods). There is some recent evidence on this question from the Healthy Incentives Pilot conducted in Massachusetts (Bartlett et al. 2014). This small-scale, randomized-controlled trial gave the treatment group a $0.30 rebate for each dollar of SNAP benefits spent on fruits and vegetables (subject to a maximum subsidy). The evaluation shows that the price subsidy led to a 25 percent increase in consumption of fruits and vegetables. It would be useful to know how consumption would respond to different levels of price subsidies, and whether the results are different if they are offered at all participating retailers or limited to farmers markets only. It would also be useful to know how and for whom consumption patterns would change under targeted price subsidies compared to other policy changes with equivalent cost, such as an increase in the maximum benefit levels or an increase in the earnings disregard. Along a similar line, Just and Price (2013) find that children are more likely to eat fruits or vegetables at lunch in school if they are given a cash incentive, and impacts are more than twice as large if they are offered a quarter as a nickel.

More work is needed to understand how to design programs that are efficient and incentive-compatible for vendors. For example, SNAP and WIC benefits make use of normal channels of trade, and can be redeemed at a large number of retail stores. What are ways to promote lowest-price redemption of WIC vouchers given that WIC is a quantity voucher? How would the efficiency and effectiveness of the program be changed if the benefits were altered such that recipients could respond to the price of the goods (e.g., by turning the program into a dollar-value voucher that could be used for targeted goods)? For school meals, how have revenues responded to the new nutrition standards, and if meals are losing revenue, from what sources are schools making up the shortfall? What combination of incentives and regulations improve the provision of healthy school meals, and does that vary by whether the meals service is run by the district or contracted to a private vendor?

3.5.3 Insights from Behavioral Economics

Another direction for research is testing whether existing economic models accurately capture participant behavior, or if models that incorporate behavioral economics insights are more appropriate. The USDA is interested in pursuing these avenues, and recently funded a Center for Behavioral Economics and Healthy Food Choice Research.

For example, some policy advocates have suggested altering the types of goods that can be purchased with SNAP benefits, such as excluding sugar-sweetened beverages or allowing purchase of hot foods. Under the canoni-

cal model, inframarginal consumers would not be predicted to alter their consumption of these goods regardless of whether SNAP benefits can be used to purchase the items. Does actual behavior adhere to the canonical model prediction, or would recipients alter their consumption of the targeted goods in response to these potential "nudges"? In 2010, New York City requested a waiver from the USDA to ban the purchase of a wide range of sugar-sweetened beverages with SNAP benefits. While the waiver was rejected, a well-designed demonstration project would provide useful evidence on the matter. Even if such policies do not alter behavior, there may be scope for other well-targeted nudges to encourage healthier food consumption.

There is more to learn about the importance of the "food stamp cycle" first documented by Shapiro (2005). In particular, the data show that as the number of days pass since a family receives their (monthly) food stamp payment, food consumption, calories, nutritional intake, and food expenses decline. The decline is especially notable in the last week of the food stamp cycle. Hastings and Washington (2010) find results consistent with this using grocery-store-scanner data. These findings have caused some policy interest in paying out benefits more frequently, for example, twice per month. Using a population shopping at commissaries on military bases, though, Zaki (2014) documents a similar decline in daily food purchasing patterns late in the pay period when paychecks are distributed twice per month. This suggests that more frequent payments of benefits may not be more effective at encouraging consumption smoothing. A better understanding of the interactions between the frequency of payments, self-control, and consumption smoothing would give us important insights into the economic decision making among low-income populations that could be incorporated in our food and nutrition programs and policies.

3.5.4 Final Conclusions

It is encouraging that in recent years there has been an increase in the study of food and nutrition programs using designs that attempt to isolate causal impacts of the programs. Nonetheless, many important questions remain that are unlikely to be answered by quasi-experimental analyses. To provide compelling answers on the impacts of these important programs, the USDA should be open to expanding access to administrative data and implementing well-designed social experiments.

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