# WIC Eligibility and Participation

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**Abstract**

This study examines WIC eligibility and participation using the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP). Comparisons of these sources to administrative totals suggest that participation is significantly undercounted in the CPS and in the SIPP. However, the characteristics of families reported to receive WIC in the CPS and the SIPP are similar to the administratively reported characteristics of WIC recipients nationally, which suggests that the undercount is approximately random, at least with respect to those characteristics that we can observe.

An examination of WIC takeup by eligible households using the SIPP shows that takeup is lower for pregnant women than for infants, and that it is lower still for children 1 to 4. Our estimates suggest that there is substantial scope for expanding participation by eligibles, which would have significant budgetary implications for the program. A more detailed analysis of WIC participation using state-level administrative data, the SIPP, and the CPS suggests that WIC participation is not strongly correlated with state-level economic indicators such as poverty and unemployment rates. Demographic characteristics are predictive of participation as are state program rules. States with stricter rules have lower participation, but a striking degree of state-to-state variation in participation rates remains unexplained.

## Introduction

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides nutrition education and food supplements to low-income pregnant and lactating women, infants, and children under age 5 who are deemed to be at nutritional risk. In the quarter century since it was authorized as a permanent program, WIC has grown steadily, from serving fewer than 1 million participants in 1977 to serving approximately 7.1 million participants per month in 1999 at an annual cost of $3.9 billion.

Many evaluations suggest that pregnant women who participate in WIC have healthier infants than those who do not, and that cost savings associated with these health improvements offset the cost of providing WIC (Devaney, Bilheimer, and Schore, 1992). However, few studies of WIC have dealt with the problem of nonrandom selection of eligibles into the WIC program, and relatively few estimates are available of the effects of the program on children 1 to 4 years old, even though children make up the largest and most rapidly growing part of the caseload.[1] A better understanding of the determinants of participation by eligibles would shed new light on attempts to evaluate the effects of WIC on health outcomes.

In recent years the number of WIC participants exceeded the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS) estimates of the number of WIC eligibles. Participation rates that regularly exceed eligibility rates suggest fraud, or at least poor targeting of scarce public resources. However, a recent National Academy of Sciences panel charged with examining this issue found that FNS estimates were likely to understate the number of eligibles (National Research Council, 2001). In their standard budgeting procedures, for

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[1]See Currie (forthcoming) or Besharov and Germanis (2001) for a summary of this literature and further background about WIC. Three recent studies that deal with selection using instrumental variables and/or fixed effects are Brien and Swann (2001), Kowaleski-Jones and Duncan (2000), and Chatterji et al. (2002).

example, FNS does not account for the fact that many people are "adjunctively eligible" for WIC because they receive Medicaid benefits. Since WIC is not an entitlement program, estimates that fall short will result in funding levels that do not allow WIC agencies to adequately meet the needs of all eligible would-be participants.

This paper asks what we can learn about WIC eligibility and participation using two large survey data sets: the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP). Ideally, we would use a single, nationally representative panel data set with comprehensive information about WIC participation, factors relevant in determining WIC eligibility, and various health outcomes for WIC eligibles. Unfortunately, no such data set exists. Our first task, therefore, is to examine the CPS and SIPP for consistency with administrative totals. This comparison suggests that participation is significantly undercounted in the CPS and in SIPP. We then assess whether underreporting in WIC is comparable to underreporting of other transfer programs, and show that the problem is more severe for WIC. These results raise the question of whether the data are adequate for supporting analyses of WIC eligibility and participation.

No single, definitive test allows us to establish the degree to which the CPS and SIPP WIC data are informative. One minimal criterion, however, is that the characteristics of families reported to receive WIC in the CPS and SIPP match the administratively reported characteristics of WIC recipients nationally. It appears that the characteristics across samples are quite close, with the exception that reported incomes are higher in both the CPS and SIPP than in administrative data.

We then examine the takeup rate of WIC by eligible individuals using data from SIPP. We

show that eligible infants have high WIC takeup. Takeup is somewhat lower for eligible pregnant and postpartum women and is considerably lower for eligible children 1–4. To the extent that WIC meets other favorable benefit-cost criteria, there are substantial opportunities for expanding participation by eligibles.

We conclude by taking a detailed look at the correlates of WIC participation in the SIPP, in the CPS, and in the administrative data. We find that WIC participation is positively associated with Hispanic ethnicity and being married, and negatively associated with Asian ethnicity and residence in a central city or MSA. WIC participation is higher in states having program rules that reduce the transactions costs of using the program (such as fewer required visits), but is not related to state-level measures of need such as poverty and unemployment rates.

**I. Background about WIC**

WIC offers eligible pregnant women, infants, and children food packages and nutritional counseling. The food packages are worth relatively modest amounts (typically, about $35 per month for women and older children), though for infants they often include formula, which is substantially more valuable. Food packages may be in-kind, though it is much more common for them to be issued in the form of coupons. The coupons can be used to purchase specific items from participating supermarkets. The frequency of issuance varies from state-to-state, and over time, and may also be different for different parts of the caseload. WIC agencies must also offer participants nutrition education, though WIC participants are not required to participate in the education in order to receive their benefits.

WIC-eligibles must fall into specific categories (pregnant, postpartum with a child 6 months or younger, breastfeeding with an infant between 6 and 12 months, infants (age 0 to 1), or

children 1-4). Eligible individuals must also have income below 185 percent of poverty, or receive Medicaid, AFDC/TANF, or Food Stamps (regardless of income). The latter group who are eligible for WIC by virtue of receiving Medicaid, AFDC/TANF, or Food Stamps are said to be "adjunctively eligible." In order to receive WIC, eligible individuals must also be certified to be at "nutritional risk." This process involves blood tests for anemia, which suggests that it is a rigorous screen. However, in practice virtually all categorically-eligible persons who present themselves for screening are certified to be at risk on the basis of an inadequate diet, even if no other risk criteria is identified. From the point of view of the analyst, the fact that "nutritional risk" is not a significant hurdle to participation is useful because one cannot observe nutritional status in most data sets.

Other aspects of the WIC program still make it difficult to assess eligibility and participation using the available data. The most important difficulty is that WIC program rules grant agencies considerable latitude in defining key concepts such as income and household structure. For example, while in principle, WIC agencies count income from all sources (including welfare payments), administrators can decide whether monthly or annual income is a more appropriate measure of the family's circumstances. Once certified, participants can stay enrolled for six months to a year, so decisions about whether or not households can be enrolled on the basis of temporarily low income in one month have important ramifications for estimates of the number of eligibles.

Similarly, WIC rules define a household as people who are living together and sharing resources. Hence, a pregnant woman who moved in with her sister's family might or might not be considered to be part of that family for WIC purposes, depending, for example, on whether or

not she paid rent to her sister. Thus, even if the analyst has monthly information about income and family structure, it is often not possible to tell whether the local WIC agency would have regarded a particular person as eligible.

## II. Data Sources

The data we use to analyze WIC eligibility and participation come from a variety of sources, since no one source has all of the information we need. Table 1 lists a number of WIC characteristics of interest and whether or not they can be studied in the different data sets we use. As Table 1 indicates, administrative counts are useful for checking totals from other data, but they have limited other uses. The various WIC Participant and Program Characteristics (PC) surveys, which are commissioned every other year by FNS to study the characteristics of the universe of WIC recipients, are useful for assessing how various survey data sets match the demographic and income characteristics of WIC recipients, but as with the administrative counts, they have no information about eligibles who do not participate. Though useful for verifying error rates in certification, the National Survey of WIC Recipients and Their Local Agencies is a single cross-section and it also does not have information about eligibles who do not participate.

Thus, we turn to the nationally representative surveys. The CPS and the SIPP have different strengths and weaknesses. The CPS is larger than the SIPP, with the March Annual Demographic survey currently covering roughly 100,000 households. Special Food Security Supplements (FSS) with questions about WIC participation were added to the CPS in 1995, but the Supplements do not have the information needed to accurately assess WIC eligibility. WIC questions have also been added to the main annual demographic file (ADF) questionnaire

starting in March 1998, so that in principle, the question of participation by eligibles can be directly addressed with these data. Unfortunately, it is impossible to determine monthly income with any accuracy in the CPS because it only elicits information on annual income. If income varies significantly during the year, it may be difficult to tell if people are actually eligible or not. Neither the CPS FSS nor the CPS ADF identifies all of the specific individuals within the household who receive WIC benefits.

The SIPP is based on a smaller sample of households (covering 40,188 households in the 1996 panel), but it collects monthly data on income, program participation, and household characteristics. Hence, it is straightforward to simulate WIC eligibility with SIPP. The SIPP also identifies the specific individuals within a household who receive WIC benefits, so the data are well-suited for examining WIC takeup by eligible persons.

This rest of this section provides more detailed information on the administrative, CPS, and SIPP data used in this paper. Of particular interest are screening questions incorporated in the CPS that result in some households potentially eligible for WIC never being asked relevant WIC questions.

*a) Administrative Data from FNS*

The official FNS numbers regarding WIC caseloads come from counts of the number of people who participated in WIC in a particular month, that is, people who picked up their WIC food instruments. Individuals who are enrolled in WIC but do not pick up their food instruments are not counted as being part of the caseload. A shortcoming of the official administrative caseload data is that they are not broken out by demographic subgroups. To remedy this deficiency, the FNS conducts a biennial survey of state program directors called the Survey of

Program and Participant Characteristics (PC Surveys). The current version of this survey captures all cases that happen to be in the state's computer system at a given time. Since some people may be certified as eligible (and hence in the computer system) but may not actually pick up food instruments, caseloads measured using the PC Surveys tend to be slightly higher than those in the administrative data. In addition to information about participant characteristics such as race and age, this survey asks detailed information about state program characteristics that we use below.

Periodically, the Food and Nutrition Service (FNS) at the USDA surveys a nationally representative sample of persons certified for WIC. The most recent is the Survey of WIC Participants and Their Local Agencies, which sampled persons certified for WIC in spring 1998. These surveys allow FNS to assess the degree of need of WIC recipients and also to verify actual eligibility of persons certified for WIC.

The administrative data do not have information about WIC-eligible households who do not participate, and the underlying microdata are sometimes not publicly available to researchers.

*b) The 1995-1999 CPS Food Security Supplements*[2]

The food security questions developed by the USDA for the CPS FSS have now been used in many other surveys. The FSS aim to assess national food security by asking questions about lack of access to food, participation in food and nutrition programs, and hunger. The FSS provide information about whether anyone in the household received WIC in the 30 days prior to the interview.

[2]This section draws from the 1995 CPS Food Security Supplement Interviewer Instructions (CPS Interviewer Memorandum no. 95-05) and from Attachment 9 of the August 1998 CPS Technical Documentation, which is the Food Security Supplement Questionnaire. The FSS were administered in April 1995, 1997 and 1999, and in September 1996 and August 1998.

A limitation of these data is that the program participation questions are asked about the household rather than about the individual, making it difficult to determine which members of the household are receiving benefits. A second significant problem is that households were screened before being asked about participation in WIC, Food Stamps, school lunch and breakfast, and meals for the elderly, so that in 1995, 1996, and 1997, only households with incomes less than a certain level were asked the questions.[3]

The income measure used to apply this screen is a categorical measure of income, asked during the first month that the household participates in the CPS and updated one year later.[4] Since the income screen depends on the number of persons in the household, the size of the household is critical to determining whether the questions were asked. In practice, the FSS used the full number of persons in the household, regardless of whether or not these persons were related. This definition of a household may or may not correspond to the one that would be used by a local WIC office to determine eligibility.

This screening procedure is likely to result in the undercounting of persons on WIC for

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[3]Households without an income measure ("don't know" or "refuse" responses) were also asked about their use of food assistance programs. The income cutoff was $15,000 for a one-person household and then went up by $5,000 for each additional household member up to a household size of six. For households of seven or eight persons, the cutoff was $50,000, for nine persons it was $60,000, and for larger households it was $75,000. WIC questions were further restricted to households with categorically-eligible persons, specifically, households containing women aged 15–45 or a child younger than 5. Households were first asked whether any household member had received WIC in the last 30 days. Those who answered yes to this question were then asked how many persons in the household had received WIC. This value was top-coded at 4, although relatively few households are likely to have been affected by the top-coding given that in general fewer than 4 people in a given household participated. Unless the number of persons receiving WIC is exactly equal to the number of persons who are potentially eligible, we cannot identify the specific people in the household receiving benefits.

[4]According to personal communication with Mark Nord of USDA's ERS division, this measure is control card income. Households in the CPS are followed for 4 months, are then out of the survey for 8 months, and finally are followed for an additional 4 months before exiting the survey. Although this measure is labeled family income, it is asked at a point in the survey before a household roster has been created.

several reasons. First, in states with Medicaid thresholds above the income screen, some people eligible for WIC (and who receive it) will not even be asked the WIC questions. Second, other eligible WIC recipients will have income above the screen in the first month that a household is surveyed, but have income below that level in subsequent months.[5] Working in the other direction, use in the FSS of the broadest possible measure of the household may help to mitigate the undercounting caused by the income screen. WIC eligibility workers count only the income of individuals "sharing resources" and may exclude the income of some related or unrelated individuals in the household. When we mimic this income screen using the SIPP, the number of WIC recipients that would appear in the SIPP falls by roughly 20 percent.

In 1998 and 1999, a second screen was added prior to the program participation questions. In addition to asking WIC questions to all households passing the income screen (and all those with "don't know" or "refuse" for control card income), households answering "yes," "don't know," or "refuse" to a further screening question about food insecurity were asked about participation in food assistance programs.[6] This additional question will mitigate the undercounting induced by the income screen only if those who are missed by the income screen experience this type of problem. To assess the effect of this change in the screen, we constructed a WIC participation measure that uses a consistent screen by discarding those persons who were asked about WIC only because of the new screening question. The fact that a number of

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[5]The FSS was not necessarily administered in the same month that the household entered the survey, so there could easily be income discrepancies between the screening questions and the household's status at the time of the FSS.

[6]The specific question reads "People do different things when they are running out of money for food in order to make their food or their food money go further. In the last 12 months, ..., did you ever run short of money and try to make your food or your food money go further?"

households reported receiving WIC when asked under the less restrictive screening procedure provides evidence that the income screen from 1995–97 causes some participants to be missed.

*c) The Annual Demographic File (March CPS)*[7]

Starting in 1998, experimental questions on WIC use were added to the March CPS. Two specific questions ask whether any females 15 or older in the household used WIC in the last calendar year and the number of such WIC participants in the family.[8] Respondents were also asked if any household members had received Food Stamps in the last year and the number of months that Food Stamps were received. In 2001, these variables were included in the publicly released data file for the first time. By combining the public data with the experimental data, we can cover the period 1997 to 2000 (since the income and program participation questions for each year refer to the previous calendar year).[9] As in the FSS, the ADF questions are asked only if the household passes an income screen, but the income screen is generally much higher than in the FSS, and so would be expected to result in less undercounting.[10]

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[7]This information comes from Appendix D of the 2001 ADF Technical Documentation, the CPS Field Representatives/Interviewer Memorandum No. 2001-03 Items Booklet - Feb/March/April 2002, which is the Facsimile of March Supplement Questionnaire, along with the 1998-2000 Questionnaires.

[8]A very small number of women over 45 are coded as being on WIC, but the vast majority of respondents coded as being on WIC are women aged 15–45. In fact, it appears that women were coded as being on WIC in all households that reported participation, leading to a large overcount of women participants relative to administrative totals. While using the 1998–2000 experimental data, we encountered a small number of males or children listed as being the persons who were in the WIC program; we recoded these persons to not be participants in order to match the recoding in the 2001 ADF.

[9]The WIC and Food Stamp questions in the March CPS refer to participation in the last year rather than in the last month, so they are not directly comparable to the FSS questions. Counts of WIC recipients are almost certain to be higher in the March CPS than in the FSS.

[10]In 1998/99 the cutoff for being asked the WIC questions in the ADF was $20,000 for one-person households, $30,000 for two- or three-person households, and $50,000 for households with four or more persons. In 2000/01 the screen was $30,000 for one-person households and $50,000 for larger households. Persons who answered "don't know/refuse" to the income question were also asked WIC questions. Thus, households with fewer than seven

The ADF also asks questions about participation in other programs, such as welfare and Medicaid. The latter is particularly important since those who participate in Medicaid are adjunctively eligible for WIC, and Medicaid often has income cutoffs above 185 percent of poverty.

*d) The Survey of Income and Program Participation*

The SIPP has been conducted by the Census Bureau since 1984. The survey design is a continuous series of national panels that gather information on income, demographics, and monthly program participation, with sample size ranging from approximately 14,000 to 41,000 interviewed households. The duration of each panel ranges from 2.5 years to 4 years. Complete information for all households in the 1996 panel is available starting with March 1996. We follow these individuals through November 1999. The survey asks about WIC each month for all individuals in households with a woman aged 15–45 (inclusive). There are no other screens. In the first wave, everyone in the universe is asked if they receive WIC. After the first wave, people who said yes before will be asked if they are still participating. If persons answered no in the previous wave or if they are new entrants, they are asked if they received WIC, how much, and when.

Because we know the specific birth month and year of children in SIPP, it is straightforward to identify four of the five categorically-eligible WIC groups: pregnant women, postpartum women, infants, and children 1–4. We do not have information on whether a mother with a child

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possibly unrelated persons were more likely to be asked the WIC questions in the ADF than in the FSS, while those with more members would be less likely to be asked in the ADF than in the FSS. We examined the importance of the different income screens by also imposing the narrower FSS screen on the March ADF data. Of people asked the WIC questions by the FSS, only 58 would have been missed by the ADF. In contrast, half of those asked the WIC questions in the ADF would have been missed under the FSS income screens.

7–12 months old breastfeeds.

## III. WIC and Other Transfers in the CPS and SIPP

The purpose of this section is to assess the ability of the CPS and SIPP to provide reliable information about patterns of WIC eligibility and participation and, to the extent that limitations are apparent, learn what we can about them so our subsequent analyses can be adapted accordingly or qualified appropriately.

We start by comparing the total number of WIC recipients nationally (and by subgroup) with counts of WIC receipt in the two CPS files (the FSS and ADF) and the SIPP. We then examine how these patterns compare with similar calculations for other major transfers. The section concludes by comparing the characteristics of WIC recipients in the CPS and SIPP to data collected by the USDA in its Survey of Program and Participant Characteristics.

### *a) WIC Receipt in the CPS and SIPP*

Table 2 shows the number of persons participating in WIC. The top panel shows monthly counts from the FNS administrative data that correspond to the months of the CPS food security supplements. WIC participation rose slightly from 6.7 million persons in April 1995 to 7.1 million persons in April 1999. The largest group of participants includes children 1–4, followed by infants and women.

The second panel of Table 2 shows FSS counts as a share of the administrative caseloads computed from the Food Security Supplements.[11] There is substantial underreporting of the total

[11]Since the CPS FSS does not ask who in the household participated, and the CPS ADF only asks about women who participated, we assume that all categorically-eligible persons in participating households received WIC. This procedure is likely to overcount WIC participants, but may be more accurate for infants than for either women or children since we cannot identify pregnant women in the CPS and since many eligible children do not participate. Counts were created by summing the number of persons reported to be on WIC in households that got WIC for the FSS, or summing the number of categorically-eligible children and infants with the number of women reported on

number of WIC participants: the Food Security Supplements capture roughly 70 percent of the administrative number. Underreporting of infants is even worse (FSS counts of infants are around 60 percent of FNS administrative numbers) even though we assume that any infant in a household that participates in WIC is a participant. The comparable figure for children 1–4 is higher, though it is likely that some of these children do not receive WIC when other members of their household do. Some of the undercount may be due to the fact that the CPS only asks the WIC questions of households with incomes below a threshold level. The undercount would have been much worse in 1998 and 1999 without the additional screening question about food security that was added to the Food Security Supplements in those years (see footnote 6). We estimate that the new question increased the total number of households recorded as receiving WIC by more than 600,000.

Reported WIC coverage in the SIPP is shown in panel 3 of Table 2. Since the SIPP follows families longitudinally and identifies specific individuals receiving benefits, we can compare administrative totals for all categorically-eligible groups with totals in the SIPP.[12] Like the CPS FSS, the SIPP sharply undercounts the total number of WIC recipients, though by a slightly smaller amount. The SIPP appears to have somewhat better coverage of infants than does the CPS, but still only roughly three-quarters of infant WIC recipients appear in the SIPP.

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the program for the ADF, weighting by the household supplement weight. Subgroup totals were created by assuming any categorically-eligible person in the household was on the program, using the person supplement weight.

[12]One complication arises in the SIPP. Weighted calculations suggest that roughly 364,000 women report receiving WIC, yet they do not appear to have a child (or fetus) of an age that would lead them to be eligible. In the calculations below, we allocate these women to categorically-eligible groups in proportion to the categorization of women WIC recipients given in the Table 2 administrative data for 1998. Thus, we allocate 47.6 percent of the unclassified women to the "pregnancy group," 31.6 percent to the postpartum group, and the remainder to the breastbreasting group.

The bottom three panels of Table 2 present similar comparisons of administrative data (in this case, average monthly WIC receipt during the year) with data from the March CPS ADF and the SIPP.[13] The administrative totals are nearly identical when matching the specific month to the FSS or when examining the average of months during the year.

The March CPS appears to have significantly better WIC coverage than the Food Security Supplements—by 1999 and 2000, the CPS accounts for over 90 percent of WIC recipients. One reason may be that the income screen for asking the questions was higher than in the FSS so that more participating households were actually asked the questions about participation. We estimate that the more generous income screen in the March CPS adds 890,000 WIC recipients in 1999 and 980,000 in 2000 relative to what would have been obtained with the more restrictive FSS screens.

However, the March CPS asks about WIC receipt at any point during the year. If families receive WIC for fewer than 12 months a year, the count of the average months of receipt will be smaller than the number of families receiving WIC at some point during the year.[14] Given this consideration, it is difficult to assess the degree to which the March CPS is comparable to the administrative totals. What is clear is that the CPS undercounts WIC recipients and that the problem is considerably more severe for infants than it is for other categories.

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[13]ADF totals were created by using the total number of women who reported being on WIC plus the number of categorically-eligible children in the same family as a woman who got WIC, using the household supplement weight. The total number of infants or children is calculated by assuming infants or children are on the program if they are in the family of a woman on the program. Totals for women reflect the total number of women who reported being on the program.

[14]For example, if the typical WIC recipient has one spell during the year that averages 9 months and coverage in the March CPS were complete, we would expect the March count to be 133 percent (or 12/9) of the administrative total.

The SIPP data also appear to undercount WIC recipients. The average number of monthly recipients in SIPP is around 75 percent of the administrative total. These percentages are similar across groups, except for women, where the coverage percentages are somewhat lower. If we replicate the CPS questions with SIPP (for example, by taking the population of infants in March of a given year and calculating the number who received WIC at some point in the prior calendar year), it appears that the SIPP coverage of WIC is much better than the WIC coverage in the March CPS.

Discrepancies could arise between the administrative data and the CPS and SIPP if the latter two data sets do not have complete coverage of the groups categorically eligible for WIC. In fact, the CPS and SIPP weights are both adjusted to match Census Bureau population estimates, so the numbers of infants, children 1–4, and women in the data sets are quite close across samples.[15] Another possible explanation for the undercount may be that neither SIPP nor the CPS survey persons in group quarters or the homeless; however, it is hard to imagine that this could account for the magnitude of the undercounts.

The administrative data provide a useful perspective on the importance of WIC. Dividing the number of infants receiving WIC by the number of infants in the population shows that roughly half of all infants in the United States receive benefits from WIC, as do a quarter of all children aged 1–4.

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[15]For August 1998, the FSS estimate of the number of women 15–45 is 0.4 percent over Census totals, while the FSS estimate of the number of children aged 1–4 is about 2.9 percent higher than Census totals and the FSS estimate of the total number of infants is 5.1 percent higher than Census totals. Comparable numbers for the 1998 ADF show that it overestimates the number of women 15–45 by about 1.5 percent, children 1–4 by about 3.9 percent, and infants by about 0.5 percent. December 1997 estimates for the SIPP compared to 1998 totals show that the SIPP overstates the number of women by 0.8 percent, the number of children 1–4 by about 4.6 percent, and produces an estimate of the number of infants that is 0.2 percent below that of the Census totals.

We take a somewhat negative message from the comparisons made in this subsection. Both the CPS and SIPP significantly undercount the number of people receiving WIC, which raises a question about the usefulness of these data for studying the program. We follow up on this concern by examining the degree to which these data sets undercount recipiency of other major transfer programs, and the degree to which the characteristics of WIC recipients in the CPS and SIPP align with the characteristics of WIC recipients nationally.

*b) Comparing WIC Receipt with Receipt of Food Stamps, Medicaid and AFDC/TANF*

Many papers use the CPS and SIPP to examine the effects of policy changes on receipt of Food Stamps, AFDC/TANF, or Medicaid, or to examine the effects of these programs on a wide range of economic activities (particularly employment). Lately, a good deal of concern has been expressed about undercounting participation in these other programs. Primus et al. (1999), for example, document substantial underreporting of AFDC/TANF and Food Stamp benefits in the CPS, while Bollinger and David (2001) and Bavier (2001) discuss undercounting of Food Stamps and welfare (respectively) in the SIPP.[16] Card, Hildreth, and Shore-Sheppard (2001), using SIPP data for California households, conclude that their estimates "suggest that the SIPP provides reasonably accurate coverage reports for those who are actually in the Medicaid system."[17]

Table 3 shows our comparisons of the fraction of persons reported to participate in these

[16]Hotz and Scholz (2002) discuss strengths and weaknesses of survey and administrative data for studying the income and employment of low-skilled workers.

[17]In contrast, Daponte and Wolfson (2002) suggest that figures on Medicaid participation of infants based on the CPS are only 53 percent of those based on administrative records for one county in Pennsylvania. The undercount may arise because of under-counting of infants, or because mothers who received Medicaid may not realize that their infants were also covered by the program.

other programs to administrative totals. The top row of each panel in Table 3 shows the administrative count for participation in each program, while the remaining rows show the total from the survey in the row header as a percentage of the administrative total. Administrative data on Food Stamps come from the FNS and are average monthly totals. Administrative totals for Medicaid come from the HCFA Web site (http://www.hcfa.gov/) and cover the total number of Medicaid participants during the year (the elderly, blind and disabled are excluded). Administrative counts of persons on AFDC/TANF are the average of monthly totals.

The top panel of Table 3 compares Food Stamp receipt using the CPS FSS and SIPP with administrative data. We see here that the CPS Food Security Supplements capture around 85 percent of Food Stamp recipients. The SIPP shows a similar percentage. This 15 percent undercount is roughly half the size of the WIC undercounts (the discrepancy is somewhat smaller in some of the SIPP comparisons). Since the income cutoffs are lower for Food Stamps than for WIC, it is likely that the FSS income screens are less problematic for these questions. Like the WIC questions, both the FSS and the SIPP ask about Food Stamp receipt in the last month.[18]

The second panel of Table 3 examines average monthly Food Stamp participation in the calendar year from the administrative data. The March CPS reports recipients at any point during the year. The CPS number will be larger than the administrative total if some spells are shorter

[18]Starting in 1997, the FSS began to ask about Food Stamp receipt in the last year. The FSS also ask when the last month was that the household received Food Stamps. We coded a household as getting Food Stamps last month if the last month was 1 or 2 before the survey month. Totals were calculated as the sum of the number of persons in households that reported getting Food Stamps, weighted with the household supplement weight. However, using the last-year question rather than the last-month question in the FSS results in a 20–24 percent increase in the estimated number of persons who were on the Food Stamp program in the past year.

than one year.[19] In contrast, the SIPP comparisons are conceptually equivalent to the administrative data. The SIPP captures roughly 90 percent of Food Stamp participants.

Comparisons of Medicaid recipients in the CPS ADF and the SIPP with administrative totals are straightforward since both are based on annual totals.[20] Panel 3 shows that the CPS and SIPP either overestimate or slightly underestimate Medicaid coverage. In contrast, comparisons of AFDC/TANF totals in the CPS ADF with administrative data compare the number of people who ever received benefits during the year (the CPS ADF) to the average number of monthly recipients (the administrative data). Hence the CPS totals should be larger than the administrative counts. Despite this, panel 4 shows that the CPS significantly understates the number of AFDC/TANF recipients when compared with administrative totals. We can match the administrative concept using the SIPP, but AFDC/TANF recipiency is significantly understated in the SIPP (but again, the SIPP estimates are not biased upwards).

To summarize, Table 3 clearly shows that the CPS ADF, CPS FSS, and SIPP undercount the number of recipients in transfer programs. Comparing the results of Tables 2 and 3, the undercount appears to be more severe for WIC than it is for the other programs.

*c) Characteristics of WIC Recipients Nationally and in the CPS and SIPP*

One way to assess potential biases that might arise from using the CPS and SIPP to study

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[19]We found that 71 percent of Food Stamp households with categorical eligibles reported spells of at least 12 months.

[20]The ADF codes Medicaid recipiency for everyone; we sum this number inside the household and report the household-supplement weighted total for that. We restrict the comparisons to people who are not over 65 and exclude persons who receive Medicaid and SSI and do not receive AFDC from the totals. The ADF only asks adults 15 and over about ADFC/TANF; we created a household measure as the sum of the number of persons on AFDC/TANF plus all children in families where someone was on the program, and sum this using the household weight. These are both annual measures in the ADF.

WIC, given that they undercount the number of WIC recipients nationally, is to compare the characteristics of WIC recipients in the CPS and SIPP with those reported from the FNS publications WIC Participants and Program Characteristics 1998, a census of WIC recipients in April 1998, and the National Survey of WIC Participants, a survey of WIC recipients.

Table 4 shows the race/ethnicity and ages of WIC recipients in these data sources for the period closest to April 1998 (the reference period for the 1998 National Survey). The race/ethnicity of the WIC population is very close to the national data in the FSS and the March CPS ADF.[21] The proportion of the WIC sample in the SIPP that is African American closely matches the national totals, but the SIPP seems to overrepresent white WIC recipients and underrepresent Hispanic recipients.[22]

The SIPP clearly dominates the CPS in allocating WIC recipients between categorically-eligible groups. Because the CPS does not identify which people within the household actually receive WIC, analysts can only assume everyone within the household gets benefits (or make some alternative ad hoc assumption). The consequence of this limitation is that the proportion of infants and children in the CPS FSS and ADF WIC caseloads is too small and the proportion of women is too high (by a factor of two). In contrast, the SIPP proportions (aside from the undercount of Hispanics) adhere closely to the administrative data.

Table 5 compares the incomes of WIC recipients in the CPS ADF and SIPP with the incomes of WIC recipients in the National Survey of WIC Participants. The comparisons yield a

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[21]We use the ADF rather than the FSS to analyze participation because the ADF is available over a longer time series, and because the comparison of reporting in the two data sets suggested that the FSS was no more successful than the ADF in measuring WIC participation.

[22]For these calculations we follow the National Survey of WIC Participants by defining African American and white as being non-Hispanic African American and non-Hispanic white. Hispanic includes Hispanics of any race.

striking result—income for the total population and across almost every subgroup is higher in the SIPP and CPS ADF than it is in the national WIC survey, even when using a family rather than household measure of income in the CPS.

The bottom panel of Table 5 shows the incomes of WIC recipients by percentages of the federal poverty line. Again there are considerable discrepancies across surveys. The National Survey of WIC Participants implies that over 94 percent of WIC recipients have incomes below 185 percent of poverty, suggesting that most adjunctively-eligible WIC households would also be income eligible. The CPS data imply that roughly 13 percent of WIC recipients have incomes above 185 percent of poverty, while SIPP data imply that 23 percent have incomes above 185 percent of poverty.[23] Hence, the data sets provide very different perspectives on the importance of adjunctive eligibility on the targeting of WIC benefits.[24]

It is not clear whether the CPS and SIPP or the National Survey of WIC Participants provides more reliable income data. The WIC program has income verification procedures whereby, for example, recipients bring in paycheck stubs to document income. But incomes frequently fluctuate over the year and people may join the program when their incomes are temporarily low. People may also have opportunities to shield some income from WIC administrators.[25] Moreover, the CPS and SIPP are designed to elicit accurate income information

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[23]We expect the SIPP numbers to be higher than the CPS numbers because the CPS will screen out some high income Medicaid recipients.

[24]While incomes appear considerably higher for WIC recipients in the SIPP than in other data sources, we show later in the paper that relatively few ineligible households appear to be getting WIC benefits.

[25]A WIC clinic visited by one of the authors was explicit about the fact that they used the lowest of monthly income, annual income, or year-to-date income in order to determine eligibility for the program. An alternative reason for administrative data to be lower is that some states did not report income for adjunctively-eligible persons. If adjunctively-eligible persons have incomes higher than do other WIC recipients, omitting them will tend to bias

and, if anything, comparisons of consumption and income data suggest that the surveys *undercount* income (see, for example, Meyer and Sullivan, 2002). Hence, we think (though we cannot conclusively demonstrate) that the CPS and particularly the SIPP provide the most accurate available picture of the resources available to families receiving WIC.

To conclude this section, it is clear that the CPS FSS and ADF and the SIPP undercount WIC recipients and that the problem is more severe for WIC than it is for other transfers.[26] But these comparisons suggest that missing recipients appear to be randomly distributed across categorically-eligible WIC groups, at least in terms of observables. The incomes of WIC recipients are higher in the CPS and SIPP than in the WIC administrative data, but it is plausible that incomes are underreported to WIC administrators. The discrepancies documented in this section serve as a qualification to CPS- and SIPP-based analyses of WIC.

## IV. Correlates of WIC Participation

This section addresses the following question: Across different categorically-eligible groups, what is the WIC participation rate (conditional on eligibility)? We can only do this analysis with SIPP data since it is difficult to model eligibility without knowing monthly income and it is impossible to identify pregnant women and hard to identify postpartum women (those

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average income downwards in the administrative data. However, even if we focus on ADF recipients who were income eligible for WIC, we find that incomes are 15 percent higher than in the administrative data.

[26]The undercount in the CPS appears to be more severe in the Northeast, Mid-Atlantic and Southeast than it is for other regions in the county. Appendix Table A contains regional comparisons across the CPS FSS, CPS ADF, National Survey, and administrative totals. There is less regional variation in the SIPP.

with children 0–6 months old) in the CPS.[27]

*a) Estimates of WIC Eligibility and WIC Participation (by Eligible Households)*

Our first task is to identify WIC-eligible individuals in the SIPP. We first identify all infants, children under age 5, pregnant women, postpartum women and women who may be breastfeeding but are not postpartum (those with children 7–12 months old).[28] Families must have income below 185 percent of the poverty line to be income eligible. For our primary analysis we allow any family whose *monthly* income falls below 185 percent of the federal poverty line divided by 12 to be income eligible. Although WIC offices may use annual income in some circumstances, we believe that monthly income more closely approximates the concept of income that is generally used in practice.

Households receiving AFDC/TANF, Food Stamp, or Medicaid benefits are adjunctively eligible for WIC regardless of their income. Recent expansions of the Medicaid program mean that in some states infants and children in households with incomes up to 300 percent of poverty may be eligible for WIC, a circumstance that may have been an unintended consequence of changes to the Medicaid program.[29]

Once an individual becomes eligible for WIC, we assume that person remains eligible for

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[27]The CPS does not give specific birth dates of children. The closest one can come to identifying postpartum women in the CPS is to assume some fraction of women with an infant aged 0 are eligible. All women with a child under 7 months are WIC-eligible if they meet the income guidelines. Income eligible women with children 7–12 months old are only eligible for WIC if they breastfeed. But Jacknowitz (2002) estimates that only 8.6 percent of mothers with infants age 7–12 months breastfeed.

[28]We classify women based on the birth dates of their children reported in the last nonmissing month of data in the SIPP panel.

[29]Some states offer automatic eligibility for participants in Head Start, the Low Energy Heating Assistance Program, Supplemental Security, the National School Lunch Program, and other programs. We do not account for these eligible people unless they were otherwise income or adjunctively eligible.

the relevant certification period. Pregnant women, for example, are certified for the entire period of pregnancy until six weeks after birth. Infants are certified until they reach their first birthday. Children are certified for six-month intervals. At the end of a child's six month certification period, eligibility is reassessed, and the child may be eligible for an additional six months of coverage if the family's income is still below the cutoff level. We incorporate certification periods in our eligibility and participation calculations.

In the tables below, we present information on average monthly WIC eligibility and participation in 1998. In Table 6, for example, we classify all infants in the SIPP in each month of 1998 into eligible and ineligibles and into those who do and do not receive WIC. For this portion of the analysis, we make one adjustment to the data, increasing the number of WIC recipients by the amount that the SIPP data undercounts recipients in a particular group, with the administrative data (shown in Table 2) as the benchmark. These allocated individuals are placed in the eligible and ineligible groups in the same proportion as individuals whose status we observe in the data. We then make the corresponding adjustment to the number of nonrecipients, reducing the number of eligible and ineligible *nonrecipients* by the increase in the number of eligible and ineligible *recipients*.

The first panel of Table 6 shows that 58 percent of all infants in a given month in 1998 were eligible for WIC. Roughly 45 percent received WIC benefits. We estimate that the WIC participation rate among eligible infants is 73.2 percent.[30] We also estimate that, of the infants receiving WIC, 5.7 percent were ineligible for the benefits. Though not the focus of our study,

[30]Eligible households may fail to receive benefits for many reasons including lack of awareness of the program, low valuation of benefits, or transactions costs associated with program participation. See Blank and Ruggles (1996) and Daponte, Sanders, and Taylor (1999) for a discussion related to participation in the Food Stamp program.

this error rate is consistent with the error rate for infants reported in the National Survey of WIC Participants (2001).[31]

The second panel of Table 6 shows a similar analysis for children 1–4. Fifty-seven percent of the 16 million children in this age group are eligible for WIC. Of the 9 million eligible children, 38 percent receive benefits.[32] Of the 3.6 million children receiving benefits, we estimate that 5.4 percent do not meet the income or adjunctive eligibility criteria (and have not done so in the last six months). Our evidence is consistent with that of Burstein et al. (2000), who show, using data from the 1993 SIPP, that infants are much more likely than older children to participate in the program. Indeed, Burstein et al. show that many children exit on their first birthdays, when the value of the WIC package falls (since it no longer includes infant formula).

The third panel of Table 6 presents information on WIC eligibility and participation by pregnant and postpartum women. We are not able to do a similar analysis for breastfeeding women since we do not observe their infant feeding practices, and we were reluctant to assume a distribution of women allocated into breastfeeding status by eligibility/noneligibility. Of the 3.9 million pregnant and postpartum women, 2.1 million or 54 percent are eligible for WIC. Of those who are eligible, 66.5 percent actually receive benefits.[33] We estimate that 6.2 percent of the 1.5 million women in this group receiving WIC are not eligible for benefits. We have the least

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[31]WIC error rates may be even lower now that the WIC program began requiring income documentation beginning in 2000.

[32]The participation rates appear to fall sharply and roughly linearly with the age of the child. Children who are one have roughly twice the participation rate of children who are four.

[33]The participation rate (among eligibles) cannot be 100 percent for pregnant women under our methodology unless all pregnant women began receiving WIC benefits in the first month of pregnancy.

amount of confidence in our estimates for women, because, as shown in Table 2, the WIC undercounting problem in SIPP is more severe for women than it is for other groups. Hence, our assumption that unobserved WIC recipients should be allocated to "eligible" and "ineligible" status in the same proportion as observed WIC recipients (among the two groups of women) is a stronger assumption than we have to make elsewhere.

The results in Table 6 are striking since they suggest that a program that served all eligibles would be considerably larger than the current one. If WIC is a cost-effective intervention, then additional funding and outreach may be warranted. We find that 73 percent of eligible infants, 67 percent of eligible pregnant and postpartum women, and 38 percent of eligible children 1–4 receive benefits. Because WIC is not an entitlement, however, greater takeup among WIC eligible families could create severe fiscal stress on the program. Those skeptical of the current targeting of WIC dollars might be concerned to learn that over half of all children younger than 5 and over half of all pregnant and postpartum women in the United States are eligible for WIC (Besharov and Germanis, 2001).

The participation estimates shown in Table 6 differ sharply from implied WIC participation rates based on budget estimates prepared by the Food and Nutrition Service at the USDA. Four factors account for these differences. Our analysis uses data from the SIPP rather than the CPS, we base eligibility on monthly rather than annual income, we account for certification periods in our eligibility estimates, and we account for adjunctive eligibility in our estimates. The importance of these differences can be seen in Table 7.

The entries in Table 7 show the average monthly number of WIC-eligible persons in each categorically-eligible group. The first row mimics the CPS calculations using the SIPP, basing

eligibility solely on annual income.[34] Like the official budget estimates based on CPS data, "participation rates" for infants exceed 100 percent in 1997 and 1998 under this measure – 1.8 million infants receive WIC benefits in 1997 and 1998, while only 1.6 million are "eligible" in 1997 and 1.4 million are "eligible" in 1998, when annual incomes are used to assess eligibility. The entries in the next row show eligibility estimates based solely on monthly income. Under this definition, a person is only eligible in the single month that they meet eligibility guidelines. This refinement increases total eligibility counts by 9 to 12 percent, though as emphasized in footnote 34 this is a result of two offsetting effects. On one hand, we expect the monthly income definition to result in a smaller number of eligibles because not all WIC recipients are eligible for the full year. On the other hand, we expect the monthly income definition to result in a larger number of eligibles because incomes vary over the year.[35]

The third row of Table 7 shows eligibility counts allowing households to gain WIC eligibility either through low income or through adjunctive eligibility. This measure only counts a household as being eligible in the month in which it is income or adjunctively eligible. This refinement increases the total number of eligible households by an additional 8 to 9 percent.

The fourth row of each panel accounts for certification periods: the fact that an infant, once eligible, is eligible until his or her first birthday. Children are certified for six-month periods. Pregnant women are certified until their infants are 6 weeks old. Postpartum women are eligible

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[34]When eligibility is based on annual income, it is difficult to calculate the "average *monthly* number of eligible individuals," which is what is shown in the rest of the table and which is how the administrative data are typically calculated. The CPS concept of "ever eligible during the year" will *overstate* monthly eligibility counts as long as people do not receive WIC for the full calendar year. But the measures understate eligibility for all the other reasons mentioned in the text.

[35]Also see Gordon, Lewis, and Radbill (1997), particularly section 3, for a discussion of monthly and annual income differences.

until their infant is 7 months old. Not surprisingly, accounting for certification periods significantly increases counts of the average number of monthly recipients. Taken together, the *combination* of monthly income, certification periods, and adjunctive eligibility increases counts of WIC eligibility by 44 to 51 percent relative to the "CPS-like" baseline measure.

*b) Factors Correlated with WIC Participation (SIPP)*

We examine the factors correlated with WIC participation by eligibles in the SIPP. We do this for three reasons. First, state WIC agencies are given some discretion in how their programs operate. We are interested in how these policy choices may be correlated with WIC takeup. Second, identifying the economic and demographic correlates of WIC participation by eligible households may enhance outreach and targeting efforts. Third, understanding the behavioral effects of WIC on outcomes such as birth weight and other measures of child well-being depends critically on the nature of the selection process into the program. If, given the distribution of eligible individuals, more capable parents tend to participate in WIC, then positive correlations between infant and child well-being measures and WIC may simply reflect selection into the program, and may not reflect a beneficial *causal* effect of WIC. Alternatively, if WIC tends to disproportionately serve the most disadvantaged part of its eligible population, then positive correlations between WIC and child well-being (or birth outcome) measures would seem more likely to reflect a beneficial effect of the program.

We can identify both eligibility and participation in the SIPP. The disadvantage of SIPP, however, is that it covers a relatively narrow time period, so any correlations between WIC receipt and WIC program characteristics are being identified by cross-state variation in program rules. But these rules may be correlated with other state characteristics that have nothing to do

with the WIC program. SIPP samples are also considerably smaller than those in the CPS. Hence, in the following section we describe a more complete, complementary analysis with the CPS.

We use SIPP data from all 12 months in 1998, so an individual can appear in the sample as many as 12 times (if they are eligible in each month). We adjust reported standard errors to account for the fact that the error terms in the regressions are likely to be correlated for repeated observations for a specific individual. State of residence and month of the year dummy variables are included (these coefficients are not reported in the tables but are available upon request).

The SIPP regression also includes a set of state-level WIC program characteristics for 1998, including the value of the WIC package provided to women (in 1997 dollars), whether benefits are distributed monthly (rather than bi- or trimonthly or on an individualized basis), whether participants are required to document their income, and the hematocrit cutoff for first-trimester pregnant women. These variables are intended to capture key benefits and costs of program participation. For example, if benefits are distributed monthly, then this will increase transactions costs. Similarly, requiring income documentation is likely to increase the cost of getting on the program.

Finally, all states are required to measure hemoglobin and hematocrit levels of pregnant women to determine their nutritional risk. The nutritional risk criteria in WIC include many factors other than anemia, including inadequate diet. Reports indicate that because nearly all American women eat a diet that falls short of one or more major food groups, virtually all income-eligible women are deemed to be at nutritional risk (Institute of Medicine, 2002). Hence, we view higher cutoff levels as indicators of other aspects of the strictness of the program, rather

than as causal factors in their own right. For example, it may be the case that persons judged to be anemic receive more personalized and desirable services than other eligibles.

Table 8 summarizes the state-level variation in these WIC program variables. The first row of Table 8 shows that a number of states have either reduced the frequency of their food instrument distribution over the 1990s or that they no longer have a standard distribution period. There was little change in the number of states requiring proof of income to verify income eligibility until January 2000, when federal law made it mandatory. In the early 1990s, a few states did not have adjunctive eligibility for Food Stamp or AFDC recipients, but as row 3 shows, all states applied adjunctive eligibility to participants in these programs by 1996; thus this variable is not in the SIPP regressions. Row 4 of Table 8 shows that considerable heterogeneity exists among states in how much they spend on food packages for women, and that this has changed somewhat over time, with costs generally going down until 2000 and then up again. Hematocrit cutoffs have shown less movement over the period before 2000, although there is some variation between states. Finally, there is considerable variation, again mostly between states, in the number of local WIC agencies per capita.[36]

The SIPP participation regressions also include indicators for educational achievement of the mother, indicator variables for the race and ethnicity of the individual, indicator variables for the survey month, and the number of children in the household who are under 18.

Table 9 shows the results of estimating a probit model of WIC participation with selection (which accounts for the possibility that WIC eligibility is endogenous due to behavioral responses caused by other programs that lead to adjunctive WIC eligibility). These results

[36]This variable had to be dropped from the SIPP-based regressions because it was collinear with the state effects.

should be regarded as suggestive given the limitations of the SIPP data, and the difficulties involved in instrumenting eligibility in a model of participation.[37] The estimates indicate that more highly-educated may be more likely to participate in WIC once eligibility is accounted for, although these coefficients are only significant at the 10% level. Participation is negatively correlated with the number of children under 18 in the family (falling by 3.6 percentage points per child); and is lower for Asians than it is for whites. We defer discussion of the effects of state WIC program parameters and other state-level variables to the analysis using administrative and CPS ADF data, where we are able to use both cross-sectional and time series variation in these policy parameters.

*c) Factors Correlated with WIC: A More Detailed Analysis*

We take two approaches in examining the importance of policy parameters and other factors correlated with WIC participation. First, we use administrative data on participation rates during 1992–2000 to see whether takeup is correlated with either WIC program variables or other state characteristics. Second, we estimate similar regressions in the individual-level CPS ADF data (these are more comparable to the SIPP analysis in section IIIb, though in both analyses the sample is not conditional on eligibility as it is in section IIIb, but rather the sample is restricted to women, infants, and children 1-4, or to these groups with income below 185 percent of the

[37]Eligibility for WIC depends on income and fertility. Given the small size of the WIC benefit package, it would be surprising if WIC had discernable effects on labor supply or fertility in the CPS and SIPP. Thus, while eligibility is endogenous, it is not clear how important controlling for this should be in practice. It is also difficult to think of exclusion restrictions for the eligibility and participation models. In these participation regressions, we have excluded state dummy variables included in the eligibility regressions from the participation equations, instead including state-level WIC program characteristics. A similar model which treates eligibility as exogenous indicated that education has a negative effect on the probability of participation.

poverty line).

We include the indicators of the characteristics of state WIC programs discussed above in each of these regressions. These are taken from the state WIC surveys for 1992, 1994, 1996, 1998, and 2000. We assume the values for odd-numbered years are the same as the preceding even-numbered year.

In addition to the WIC program variables, the longer time series and greater sample size of the CPS allow us to include several measures of demographic and economic conditions in these state-level regressions. The measures include the unemployment rate (in units of percent/100), the share of the population in poverty, the share of the state population that is Hispanic, the share of the state population that is African American, the share of births in that year to unmarried women, the employment growth rate (in percent /100), the share of residents in the state who live in metropolitan areas, and real median family income for a family of four. These variables attempt to pick up the extent to which variations in within-state WIC participation are driven by economic need, as well as possible differences in participation rates across demographic groups.

Several included covariates reflect participation in other programs as well as the generosity of those programs (where it varies across states). These variables include the real maximum monthly AFDC/TANF benefit for a family of four (in 1000s of 1997 dollars), the AFDC/TANF participation rate, the Food Stamp participation rate, the Medicaid eligibility threshold for a pregnant woman as a share of the federal poverty line, and the Medicaid participation rate (which is available only up to 1998).[38]

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[38]The Health Care Financing Administration recently changed the way it reports Medicaid statistics. Hence, we were only able to obtain this number through 1998.

These program variables help measure the extent to which participation in WIC is related to participation in other programs and to the generosity of other programs. For example, current FNS procedures assume that WIC participation is closely tied to participation in the Food Stamp program, even though the two programs operate in quite different ways, and current procedures for calculating the number of eligibles ignore adjunctive eligibility through programs such as Medicaid. Thus, is it of interest to examine the way that participation in these programs is related to WIC participation. Finally, since the generosity of AFDC and Medicaid varies considerably across states, it is useful to control for this as well. If we compare two states with similar Medicaid/TANF participation but different levels of generosity, the more generous states will be drawing Medicaid/TANF participants from a higher level of the income distribution, which may have implications for WIC participation.

These state-level models also control for state and year fixed effects to account for time trends and mean differences across states. These regressions are weighted using the (subgroup) population in the state, and errors are corrected for possible heteroskedasticity using White's procedure.

Table 10 gives estimates for models using the administrative FNS totals. The first column shows the means of the independent variables, the next four columns show estimates from models that include Medicaid participation rates (which are only available up to 1998), and the last four columns show estimates for the whole sample period, 1992–2000. The dependent variable is the fraction of persons in a state (by group) who receive WIC at some point during the year.

These estimates suggest that variations in WIC participation are not strongly related to state-

level indicators of need, at least as measured by the unemployment rate or the poverty rate. However, demographic characteristics are important. The percent of the population that is Hispanic in the state has a consistently large and positive effect on WIC participation rates. For example, the coefficient of 1.00 in column 2 implies that doubling the share of Hispanics (from 11 percent to 22 percent) would double the total WIC participation rate (the average rate for the total population is around 11 percent). The percent of the population that is African American has the opposite effect. The share of births to unmarried mothers has a significantly negative effect on the probability that children 1–4 participate.

The programmatic variables indicate no strong relationship between WIC participation and AFDC/TANF participation. However, higher AFDC/TANF benefits are associated with lower WIC participation rates. The Medicaid participation rate has a positive effect on WIC participation rates among children, but a negative effect on rates for infants. However, states with higher income cutoffs for the Medicaid program have higher WIC participation (in the estimates for the entire time period).

Features of the way that WIC programs are administered across states are also correlated with participation. The cost of the women's food package has a positive effect on children (significant only at the 10 percent level) and a negative effect for infants. The cost of packages for infants is negatively correlated with the cost for women while the cost of the food packet for children is positively correlated with that for women. Hence these estimates suggest that people are more likely to participate when the value of the package is higher. Three other characteristics that relate to the stringency with which the programs are operated are correlated with participation: dispersing WIC benefits monthly (as opposed to less frequently, which means

fewer visits into the WIC office) is positively correlated with participation contrary to our expectations; while requiring proof of income; and having a higher nutritional risk cutoff for pregnant women are both negatively associated with WIC participation. Adjunctive eligibility for WIC via participation in the Food Stamp program is positively associated with WIC participation while adjunctive eligibility through the AFDC/TANF program is negatively associated with WIC participation (their linear combination is also significantly different from zero). The program characteristics are jointly significant in all of the regressions at below the 5 percent level.

Figure 1 graphs the estimated state effects from column 6 of Table 10. There is considerable variation in total WIC participation rates across states, even after controlling for all the variables included in these models. These differences may reflect important unobserved differences in the way that the program operates across states.

In Table 11, we use individual-level data from the March CPS to examine factors correlated with WIC participation. These regressions are estimated using individual ADF data covering calendar years 1997–2000 (survey years 1998–2001). Regressions are shown separately for all households, and for those with incomes less than 185% of poverty. Means of the independent variables appear in Appendix Table B. The samples are indicated in the column headings. Regressions also include the employment growth rate, the share of persons living in a metropolitan area, median real family income for a family of four, and categorical variables for the age of the respondent. All regressions include state and year fixed effects. We adjust reported standard errors to account for the fact that the error terms in the regressions may be correlated for all households within a given state-year cell, since the program rules do not change within a

state in a given year.

We see that when men are respondents, WIC participation is significantly lower, which may be indicative of a reporting phenomenon. Conversely, WIC participation is higher when the respondent is the head of household or the head's spouse.[39] Participation is higher for Hispanics and African Americans and lower for Asians than it is for whites. Participation falls with education (conditional on income) and is higher for low-income households with married heads. This is different than what we saw in the SIPP models controlling for eligibility, suggesting that the negative effect of education might be working through its effects on eligibility. Participation is strongly positively correlated with aggregate Food Stamp use in the regressions for all households, though not in the regressions for low-income households. Higher Medicaid income cutoffs are associated with lower participation, while higher AFDC/TANF maximums increase participation, perhaps through the linkage between eligibility for ADFC/TANF and WIC. The unemployment rate is estimated to have a negative effect on WIC participation, where it is statistically significant. Central-city residents are more likely to participate, while residents of MSAs are less likely to participate than persons not living in an MSA.

These models are estimated over a much shorter time period than the models using state-level data, with correspondingly smaller amounts of within-state variation in WIC program characteristics and economic conditions. Hence, although the WIC program characteristics are jointly significant at the 95 percent level of confidence in the regressions for infants and children, we do not place much weight on the individual coefficient estimates.

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[39]In the CPS ADF in this time period, the head of household is defined as the person whose name is on the lease or who owns the home. If there is more than one such person, and they own equal shares of the home or pay equal rent, it may be either person (the CPS discontinued the practice of always assigning headship status to the male member of a married couple in 1980).

These analyses of WIC participation suggest several tentative conclusions. First, WIC participation does not seem to be strongly correlated with state-level indicators of economic need such as poverty or unemployment rates. Second, WIC participation is strongly associated with individual demographic characteristics.[40] Third, WIC program characteristics may play an important role in explaining the substantial variation in participation rates across states. In particular, regulations requiring income verification and applying stricter nutritional risk criteria may reduce participation.

## V. Conclusion

WIC is now over 25 years old, but less is known about the determinants of eligibility and participation in WIC than in other antipoverty programs such as AFDC/TANF, Medicaid, or Food Stamps. Without accurate information about determinants of eligibility and participation, it is difficult to evaluate the effects of the WIC program, or even to accurately budget for the program. This paper has taken some first steps toward remedying this situation.

We find that while participation in most antipoverty programs is underreported in the CPS and in the SIPP, the degree of underreporting appears to be larger for WIC. Moreover, it is unclear that the degree of underreporting is any less in the CPS Food Security Supplements, which were specifically designed to elicit information about participation in nutrition programs, than it is in the CPS Annual Demographic Files. One reason for this problem is that the income screen on the WIC questions in the CPS FSS prevents many participants from being asked the

[40]Similarly Burstein et al. (2000) found that mothers of WIC children were more likely to smoke or drink during pregnancy, were poorer, and had lower skills on a test of coping skills than other eligible mothers.

WIC questions.

It is unclear why the degree of underreporting should be greater for WIC than for other social programs. One intriguing finding is that male respondents are less likely than female respondents to report that anyone in the household uses WIC, other things being equal. It is possible that the stigma involved in using WIC is greater than for Food Stamps given that WIC participants generally have to purchase specific items (which cashiers must then verify are eligible for WIC subsidies). The reasons for this underreporting clearly deserve further research.

While the underreporting may cast some doubt on analyses conducted using the CPS and SIPP data, we also found that the demographic characteristics of recipients track the WIC caseload well, which is consistent with the undercount being approximately random along observable characteristics, and suggests that the data can be used to analyze determinants of WIC eligibility and participation.

Demographic characteristics are similar but the incomes that WIC participants report in the CPS and the SIPP are much higher than those recorded in administrative records. This finding suggests either that WIC recipients underreport income to program administrators (though not to survey takers) or that families turn to WIC when their incomes are at a temporary low, and then stay on the program for some time after incomes rebound.

We find that roughly 58 percent of all infants in a given month in 1998 were eligible for WIC. Fifty-seven percent of children 1-4 and 54 percent of pregnant and postpartum women were eligible for WIC. However, many eligibles do not participate. We estimate that of those eligible, 73 percent of infants, 67 percent of pregnant and postpartum women, and 38 percent of children 1–4 participate. Thus, there is clearly scope for increasing both the participation of

eligibles and expenditures on the program. Conversely, the number of participants who appeared to be ineligible was small, which is consistent with FNS audit studies.

The fact that many people eligible for WIC do not participate highlights the importance of isolating factors that influence WIC participation. We find some evidence that attributes of state programs matter. In particular, states that require proof of income (before it was made mandatory by federal law) and that have stricter program rules (reflected in higher standards for nutritional risk) have less participation. In addition, there is a good deal of variation in participation rates across states, which is not explained by variables we measure but which may reflect differences in the way programs are administrated. At the same time, we found little evidence that within-state variations in economic indicators such as poverty or unemployment rates affected WIC participation.

At the individual level, we found that individuals in households with African American or Hispanic respondents were more likely to participate than were non-Hispanic whites, while households with Asian respondents were less likely to participate. Low income households with married respondents were more likely to participate than those with single respondents (which may reflect a lowered ability to deal with the transactions costs associated with program participation). Households with more educated respondents (in the CPS) were also less likely to participate, though the SIPP regressions suggest that the effect of education may be arising due to its affect on eligibility. Finally, households in suburban areas were less likely to participate than those in less urban areas. Though preliminary, these findings suggest that outreach targeted to Asian women and suburban women might be warranted, and that efforts to reduce transactions costs might also increase participation, particularly among single mothers, and more-educated

eligible mothers.

Learning more about the process of selection into WIC is critical, since interpretation of studies examining the impact of WIC depends critically on the characteristics of people receiving benefits. Further work addressing the impacts of WIC on children is necessary in order to shed light on the wisdom of extending WIC to the many eligible nonparticipating children.

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**Figure 1**

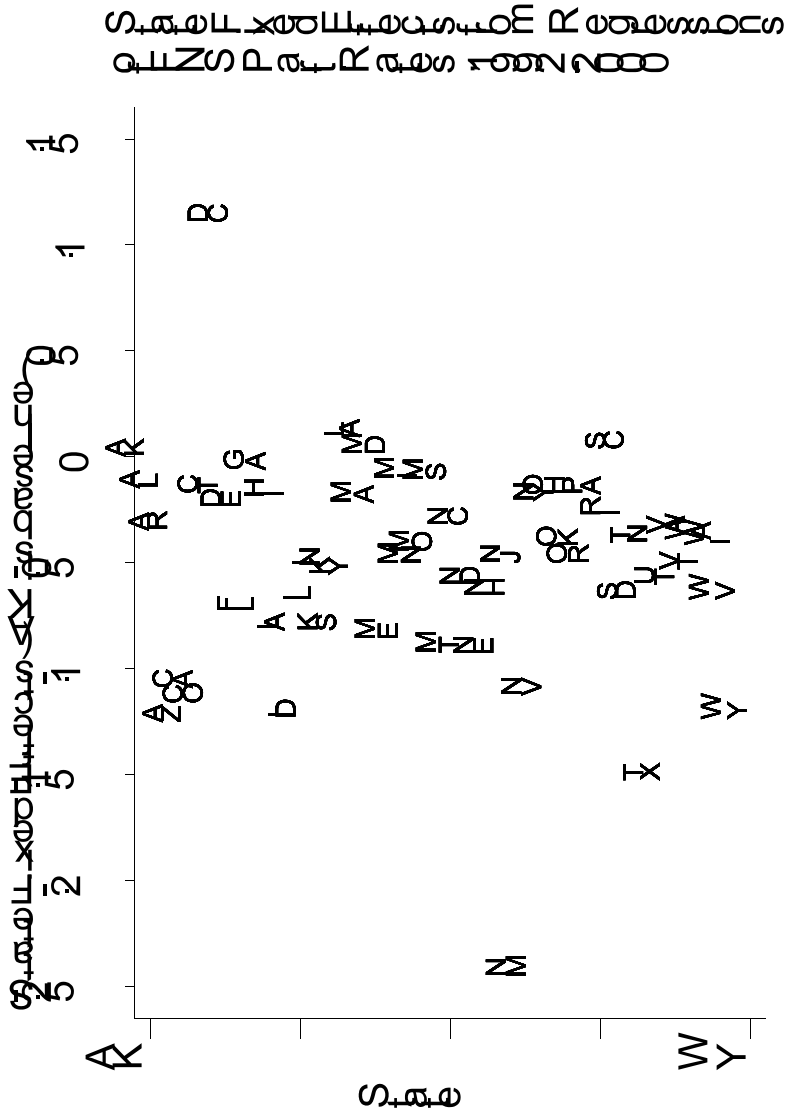

**TABLE 1**
**Data Sources and Uses**

| Used For: | Participant Counts | Demographics | Income | Calculate WIC Eligibility? | Participation Regressions? | Other Public Assistance Programs? | Effects of WIC on Other Outcomes? |
|---|---|---|---|---|---|---|---|
| FNS Administrative Counts (1988–2000)<br>By state, for month<br>Aggregate data | All, women, children 1–4, infants; women by category 1991–2000 | N | N | N | Y, state level | NA (Other government sources) | N |
| USDA FNS PC Surveys<br>By region, for April 1992, 1994, 1996, 1998, & 2000 | All, women by category, children, infants | Y | Y | N | N | AFDC/ TANF, Food Stamps, Medicaid | N |
| National Survey of WIC Recipients and Their Local Agencies | Nationally representative sample of WIC recipients in the contiguous U.S. certified in Spring 1998 | Y | Y | N | N | Y | N |
| CPS Food Security Supplements (1995–1999)<br>By state, for month before survey was done<br>Household data | Total, if pass income screen<br>Estimate: women, infants, children in household | Y | N | N | N | Food Stamps (HH meas. last month) | N |
| CPS Annual Demographic File (1998–2001)<br>By state, for prev. cal. year<br>Individual data | Women, if pass income screen<br>Estimate: children, infants in family of women | Y | Y (only annual income) | N | Y, state & ind. level | AFDC/ TANF, Food Stamps, Medicaid | N |
| SIPP (1996 panel)<br>By state, by month<br>Individual data | Any person last month | Y | Y | Y | Y, state & ind. level | AFDC/ TANF, Food Stamps, Medicaid | Y |

**TABLE 2**
**WIC Recipients and Coverage in CPS Food Security Supplement, CPS Annual Demographic File, and SIPP**

| | Apr 1995 | Sep 1996 | Apr 1997 | Aug 1998 | Apr 1999 |
|---|---|---|---|---|---|
| **Administrative totals of WIC recipients (in 10,000s)** | | | | | |
| Total | 666 | 718 | 721 | 719 | 713 |
| Infants | 175 | 179 | 182 | 184 | 185 |
| Children 1–4 | 338 | 371 | 372 | 363 | 357 |
| **Percentage of administrative counts in the CPS Food Security Supplements**[a] | | | | | |
| Total | 73.1 | 67.4 | 62.8 | 70.2 | 70.4 |
| Infants | 61.7 | 63.7 | 56.0 | 65.2 | 58.9 |
| Children 1–4 | 85.2 | 73.3 | 72.8 | 75.8 | 80.7 |
| **Percentage of administrative counts in the SIPP** | | | | | |
| Total | | 81.3 | 77.5 | 73.4 | 70.6 |
| Infants | | 85.2 | 80.5 | 73.6 | 66.5 |
| Children 1–4 | | 82.2 | 79.9 | 77.2 | 76.5 |

| | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| **Administrative totals of the average number of monthly WIC recipients (in 10,000s)** | | | | | |
| Total | | 715 | 716 | 703 | 698 |
| Infants | | 181 | 184 | 184 | 184 |
| Children 1–4 | | 368 | 362 | 350 | 342 |
| Pregnant women[c] | 88 | | 89 | | |
| Postpartum women[c] | 57 | | 59 | | |
| Breastfeeding women[c] | 33 | | 39 | | |
| **Percentage of administrative counts in the CPS Annual Demographic File**[b] | | | | | |
| Total | | 87.8 | 88.4 | 92.7 | 99.4 |
| Infants | | 48.1 | 50.5 | 54.3 | 57.6 |
| Children 1–4 | | 70.4 | 72.9 | 74.9 | 81.6 |

(table continues)

**TABLE 2, continued**

| | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|
| **Percentage of administrative counts in the SIPP** | | | | | |
| Total | | 75.8 | 74.4 | | |
| Infants | | 77.6 | 72.5 | | |
| Children 1–4 | | 78.8 | 78.4 | | |
| Pregnant women | | | 67.2 | | |
| Postpartum women | | | 52.4 | | |

[a]Applying a consistent screen with the Food Security Supplements (not allowing the second food question) would reduce the total number of WIC recipients by 660,000 in 1998 and by 610,000 recipients in 1999. The number of infants falls by 140,000 in 1998 and by 130,000 in 1999. The number of children falls by 320,000 in 1998 and by 290,000 in 1999.

[b]Applying the screen from the FSS (restricting the incomes of who gets asked the questions) reduces the total number of recipients by 55 in 1997, by 60 in 1998, by 890,000 in 1999, and by 980,000 in 2000.

[c]These estimates are based on survey data which report 8,040,000 (rather than 7,160,000) WIC recipients in 1998.

**TABLE 3**
**Food Stamp, Medicaid, and AFDC/TANF Participation**

| | Apr 1995 | Sep 1996 | Apr 1997 | Aug 1998 | Apr 1999 |
|---|---|---|---|---|---|
| FNS Monthly Food Stamp Recipients (in 10,000s) | 2667 | 2483 | 2269 | 1888 | 1806 |
| *CPS Food Security Supplement Recipients*[a] | 93.4% | 80.4% | 84.2% | 85.2% | 84.9% |
| SIPP Food Stamp Recipients | | 87.8% | 89.0% | 89.0% | 88.3% |

| | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| FNS Average Monthly Food Stamp Recipients in Calendar Year (in 10,000s) | 2194 | 1926 | 1783 | 1704 |
| *March CPS Food Stamp Recipients* | 103.1% | 103.1% | 102.4% | 96.8% |
| *SIPP Food Stamp Recipients* | 88.8% | 90.2% | | |
| | | | | |
| HCFA Medicaid Recipients (in 10,000s) | 2369 | 2907 | | |
| *March CPS Medicaid Recipients* | 93.0% | 72.0% | | |
| *SIPP Medicaid Recipients* | 115.8% | 94.4% | | |
| | | | | |
| HHS Counts of AFDC/TANF Recipients (in 10,000s) | 1023 | 822 | 637 | 575 |
| *March CPS AFDC/TANF Recipients* | 76.4% | 79.1% | 78.0% | 78.8% |
| *SIPP AFDC/TANF Recipients* | 84.5% | 79.8 | | |

[a]Adding the second food security question (see footnote 3) adds 138,000 recipients in 1998 and 111,000 recipients in 1999.

**TABLE 4**
**Demographic Characteristics of WIC Recipients, Various Sources** (percent)

| | Total | Black | White | Hispanic | Age 1 | Age 2 | Age 3 | Age 4 |
|---|---|---|---|---|---|---|---|---|
| **Total WIC Population** | | | | | | | | |
| PC 1998 | | 22.9 | 39.2 | 32.3 | | | | |
| SIPP | | 23.9 | 46.9 | 26.2 | | | | |
| CPS FSS | | 24.4 | 38.9 | 33.4 | | | | |
| CPS FSS, with screen | | 25.4 | 37.2 | 34.0 | | | | |
| CPS ADF | | 21.3 | 43.2 | 30.6 | | | | |
| **Infants** | | | | | | | | |
| PC 1998 | 25.5 | 24.3 | 39.8 | 30.4 | | | | |
| SIPP | 24.0 | 21.2 | 55.3 | 20.7 | | | | |
| CPS FSS | 15.8 | 24.9 | 42.1 | 31.1 | | | | |
| CPS FSS, with screen | 15.9 | 25.7 | 40.2 | 32.0 | | | | |
| CPS ADF | 14.4 | 20.3 | 43.1 | 31.3 | | | | |
| **Children 1–4** | | | | | **1** | **2** | **3** | **4** |
| PC 1998 | 51.2 | 22.9 | 37.7 | 33.7 | 35.6 | 25.1 | 22.3 | 16.2 |
| SIPP | 56.6 | 25.1 | 42.9 | 29.5 | 33.8 | 23.9 | 23.6 | 18.8 |
| CPS FSS | 36.0 | 21.8 | 38.2 | 36.1 | 31.0 | 24.3 | 22.9 | 21.8 |
| CPS FSS, with screen | 36.5 | 22.9 | 36.7 | 36.4 | 30.7 | 23.4 | 24.0 | 21.9 |
| CPS ADF | 41.0 | 22.6 | 40.9 | 31.0 | 29.7 | 25.9 | 25.7 | 18.7 |
| **Women** | | | | | **<15** | **15–17** | **18–34** | **35+** |
| PC 1998 | 23.3 | 21.4 | 42.1 | 31.2 | 0.6 | 8.5 | 83.7 | 6.9 |
| SIPP | 19.4 | 23.7 | 48.1 | 23.5 | 4.8 | 9.8 | 78.9 | 10.8 |
| CPS FSS | 48.2 | 26.1 | 38.4 | 32.0 | 0.0 | 8.3 | 73.0 | 18.7 |
| CPS FSS, with screen | 47.6 | 27.3 | 36.5 | 32.9 | 0.0 | 8.4 | 72.9 | 18.7 |
| CPS ADF | 44.6 | 20.4 | 45.4 | 30.1 | 0.0 | 3.5 | 83.3 | 13.2 |

Each column contains statistics for a different demographic characteristic of WIC recipients from different sources. Panel 1 shows shares of the total WIC population in each group, panel 2 shows the characteristics of infants on WIC, panel 3 the characteristics of children 1–4, and panel 4 of women (CPS figures restricted to women 15–45). Each number represents the share of the subgroup's WIC population in the category indicated by the column heading. Rows 1, 6, 11, and 16 contain PC 98 totals, rows 2, 7, 12, and 17 totals from the SIPP (5/97–4/98), rows 3, 8, 13, and 18 totals from the CPS FSS (August 1998), rows 4, 9, 14, and 19 totals from the CPS FSS (8/98) using a consistent income screen, and rows 5, 10, 15, and 20 from the 1999 March ADF (calendar year 1998).

**TABLE 5**
**Family or Household Income of WIC Recipients, Various Sources, April 1998**

| | All | Black | White | Hisp. | Infant | Child | Women |
|---|---|---|---|---|---|---|---|
| Average, PC 1998 data | 12,479 | 9,593 | 14,080 | 12,259 | 12,007 | 12,814 | 12,205 |
| Average, SIPP data | 19,326 | 17,071 | 20,582 | 18,901 | 11,138 | 21,962 | 21,806 |
| Average family income, CPS ADF | 17,242 | 11,843 | 19,878 | 17,388 | 15,858 | 18,218 | 16,792 |
| Average HH income, CPS ADF | 21,604 | 16,683 | 24,465 | 21,339 | 21,249 | 21,563 | 21,755 |
| Median, PC 1998 data | 11,440 | 7,752 | 13,434 | 11,580 | 10,920 | 11,752 | 11,400 |
| Median, SIPP data | 15,412 | 12,612 | 16,778 | 14,098 | 7,073 | 17,810 | 16,336 |
| Median family income, CPS ADF | 14,000 | 7,932 | 16,972 | 14,500 | 12,908 | 14,864 | 13,472 |
| Median HH income, CPS ADF | 18,200 | 12,786 | 21,000 | 18,400 | 18,035 | 18,056 | 18,341 |

| | Family Income under 185% FPL | | | Family Income under 100% FPL | | |
|---|---|---|---|---|---|---|
| Distribution of Income | 1998 CPS ADF | 1998 SIPP | National Part. Survey | 1998 CPS ADF | SIPP | National Part. Survey |
| Total Population | 87.1% | 76.8% | 94.2% | 54.2% | 45.0% | 63.8% |
| Infants | 86.9 | 74.9 | 93.9 | 55.8 | 44.3 | 65.0 |
| Children 1–4 | 88.1 | 79.2 | 94.3 | 53.7 | 45.5 | 65.3 |

Each column in Panel A contains statistics for the income of WIC recipients in a different subgroup from different sources. The subgroup is listed in the column heading. Each row contains averages (rows 1–4) or medians (rows 5–8) for total household income (rows 1, 2, 4, 5, 6, or 8) or total family income (rows 3 and 7) for WIC recipients. Rows 1 and 5 contain totals from the PC 1998 survey, rows 2 and 6 totals from the SIPP (5/97–4/98), and rows 3, 4, 7, and 8 from the 1999 March ADF (calendar year 1998). Rows 3 and 7 present totals for family income and rows 4 and 8 for total household income. Panel B presents the share of WIC participants in different subgroups with family income under certain multiples of the poverty level from different sources for 1998.

**TABLE 6**
**WIC Eligibility and Participation by Infants, SIPP, Average Monthly, 1998**

| | Eligible | | |
|---|---|---|---|
| | No | Yes | RowSum |
| Do Not Receive | 1,605,012 | 633,470 | 2,238,482 |
| Row % | 71.7 | 28.3 | 100 |
| Col % | 93.8 | 26.8 | 54.9 |
| Do Receive WIC | 105,724 | 1,734,276 | 1,840,000 |
| Row % | 5.7 | 94.3 | 100 |
| Col % | 6.2 | 73.2 | 45.1 |
| SumCol | 1,710,736 | 2,367,746 | 4,078,482 |
| Row % | 41.9 | 58.1 | |
| Col % | 100 | 100 | |
| **WIC Eligibility and Participation by Children 1–4, SIPP, Average Monthly, 1998** | | | |
| Do Not Receive | 6,712,175 | 5,615,276 | 12,327,451 |
| Row % | 54.4 | 45.6 | 100 |
| Col % | 97.2 | 62.1 | 77.3 |
| Do Receive WIC | 196,245 | 3,423,755 | 3,620,000 |
| Row % | 5.4 | 94.6 | 100 |
| Col % | 2.8 | 37.9 | 22.7 |
| SumCol | 6,908,420 | 9,039,031 | 15,947,451 |
| Row % | 43.3 | 56.7 | |
| Col % | 100 | 100 | |
| **WIC Eligibility and Participation by Pregnant and Postpartum* Women** | | | |
| Do Not Receive WIC | 1,680,494 | 699,134 | 2,379,628 |
| Row % | 70.6 | 29.4 | 100 |
| Col % | 94.8 | 33.5 | 61.7 |
| Do Receive WIC | 91,604 | 1,388,396 | 1,480,000 |
| Row % | 6.2 | 93.8 | 100 |
| Col % | 5.2 | 66.5 | 38.3 |
| SumCol | 1,772,098 | 2,087,530 | 3,859,628 |
| Row % | 45.9 | 54.1 | |
| Col % | 100 | 100 | |

*Postpartum women are defined as women with children 0–6 months old.

**TABLE 7**
**Importance of Monthly Income, Certification Periods, and Adjunctive Eligibility, SIPP**

| | Infants | Children | Pregnant Women | Postpartum Women | Total |
|---|---|---|---|---|---|
| **1997: Average Monthly Eligible Individuals** | | | | | |
| Annual income | 1,613,920 | 6,744,049 | 937,059 | 575,740 | 9,870,768 |
| Monthly income | 1,807,541 | 7,119,389 | 1,176,188 | 676,412 | 10,779,530 |
| Monthly income and adjunctive eligibility | 2,032,374 | 7,630,879 | 1,249,036 | 735,568 | 11,647,857 |
| Monthly income and certification periods (based only on income) | 2,350,784 | 9,031,690 | 1,417,798 | 781,370 | 13,581,642 |
| Monthly income, adjunctive eligibility, and certification periods | 2,493,001 | 9,383,579 | 1,464,607 | 833,789 | 14,174,976 |
| **1998: Average Monthly Eligible Individuals** | | | | | |
| Annual income | 1,433,296 | 6,312,604 | 727,715 | 474,984 | 8,948,599 |
| Monthly income | 1,682,858 | 6,718,372 | 1,024,587 | 614,735 | 10,040,552 |
| Monthly income and adjunctive eligibility | 1,892,761 | 7,314,001 | 1,117,254 | 660,624 | 10,984,640 |
| Monthly income and certification periods (based only on income) | 2,206,036 | 8,589,934 | 1,278,372 | 712,374 | 12,786,716 |
| Monthly income, adjunctive eligibility, and certification periods | 2,367,748 | 9,039,032 | 1,328,681 | 758,850 | 13,494,311 |

**TABLE 8**
**Variation in State WIC Program Characteristics**

| | 1992 | 1994 | 1996 | 1998 | 2000 |
|---|---|---|---|---|---|
| Monthly distribution of food instrument (# states with policy) | 31 | 29 | 29 | 19 | 19 |
| Adjunctive eligibility with FS (AFDC) | 48<br>(48) | 49<br>(49) | 51<br>(51) | 51<br>(51) | 51<br>(51) |
| Proof of income required for WIC eligibility (# states with policy) | 26 | 24 | 25 | 26 | 51 |
| Average food cost, woman, 1997 dollars (minimum/median/maximum) | 19.8<br>37.5<br>51.0 | 7.5<br>38.2<br>72.7 | 11.3<br>35.9<br>82.0 | 27.6<br>35.8<br>50.3 | 26.2<br>34.3<br>62.1 |
| Hematocrit cutoff, first trimester, pregnant women (%) | 32.0<br>34.0<br>37.9 | 32.0<br>34.0<br>37.9 | 32.0<br>34.0<br>37.0 | 32.0<br>33.9<br>37.0 | 33.0<br>33.0<br>33.0 |
| Local WIC agencies per 100,000 persons in the state | 0.70<br>2.88<br>29.94 | 0.71<br>2.93<br>28.66 | 0.72<br>2.86<br>29.50 | 0.74<br>2.87<br>30.30 | 0.73<br>2.67<br>30.22 |

**Notes**: Table contains either number of states with a given policy for 0–1 indicators (rows 1–3) or the minimum, median, and maximum values for continuous indicators (rows 4–6). Nominal values or counts are the same for odd years as for the previous even year (except that 2000 values are the same as 1998 except for the proof of income required).

**TABLE 9**
**Probit Model of WIC Participation with Sample Selection (on Eligibility), SIPP 1998 Monthly Data**

| | dF/dx |
|---|---|
| **Receive WIC** | |
| High school graduate | 0.034* |
| Some college | 0.063* |
| College graduate | 0.119 |
| Beyond college | 0.027 |
| Number of children under 18 | -0.036*** |
| Non-Hispanic black | -0.022 |
| Asian | -0.091** |
| Hispanic | 0.030 |
| Cost of food packages for kids | -0.020*** |
| Indicator for missing cost information | -0.020 |
| Cost of food packages for infants | 0.001 |
| Food packages distributed monthly | -0.114 |
| Income documentation required | -0.013 |
| Hemocrit cutoff levels, children 2–4 | -0.009 |
| Hemocrit cutoff levels, children under 2 | –0.016 |
| **Selection Equation: Eligible for WIC?** | |
| High school graduate | -0.235*** |
| Some college | -0.385*** |
| College graduate | -0.588*** |
| Beyond college | -0.555*** |
| Number of children under 18 | 0.073*** |
| Non-Hispanic black | 0.238*** |
| Asian | 0.003 |
| Hispanic | 0.180*** |
| **Rho** | -0.826*** |

The WIC equation includes month effects. The eligibility equation includes state and month effects. * indicates significance at 10 percent, ** at 5 percent, and *** at 1 percent.

**TABLE 10**
**Predictors of WIC Participation, State-Level Data, 1992–2000**

| | Means | Total | Infants | Women | Children | Total | Infants | Women | Children |
|---|---|---|---|---|---|---|---|---|---|
| Real AFDC/TANF maximum, family of 4 ($1000) | 0.484 | -0.072*** | -0.089 | -0.008 | -0.358*** | -0.115*** | -0.099 | -0.014** | -0.486*** |
| | (0.009) | (0.024) | (0.090) | (0.010) | (0.088) | (0.025) | (0.075) | (0.007) | (0.088) |
| AFDC/TANF participation rate | 0.041 | 0.000 | 0.993 | -0.006 | -0.550 | -0.033 | -0.082 | 0.010 | -0.720** |
| | (0.001) | (0.111) | (0.639) | (0.036) | (0.460) | (0.072) | (0.426) | (0.020) | (0.317) |
| Unemployment rate (share) | 0.055 | 0.030 | 0.035 | 0.039* | -0.120 | 0.036 | -0.099 | 0.047** | -0.117 |
| | (0.001) | (0.063) | (0.347) | (0.023) | (0.272) | (0.068) | (0.305) | (0.020) | (0.289) |
| Share of population in poverty | 0.135 | -0.020 | -0.068 | -0.001 | -0.067 | 0.007 | -0.043 | 0.002 | 0.015 |
| | (0.002) | (0.021) | (0.093) | (0.006) | (0.089) | (0.022) | (0.090) | (0.006) | (0.086) |
| Food Stamp participation rate | 0.087 | 0.064 | -0.125 | 0.008 | 0.431* | -0.024 | -0.206 | -0.021 | 0.149 |
| | (0.001) | (0.057) | (0.307) | (0.015) | (0.236) | (0.050) | (0.243) | (0.014) | (0.204) |
| Share of FPL for Medicaid eligibility | 1.785 | 0.002* | -0.019 | 0.001* | 0.011* | 0.006*** | -0.018 | 0.001** | 0.033*** |
| | (0.018) | (0.001) | (0.017) | (0.000) | (0.006) | (0.001) | (0.012) | (0.000) | (0.006) |
| Medicaid participation rate | 0.093 | 0.049** | -0.354** | -0.005 | 0.398*** | | | | |
| | (0.002) | (0.020) | (0.151) | (0.006) | (0.088) | | | | |
| Share Hispanic | 0.109 | 1.003*** | 2.124*** | 0.115*** | 3.402*** | 0.537*** | 2.077*** | 0.059*** | 1.973*** |
| | (0.005) | (0.105) | (0.527) | (0.032) | (0.433) | (0.078) | (0.321) | (0.020) | (0.301) |
| Share African American | 0.127 | -0.510*** | 1.110 | -0.088* | -2.496*** | -0.182 | 0.015 | -0.024 | -1.330** |
| | (0.004) | (0.163) | (0.800) | (0.052) | (0.704) | (0.139) | (0.542) | (0.034) | (0.625) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Share of births to unmarried women | 0.321 | -0.028** | 0.059 | 0.005 | -0.185*** | -0.026 | 0.085 | 0.008 | -0.222*** |
| | (0.002) | (0.014) | (0.074) | (0.005) | (0.058) | (0.018) | (0.078) | (0.005) | (0.068) |
| Ave. real cost, WIC package, women ($1000) | 0.037 | 0.072 | -0.595** | 0.005 | 0.490* | 0.007 | -0.653** | -0.007 | 0.250 |
| | (0.000) | (0.057) | (0.251) | (0.012) | (0.265) | (0.052) | (0.261) | (0.011) | (0.260) |

(table continues)

**TABLE 10, continued**

| | Means | Total | Infants | Women | Children | Total | Infants | Women | Children |
|---|---|---|---|---|---|---|---|---|---|
| Data missing for cost of woman's WIC package | 0.177 | -0.000 | 0.009* | 0.001** | -0.007* | -0.001 | -0.000 | 0.000 | -0.008** |
| | (0.018) | (0.001) | (0.005) | (0.000) | (0.004) | (0.001) | (0.003) | (0.000) | (0.004) |
| Local WIC agencies in state per 100 residents | 0.003 | 0.010 | -1.998 | -0.176 | 1.719 | 0.244 | -0.330 | -0.188 | 2.773* |
| | (0.000) | (0.351) | (1.235) | (0.111) | (1.307) | (0.376) | (1.608) | (0.121) | (1.436) |
| WIC dispersed monthly | 0.372 | 0.001 | -0.000 | 0.001** | 0.001 | -0.000 | -0.001 | 0.001** | -0.009* |
| | (0.023) | (0.001) | (0.005) | (0.000) | (0.005) | (0.001) | (0.004) | (0.000) | (0.005) |
| WIC eligibility requires proof of income | 0.536 | -0.003* | -0.017*** | -0.001** | -0.008 | -0.003** | -0.012** | -0.001*** | -0.009* |
| | (0.023) | (0.002) | (0.006) | (0.000) | (0.006) | (0.001) | (0.005) | (0.000) | (0.005) |
| AFDC/TANF confer WIC eligibility | 0.952 | -0.010*** | -0.027*** | -0.001*** | -0.036*** | -0.009*** | -0.020*** | -0.001 | -0.044*** |
| | (0.010) | (0.002) | (0.008) | (0.001) | (0.009) | (0.002) | (0.007) | (0.001) | (0.009) |
| Food Stamps confer WIC eligibility | 0.970 | 0.009*** | 0.021** | 0.004*** | 0.022** | 0.006*** | 0.018** | 0.004*** | 0.017 |
| | (0.008) | (0.002) | (0.009) | (0.001) | (0.010) | (0.002) | (0.009) | (0.001) | (0.011) |
| Hematocrit cutoff for 1st trimester pregnant women | 34.535 | -0.001*** | -0.000 | -0.000 | -0.007*** | -0.000 | 0.002 | -0.000 | -0.002 |
| | (0.075) | (0.000) | (0.002) | (0.000) | (0.002) | (0.001) | (0.002) | (0.000) | (0.002) |
| F-statistic, program variables significant | | 4.247 | 3.563 | 4.193 | 6.207 | 4.965 | 2.851 | 4.735 | 7.532 |
| P-value | | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 |
| # observations | | 357 | 357 | 357 | 357 | 459 | 459 | 459 | 459 |
| Adjusted $R^2$ | | 0.952 | 0.960 | 0.969 | 0.910 | 0.934 | 0.950 | 0.967 | 0.872 |

**Notes**: All regressions also include the share of the state population living in an MSA, the state's employment growth rate, and real median income for a family of four as well as state and year fixed effects. All statistics weighted by the state population. Standard errors appear in parentheses and are clustered by state-year. *** denotes an estimate that is statistically significant at the 1% level of confidence, ** at the 5% level, and * at the 10% level..

**Table 11**
**Predictors of WIC Participation, CPS Microdata, 1997–2000**

| | Total | Infants | Women | Children | Total, <185% FPL | Infants <185% FPL | Women <185% FPL | Children <185% FPL |
|---|---|---|---|---|---|---|---|---|
| Respondent high school dropout | 0.131*** | 0.316*** | 0.100*** | 0.212*** | 0.136*** | 0.239*** | 0.104*** | 0.135*** |
| | (0.010) | (0.023) | (0.006) | (0.015) | (0.016) | (0.058) | (0.011) | (0.032) |
| Respondent high school grad., no college | 0.069*** | 0.196*** | 0.048*** | 0.116*** | 0.101*** | 0.188*** | 0.075*** | 0.094*** |
| | (0.004) | (0.018) | (0.003) | (0.009) | (0.016) | (0.058) | (0.012) | (0.032) |
| Respondent some college, no 4 yr. degree | 0.037*** | 0.121*** | 0.025*** | 0.072*** | 0.069*** | 0.195*** | 0.052*** | 0.089*** |
| | (0.003) | (0.014) | (0.002) | (0.006) | (0.017) | (0.058) | (0.011) | (0.031) |
| Respondent is male | -0.042*** | -0.082*** | -0.021*** | -0.078*** | -0.132*** | -0.135*** | -0.053*** | -0.153*** |
| | (0.004) | (0.013) | (0.003) | (0.007) | (0.015) | (0.029) | (0.010) | (0.015) |
| Respondent is married | 0.029*** | -0.136*** | 0.006 | -0.064*** | 0.165*** | 0.012 | 0.066*** | 0.047*** |
| | (0.005) | (0.024) | (0.004) | (0.011) | (0.016) | (0.035) | (0.011) | (0.018) |
| Respondent is head of household | 0.083*** | 0.225*** | 0.039*** | 0.123*** | 0.144*** | 0.264*** | 0.054*** | 0.124*** |
| | (0.006) | (0.026) | (0.004) | (0.011) | (0.016) | (0.038) | (0.010) | (0.019) |
| Respondent is spouse of HH head | 0.059*** | 0.189*** | 0.026*** | 0.093*** | 0.073*** | 0.195*** | 0.021 | 0.061** |
| | (0.007) | (0.029) | (0.005) | (0.015) | (0.026) | (0.050) | (0.017) | (0.028) |
| Respondent record missing | -0.038*** | 0.234*** | 0.027*** | 0.105*** | -0.119*** | 0.470*** | 0.048** | 0.186*** |
| | (0.010) | (0.036) | (0.007) | (0.024) | (0.031) | (0.098) | (0.020) | (0.052) |
| Respondent is Hispanic | 0.112*** | 0.098*** | 0.062*** | 0.069*** | 0.120*** | 0.043 | 0.067*** | 0.051*** |
| | (0.012) | (0.027) | (0.006) | (0.012) | (0.020) | (0.037) | (0.009) | (0.018) |
| Respondent is African American | 0.066*** | 0.097*** | 0.039*** | 0.072*** | 0.084*** | 0.101*** | 0.045*** | 0.069*** |
| | (0.006) | (0.027) | (0.006) | (0.012) | (0.013) | (0.037) | (0.009) | (0.018) |
| Respondent is Asian | -0.011* | 0.024 | -0.003 | 0.015 | -0.079*** | -0.021 | -0.042*** | -0.054 |
| | (0.006) | (0.032) | (0.003) | (0.015) | (0.026) | (0.077) | (0.012) | (0.040) |

| | Total | Infants | Women | Children | Total, <185% FPL | Infants <185% FPL | Women <185% FPL | Children <185% FPL |
|---|---|---|---|---|---|---|---|---|
| HH in central city | 0.009** | 0.037** | 0.007*** | 0.035*** | -0.013 | -0.032 | -0.008 | 0.016 |
| | (0.004) | (0.016) | (0.003) | (0.008) | (0.012) | (0.032) | (0.008) | (0.015) |
| HH central-city status censored | 0.036*** | 0.098*** | 0.024*** | 0.082*** | 0.069*** | 0.103*** | 0.045*** | 0.115*** |
| | (0.005) | (0.019) | (0.003) | (0.011) | (0.014) | (0.036) | (0.009) | (0.022) |
| HH in MSA | -0.041*** | -0.131*** | -0.033*** | -0.090*** | -0.049*** | -0.094*** | -0.039*** | -0.085*** |
| | (0.004) | (0.020) | (0.003) | (0.009) | (0.011) | (0.036) | (0.009) | (0.018) |
| HH MSA status censored | -0.055** | -0.013 | -0.036* | -0.151*** | -0.105* | -0.249** | -0.035 | -0.242** |
| | (0.024) | (0.116) | (0.021) | (0.046) | (0.062) | (0.110) | (0.061) | (0.108) |
| Real AFDC/TANF max., family of 4 ($1000) | 0.090 | 0.685** | 0.074 | 0.199 | 0.184 | 1.141** | 0.213 | 0.049 |
| | (0.072) | (0.306) | (0.055) | (0.156) | (0.216) | (0.575) | (0.156) | (0.281) |
| AFDC/TANF participation rate | -0.096 | -0.948 | -0.100 | -0.081 | -0.456 | -0.715 | 0.001 | 1.926 |
| | (0.395) | (1.922) | (0.315) | (0.928) | (1.187) | (3.832) | (0.838) | (1.811) |

**Table 11, continued**

| | Total | Infants | Women | Children | Total, <185% FPL | Infants <185% FPL | Women <185% FPL | Children <185% FPL |
|---|---|---|---|---|---|---|---|---|
| Unemployment rate (%/100) | -0.626<br>(0.394) | -0.430<br>(1.975) | -0.767**<br>(0.315) | -0.235<br>(0.919) | -3.255**<br>(1.341) | 4.257<br>(4.417) | -2.853***<br>(0.929) | -2.506<br>(2.009) |
| Share of population in poverty | 0.254**<br>(0.111) | -0.085<br>(0.545) | 0.118<br>(0.083) | 0.356<br>(0.242) | 0.408<br>(0.375) | -0.528<br>(0.997) | 0.233<br>(0.276) | 0.246<br>(0.557) |
| Food Stamp participation rate | 1.009***<br>(0.375) | 4.283**<br>(1.832) | 1.001***<br>(0.298) | 1.198<br>(0.798) | 1.297<br>(1.130) | 3.238<br>(3.278) | 0.812<br>(0.822) | -1.457<br>(1.610) |
| Share of FPL for Medicaid eligibility | -0.015**<br>(0.007) | -0.060***<br>(0.018) | -0.010*<br>(0.005) | -0.042***<br>(0.015) | -0.041***<br>(0.014) | -0.033<br>(0.033) | -0.031***<br>(0.011) | -0.033<br>(0.021) |
| Share Hispanic | -0.110<br>(0.317) | 1.640<br>(1.597) | -0.202<br>(0.259) | 0.925<br>(0.756) | -0.712<br>(0.977) | 0.438<br>(2.542) | -0.402<br>(1.574) | 0.204<br>(3.430) |
| Share African-American | 0.388<br>(0.622) | 3.750<br>(3.171) | 0.689<br>(0.521) | 0.695<br>(1.513) | 1.494<br>(1.760) | 8.250<br>(6.072) | 2.169<br>(1.574) | 3.731<br>(3.430) |
| Share of births to unmarried women | -0.328<br>(0.231) | -2.050<br>(1.418) | -0.303*<br>(0.177) | -0.081<br>(0.538) | -0.226<br>(0.752) | -2.855<br>(2.750) | -0.264<br>(0.489( | 1.134<br>(1.208) |
| Average real cost, WIC package, women ($1000s) | 0.120<br>(0.244) | -3.893***<br>(1.327) | -0.200<br>(0.192) | 0.681<br>(0.559) | 2.212**<br>(0.905) | -5.017**<br>(2.415) | 0.259<br>(0.554) | 3.731***<br>(1.344) |
| Data missing for cost of WIC package | 0.002<br>(0.003) | -0.038**<br>(0.017) | 0.000<br>(0.002) | 0.002<br>(0.008) | -0.011<br>(0.011) | -0.100***<br>(0.034) | -0.012<br>(0.008) | -0.026<br>(0.020) |
| Local WIC agencies in state per 100 residents | -2.165<br>(9.241) | 88.713**<br>(44.758) | -5.346<br>(6.533) | -20.525<br>(20.753) | -8.043<br>(25.056) | 60.854<br>(68.636) | -20.703<br>(17.096) | -52.492<br>(35.650) |
| WIC dispersed monthly | 0.003<br>(0.004) | 0.032<br>(0.023) | 0.001<br>(0.003) | 0.006<br>(0.009) | 0.012<br>(0.013) | 0.059<br>(0.041) | 0.004<br>(0.010) | 0.011<br>(0.017) |
| WIC eligibility requires proof of income | -0.001<br>(0.005) | 0.038<br>(0.025) | -0.001<br>(0.004) | -0.002<br>(0.013) | -0.012<br>(0.016) | -0.013<br>(0.046) | -0.012<br>(0.012) | -0.021<br>(0.027) |
| Hematocrit cutoff for 1st trimester pregnant women | -0.013*<br>(0.007) | -0.030<br>(0.027) | -0.010*<br>(0.006) | -0.035**<br>(0.016) | -0.046**<br>(0.021) | -0.079<br>(0.053) | -0.044***<br>(0.016) | -0.075***<br>(0.028) |
| F-statistic, program variables significant | 1.183 | 3.079 | 1.556 | 1.896 | 2.585 | 3.242 | 1.573 | 3.313 |
| P-value | 0.307 | 0.002 | 0.131 | 0.054 | 0.008 | 0.001 | 0.125 | 0.001 |

| | Total | Infants | Women | Children | Total, <185% FPL | Infants <185% FPL | Women <185% FPL | Children <185% FPL |
|---|---|---|---|---|---|---|---|---|
| F-statistic respondent and HH variables significant | 112.296 | 70.478 | 107.491 | 90.440 | 112.062 | 9.806 | 72.626 | 20.013 |
| P-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| # observations | 162,307 | 6,886 | 120,605 | 30,636 | 41,529 | 2.651 | 31,843 | 11,996 |
| Adjusted R-squared | 0.060 | 0.175 | 0.057 | 0.108 | 0.105 | 0.079 | 0.059 | 0.053 |

**Note**: All regressions also include the share of the state population living in an MSA, the state's employment growth rate, real median income for a family of four, state and year fixed effects and controls for repondent's age group. All statistics weighted using the household supplement weight (columns 1 and 5) or the person supplement weight (columns 2-4 and 6-8). Standard errors appear in parentheses and are clustered by state-year. *** denotes statistical significance at the 1% level of confidence, ** at the 5% level, and * at the 10% level.

**APPENDIX TABLE A**
**Counts of Regional WIC Participation (10,000 persons)**

| | NE | MA | SE | MW | SW | Mnt | West | U.S. |
|---|---|---|---|---|---|---|---|---|
| FNS annual avg of monthly #, 1998 | 74 | 70 | 138 | 104 | 108 | 48 | 174 | 716 |
| FNS monthly total, 1998 | 75 | 70 | 139 | 104 | 108 | 48 | 174 | 719 |
| PC 1998 total | 81 | 98 | 153 | 114 | 115 | 52 | 191 | 804 |
| CPS FSS 1998 total | 48 | 45 | 82 | 83 | 94 | 35 | 119 | 505 |
| SIPP annual average of monthly #, 1998 | 48 | 51 | 99 | 91 | 90 | 33 | 112 | 524 |
| CPS ADF 1999 total (1998 calendar year) | 52 | 48 | 111 | 106 | 102 | 52 | 163 | 633 |
| Ratio of SIPP to first row | .65 | .73 | .72 | .87 | .83 | .68 | .64 | .73 |
| Ratio CPS ADF to first row | .70 | .69 | .80 | 1.02 | .94 | 1.08 | .94 | .88 |

**Notes**: Each column contains WIC participation totals for the region identified in the column heading. Region definitions are as follows: Northeastern states include CT, ME, MA, NH, NY, RI, and VT; Mid-Atlantic states include DE, DC, MD, NJ, PA, VA, and WV; Southeastern states include AL, FL, GA, KY, MS, NC, SC, and TN; Midwestern states include IL, IN, MI, MN, OH, and WI; Southwestern states include AR, LA, NM, OK and TX; Mountain Plains states include CO, IA, KS, MO, MT, NE, ND, SD, UT, and WY; and Western states include AK, AZ, CA, HI, ID, NV, OR, and WA.

**APPENDIX TABLE B**
**Means, Individual and Household Controls, CPS Microdata**

| | HH | Infants | Women | Children 1–4 |
|---|---|---|---|---|
| Respondent is high school dropout | 0.098 | 0.133 | 0.107 | 0.126 |
| | (0.001) | (0.004) | (0.001) | (0.002) |
| Respondent is high school grad, no college | 0.233 | 0.218 | 0.236 | 0.228 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| | 0.229 | 0.214 | 0.229 | 0.215 |
| Respondent has some college, no 4 yr. degree | (0.001) | (0.005) | (0.001) | (0.002) |
| Respondent is male | 0.232 | 0.228 | 0.222 | 0.228 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| Respondent is married | 0.475 | 0.567 | 0.467 | 0.560 |
| | (0.002) | (0.006) | (0.001) | (0.003) |
| Respondent is head of household | 0.495 | 0.448 | 0.484 | 0.469 |
| | (0.002) | (0.006) | (0.001) | (0.003) |
| Respondent is spouse of HH head | 0.208 | 0.255 | 0.205 | 0.249 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| Respondent record missing | 0.229 | 0.233 | 0.229 | 0.232 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| Respondent is Hispanic | 0.092 | 0.144 | 0.097 | 0.141 |
| | (0.001) | (0.004) | (0.001) | (0.002) |
| Respondent is black | 0.107 | 0.106 | 0.112 | 0.114 |
| | (0.001) | (0.004) | (0.001) | (0.002) |
| Respondent is Asian | 0.032 | 0.030 | 0.034 | 0.035 |
| | (0.001) | (0.002) | (0.001) | (0.001) |
| HH in central city | 0.256 | 0.260 | 0.260 | 0.255 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| HH central-city status censored | 0.139 | 0.142 | 0.137 | 0.132 |
| | (0.001) | (0.004) | (0.001) | (0.002) |
| HH in MSA | 0.821 | 0.813 | 0.821 | 0.821 |
| | (0.001) | (0.005) | (0.001) | (0.002) |
| HH MSA status censored | 0.002 | 0.003 | 0.002 | 0.003 |
| | (0.000) | (0.001) | (0.000) | (0.000) |

**Notes**: Each column contains means (standard errors) for household-level and individual controls for the 1998–2001 CPS ADF (calendar years 1997–2000) for the sample indicated in the column head. In column 1, the sample is all households containing a woman aged 15–45 or a child under 5; in column 2, it is infants; in column 3, women aged 15–45; and in column 4, children 1–4. All statistics weighted using the household supplement weight (column 1) or the person supplement weight (columns 2–4).