INSTITUTE for RESEARCH on POVERTY
UNIVERSITY OF WISCONSIN–MADISON

IRP Discussion Paper

No. 1423-14

Is WIC Reaching Those in Need?
Children's Participation in Nutritional Policy during the Great Recession

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January 2014
Preliminary Draft: Please do not cite.

This research was funded through the Institute for Research on Poverty (IRP) RIDGE Center for National Food and Nutrition Assistance Research, which is supported by the Economic Research Service (ERS) of the U.S. Department of Agriculture. The views and opinions expressed herein are those of the author and do not necessarily reflect those of the Institute for Research on Poverty, the Economic Research Service, or the United States Department of Agriculture.

Abstract

For the roughly 20 percent of American children living in poverty and food insecure households, nutritional policy provides an essential safety net against hunger and its negative effects on development. Though it is established that more mothers and children enrolled in the nutritional safety net during the Great Recession, it is unclear whether this increase was experienced equally by all racial/ethnic and socioeconomic groups. Using longitudinal data from the Survey of Income and Program Participation (SIPP), we examine whether exposure to the early childhood nutritional safety net has remained steady or increased as economic need increased during the Great Recession. Specifically, we examine the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), which increases access to nutritious food from the prenatal period until the time of school entry. Two questions drive the analysis: (1) Did participation in WIC increase between 2004 and 2013 for children in all age groups: in utero, infants, and ages 1–5?; and (2) Have these increases been experienced equally across racial/ethnic and socioeconomic groups? Preliminary findings suggest that age differences in participation remain pronounced, with infants more likely than older children, and especially the in utero population, to receive exposure to WIC. Differences between non-Hispanic whites and others declined in all age groups, driven by increasing participation among non-Hispanic whites and Hispanics. Socioeconomic differences in participation also declined, largely because of increasing participation among children in higher-educated and higher-income families. These findings suggest that, during the recession, socioeconomic status became a weaker predictor of WIC participation.

Keywords: Special Supplemental Nutrition Program for Women, Infants, and Children; WIC; Survey of Income and Program Participation; SIPP; Great Recession; food insecurity

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INTRODUCTION

For the 20 percent of American children who live in poverty, and the 23 percent of children who live in food insecure households, nutritional policy provides an essential safety net against hunger and its negative effects on children's development. Rather than targeting one particular micronutrient deficiency, federal nutrition assistance programs provide the benefit of steadily available food from the food groups essential for physical and cognitive development. Their effects on dietary quality and the reduction of micronutrient deficiencies among children are strong and positive (Bitler and Currie 2005). Furthermore, there is a strong influence of nutrition on cognitive development and socioeconomic inequality (Behrman et al. 2009). Childhood nutritional policy is an early health investment that overlaps with sensitive periods of child development, with theory and evidence suggesting that very early intervention confers the strongest benefits for children's physical and cognitive development (Gluckman and Hansen 2006). Prior to the recession, infants were more likely to receive WIC benefits than pregnant women or older children (Tiehan and Jacknowitz 2008). Though it is established that more mothers and children have enrolled in federal nutritional programs in the last five years (Connor et al. 2011; USDA 2011), it is unclear whether this increase has been experienced equally by children of all ages, and by mothers in all racial/ethnic and socioeconomic groups.

Using longitudinal data from the Survey of Income and Program Participation (SIPP), this article examines whether differences in children's participation in nutritional policy have remained steady, increased, or decreased as families' economic need has increased during the Great Recession that began in December 2007 (National Bureau of Economic Research 2008). The program that forms the basis for our investigation is the Special Supplemental Nutrition Program for Women, Infants, and Children, or WIC, which increases children's access to nutritious food from the prenatal period until the time of school entry. Two questions drive the analysis: (1) Did participation in WIC increase between 2004 and 2011 for

all age groups: those exposed in utero, as infants, and between ages 1–5?; and (2) Have these increases been experienced equally across racial/ethnic and socioeconomic groups?

BACKGROUND

The Early Emergence of Inequality of Opportunity

Several decades of research reveal the negative effects of early childhood adversity on children's skill development and health. At as early as age two, the children of highly educated parents show stronger skill development than their peers with lower-educated parents (Alexander and Entwisle 1988; Feinstein 2003; Klebanov et al. 1998), and youth in high-resource families are more likely to attain high levels of education than their peers (Duncan, Ziol-Guest, and Kalil 2010). A growing body of research suggests that poor health in childhood, as one form of adversity that is closely intertwined with biological and social processes, may also play a role in generating social and economic inequality within and across generations (e.g., Jackson 2010; Palloni 2006). Health is a marker of population welfare that is unequally distributed at the time of birth (Finch 2003), and that has important implications for patterns observed over the life course. Child health, often measured by birth weight or nutrition (or height as a proxy for nutrition), affects adults' health (Bengtsson and Lindstrom 2003; Hayward and Gorman 2004); youths' educational achievement and attainment (Boardman et al. 2002; Conley and Bennett 2000; Conley, Strully and Bennett 2003; Jackson 2009); and adults' earnings and labor force participation (Currie and Stabile 2006; Palloni 2006). That these relationships are robust to statistical techniques that control for socioeconomic background and family-level differences suggests that child health is not simply a proxy for economic disadvantage, but is an important dimension of human capital development, one that influences its other dimensions—including skills and education—and has direct and indirect long-term effects on social and economic processes.

Background about WIC

Nutritional policy is an early health investment that has important implications for children's health and development. Though the policy debate surrounding nutrition in the United States often emphasizes the problem of overnutrition (e.g., overweight and obesity), micronutrient deficiencies are prevalent and increasing. Seven percent of toddlers (ages 1–2) and 16 percent of adolescents are anemic (CDC 2002)—a prevalence exceeding that of the heavily studied health marker of low birth weight (Conley et al. 2003). Nutritional policy provides a safety net against hunger and its negative effects on child development. WIC, along with school-based nutritional policies later in childhood, works to maintain proper nutrition among low-income children, with WIC providing supplements to pregnant women and young children (ages 0–5). In contrast to the federal food stamp program (now called the Supplemental Nutrition Assistance Program, SNAP), nutritional content from major food groups is federally mandated for WIC, making it a useful proxy for prenatal and early childhood nutrition. WIC is fully federally funded and administered by states, providing access to steadily available nutritious food, rather than targeting one deficiency. Target families are at or below 185 percent of the federal poverty threshold and women must also demonstrate that they are nutritionally at risk. In addition, women who participate in other federal assistance programs (SNAP, TANF, Medicaid) are automatically eligible to enroll themselves (while pregnant or postpartum) or their children in WIC. Participation in WIC is high. In 2006, about 50 percent of U.S. infants participated in WIC, and about 25 percent of pregnant women, postpartum women (up to six months after birth), and children ages 1–4 (Oliveira and Frazao 2009).

WIC as an Early Health Investment

Examining nutritional policy provides a useful case study for identifying critical windows of health investment during childhood, as children's eligibility for WIC coincides with sensitive periods of child development—theory and evidence suggest that very early intervention confers the strongest benefits for children's physical and cognitive development (Gluckman and Hansen 2006). The early life

cycle, particularly birth through age 3, is a highly sensitive period of brain development, with many neural circuits affected by experiences during that time (Knudsen 2004). Some researchers suggest that very early health, or exposures in utero, can permanently "program" aspects of physical and cognitive development (Barker 1994, 1995; Lucas 2005; Gluckman and Hansen 2006). Beyond the prenatal period, infants' nutritional environments also have persistent effects on development. Anemia during infancy, for example, may decrease auditory brain stem response, an indicator of central nervous system development (Roncagliolo et al. 1998). Hoddinot et al. (2008) find that nutritional intervention before age 3, but not between ages 3 and 6, has strong and positive effects on Guatemalan men's hourly wages in adulthood.[1] Collectively, this evidence suggests that WIC coincides with a period of human development that is highly consequential in both the short and longer-term.

The weight of evidence suggests that WIC "works" by improving the quality of children's diets and, in turn, physical and cognitive development. First, U.S. nutritional policy has strong positive effects on birth outcomes and the quality of children's diets. Mothers who participate in WIC are more likely to have babies with a healthy birth weight and to breastfeed their infants (Bitler and Currie 2005, Kowaleski-Jones and Duncan 2002). These effects are most pronounced—but not limited to—among the most disadvantaged mothers and children, including mothers receiving other forms of public assistance and single mothers (Bitler and Currie 2005). Later in childhood, children in the National School Breakfast Program consume fewer calories from fat, more fiber, iron, and potassium, and demonstrate fewer micronutrient deficiencies (Bhattacharya, Currie and Haider 2006). A parallel body of research documents positive effects of nutritional policy on children's diets in developing settings, albeit in different nutritional environments. In one example, Mexican infants receiving fortified nutrient

[1]Despite the possibly stronger benefit of early intervention, evidence from very small randomized experiments in developing settings also demonstrates cognitive improvements among children receiving nutritional intervention even after the early period of peak growth (Pollitt, Cueto and Jacoby 1998). Older children and adolescents who regularly miss breakfast, for example, may in turn lack proper nutrient delivery to the central nervous system, reducing information retrieval and memory (Pollitt and Mathews 1998), and adolescents with anemia may face fatigue that limits their capacity to learn effectively (Haas 2001).

supplements (via the Progresa program) showed faster growth and a lower prevalence of anemia than control children (Rivera et al. 2004).

Secondly, a relevant but distinct literature demonstrates that children's nutrient deficiency is negatively related to cognitive development, academic achievement, education, and earnings (Behrman et al. 2009; see Haas and Brownlie 2001, Thomas and Frankenberg 2002 for reviews), with the bulk of research in developing settings where poor nutrition is prevalent. There are positive effects of Guatemalan children's adequate protein intake, for example, on educational outcomes several decades later and into the next generation (Hoddinot et al. 2008; Maluccio et al. 2009). Nutritional intake is also strongly consequential for children in developed nations, when nutrition is measured by iron-deficiency anemia or height (Case and Paxson 2008). Anemic children in the United States who receive iron supplementation, for example, increase their test performance and learning capacity (Grantham-McGregor and Ani 2001), with the primary pathway believed to operate physiologically through changes in the structure and function of the central nervous system, and structurally through a heightened ability to focus in the classroom (Roncogliolo et al. 1998). This research is complemented by evidence linking other markers of child health to education (Conley and Bennett 2000), earnings, and labor force participation in adulthood (Jackson 2010a; Palloni 2006). Such research highlights the role of nutrition in producing or reducing academic and socioeconomic inequality, even in a wealthy setting.

The Stratification of Children's WIC Participation during the Great Recession

During the Great Recession, poverty and food insecurity among children increased hand in hand—22 percent of U.S. children now live in poverty (vs. 16 percent in 2001), about 50 percent of U.S. children live in households with incomes near the poverty line, and 23 percent of children live in food-insecure households, indicated by families' cutting the size of meals, skipping meals, and not having enough money for meals. It is clear that participation in the nutritional safety net has increased alongside economic hardship since the beginning of the recession in late 2007. WIC enrollment increased by 5 percent from 2008 to 2010 (Connor et al. 2011), while school meal program enrollment increased by 17

percent between 2006 and 2010, with higher increases in some states (Dillon 2011; USDA 2011). While overall increases in participation are clear, what remains poorly understood is whether increasing participation has been experienced equally by all mothers and children. Prior to the recession, for example, infants were more likely to receive WIC benefits than pregnant women or older children (Oliveira and Frazao 2009), and eligible Hispanic women enrolled later in their pregnancies than their peers (Tiehan and Jacknowitz 2008). A thorough evaluation of WIC's availability and effectiveness for all mothers and children will reveal not only how to intervene, but when intervention might benefit from additional outreach.

DATA

Of the several individual-level data sources available for tracking children's participation in federal nutritional programs, the Survey of Income and Program Participation (SIPP) is the best suited for the purposes of this research. SIPP is a longitudinal survey, conducted by the Census Bureau, that began in 1984 with the goal of monitoring individuals' sociodemographic characteristics and monthly program participation. The survey is made up of a series of panels, each of which has several waves. Each sample within a panel is interviewed every four months (each interview comprises a wave within a panel), when respondents provide information about the previous four months. In order to capture patterns pre- and post-recession, we use available data from the 2004 and 2008 panels. The 2004 panel began in February 2004 with approximately 51,000 households, and ran until January 2008. The 2008 panel began with 52,000 households in September 2008 and ran until December 2012. We use data through September 2011, the most recent wave available at the time of this analysis.

Measures

An important benefit of SIPP data compared to other microdata spanning the pre- and post-recession period is the measurement of children's birth month and year, as well as monthly income and monthly (person-specific) participation in WIC and other federal programs. It is therefore possible to

measure eligibility and participation on a monthly basis, which is not possible with data from the Current Population Survey (CPS) and some administrative sources. Given pronounced differences in WIC participation across age groups, we use information on age to separate four groups of WIC-eligible children: in utero, postnatal (0–6 months), older infancy (6 months to 1 year), and ages 1–5. WIC participation is assessed monthly, producing approximately four years of continuous participation data for the 2004 panel, and approximately three years for the 2008 panel.

In addition to examining child age and WIC participation, we measure several other individual-level characteristics available in the SIPP, including maternal race and ethnicity (non-Hispanic white, the reference category; non-Hispanic black; Hispanic; and Asian); child sex; maternal educational attainment (less than high school, high school, some college or higher); the number of children in the household; the household poverty ratio (less than 100 percent, the reference category; 100–185 percent; and 185 percent+); and mothers' participation in other federal programs (Medicaid, TANF, and SNAP). Together with the household poverty ratio, we use measures of other program participation to construct a child-specific, monthly measure of eligibility that is made up of both income-based and automatic qualification.

METHODS

The analysis consists of a bivariate and multivariate description of eligibility, participation, and the determinants of participation over time. We begin by addressing the first research question—who participates, and how did participation change during the recession? We compare pre- and post-recession participation rates, using the 2004 and 2008 panels, to document that overall eligibility and participation has increased across the 2004 and 2008 panels. Next, we examine the percentage of the four groups of WIC-eligible children (in utero, postpartum, older infant, children) that participated in each four-month wave of the 2004 and 2008 panels. We calculate the average monthly participation in each four-month wave of each panel among both the total population (all respondents in the allowable age/fertility groups) and those eligible. Do infants remain overrepresented among participants, or have other children—those exposed prenatally, or non-infant children—disproportionately increased their participation?

After documenting changes in participation among several groups of children, we examine whether these patterns are stratified by socioeconomic status (maternal education and household poverty ratio) and maternal race/ethnicity among eligible families. Have the most socioeconomically needy families—those at the bottom of the income and educational distributions—increased their participation, especially at the earliest ages, to the same degree as their peers? Have black, Hispanic, Asian and non-Hispanic white children benefited equally from increases in participation at all ages? To rigorously evaluate the degree of socioeconomic and racial/ethnic stratification in participation, we examine the determinants of monthly participation within age groups among WIC-eligible children. Because the two infant groups (0–6 months and 7–12 months) exhibit very similar patterns in descriptive analyses, we combine all infants into one group. Using logistic regression, we estimate a model that takes the following form:

$$\log[\frac{p_i}{1-p}] = \beta_0 + \beta_1 X_m$$

where $\log[\frac{p_{ih}}{1-p_{ih}}]$ equals the log odds of *p*, the probability that a child, *i,* participates in WIC in a given month—the unit of analysis is person-months. X_{ih} is a vector of mother-level characteristics, including education and race/ethnicity. We estimate separate models for several groups while conditioning on eligibility: prenatal; infant; and ages 1–5. From the regression estimates, we calculate adjusted probabilities of participation in each panel for each group of children, conditional on reaching the maximum age in an age group. We adjust standard errors for the clustering of observations within children. This part of the analysis also enables us to examine whether the stratification of participation has changed over time. Are Hispanic mothers still less likely to participate in WIC early in their pregnancies? Are the most poorly educated mothers participating to the same degree as their peers? We estimate separate models for each panel and compare across models using Wald tests.

RESULTS

Patterns of Eligibility and Participation

We begin by describing patterns of eligibility and participation across the two panels. Figure 1 presents average monthly WIC eligibility in each wave of the 2004 and 2008 SIPP panels. Eligibility remains steady across the 2004 panel, between 2004 and the beginning of 2008, around 54 percent. In contrast, we observe a steady increase in eligibility throughout the 2008 panel, increasing from around 55 percent in June 2008 to 61 percent in November 2011—an increase of about 8 percent.

Figures 2a and 2b show average monthly participation in each panel, among eligible children in each age group. While there is no clear pattern of increasing participation across waves in the 2004 panel, inspection of the 2008 panel reveals higher participation in the middle of the panel—during the year 2009—for eligible children in all age groups. In mid- to late 2009, about 40 percent of eligible children received in utero exposure to WIC (i.e., their mothers participated in the program); about 73 percent of infants; and about 48 percent of children ages 1–5. These estimates are consistent with those presented in Bitler, Currie, and Scholz (2003), and provide evidence of age stratification in eligible children's exposure to WIC as well as increasing participation in all age groups during the peak of the recession. Among the youngest age group—those in utero—exposure to WIC continued to increase after 2009, whereby about 48 percent of the eligible in utero population received exposure between February and June of 2011.

Finally, in order to provide a benchmark against official estimates of WIC participation, Figure 3 shows participation by age group among the *total* population of children (both eligible and ineligible). The graph shows "ever participation," conditional on reaching the maximum age in each group. Beginning with the 2004 panel, SIPP estimates are similar to those in official government data—about 50 percent of infants ever participate, about 25 percent of children are exposed in utero, and about 25 percent of older children between ages 1–5 participate. All children are more likely to participate in WIC during the 2008 panel. However, the size of differences between age groups remains quite similar in the later

Figure 1: WIC Eligibility, 2004 and 2008 SIPP Panels

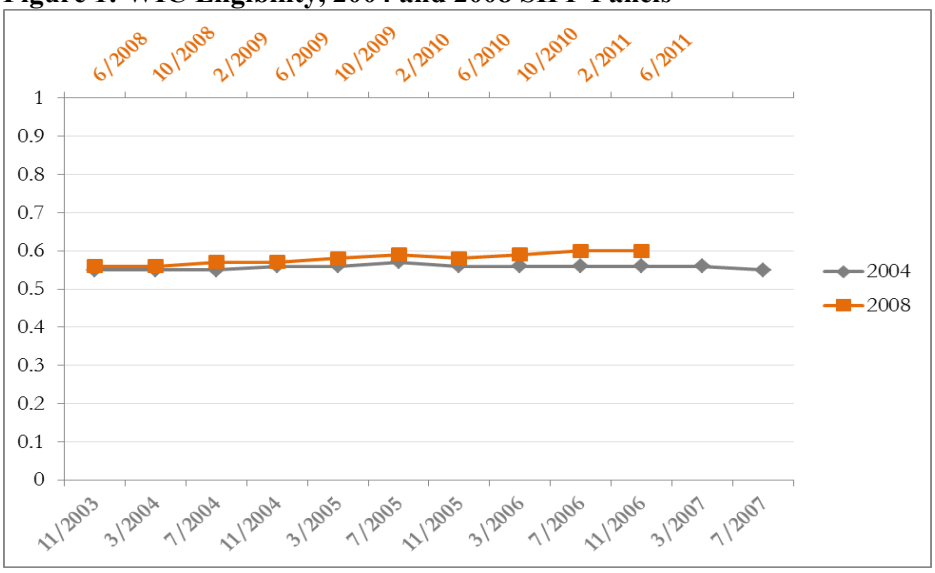


Figure 2A: WIC Participation by Age Group, Eligible Population: 2004 SIPP Panel

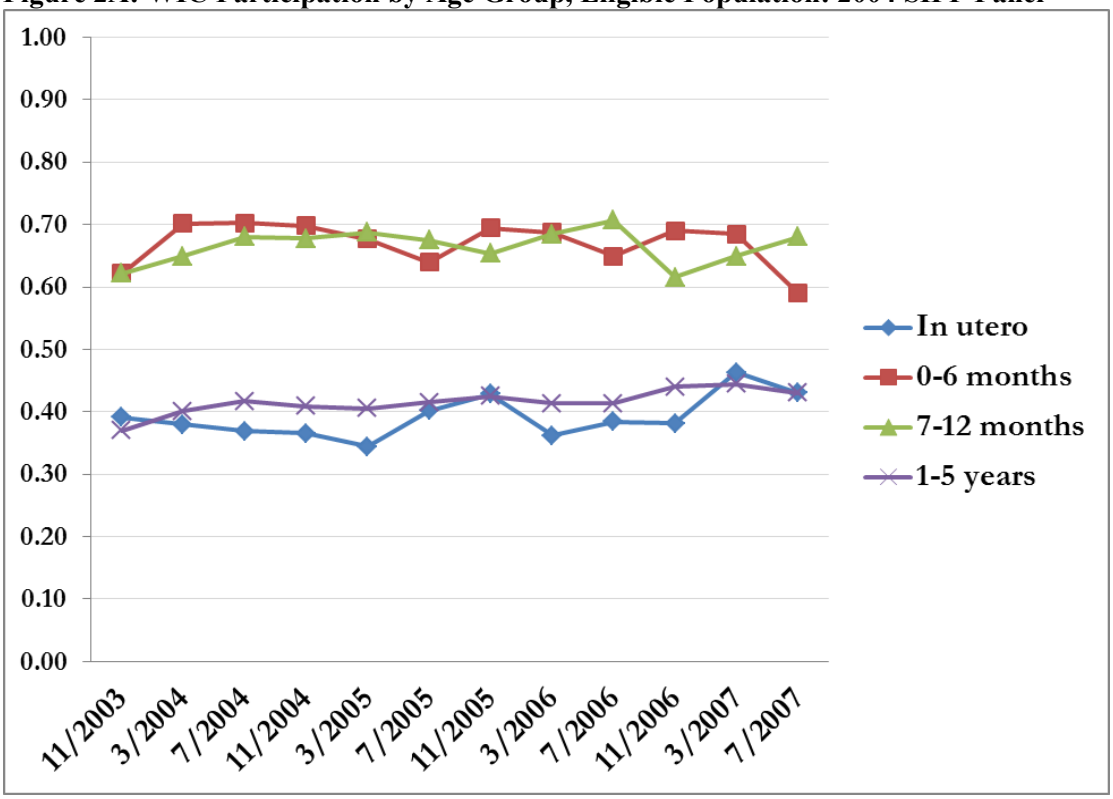


Figure 2B: WIC Participation by Age Group, Eligible Population: 2008 SIPP Panel

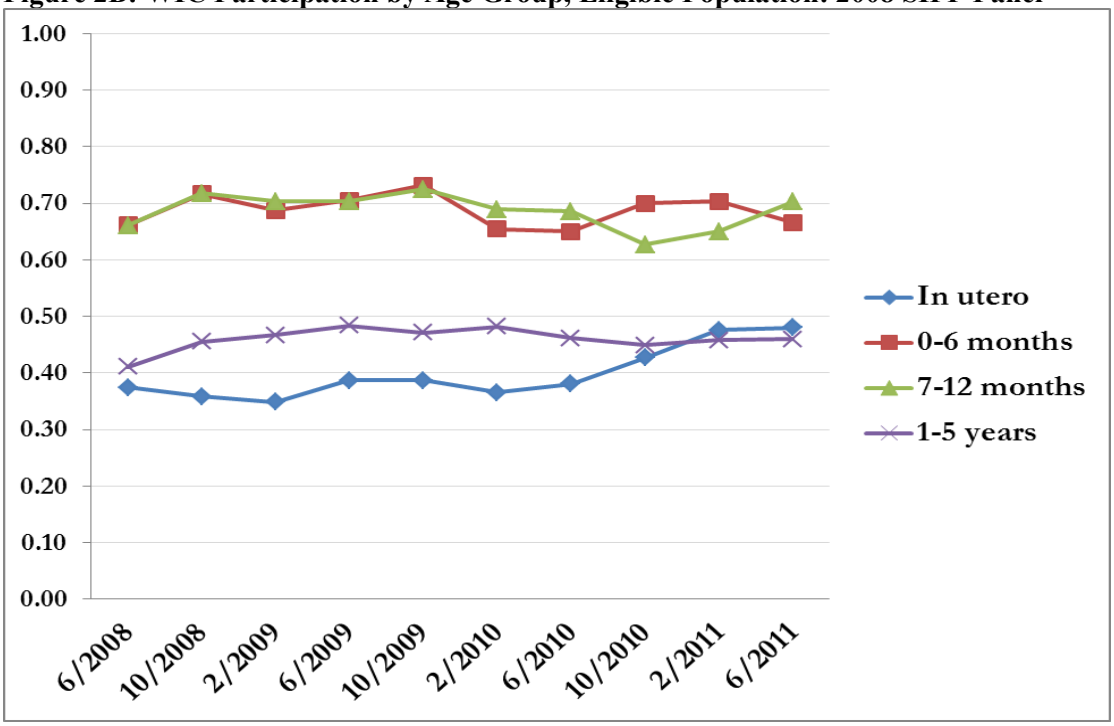
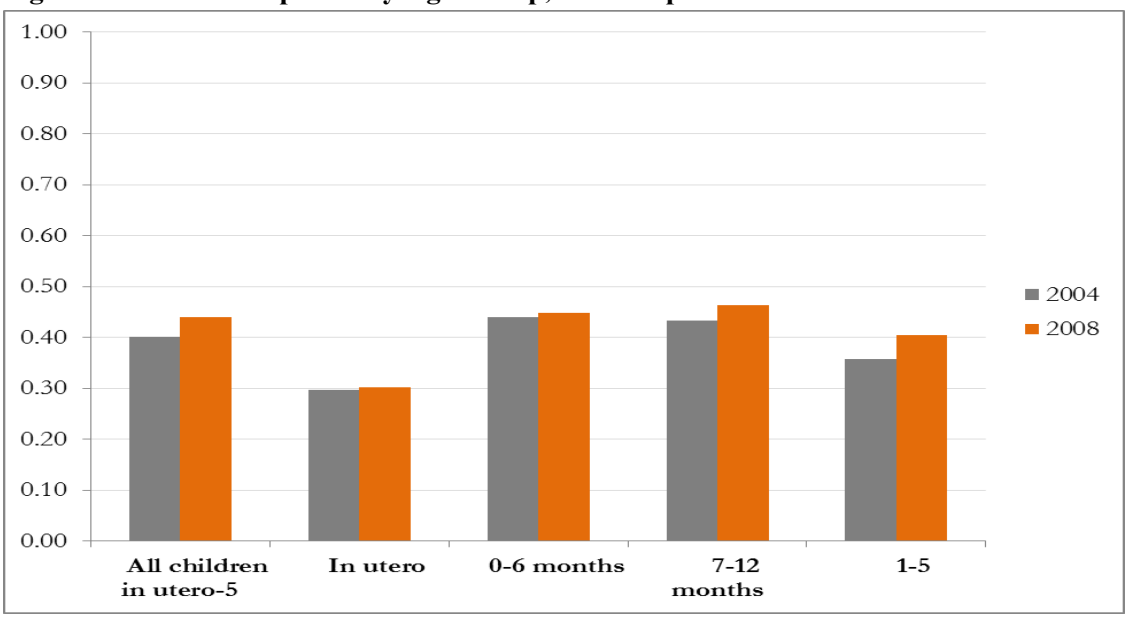


Figure 3: WIC Participation by Age Group, Total Population: 2004 and 2008



panel, with infants more likely than older children, and especially the in utero population, to participate in/receive exposure to WIC.

The Stratification of Participation

In order to assess whether the general increases in WIC participation presented above extend equally to children in all socioeconomic and racial/ethnic groups, Table 1 shows results from the multivariate analysis of stratification in children's participation. We estimate separate models for each of three age groups (in utero; infants; children 1–5) and for each panel (2004 and 2008). Analyses are restricted to eligible person-months. Table 1 shows that, in the 2004 panel, eligible children in every age group of more highly educated mothers were significantly less likely to participate in WIC than their peers with less-educated mothers. Having a mother with at least some college, for example, is associated with a 25 percent lower odds ($e^{-0.285}$) of in utero WIC exposure; a 38 percent lower odds of participation as an infant; and a 26 percent lower odds of participation as an older child. Similarly, in the 2004 panel, eligible children in higher-income families (those with a household poverty ratio above 185 percent of the federal poverty threshold) are less likely to receive the benefit of WIC participation than their lower-income peers—in other words, eligible higher-income families are less likely to enroll their children in WIC than their more economically disadvantaged peers. These findings suggest that, prior to the recession, eligible families with more education and income were more likely to use their resources to avoid enrolling in WIC. With respect to racial/ethnic differences in WIC participation, 2004 results suggest that non-Hispanic white children are more likely than their peers to receive in utero WIC exposure—the odds of in utero exposure are almost 30 percent lower ($e^{-0.346}$) for eligible non-Hispanic black children, for example. Among infants and older children, however, eligible non-Hispanic black and Hispanic children are significantly more likely to participate in WIC.

Inspection of analyses from the 2008 panel suggests a reduction in many of the socioeconomic and racial/ethnic differences in participation observed in the 2004 panel. Differences in the odds of participation between children in the highest- and lowest-educated eligible families are lower, as are those

Table 1: Logistic Regression of Average Monthly WIC Participation: WIC-Eligible Children by Age, SIPP 2004 and 2008 Panels*

	In Utero		Infants		1-5 Years	
	2004	**2008**	**2004**	**2008**	**2004**	**2008**
High School	0.037	0.085	0.099	0.0075	-0.0770	-0.208*
	(0.11)	(0.13)	(0.11)	(0.13)	(0.07)	(0.08)
Some College or Higher	-0.285*	-0.095	-0.464*	-0.295*	-0.307**	-0.360**
	(0.11)	(0.13)	(0.11)	(0.13)	(0.08)	(0.08)
Poverty Ratio 100-184%	-0.065	0.053	-0.141†	0.134	-0.084	0.091
	(0.09)	(0.11)	(0.08)	(0.10)	(0.05)	(0.06)
Poverty Ratio 185+%	-0.621**	-0.153	-0.804**	-0.129	-0.610**	-0.316**
	(0.11)	(0.13)	(0.09)	(0.13)	(0.07)	(0.07)
Non-Hispanic Black	-0.346**	-0.505**	0.811**	0.380**	0.256**	0.009
	(0.13)	(0.14)	(0.12)	(0.14)	(0.08)	(0.09)
Hispanic	-0.103	0.082	0.695**	0.715**	0.714**	0.563**
	(0.10)	(0.12)	(0.10)	(0.11)	(0.07)	(0.07)
Asian	-0.397	-0.541	-0.310	0.323	-0.070	-0.016
	(0.28)	(0.41)	(0.23)	(0.29)	(0.17)	(0.20)
Food Stamp Receipt		0.577**		0.909**		0.668**
		(0.11)		(0.10)		(0.06)
Medicaid Receipt	1.435**	0.910**	1.435**	1.133**	1.024**	0.980**
	(0.14)	(0.14)	(0.14)	(0.11)	(0.07)	(0.07)
Child Male	-0.027	0.064	0.048	-0.0091	0.076	-0.046
	(0.09)	(0.10)	(0.08)	(0.09)	(0.05)	(0.05)
Age (months)	0.234**	0.193**	0.0085	-0.0031	-0.030**	-0.028**
	(0.02)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Intercept	-0.494*	-0.823**	-0.165	-0.615**	-0.274*	-0.249*
	(0.20)	(0.22)	(0.18)	(0.22)	(0.12)	(0.11)
N	13,162	9,908	21,121	15,194	112, 466	87, 718

*Standard errors adjusted for clustering within children. Reference categories are as follows: less than high school; non-Hispanic white; poverty ratio less than 100%; female child.

between children in the highest- and lowest-income families. In order to provide a more intuitive interpretation of the results and to allow for comparison of findings across the 2004 and 2008 panels, Table 2 presents predicted probabilities calculated from the results in Table 1, disaggregated by maternal education, household poverty ratio, and race/ethnicity. Other characteristics are held constant at the sample mean. In order to compare probabilities, we calculate t-tests using the probabilities and their standard errors.

Beginning with educational differences, Table 2 reveals a pattern of declining educational differences in WIC participation among eligible children, largely driven by increases in participation among children with more highly educated mothers. With the exception of older children (ages 1–5), the participation gap between children with the lowest- and highest-educated mothers decreased between the 2004 and 2008 panels. The 18 percent gap (0.324 vs. 0.265) in the probability of in utero exposure between an average eligible child in the 2004 panel whose mother has less than a high school education and one with some college, for example, declines to a 6 percent gap in the 2008 panel, and is no longer statistically significant. A similar reduction in educational differences during the recession is observed for infants, but not for older children.

Differences in patterns of participation by household poverty ratio, the other indicator of socioeconomic status we examine, are similar. In the 2004 panel, eligible higher-income children were significantly less likely to participate in WIC than their lowest-income peers—ranging from a difference of 36 percent among the in utero group to a 33 percent difference among the 1–5 age group. In the 2008 panel these differences are greatly diminished, to a 10 percent predicted participation gap between the highest and lowest-income in utero children; a 4 percent gap among infants; and a 17 percent gap among older children. With the exception of older children, the predicted income gaps are no longer statistically significant.

With respect to racial/ethnic differences in participation, by 2008 eligible Hispanic children in all age groups are the most likely to participate in WIC—compared to eligible non-Hispanic whites, they are 5 percent more likely to participate in utero, 23 percent more likely as infants, and 36 percent more likely

Table 2: Predicted Probability of WIC Participation by Socioeconomic Status and Race/Ethnicity: SIPP 2004 and 2008 Panels

	In utero		Infants		1-5 years	
Maternal Education	**2004**	**2008**	**2004**	**2008**	**2004**	**2008**
Less HS	0.324	0.319	0.703	0.724	0.413	0.483
High School	0.332	0.301	0.724	0.726	0.394	0.431
Some College +	0.265*	0.299	0.598*	0.662	0.340*	0.394*

	In utero		Infants		1-5 years	
Poverty Ratio	**2004**	**2008**	**2004**	**2008**	**2004**	**2008**
Less than 100%	0.338	0.308	0.718	0.696	0.411	0.432
100-184%	0.323	0.32	0.689	0.724	0.391	0.454
185%+	0.215*	0.277	0.533*	0.668	0.275*	0.357*

	In utero		Infants		1-5 years	
Race/Ethnicity	**2004**	**2008**	**2004**	**2008**	**2004**	**2008**
NHW	0.325	0.324	0.592	0.635	0.318	0.382
NHB	0.254*	0.224*	0.766*	0.718*	0.376*	0.384
Hispanic	0.303	0.341	0.744*	0.780*	0.488*	0.521*
Asian	0.245	0.217	0.515	0.706	0.303	0.378

Other variables listed in Table 1 are held constant at the sample mean.
* denotes significant within-panel differences between subgroup and reference group, at the $p < 0.05$ level.

as older children. Notably, Hispanic children were the only group to experience an increase in the likelihood of in utero exposure across the two panels. Among other age groups, non-Hispanic white and Asian children also increased in their participation, though predicted differences in average participation between non-Hispanic white and Asian children are not statistically meaningful, while those between non-Hispanic whites and Hispanics are.

Finally, it is important to note that, across all groups, an average infant is much more likely to participate in WIC than a similar in utero or older child. In other words, age differences in WIC participation changed little during the recession.

CONCLUSIONS

Despite an interest in understanding changes in Americans' use of the safety net during the Great Recession, it is unclear whether increases in use of the nutritional safety net have been experienced equally by children of all ages, and by mothers in all racial/ethnic and socioeconomic groups. We use longitudinal data from the SIPP to examine: (1) whether eligibility and participation in WIC increased between 2004 and 2011 for all age-eligible groups of children; and (2) whether increases have been experienced equally across racial/ethnic and socioeconomic groups.

With respect to the first research question, the findings demonstrate that participation in the nutritional safety net increased during the Great Recession—beginning in 2008, WIC eligibility and participation increased among the total population of U.S. children and youth. Before, during, and after the recession, however, age differences in WIC participation remained pronounced—infants are more likely than older children, and especially the in utero population, to participate/receive exposure to WIC. Examining the second research question reveals that, for all age groups, there were substantial declines in the stratification of WIC participation during the recession. Non-Hispanic white and Hispanic children increased their participation, reducing differences between these groups and leading to a universal pattern of higher WIC participation among Hispanic children. In addition, with the exception of older children in the in utero group, the participation gap between children with the lowest and highest-educated mothers

decreased between the 2004 and 2008 panels, primarily because of larger increases among children with higher-educated mothers. Similarly, children in higher-income families were more likely to participate in the 2008 panel, serving to reduce income gaps in participation among eligible children.

Declines in socioeconomic differences in WIC participation among eligible children suggest that, while eligible higher-resource families were able to avoid the use of WIC prior to the recession, they became less able to do so during the recession. There are several possible reasons for these changes, which we plan to examine in the next steps of the analysis. First, higher-resource families may have experienced changes in their assets during the recession, reducing their available economic buffer during a period of increased economic hardship. Relatedly, they may have become more forward-thinking during the recession, anticipating the possibility of unemployment and enrolling in WIC. Alternatively, higher-resource families may have perceived a decline in the stigma associated with WIC participation during the recession, and therefore enrolled in order to receive the additional nutritional benefit provided by the program. While it will be difficult to precisely measure each of these possibilities, we will use the available data to adjudicate between the possibility of an economic motivation for enrollment versus a reduction in the stigma associated with receiving federal assistance.

We have also completed a complementary analysis for school meal programs—specifically, the National School Breakfast and Lunch Programs—and will incorporate those findings into the paper shortly. Moreover, because these are preliminary findings, there are several next steps, including examining the duration of children's WIC participation within each panel.

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