Published in final edited form as:

Soc Sci Med. 2016 December ; 170: 197–207. doi:10.1016/j.socscimed.2016.10.004.

Child Access to the Nutritional Safety Net during and after the Great Recession: The Case of WIC

Margot I. Jackson* and

Brown University

Patrick Mayne

Brown University

Abstract

Because children disproportionately live in poverty, they are especially vulnerable during economic crises, making the social safety net a key buffer against the effects of economic disadvantage on their development. The Great Recession of 2007–2009 had strong and lasting effects on American children and families, including striking negative effects on their health environments. Understanding access to the health safety net during this time of increased economic need, as well as the extent to which all children—regardless of age, income or race/ethnicity—share in the increased use of transfer programs, is therefore important in identifying the availability and accessibility of government assistance for those in need. Focusing on the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) program because of its strong effects on child development, we use longitudinal data from the Survey of Income and Program Participation (SIPP) to examine change and stability in children's WIC enrollment before, during and after the recession. Specifically, we examine: 1) whether children's WIC enrollment increased alongside changing family income, and 2) the extent to which changes in participation were shared by all subpopulations, regardless of age, income, and race/ethnicity. Analyses reveal that WIC participation among eligible children increased leading up to, during, and after the Great Recession, suggesting that the program was responsive to increasing economic need. Examining the distribution of WIC enrollment across demographic groups largely reveals a pattern of stable inequality in access and “take up.” Children born to poorer and less-educated mothers were more likely to be enrolled prior to the recession, and these differences remain mostly constant during and after the recession. Eligible Hispanic children had consistently higher enrollment, particularly among those in families with foreign-born mothers. The findings suggest that not all eligible children equally enroll in WIC, but that these differences have not been drastically exacerbated by macroeconomic instability.

*Corresponding author. Brown University Department of Sociology, Box 1916, Providence RI 02912. margotj@brown.edu.

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Introduction

The “Great Recession,” the largest economic downturn in the United States since the Great Depression, began in December of 2007 and officially ended in June 2009. The economic crisis and the slow recovery that has followed it have had striking negative effects on children’s economic, social and health environments (Brooks-Gunn, Schneider and Waldfogel 2013; Lee et al. 2013). Overall household food security increased during this period, and the percentage of children in food-insecure households—those facing economic and social conditions of limited food access—increased from 18% in 2003 to 23% in 2009 (Coleman-Jensen, Nord, and Singh 2013; Gundersen and Ziliak 2014). These patterns are consistent with a broader body of research on the negative consequences of macroeconomic crises for children’s health and access to health services (Paxson and Schady 2005; Suci 2006; Suhrche and Stuckler 2012).

For children in economically disadvantaged households, the social safety net is a key buffer against the effects of poverty and economic instability on health and well-being (Currie 2006; Kowaleski-Jones and Duncan 2002). Moreover, the reach of safety net programs is broadening, as those toward the top end of eligibility criteria increasingly make use of the benefits for which they qualify (Moffitt 2013). Understanding children’s access to nutritional support programs (part of the health safety net, contained within the broader social safety net) during this time of increased economic need, as well as the extent to which all eligible children—regardless of age, income, or race/ethnicity—share in the increased use of such programs, is therefore important in identifying the availability and accessibility of government assistance for those in need (e.g., Erus et al. 2015). This paper examines trends in eligible children’s participation in the nutritional safety net during and after the Great Recession, in order to 1) understand whether children’s access to important nutritional resources for healthy development increases alongside economic need, and 2) understand the extent to which increases in participation are the same or vary across social and economic groups. We focus on WIC, or the Special Supplemental Nutrition Program for Women, Infants and Children, a health safety net program targeted at low-income pregnant, postpartum and breastfeeding women, as well as young children. WIC is a useful case study for examining trends in the accessibility of the health safety net among American children because of its broad reach and strong nutritional component. Over 50% of U.S. infants participate in WIC, and about 25% of pregnant women, postpartum women, and children ages 1–4 (Oliveira and Frazao 2009). Unlike the federal food stamp program (SNAP), WIC vouchers can be used on only specific food products, allowing the program to provide the benefit of steadily available food from the food groups essential for physical and cognitive development. The program also provides educational resources to families in order to encourage healthy nutritional planning within families.

Only a very small body of previous research examines trends in the distribution of health safety net transfers in the U.S. during and after the recession (e.g, Bitler and Hoynes 2010; Moffitt 2013). Moreover, the distribution of WIC benefits is less commonly studied than other food assistance programs, including SNAP and the school lunch program (Grieger, Danziger, and Schoeni 2009; Grieger and Danziger 2011; Moffitt 2013; Rank and Hirschl 1993). Despite its smaller size, however, WIC participation is strongly, positively associated

with child development, owing to the clear and developmentally specific nutritional component of the program (Jackson 2015; Kowaleski-Jones and Duncan 2002). Though it is established that participation rates as a proportion of the total population increased in federal nutritional programs as economic need increased during and after the Great Recession (Connor et al. 2011; USDA 2011), it is unclear whether all segments the larger eligible population—regardless of age, income, and race/ethnicity—were equally likely to enroll during this period, or if increased participation was confined to a few groups. Using longitudinal data from the Survey of Income and Program Participation (SIPP), we examine change and stability in the distribution of children's WIC enrollment during and after the Great Recession.

Background

Overview of WIC Program

In a two-year period, between the end of 2007 and 2009, the unemployment rate nearly doubled, the housing market collapsed and economic insecurity increased for millions of American families (Grusky, Western, and Wimer 2011). Between 2007 and 2010, poverty in the U.S. increased from 18% to 22% (Dubay and Zarabozo 2013). While the recession officially ended in June 2009, recovery is ongoing—unemployment and child economic disadvantage remain persistently high, and nearly half of American children live in poor or low-income families (Addy, Engelhardt, and Skinner 2013). Children are especially vulnerable during times of economic insecurity—not only are they more likely to live in poverty than adults, but families also have greater difficulty in investing in children's development when struggling to meet basic needs (Addy, Engelhardt, and Skinner 2013; Brooks-Gunn, Schneider, and Waldfogel 2013). The effects of low economic status are striking, with several decades of research revealing the negative effects of childhood economic disadvantage on children's cognitive development and health (Finch 2003; Guo and Harris 2000; Reiss 2013; Schmeer 2012; Strully, Rehkopf, and Xuan 2010).

Increases in child poverty and economic disadvantage during periods of economic crisis are well-documented, as is the disproportionate increase in poverty and low-income status among children in poorly-educated and ethnic minority families (e.g., Dubay and Zarabozo 2013). Accompanying the greater likelihood of economic disadvantage and uncertainty is an increase in family stress and a decline in the quality of children's in-home environments. Economic shocks within families, as well as macroeconomic conditions such as increases in local unemployment rates, are strongly related to increases in harsh parenting practices (Brooks-Gunn, Schneider, and Waldfogel 2013; Lee et al. 2013).

For children in economically disadvantaged households, the social safety net is a key buffer against the effects of poverty and its associated circumstances. Despite its comparatively small budget, WIC has broad reach and strong effects on children's development. As a nutritional safety net program targeted at low-income pregnant, postpartum and breastfeeding women (up to 12 months after giving birth), as well as young children, WIC serves much of the U.S. population of mothers and children. Over 50% of U.S. infants are enrolled in WIC, and about 25% of pregnant women, postpartum women, and children ages 1–4 are enrolled (Oliveira and Frazao 2009). Though the policy debate surrounding nutrition

in Western nations often emphasizes the effects of overweight and obesity, micronutrient deficiencies are also prevalent and increasing among some subgroups of the population (CDC 2002; CDC 2012). The goal of WIC is to provide steadily available nutritious food, rather than targeting one deficiency. Target families are at or below 185% of the federal poverty threshold, and eligible women must also demonstrate that they are nutritionally at risk, which is true for the overwhelming majority of participants. Nutritional risk is determined by a broad range of either medically-based risk (anemia, underweight, maternal age, previous pregnancy complications, poor pregnancy outcomes), or by diet-based risk (inadequate dietary pattern). Health professionals in each state use federal nutrition risk criteria in making risk decisions (e.g., Institute of Medicine 2002). Women who participate in other federal assistance programs (SNAP, TANF, Medicaid) are also automatically eligible. WIC is fully federally funded and administered by states.

In contrast to the federal food stamp program, the WIC program is designed to provide for specific nutritional needs rather than to broadly subsidize a household's food budget. A pregnant woman, for example, can purchase cereal, milk, fruits, vegetables, whole grains and legumes. An older infant (ages 6–11 months) is eligible to receive formula, infant cereal and baby food (fruit, vegetables, and meat) (Oliveira and Frazao 2009). Perhaps because of the strong nutritional component of WIC benefits, program participation has positive effects on birth outcomes and the quality of children's diets. Pregnant women and their young children who participate in WIC have higher nutrient intake than similar peers who do not, based on both observational and experimental study designs (Fox, Hamilton, and Lin 2004; Metcalf et al. 1985; Rush et al. 1988). Mothers who participate in WIC are more likely to have babies with a healthy birth weight, an important indicator of fetal growth and maternal nutrition, and their children are more likely to exhibit strong cognitive development and academic learning (Bitler and Currie 2005; Jackson 2015; Kowaleski-Jones and Duncan 2002; Owen and Owen 1997; Rossin-Slater 2013). Beyond the nutritional goals of WIC, the program also has educational aims, whereby participants are offered the opportunity to enroll in nutrition education classes that inform caregivers about the nutritional needs of children, the benefits of breastfeeding, and the importance of physical activity. In addition, participants receive assistance in accessing other health and social services.

Who Participates in WIC, and Has this Changed with Increasing Economic Need?

WIC participation is a good predictor of prenatal and early childhood nutrition and health environments, which are in turn strongly linked to child health and cognitive development. Maximizing enrollment among eligible families and children is therefore an important goal for both effective policymaking and for population health, especially in light of evidence that the first several years of life are a highly sensitive period of developmental plasticity and that exposures during this time have strong and persistent effects (Gluckman and Hanson 2009; Torche 2011; Turney, Lee and Mehta 2013). While WIC serves nearly half of young American children, participation among the eligible population is stratified. Infants are more likely to receive the benefit of participation than older children, Hispanic children are more likely to be enrolled than their peers in other racial and ethnic groups, and women likely to breastfeed have lower participation rates (Martin-Anderson 2013; Martinez-Schieferl 2012; Tiehen and Jacknowitz 2008). At the aggregate level, there is also evidence that state-level

characteristics (e.g., the unemployment rate) are associated with WIC participation (Swann 2010).

Much existing research on the dynamics of nutritional safety net usage focuses on estimating participation rates among the total population, or providing estimates of the probability of ever participating in a particular program (Grieger and Danziger 2011). In this vein, it is clear that participation in WIC, and in the food assistance safety net more broadly, has increased alongside economic hardship since the beginning of the recession. WIC participation increased 5% from 2008 to 2010 (Connor et al. 2011), while enrollment in school meal programs increased 13% between 2007 and 2010 (Dubay and Zarabozo 2013). While overall increases in participation are clear, what remains poorly understood is whether this growth is driven by an expansion of the eligible population, or if there is also an increase in enrollment within segments of the eligible population. Research on other programs suggests that the coverage of similar social safety net programs expands during economic crisis, and that the receipt of benefits is distributed widely across demographic groups (Bitler and Hoynes 2010; Moffitt 2013).

Participation in means-tested social safety net programs is rarely universal among the eligible population, typically ranging between 40–60% (Bitler, Currie, and Scholz 2003; Rank and Hirschl 1993). While an important reason for non-universal participation is lack of awareness about the existence of a program and/or one's eligibility for it, enrollment is also partly driven by individuals' attitudes toward public assistance. There are several reasons why WIC enrollment among those who are eligible may increase during an economic downturn. First, eligible families who previously had access to other resources may become less able to avoid enrolling in WIC. Reductions in the assets available to higher-resource families, for example, may reduce available economic buffers during a period of increased economic hardship, or cause them to become more forward-thinking. In this scenario, increases in WIC enrollment would be larger among higher-resource children. Second, families may perceive a decline in the stigma associated with WIC participation during an economic downturn. The phenomenon of "welfare stigma" has been observed for other social safety net programs (e.g., SNAP, TANF), and may decline when economic resources are more constrained (Danziger 2010; Moffitt 1983; Stuber and Schlessinger 2006). This scenario would also predict disproportionately increased enrollment among higher-resource women and children. Third, families may benefit from additional outreach from local and regional governments and agencies during a recession. To the extent that outreach efforts disproportionately occur in the context of pregnancy and childbirth interactions with providers, the disproportionately higher enrollment of infants may persist or even grow as overall enrollment increases. These age differences may be offset, however, by longer durations of WIC participation during the recession. Finally, in the context of the Great Recession, legislation enacted specifically to maintain and increase participation may affect enrollment rates among those eligible. While the majority of recession-specific funds were directed toward other programs, such as unemployment insurance and SNAP, WIC received some contingency funds to cover an increased caseload during the recession, thus expanding the potential number of available slots for eligible participants (McDevitt 2012; Moffitt 2013).

Data

We use longitudinal microdata from the Survey of Income and Program Participation (SIPP) to examine patterns of enrollment and overall participation among the WIC-eligible population before, during and after the recession. SIPP is a nationally representative longitudinal household 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 tracking the same households across four years. Each panel, up to and including the 2008 panel, consists of survey waves spaced four months apart, during which households are asked to retrospectively report on demographic and economic information in the previous four months. SIPP data therefore provide monthly information on individuals nested within households for about four years. In order to observe WIC enrollment before, during and after the recession, we use data from the 2004 and 2008 panels. The 2004 panel began in February 2004 with approximately 51,000 households, and provides information in 12 waves through January 2008, the beginning of the recession. The 2008 panel began with 52,000 households in September 2008, and provides information in 15 waves through August 2013. Our observation period covers the period before and during high unemployment, as well as before and during expected eligibility and enrollment increases resulting from both legislation and changing economic circumstances.

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. We use information about the household poverty ratio, other program participation, and child age to construct a child-specific, monthly measure of *eligibility* that accounts for income-based and automatic qualification, as well as whether a child is currently in a certification window. In general, children are automatically certified until age 1, and must be recertified every six months thereafter. In 2011, following the Healthy, Hunger-Free Kids Act of 2010, states began to have the option of certifying children (1–5 years) for one year intervals instead of six months. In our analyses we use the more conservative six-month window as our certification period for older children.

Given differences in WIC participation across age groups, as well as differing certification periods by age, we use information on age to separate two groups of WIC-eligible children: in utero and infants (–9 to 11 months old), and children one to five years old. Based on a question asking whether an individual was receiving WIC aid in a given month, WIC participation is assessed monthly, producing approximately four years of continuous participation data for the 2004 panel, and almost five years for the 2008 panel.

We measure several other individual-level characteristics available in the SIPP and associated with both eligibility and participation. Because child *age* is associated with

enrollment in the broader social safety net, we include child age (measured in months) and age-squared. In addition to revealing differences in the timing of children's participation, measuring age is useful in accounting for differences in the likelihood of enrolling in WIC before the beginning of our observation period. A measure of child *sex* captures possible differences in enrollment patterns between boys and girls. Given differences in enrollment and participation across racial and ethnic groups, we measure maternal *race and ethnicity* (non-Hispanic white, the reference category; non-Hispanic black; Hispanic of any race; and a category including all other races and ethnicities). Among Hispanics, we also measure mothers' nativity (citizenship status is not recorded in SIPP). In contrast to SNAP and social safety net programs, WIC does not require legal residency, meaning that higher participation among Hispanics could be driven by those not born in the United States who are not eligible for other programs. We measure *maternal educational attainment* categorically (less than high school, high school, some college or higher), and use information about total family income and monthly federal poverty thresholds for each family to calculate *monthly poverty ratios* (less than 100%, the reference category; 100–184%; and 185% and greater). Maternal education, poverty ratio and race/ethnicity constitute our focal demographic variables for understanding the distribution of WIC enrollment. Finally, we measure household participation in *other federal programs* (Medicaid, TANF, and SNAP) in each month. In sensitivity analyses, we include a measure indicating employment loss among the household head in the previous month, as well as several lagged measures of employment loss. We also test the sensitivity of the findings to lagged measures of household poverty ratio and other welfare program participation. Results do not change.

Methods

The analysis consists of a bivariate and multivariate description of enrollment and the determinants of enrollment. We begin by examining patterns of enrollment among the eligible population before, during and after the recession. [We also examine trends in children's eligibility. Because this analysis confirms an increase in eligibility, we do not present these results in favor of focusing on patterns among the eligible population.] After documenting any changes in participation, we turn to multivariate models to examine how widely distributed increased WIC enrollment was across demographic groups, with a particular focus on race/ethnicity, maternal education and household poverty ratio. We use discrete-time logit models to examine the likelihood of first enrolling in WIC (taking up the program) in a given month. The model takes the following form:

$$\ln \left(\frac{p_{ijt}}{1-p_{ijt}} \right) = \beta_0 + \beta_1 X_{1t} + \dots + \beta_k X_{kt} \quad (1)$$

where p_{ijt} is the probability that individual i enrolls in WIC during month t of episode j , given that the individual was not enrolled in month $t-1$, and for a given set of covariates, X , 1 through k , which may be time-varying (in the case of age, household income, or other program participation), or time-invariant (in all other cases). [In separate analyses, we examine exit rates from WIC (among the eligible population), in order to provide a more comprehensive portrait of the changing composition of WIC participation during and after

the recession. We do not find meaningful variation in the determinants of, or trends in, exit rates.] This approach has the benefit of addressing right-censoring and easily incorporating time-varying information. The unit of analysis is the child-month, and the analytic sample consists of eligible child-months between the ages of –9 months (prenatal period) and 60 months. Children are censored at the point of first enrollment within an eligibility period. Younger children have one eligibility spell, since certification is valid until age 1, while older children are allowed to have multiple spells of enrollment, in which they are censored after the first enrollment in each eligibility window. Standard errors are adjusted for the clustering of observations within children. The final analytic sample includes 4,049 children in utero through 11 months (from 37,110 child months), and 14,348 children 1–5 (from 155,854 child-months).

In order to provide a broad description of the distribution of enrollment before and during/after the recession, we estimate separate models for each panel (2004 and 2008) for each of the two age groups (–9 to 11 months old and 12 to 60 months old), while conditioning on eligibility. We test for the significance of coefficient differences using Wald equality tests within panels, and t-tests across panels. Our approach, in essence, incorporates panel fixed effects fully interacted with the regressors. In sensitivity analyses, we estimate models incorporating fully-interacted year fixed effects. In the absence of clear expectations about the functional form of the time trend in relation to enrollment, and in interaction with our covariates, we present panel-specific models here. Examining the time trend by year does not reveal substantively different patterns.

From our models we examine whether the hazard of enrollment has increased across panels, and whether there is a change in the degree to which individual characteristics predict enrollment. Have the most socioeconomically needy families among the eligible population—those at the bottom of the income and educational distributions—increased their chances of enrollment to the same degree as their peers? Have black, Hispanic, other-race and non-Hispanic white children benefited equally from increases in participation at all ages?

Results

Descriptive Statistics and Aggregate Patterns of Participation

Table 1 shows descriptive statistics for all WIC-eligible child-months from the 2004 and 2008 panels. Across both the 2004 and 2008 panels, eligible infants and children in utero were more likely to be enrolled in WIC than older children, with over half of eligible child-months for the younger group being actually enrolled in WIC. In the younger group, there was no noticeable change in WIC enrollment between panels. For older children, aged 1 to 5 years, WIC enrollment during eligible child-months was 39% during the 2004 panel, but increased to 44% during the 2008 panel. In both groups, there was a notable increase in receipt of SNAP benefits (food stamps), rising from less than 40% in both groups in 2004 to approximately 50% in 2008. Both groups reported high, stable levels of receipt of Medicaid benefits, with 75–80% of WIC-eligible child-months reporting Medicaid receipt. In both age groups, children below the federal poverty line contribute the plurality of eligible child-months, with this pattern strengthening slightly between the 2004 and 2008 panels. There

are no notable changes in WIC enrollment by gender, education, or race/ethnicity between the 2004 and 2008 panels.

Figure 1 presents the annual trend in WIC participation by age, among WIC-eligible children. The figure shows a pattern of increasing participation up to the recession, and then a decrease in participation after 2009. Participation among eligible infants and older children peaked in late 2009, at 70% among infants and 47% among children ages 1–5. In 2003, average participation was at 56% for eligible infants and 33% for older children. No clear increase is observed among the in utero group, among whom 34% received WIC exposure in 2003, with a maximum of 35% enrolled in 2009. [Figure 1 omits months for the in utero group for which there are fewer than 30 observations. The volatility observed in enrollment among the in utero/infant group in late 2007 and early 2008, and in 2013, may be seen as an artifact of the sample size: as no children were observed being born in a panel after the end of the panel, in utero children were thus excluded and the sample size drops precipitously in the last nine months of each panel.] Overall, these estimates are consistent with those presented in Bitler, Currie and Scholz (2003), and provide evidence of both age stratification in eligible children's exposure to WIC, as well as increasing participation during the peak of the recession. Age differences in participation remain quite similar over time, with infants more likely than older children, and especially the in utero population, to participate in/ receive exposure to WIC across years.

It is interesting to note in Figure 1 that WIC participation begins to decline after peaking in 2009. A number of demographic and programmatic factors may explain this pattern. While declining birth rates from 2007–2010 certainly reduced the total number of women and children at any given time point, that process is unlikely to explain the decline in WIC take-up among *eligible* children. Programmatic factors provide a more likely explanation. WIC eligibility, for example, must be recertified every six months for older children in most states (especially prior to 2011), while SNAP certification periods are usually for one year. This administrative requirement increases the difficulty, relative to other programs, of remaining in the program once enrolled. In addition, while the WIC budget is subject to annual fluctuation, which sometimes results in more willing participants than the program can support, SNAP is available as an entitlement to all who are eligible and enroll. As described above, while SNAP and other programs received a large influx of new resources during the recession, via the economic stimulus and other outreach efforts, WIC was the target of fewer new outreach efforts during this period (Moffitt 2013; Prah 2012). Finally, the dollar value of WIC benefits is also generally substantially smaller than SNAP benefits, as well as being much more tightly linked to the nutritional content of foods and requiring mothers to visit with a health professional to demonstrate nutritional risk. By way of descriptive comparison, Figure 2 shows SNAP participation among the households of the same children in Figure 1. While WIC participation among eligible children is variable across years, the participation of their households in SNAP, a safety net program more broadly focused on food access rather than meeting particular nutritional needs, steadily increases after 2007. These differences in the WIC and SNAP participation patterns of the same children and families suggest that the barriers to successful WIC enrollment may be higher among participants in need of both programs, or that families are less likely to continually consider WIC enrollment as a possibility.

The Distribution of WIC Benefits across Demographic Groups

In order to assess how widely distributed WIC enrollment is across socioeconomic and racial/ethnic groups, we examine the stratification of children's participation in multivariate perspective. An event history approach affords examination of children's characteristics simultaneously and accounts for right-censoring, since some children who are age-eligible, and will eventually enroll, have not yet enrolled by the end of the panel observation period. Table 2 shows results from a discrete-time logit model of the hazard of transitioning into enrollment in a given month, among eligible children. We estimate one model for the in utero/infant group, who is eligible until age one, and one model for children ages 1–5, who are eligible in six month periods. Children ages 1–5 may experience multiple transitions into enrollment since they are recertified every six months. The model for older children therefore includes a random intercept term at the child level to account for multiple observations per child, as well as an indicator for whether that child was enrolled in the previous certification period.

Figure 3 shows the predicted hazard of enrollment by child age (in months) for each age group, controlling for the covariates in Table 2. Among younger children, enrollment increases steadily throughout mothers' pregnancies and peaks right around the time of birth, declining again during the first year of life. In the 2008 panel, encompassing the period during and after the recession, first enrollment earlier in pregnancy is significantly more likely, as is enrollment after five months of age: that is, overall, the relationship between age and enrollment is flatter during and after the recession. Among older children, enrollment at all ages became more likely during and after the recession, especially at younger ages. The trend of declining enrollment with age for children over one year of age is still observed in both panels, however, suggesting that increases in need did not fundamentally change the timing of children's entry into WIC.

With respect to socioeconomic differences, Table 2 reveals a higher concentration of enrollment among children in poorer, and more poorly educated, eligible families. This pattern persists during and after the recession, leaving pronounced educational and income-based differences in the distribution of WIC enrollment. In the 2004 panel, for example, eligible older children of more-highly educated mothers were significantly less likely to participate in WIC than their peers with more poorly educated mothers. Having a mother with at least some college is associated with 18% lower odds ($e^{-0.195}$) of WIC enrollment compared to children whose mothers have less than a high school education. This pattern is similar, though less pronounced, among the younger age group. Similarly, in the 2004 panel, eligible children in higher-income families (those with a household income more than 185% of the federal poverty threshold) are significantly less likely to enroll than their lower-income peers. Higher-income younger children are 39% ($e^{-0.489}$) less likely to enroll in a given month, and their older peers are 22% less likely. Middle-income children (those between 100–185% of the poverty line) do not differ significantly from the poorest group in their likelihood of enrolling during this period, among those eligible. These findings suggest that, prior to the recession, eligible families with more educational and financial capital were more likely to use their resources to avoid enrolling in WIC.

Inspection of findings from the 2008 panel suggests a great deal of stability in this unequal distribution of benefits among the eligible population of children. Among younger children, educational differences in the odds of enrolling increase slightly, thus enrollment remains less likely among children with more highly educated mothers. This pattern is more pronounced among older children, with children in the most highly educated families 37% ($e^{-0.469}$) less likely to enroll in the 2008 panel, compared to an 18% difference in the 2004 panel. This decline in the likelihood of enrollment among children of more highly educated mothers is statistically significant across time periods ($p < 0.05$). The pronounced income-based differences prior to 2008 also persist during and after the recession, with higher-income eligible children significantly less likely to enroll than their poorest peers. There is one notable exception to this pattern, whereby during and after the recession, enrollment becomes more likely among those just above the poverty line, compared to the poorest children. In the 2008 panel, while eligible children in the highest-income group remain the least likely to enroll, children in families at 100–184% of the poverty line are 17% ($e^{0.153}$) more likely to enroll than their poorest peers. This pattern is significantly different between income groups, and marginally significant within the near-poor group across time periods ($p = 0.08$). This weak evidence for the redistribution of enrollment from the poorest families toward those with slightly more resources is consistent with findings for other safety net programs (Moffitt 2015).

Finally, with respect to race/ethnic differences in WIC enrollment, inspection of both panels reveals that eligible Hispanic children in both age groups are consistently more likely than non-Hispanic white children to be enrolled, and that this pattern changes little during and after the recession. Greater participation among Hispanic children is particularly high among those with foreign-born mothers, who are considerably more likely to enroll than both non-Hispanic white children and children born to U.S.-born Hispanic mothers. Compared to eligible non-Hispanic whites, for example, older Hispanic children of U.S.-born mothers are almost twice as likely to enroll during and after the recession, and Hispanic children born to foreign-born mothers are 3.5 times more likely to enroll. Enrollment differences between other racial/ethnic groups are less pronounced.

Variation by Income

Because WIC is a means-tested program, it is possible that the distribution of benefit receipt and enrollment across demographic groups varies by income. In order to examine whether racial/ethnic and educational differences in enrollment are more pronounced at particular income levels, we test interactions between race/ethnicity and the income categories, and between maternal education and income. Figure 4 shows racial/ethnic differences in hazard of enrollment within each income category (regressions available upon request). Comparing the top two panels of Figure 4 reveals that, while there are no significant differences in enrollment by race within income categories in the 2004 pre-recession panel ($\chi^2(8) = 10.92$, $p = 0.206$), there are significant differences between racial/ethnic groups in the 2008 post-recession panel ($\chi^2(8) = 23.90$, $p = 0.002$). Children in utero and under the age of one born to black, non-Hispanic mothers are significantly more likely to be enrolled in WIC than their peers across all income groups. Moreover, within this group, higher income is associated

with higher hazard of enrollment, while there is no such pattern among other racial or ethnic groups.

Among older children, this pattern is largely similar. While there are significant racial/ethnic differences in enrollment within income categories in the pre-recession panel ($\chi^2(8) = 16.34$, $p = 0.038$), these differences do not result in large differences in the hazard of WIC enrollment. In the 2008 panel, however, children born to black, non-Hispanic mothers are more likely than their white, non-Hispanic counterparts to be exposed to WIC, and this gap increases as income increases. Within this age group, there is also a similar, but less pronounced, trend among children born to U.S.-born Hispanic mothers, with a higher likelihood of enrollment than among non-Hispanic white children, and an increasing difference with income. This analysis suggests that, during and after the recession, eligible non-Hispanic black children disproportionately benefited from increased WIC enrollment, particularly in higher-income groups.

Figure 5 similarly examines variation in the relationship between education and enrollment by income. In the pre-recession panel for in utero children and infants, there are significant differences in enrollment by education within income categories ($\chi^2(4) = 16.17$, $p = 0.003$). This trend is primarily driven by the relatively equal probability of enrollment across education categories within the two lower income categories, and a lower but highly graded probability of enrollment within the highest (>185% FPL) income category, whereby higher levels of education are negatively associated with the hazard of enrollment. In the 2008 panel, this pattern is greatly reduced and only marginally significant ($\chi^2(4) = 8.76$, $p = 0.067$). Among older children, there is significant variation in the relationship between education and enrollment across income categories in both time periods ($\chi^2(4) = 11.20$, $p = 0.024$ for the 2004 panel; $\chi^2(4) = 17.12$, $p = 0.002$ for the 2008 panel). In this group, increasing maternal education is associated with a lower hazard of enrollment in WIC, with an especially pronounced association among the highest income group. Overall, the findings suggest that educational differences in younger children's enrollment declined among higher-income families during and after the recession, but that they persisted among older children.

Discussion

Because children are more likely to live in poverty than the rest of the population, they are especially vulnerable during economic crises, making the social safety net a key buffer against the effects of economic disadvantage on their development. Understanding the responsiveness of the nutritional safety net during this time of increased economic need, as well as the children across age, income and racial/ethnic groups share in increased access to transfer programs, is important in identifying the availability and accessibility of government assistance for those in need. Focusing on the WIC program because of its strong effects on child development, we use longitudinal data from the Survey of Income and Program Participation to examine change and stability in children's WIC enrollment before during and after the recession. Specifically, we ask: 1) whether children's WIC enrollment increased alongside economic need, and 2) how widely distributed increased nutritional safety net participation was across demographic groups.

WIC participation among eligible children clearly increased leading up to, and during, the Great Recession, suggesting that the program was responsive to increasing economic need. After the official end of the recession in June 2009, however, participation begins to decline among eligible children. This pattern stands in contrast to SNAP participation among the same families, which steadily increases during this period. These differences in the WIC and SNAP participation patterns of the same children and families suggest that the barriers to successful WIC enrollment may be higher among participants in need of benefits from both programs. This pattern suggests that WIC participation may be more sensitive to budgetary and administrative factors than SNAP, an entitlement program that is the target of considerably more economic and outreach investment, provides larger dollar value to participants, and has fewer barriers to enrollment because of its availability to all who qualify, its generally longer certification periods, and its less stringent monitoring of recipient health in connection with benefit receipt.

Examining changes in the stratification of children's WIC enrollment largely reveals a pattern of stability in the distribution of WIC enrollment and participation. Age differences in enrollment remained quite similar over time, with eligible infants more likely than either older children or those in utero to be enrolled. While enrollment is persistently most likely around the period of birth and during the first few years of life, earlier enrollment during pregnancy did become more likely during and after the recession. Though it is unclear to what extent outreach efforts disproportionately occurred in the context of prenatal care, this pattern suggests that the timing of enrollment could be sensitive to these efforts. With respect to socioeconomic status, the findings suggest that not all eligible children shared equally in increased enrollment, and that the unequal distribution of benefits has remained highly persistent over time. Children in poorer, and more poorly educated, eligible families, were more likely to enroll prior to the recession. These differences remain or increase during and after the recession, in the 2008 panel. One exception to this pattern is seen among children living in near-poverty, just above the poverty line, who become more likely to enroll than their poorest peers. Though not observed among the younger age group, this pattern of larger benefit increases among those near the poverty line, rather than below it, is consistent with some evidence on other safety net programs (Moffitt 2015). Finally, racial/ethnic differences in enrollment remained fairly steady, most notably because of consistently higher participation among eligible Hispanic children, particularly those in families with foreign-born mothers. The consistent Hispanic "advantage" in enrollment is worth further examination in order to understand whether higher enrollment is driven by particularly effective strategies tailored to this population, by a greater visibility of the program among immigrant communities, by lower stigma, or something else. There is ample evidence, for example, of stigma about accepting WIC and SNAP benefits from the government, at least among U.S.-born women (e.g., Bryant et al. 2001; Kaiser 2008), but it is not clear whether perceptions about enrollment are more favorable among immigrant women. Examining income variation in the relationship between race/ethnicity and enrollment reveals that, among higher-income families, Hispanic children (in the older age group) and non-Hispanic black children benefited disproportionately from increased enrollment during and after the recession.

The persistence of socioeconomic gaps in enrollment demonstrates that not all children benefit equally from increased WIC enrollment during periods of economic hardship. However, the findings also suggest that the economic crisis of the Great Recession did not exacerbate these differences substantially. The fact that the most disadvantaged eligible children are usually those most likely to receive WIC benefits is consistent with prior research on WIC take-up among the eligible population, and is reassuring to the extent that those children are the most in need of program assistance, as well as the least likely to have access to compensatory resources to buffer against economic disadvantage. Notwithstanding the higher enrollment among those most in need, however, enrollment is persistently low among other eligible children. Although many eligible families experienced a reduction in assets that made them less economically able to avoid the use of safety net programs, barriers to enrollment—whether related to administrative hurdles or the stigma associated with benefit receipt—may not have sufficiently declined to make enrollment more appealing to those traditionally less likely to participate. An important task for future research is to examine the reasons for non-participation among those eligible to enroll, and to understand their sensitivity to not only economic need, but to programmatic and social psychological factors related to participation.

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- Children in low-SES eligible families more likely to receive WIC prior to and after the recession.
- Eligible Hispanic children had consistently higher enrollment, especially in immigrant families.
- Differences in enrollment not drastically altered during a period of economic instability.

Figure 1.
WIC Participation among Eligible Children: 2004 and 2008 SIPP Panels

Figure 2.
SNAP Participation among Eligible Children: 2004 and 2008 SIPP Panels

Figure 3.
Age Differences in the Hazard of WIC Enrollment: 2004 and 2008 SIPP Panels

Figure 4.
Racial/Ethnic Differences in the Hazard of WIC Enrollment by Income: SIPP 2004 and 2008 Panels

Figure 5.
Educational Differences in the Hazard of WIC Enrollment by Income: SIPP 2004 and 2008
Panels

Table 1

Descriptive Statistics: 2004 and 2008 SIPP

	In utero and infants		1–5 years	
	2004 Panel	2008 Panel	2004 Panel	2008 Panel
WIC Enrollment	53.7	53.6	38.9	43.7
Age in months (S.D.)	2.4 (5.9)	2.2 (6.0)	35.6 (13.9)	35.9 (13.7)
Enrolled in SNAP	36.4	48.7	38.0	50.9
Enrolled in Medicaid	78.8	77.7	74.4	75.6
<i>Maternal Education</i>				
Less than High School	25.3	24.4	24.1	22.6
High School	33.3	33.9	31.0	33.3
Some College or More	41.5	41.7	44.9	44.1
<i>Poverty ratio</i>				
<100% of FPL	43.2	47.7	43.5	47.9
100–184% of FPL	33.6	32.6	36.1	34.8
185+% of FPL	23.2	19.7	20.4	17.3
<i>Mother's race/ethnicity</i>				
Non-Hispanic White	50.7	49.7	48.9	47.4
Non-Hispanic Black	17.6	17.2	19.1	17.2
Hispanic, US-born	15.2	17.5	15.0	17.2
Hispanic, Foreign-born	13.3	13.0	13.6	15.2
Any other race	3.2	2.6	3.5	3.0
Female (child)	49.0	49.0	49.5	48.4
Enrolled in WIC in last eligibility period			42.3	48.4
N	38310	45492	112466	144649

Table 2

Discrete-time Logit Models Predicting WIC Enrollment: 2004 and 2008 SIPP

	In utero and infants		1–5 years	
	2004 Panel	2008 Panel	2004 Panel	2008 Panel
WIC Enrollment				
Age (in months)	0.00511 (0.0066)	0.00887 (0.0056)	−0.0644 ^{***} (0.0087)	−0.0650 ^{***} (0.0071)
Age ²	−0.0130 ^{***} (0.0011)	−0.00731 ^{***a} (0.0010)	0.000230 ⁺ (0.00012)	0.000189 ⁺ (0.00010)
<i>Maternal Education</i>				
High School	0.137 ⁺ (0.076)	0.0912 (0.068)	0.0846 (0.086)	−0.103 ^b (0.076)
Some College or More	−0.114 (0.077)	−0.134 ⁺ (0.069)	−0.195 [*] (0.091)	−0.469 ^{***a} (0.081)
<i>Poverty ratio</i>				
100–184% of FPL	0.0825 (0.072)	−0.0586 (0.065)	0.0231 (0.057)	0.153 ^{***b} (0.048)
185+ % of FPL	−0.489 ^{***} (0.089)	−0.545 ^{***} (0.080)	−0.253 ^{***} (0.075)	−0.182 ^{**} (0.065)
<i>Mother's race/ethnicity</i>				
Non-Hispanic Black	0.0348 (0.078)	0.0335 (0.067)	0.221 [*] (0.010)	0.13 (0.092)
Hispanic, US-born	0.223 ^{**} (0.084)	0.272 ^{***} (0.070)	0.724 ^{***} (0.10)	0.676 ^{***} (0.092)
Hispanic, Foreign-born	0.501 ^{***} (0.089)	0.404 ^{***} (0.091)	1.263 ^{***} (0.11)	1.236 ^{***} (0.10)
Any other race	−0.404 [*] (0.17)	−0.264 (0.17)	−0.0456 (0.20)	−0.026 (0.21)
Enrolled in food stamps	0.652 ^{***} (0.072)	0.704 ^{***} (0.064)	0.892 ^{***} (0.066)	0.997 ^{***} (0.055)
Enrolled in Medicaid	1.208 ^{***} (0.10)	1.092 ^{***} (0.089)	0.815 ^{***} (0.070)	0.877 ^{***} (0.059)
Female (child)	−0.0384 (0.055)	0.00624 (0.051)	0.0261 (0.072)	−0.0584 (0.067)
Enrolled in WIC in last eligibility period			3.946 ^{***} (0.061)	3.504 ^{***a} (0.050)
Intercept	−3.092 ^{***} −0.134	−3.190 ^{***} −0.123	−3.652 ^{***} (0.20)	−3.125 ^{***} (0.18)
<i>Tests of Coefficient Equality</i>				
Education				
χ^2 (2)	14.68	13.49	18.56	25.5
p < 0.05	0	0.3	0.63	0
Poverty Ratio				
χ^2 (2)	43.45	49.42	99.14	90.99
p < 0.05	0	0.02	0.01	0
Race/Ethnicity				
χ^2 (3)	34.05	33.64	161.87	162.91
p < 0.05	0	0	0	0
N	16867	20243	70749	85105

Standard errors in parentheses

⁺ p < .1^{*} p < .05^{**} p < .01

 $p < .001$

^a indicates significant difference between 2004 and 2008 panel, at $p < .05$

^b indicates significant difference between 2004 and 2008 panel, at $p < .10$

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