Food Assistance Program Participation and Infant Growth and Health

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The Federal government administers the Food Stamp Program (FSP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) to combat food hardships or provide support to those who are at-risk of food hardships. The FSP serves as the first line of defense against hunger, enabling low-income families to buy nutritious food in authorized retail food stores. The Program is the cornerstone of the Federal food assistance programs, and provides crucial support to needy households and to those making the transition from welfare to work. For many low-income households, food stamp benefits represent an important share of household resources. Over 21 million people per month participated in the FSP in 2003, where 55 percent of the participants were children. WIC serves an alternate function, and works to safeguard the health of low-income women, infants, and children up to age 5 who are at nutritional risk by providing nutritious foods to supplement diets, information on healthy eating, and referrals to health care. WIC provides eligible families with monthly vouchers that enable them to obtain a specific nutrient-rich package of food at retail grocery stores. These food packets are designed to provide nutrients that are lacking in the target population's diet.

Despite the similar aims, the impacts of these programs on infant growth and health remain poorly understood. A review of food assistance and nutrition programs (Fox, Hamilton, & Lin, 2004) notes that these programs increase the availability of food and protein within the household and benefit households by freeing up resources to spend on other things besides food. However, there is much less support for the role of food assistance in improving nutrition at the individual level, nor impacts on self-reported health among children. This study attempts to add to this literature.

Empirical Literature

Many studies that have examined the effectiveness of WIC focus on measures of nutritional sufficiency, by and large find that WIC has beneficial effects on the health of both mothers and children. Further, most studies that have examined the impact of WIC participation prenatally on birth outcomes have also found benefits. A 1992 General Accounting Office meta-analysis (U.S. GAO, 1992) reviewed 17 studies (judged to be adequate in sample size and research design) of the effects of prenatal WIC participation on newborns. The review suggests that WIC participation reduced the incidence of low birth weight by between ten and 43 percent, and that it reduced the incidence of very low birth weight between 21 and 53 percent. Additional studies completed since this meta-analysis have also found positive impacts of the program, namely that WIC participation has a positive influence on average birth weight and reductions in low birth weight. These studies use both nationally representative data (e.g. Brien & Swann, 2001; Covington, 1995; Gordon & Nelson, 1995; Kowaleski-Jones & Duncan, 2000), as well as state-level data (e.g. Ahluwalia, et al. 1998; Bitler & Currie, 2004), the WIC-Medicaid study (e.g. Devaney, 1992) and hospital-level data (e.g. Brown, Watkins, & Hiett 1996).

Less research has been conducted on prenatal participation and initiation of breastfeeding. The WIC program encourages breastfeeding as "the best source of infant nutrition" and currently allocates a portion of expenditures for breastfeeding promotion and support. Studies using the National Maternal Infant Health Survey (NMHIS) suggest that the relationship between WIC participation and breastfeeding is negative, but is positive among women who self-report that they received advice about breastfeeding from WIC counselors (Balcazar, Trier, & Cobas, 1995; Schwartz, Guilkey, Akin, & Popkin, 1992). A more recent study (Chatterji, Bonuk, Dhawan, & Deb, 2002) using data from the NLSY found a negative association between WIC participation and initiation of breastfeeding in the reduced form and fixed effects models (two-stage models were negative but not significant).

Finally, little empirical research exists on weight gain during pregnancy, and what has been completed provide mixed results. The two national WIC evaluations found both a positive impact (Edozien, Switzer, & Bryan, 1979) and no effect of the program (Rush, Sloan, Leighton, Malvir, Horvitz, et al., 1988). Recently, empirical research has examined the impact of postnatal WIC participation on infants and children, including measures such as growth (including both underweight and overweight) and general health status. Findings from these studies suggest that infants who participated in WIC are significantly longer and significantly less underweight than infants who did not participate because of access problems (Black, Cutts, Frank, Geppert, Skalicky, et al., 2004). WIC participation is also associated with a lower likelihood of failure to thrive (Lee, Mackey-Bilaver, & Goerge, 2000).

Despite the seeming agreement in the literature on the health benefits of both WIC and FSP participation, the issue of selection bias is still present. Most empirical studies isolate the program effects by comparing the outcomes of those who participate to those who are eligible but do not participate and controlling for observed characteristics that might be associated with this. This does not necessarily remove bias due to unmeasured heterogeneity, that is unobserved differences in individual characteristics that are correlated with both participation and the outcome measure (Besharov & Germanis, 2001). Because randomized experimental methods are not possible with this policy instrument, several studies have used statistical techniques to address selection. For example, Kowalski-Jones and Duncan (2000) using a sibling-fixed effects model found positive effects of prenatal WIC participation and birth weight and infant temperament, but also noted selection bias in the OLS results as a comparison. Additionally Rose, Habicht, and Devaney (1998) used a two-stage least squares approach and found that WIC participation was associated with increased nutrient intake in preschool children, finding no evidence of selection bias in comparison OLS models. Our paper attempts to correct for selection bias by using a rich dataset that has numerous controls not available in other datasets, as well as propensity score matching.

Theoretical Perspectives

The sensitivity of early childhood to environmental influences has been demonstrated in a wide range of infant, toddler and preschooler intervention studies. Taken together, they show that early-life interventions may well be the most effective and cost-efficient approaches to promoting human capital development (Cunha, Heckman, Lochner, & Masterov, 2005). Emerging evidence from human and animal studies highlights the critical importance of early

childhood for brain development and for setting in place the structures that will shape future cognitive, social, and emotional outcomes (Shonkoff & Phillips, 2000). Epidemiological studies such those within the fetal programming literature illustrates that in utero environments directly affect health and the environment is important in causing gene expression that influences susceptibility to disease (e.g. Barker, 1998; Gluckman & Hanson, 2005). Parallel research in economics illustrates the importance of early environmental conditions on the accumulation of cognitive and non-cognitive skills (Cunha & Heckman, 2007; Knudsen, Heckman, Cameron, & Shonkoff, 2006), and research in child development (Rutter, 1979; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987).

In all, perspectives in economics, developmental psychology, and neuroscience cite the importance of early enrichment for disadvantaged children and its influence on eventual success. The environment in which disadvantaged children are raised is influenced by public policies designed to ameliorate the effects of poverty on eventual well-being. Our study examines food assistance programs as interventions that potentially do so. We focus on the first year of life as Barker and colleagues find that intervention administered in the first year after birth can compensate for under-nutrition which is associated with adult coronary heart disease (Eriksson, Forsén, Tuomilehto, Osmond, & Barker, 2001).

Data and Methods

Data for this paper are drawn from the *Fragile Families and Child Wellbeing Study* (FFCW), a longitudinal study that examines the conditions and capabilities of new unmarried parents and the welfare of their children. The FFCW study follows a cohort of 4,898 births born in 20 U.S. cities between 1998 and 2000, and families are comprised of two-thirds unwed parents and one-third married parents, a ratio that intentionally reverses the proportion of marital to non-martial births in the U.S. Mothers were initially interviewed in hospitals at the focus child's birth, and were interviewed again when children were one, three, and five years-old (five year data not publicly available).

Because we are interested in intervention and investment in the first year of life, we use the 12-month follow-up survey. Mothers who reported multiple births or were not living with the child at 12-months were excluded from our analyses. We limit the sample to those households who report incomes less than $40,000 annually in order to obtain a sample most likely to be eligible for programs. The cut-off of $40,000 was used because it represents approximately two-times the poverty threshold for a family of four and a common definition for the working poor. Actual income to needs is not available in the public use dataset, so household poverty calculations are not feasible.

At the 12-month survey mothers reported on food assistance program participation. Specifically mothers reported on whether or not they had received food stamps in the past year (equivalent to since the child's birth), or received WIC since the child was born. Mothers also report how many months they were on food stamps, and how much they received. Further, mothers who did not receive food stamps indicate whether there was a time in the past 12 months they thought they were eligible and if so whether they applied. Table 1 illustrates the prevalence of program participation among the sample. Within this sample of low-income families with infants, 38

percent of received food stamps and 83 percent received WIC during the first year of the child's life (33 percent reported receiving both).

We test several child health outcomes at the 12-month follow-up, namely mother-rated child health [scale 1= excellent to 5= poor; and dichotomous measure where "fair" or "poor" health were coded as having "poor" health (good health is omitted)]; weight of child (weight-for-age less than the 10^{th} percentile); and whether the mother reported ever breastfeeding the child. Table 1 also illustrates the weighted descriptive statistics for these outcome measures, for the overall sample and by those who participate and do not participate in FSP and WIC. Overall, 16 percent of the mothers rate their children in poor health; 23 percent of the children are below the 10^{th} percentile in weight-for-age when they are 12 months old; and 55 percent of the mothers reported ever breastfeeding the child. As illustrated in the table, there are differences between those who report receiving food assistance during the child's first year and those who do not. For example, 44 percent of the FSP participants ever breastfed their child compared to 62 percent of FSP non-participants. Fifty-four percent of WIC participants ever breastfed their child compared to 62 percent of WIC non-participants.

Preliminary regressions suggest that some of these univariate differences hold up once characteristics of the child, mother, and household are included. Specifically, child controls are sex, age, low birth weight and physical disability. For the mother we include measures of age, race, education, employment, marital status, citizenship, health, depression, smoking, and drinking. At the household level we include measures of the number of children residing in the household and household annual income. Additionally, we include city fixed effects. All regressions are weighted using the national weights provided by the Fragile Families dataset. Ordered logits were performed for the child health scale and logistic regressions were conducted for all other outcomes. Table 2 presents coefficients of the main study variables from preliminary regressions. We find that WIC participation has a negative association with breastfeeding, equivalent to a 14 percentage point (25 percent) reduction in the likelihood of breastfeeding.

Additional analysis will examine children's health care utilization including wellness visits, and differences across the income distribution as pooled analysis may mask important associations for the poorest children. We will also use the measures of perceived eligibility to test whether those who participate differ from those who think they are eligible (and potentially only differ on actual participation). Finally, as a robustness check we will use propensity score matching as a mechanism to account for selection bias. Matching involves identifying non–program participants comparable in observable characteristics to participants by using the propensity score (predicted probability of participation given observed characteristics).

Policy Implications

The Food Stamp Program served an average of 23.9 million people each month during Fiscal Year 2004, and cost $27.2 billion for the year. Further, WIC served 7.9 million people (24% women, 25% infants, and 50% children) at a cost of $4.9 billion that same year. Food assistance programs, after unemployment insurance, are the most economy-responsive federal benefit programs and are efficient in targeting populations that have the most difficulty purchasing an

adequate diet (over 95 percent of Food Stamp benefits go to households with incomes below the federal poverty threshold). Yet, the benefits are not overly generous as the average food stamp benefit is only about $1 per-person per-meal (Rosenbaum, 2005). Further, a dollar invested in WIC for prenatal women saves at least $3.50 in savings over 18 years, by reducing the amount the government spends on Medicaid, as Medicaid covers a large share of medical care costs for low-income infants (U.S. GAO, 1992).

These figures cited above stress the importance of these programs in the lives of low-income families and children, and underscore the need for research to understand the effect these programs have on children themselves. As such this paper addresses an important policy question; namely, whether participation in food assistance programs impacts the well-being of children. The FSP is designed to improve the nutrition level and food purchasing power of low-income households and WIC is designed to ensure the health of low-income women, infants, and children. As the stated intentions of the programs, it is essential that policymakers understand if these programs are having the intended effects on participants. Given that the end goal of food assistance programs is to improve the well-being of low income families, an examination of their role in influences young children's development is sorely needed.

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Table 1
Weighted Descriptive Statistics

	Overall		FSP participants		FSP non-participants		WIC participants		WIC non-participants	
	Mean or %	SD	Mean or %	SD	Mean or %	SD	Mean or %	SD	Mean or %	SD
Program Participation										
Food stamps in past year	38%	---	100%	---	0%	---	39%	---	31%	---
WIC since child's birth	83%	---	86%	---	81%	---	100%	---	0%	---
Child Health at 12 Months										
Child health (scale)	4.46	0.82	4.5	0.86	4.44	0.8	4.44	0.82	4.55	0.84
Child health (binary)	16%	---	14%	---	17%	---	17%	---	13%	---
Weight-for-age < 10th percentile	23%	---	28%	---	21%	---	24%	---	19%	---
Ever breastfed	55%	---	44%	---	62%	---	54%	---	62%	---

Table 2

Regression Coefficients

	Child Health (scale)		Child Health (binary)		Weight-for-Age		Breastfed		
	B	SE	B	SE	B	SE	B		SE
Model 1									
Food Stamps	0.23	0.25	-0.29	0.36	0.21	0.30	0.03		0.23
Model 2									
WIC	-0.44	0.34	0.40	0.42	0.29	0.39	-0.58	*	0.29
Model 3									
Food Stamps	0.25	0.25	-0.31	0.35	0.20	0.29	0.08		0.23
WIC	-0.46	0.35	0.41	0.42	0.29	0.39	-0.59	*	0.29