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Can targeted transfers improve birth outcomes? Evidence from the introduction of the WIC program

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ABSTRACT

The goal of federal food and nutrition programs in the United States is to improve the nutritional well-being and health of low income families. A large body of literature evaluates the extent to which the Supplemental Program for Women Infants and Children (WIC) has accomplished this goal, but most studies have been based on research designs that compare program participants to non-participants. If selection into these programs is non-random then such comparisons will lead to biased estimates of the program's true effects. In this study we use the rollout of the WIC program across counties to estimate the impact of the program on infant health. We find that the implementation of WIC led to an increase in average birth weight and a decrease in the fraction of births that are classified as low birth weight. We find no evidence that these estimates are driven by changes in fertility or selection into live births. Our preferred estimates suggest that WIC initiation raised average birth weight by 2 g, or by 7 g among infants born to mothers with low education levels. These translate into estimated birth weight increases among participating mothers of approximately 18 to 29 g. Estimated treatments on the treated impacts among infants born to participating mothers with low education are of similar magnitude.

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1. Introduction

The goal of the Supplemental Nutrition Program for Women, Infants, and Children (WIC) is to improve the nutritional well-being of low income pregnant and postpartum women, infants, and children under the age of five. Many studies show that pregnant women who participate in WIC give birth to healthier infants than those who do not, and this has contributed to broad support for the program: since its inception in the mid 1970s, the number of WIC participants has grown to 8.7 million, at an annual cost of 6.2 billion dollars.[1]

Recently, however, the validity of existing studies – most of which use comparisons between participants and non-participants to estimate WIC's effects – has come under question. Several researchers (Besharov and Germanis, 2001; Bitler and Currie, 2005; Brien and Swann, 2001; Chatterji et al., 2002; and Kowaleski-Jones and Duncan, 2002) have drawn attention to the fact that selection into the WIC program is non-random. If pregnant women who participate in WIC are healthier, more motivated, or have better access to health care than other eligible women, then comparisons between the children of participants and non-participants could produce positive program estimates even if the true effect is zero. Conversely, if WIC participants are more disadvantaged than other mothers, such comparisons may understate the program's impact.

Recent studies have used several different approaches to address this problem. Bitler and Currie (2005),Joyce et al. (2005, 2008) and Figlio et al. (2009) compare outcomes among more narrowly defined treatment and control groups; Brien and Swann (2001), Chatterji et al. (2002) and Kowaleski-Jones and Duncan (2002) include maternal fixed effects in their regression analyses; and Brien and Swann (2001) and Chatterji et al. (2002) utilize limited state variation in WIC program parameters. These approaches yield smaller WIC estimates, yet they, too, suffer from identification problems. For example, even estimates based on comparisons of observationally similar participants and non-participants may suffer from omitted variables bias. Likewise, within family estimates may be driven by changes in family circumstances between births. And while evaluations of other programs aimed at helping disadvantaged families – including AFDC/TANF and Medicaid – commonly leverage significant variation in eligibility and benefit rules across states, the parameters of the WIC program, like other food and nutrition programs in the United States, exhibit little geographic variation.[2] Ultimately, as noted in a recent review of WIC studies by Ludwig and Miller (2005), WIC analyses are challenged by the absence of a "clearly exogenous source of identifying variation (that is, a randomized or natural experiment that drives variation across low-income women in WIC enrollment)."[3]

This study addresses this problem by exploiting variation in WIC program introduction across geographic areas and over time. WIC was first established as a pilot program in 1972, and WIC sites were

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[1] For a recent summary of the extensive WIC literature see Currie (2003). WIC program information available on USDA website, see http://www.fns.usda.gov/pd/wisummary.htm.

[2] Another difference between WIC and AFDC/Food Stamps is that WIC is administered by local non-profits.

[3] Ludwig and Miller (2005).

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established in different counties and in different years between 1972 and 1979. This feature of the program's introduction allows us to perform a difference-in-differences analysis, in which we compare changes in infant health within a set of "treatment" counties (those adopting WIC in a given year) to changes within a set of "control" counties (those who have not yet adopted WIC).

We find that when WIC is made available by the third trimester, average birth weight in the county increases by approximately 2 g. This estimated effect is driven by women with low levels of education and women living in high poverty counties — precisely the women who are most likely to be eligible for program benefits. Among women with low levels of education, WIC increases average birth weight by 7 g and reduces the fraction of births that are classified as low birth weight by 1.4%. Using estimates of WIC participation rates, these results for low educated women suggest a 10 (11) percent increase (decrease) in average birth weight (fraction low birth weight) of children born to WIC participants. Since we find no evidence that WIC affects fertility or characteristics of mothers giving birth, our estimates are unlikely to be generated by indirect effects on selection into birth.

In the next section we provide a brief description and history of the WIC program and in Section 3 we review the prior WIC literature. In Section 4 we present our research design and in Section 5 we describe our data. We present our results in Section 6 and we conclude in Section 7.

2. Background

The goal of the WIC program is to increase the nutritional well-being among low-income pregnant/post-partum women, infants and young children by providing food packages and nutritional counseling. Five types of individuals are eligible for WIC: pregnant women, post-partum women with a child under six months, breastfeeding women with a child under 12 months, infants, and children under age five. Participants must live in households with family incomes below 185% of the poverty line or become eligible through participation in another welfare program such as Medicaid, Temporary Assistance to Needy Families, or Food Stamps. They must also be certified to be at nutritional risk, but virtually all financially eligible persons appear to satisfy this requirement (Ver Ploeg and Betson, 2003). Food packages are typically provided in the form of vouchers that can be used to purchase specific items from participating supermarkets. WIC maintains a list of approved foods, which must contain protein, calcium, iron, and Vitamins A and C.[4] Post-partum women have access to free infant formula and (in later years of the program) breastfeeding services.

The WIC program was first established as a pilot program in 1972, and became permanent in 1975. The program was developed in direct response to policy recommendations highlighting health deficits among low-income individuals that might be reduced by improving their access to food. It was further recognized that, by providing food at "critical times" to pregnant and lactating women and young children, it might be possible to prevent a variety of health problems (Oliveira et al., 2002).

WIC sites were established in different counties between 1972 and 1979, with legislation requiring that the program be implemented first in "areas most in need of special supplemental food" (Oliveira et al., 2002). The first WIC program office was established in January 1974 in Kentucky, and had expanded to include counties in 45 states by the end of that year. WIC was intended to supplement food stamp benefits and the authorizing legislation specifically did not preclude a person from WIC participation if they were already receiving food stamps.[5]

[4] WIC approved foods include juice, fortified cereal, eggs, cheese, milk, dried beans, tuna, carrots, and iron-fortified infant formula.

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

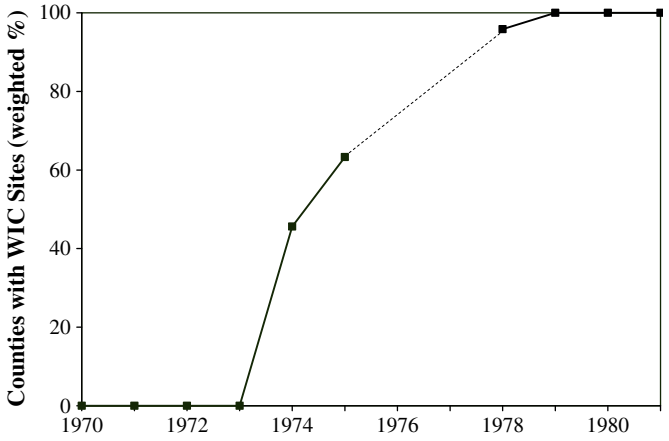

Fig. 1. Weighted percent of counties with WIC programs, 1970–1981. Notes: As noted in the text, we do not have any data on WIC coverage for 1976 and 1977. In 1978, we observe data for some but not all states. The 1978 value is calculated for this subsample of counties. See text and Appendix A for details.

We have obtained data on the year the first WIC programs were implemented in a county. These data were assembled from five documents listing all active WIC programs as of 1974, 1975, 1978, 1979, and 1989 and are more fully described in Section 5 and Appendix A. Fig. 1 documents the aggregate rollout of WIC by presenting the fraction of counties (weighted by 1970 population) that had WIC programs in place in each year. The figure clearly shows that there was a dramatic increase in exposure to the program between 1974 and 1979.[6]

Fig. 2 presents a map of the U.S. counties in 1974, 1975, 1978 and 1979. In each panel, black counties identify those counties that had a WIC program in place. White counties did not have a WIC program. Gray counties are counties for which we have no information (the reason for this missing data is explained below). As is clear from these figures, there is a considerable amount of geographic variation in the timing of WIC implementation, both within and across regions. Our identification strategy hinges on this county level variation in WIC "treatment."

3. Existing literature

There are many studies that examine the impact of WIC on birth outcomes, breastfeeding, and nutritional intake (see Currie, 2003 for a review of the literature), and most find that women who participate in WIC give birth to healthier infants than non-participants (Currie, 2003; Devaney et al., 1990). At issue, however, is the extent to which such studies provide information about the program's true causal effect. If WIC recipients differ from non-recipients in other ways, then some of the differences in children's outcomes may reflect differences in the mothers' characteristics. For example, if pregnant women who participate in WIC are healthier, more motivated, or have better access to health care than other eligible women, comparisons between the children of participants and non-participants could produce positive program estimates even if the true effect is zero (Besharov and Germanis, 2001; Brien and Swann, 2001; Chatterji et al., 2002; and Kowaleski-Jones and Duncan, 2002). Conversely, if WIC participants are more disadvantaged than other mothers, such comparisons may understate the program's impact. A detailed examination of participating vs. non-participating mothers' characteristics suggests that WIC mothers are negatively selected from the pool of eligibles (Bitler and Currie, 2005).

[6] Note that 1976 and 1977 are omitted because we have no information for those years.

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