Determinants and Effects of WIC Rollout: Evidence from Newly Digitized Data from the National Archives

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Abstract

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program provides eligible low-income, nutritionally at-risk postpartum and pregnant women, infants, and children under age five with nutritious food. The WIC program was created during the War on Poverty in the 1970s, with the first clinic opening in January 1974. WIC is run by a host of non-profit clinics that screen women for nutritional risk and other eligibility. At screening, women obtained either vouchers that could be redeemed at participating stores for specific food items or picked up from distribution sites. Previous work by Hoynes, Page, and Stevens (2011) examined the effect of WIC adoption on birth outcomes using two-way fixed effects models. We have augmented their rollout data with extensive new data from the National Archives on State WIC plans through 1980, allowing us to detect with more granularity when-and-where WIC was implemented. We also bring new methods to deal with detecting pre-trends and obtaining estimates that are robust to treatment effect heterogeneity across places and over time. We find robust evidence that access to WIC in women's county of residence by the second trimester leads to higher birth weight and a reduction in the probability of low birth weight, with larger effects for Black and other race mothers. For Black mothers, we find that exposure to WIC increases birth weight by around 8.8 grams, on a baseline of 3083 grams, or a 0.28% effect, while it decreases the probability of low birth weight by 0.31 percentage points or 2.1% of the mean. We roughly convert these to treatment on the treated estimates by inflating by the national participation rate for black women in 1986; 36 percent of pregnant black women obtained WIC. This suggests treatment on the treated effects for birth weight of around 25 grams, and for low birth weight of -0.85 percentage points, both clearly economically meaningful. These results hold whether we focus on standard two-way fixed-effect models or newer approaches to deal with treatment effect heterogeneity (e.g., Sun and Abraham, 2021). These are relatively large effects; the magnitudes of the intent-to-treat effects are similar to those for Food Stamps for Blacks found by Almond, Hoynes, and Schanzenbach (2011). Effects for Whites are smaller for birth-weight (4.4 grams) and much smaller and statistically insignificant for low birth weight (-0.05). These findings show WIC reduced disparities between Blacks and Whites in low birth weight by 12 percent. Ongoing work explores potential explanations for these differential findings by race.

1 Introduction: Motivation and Significance

Health disparities among racial groups are an important concern to researchers and policymakers. These disparities begin at birth and persist throughout the lifetime. This is paramount because an individual's health at birth is a key determinant of long-term human capital, well-being, and economic self-sufficiency citepcurrie2011,black2007cradle. During the 1960s and early 1970s, the United States (U.S.) established a series of safety net programs aimed at helping disadvantaged individuals, including Food Stamps, the School Breakfast Program, Head Start, and Medicaid, as well as the program that is the focus of our attention, the Special Supplemental Nutrition Program for Women, Infants, and Children Program (WIC).

WIC is a means-tested program, currently offering benefits to children aged 0-4 and pregnant women whose income is below 185% of the Federal Poverty Guideline. At the time of our study, conditional on living in a location authorized to be served by a local WIC program, eligibility was mostly conditional on the presence of a pregnant women or children under 4 (and, later, 5) in the household, nutritional risk, and participation in or eligibility for a free or sliding-scale medical program. WIC was operated by non-profit or government-operated clinics, and eligibility was determined by health professionals who assessed nutritional risk and whether families satisfied the means testing.

WIC has the potential to influence health at birth and beyond, and to ameliorate gaps in health outcomes. First, it provides nutritious food to low-income, nutritionally at-risk postpartum, pregnant, and breastfeeding women, infants, and children under age five. Bendick Jr. et al. (1976) report that in 1976, the WIC food package relevant for pregnant women consisted of milk or cheese, eggs, high-iron breakfast cereal, and high-vitamin fruit juice, with average monthly food costs of about $20 per month, or about 39 percent of average food at home spending in 1974 (Manchester, 1976).[1] Second, it also provided referrals to other health and social safety net programs as well as nutritional education. At the time of WIC's creation, women obtained either vouchers that could be redeemed at participating stores for specific food items or they could get groceries delivered or pick them up at local warehouses or, in some cases, at the clinics themselves. Today, the program has transitioned to electronic benefit transfer (EBT). The research literature on WIC has established that the current incarnation of this program improves birth outcomes (e.g., Rossin-Slater (2013); Figlio et al. (2009)) and improves the quality of nutritional intake.

[1] Important parts of the package for infants were infant cereal, and, in particular, iron-fortified infant formula.

We add to this literature by exploring the roll-out of the WIC program during the early 1970s. The WIC program was created at the tail end of the War on Poverty, with the first clinic opening in January 1974 in Pineville, KY. Over the next few years, the USDA enacted a series of program changes but was also constrained by lawsuits to expand the program significantly. We take advantage of this quasi-experimental variation in WIC implementation to study its effects on pregnancy and birth outcomes.

We pay particular attention to how the program influences birth outcomes by race, focusing primarily on Black-White differences but also showing distinctions between Whites and Other race groups (exclusive of Native Americans, who we study elsewhere).[2]

There are multiple reasons that might plausibly explain why WIC would influence infant health and race-based health gaps during pregnancy. First, eligibility, participation, and take-up of WIC are substantially higher for Blacks than Whites, with Other racial groups' participation being in the middle. Second, Black infants in this period had far worse birth outcomes than their White counterparts, again with most other racial groups being in the middle. For example, average Black infant's birth weight in our sample is 3079 grams, while that for White infants is 3298 grams, a difference of 219 grams; and 13 percent of Black infants have low birth weight, compared to 6 percent of White infants.

We next explore three other possible explanations. The first is differences in local area characteristics. Non-Whites live in locations with higher poverty rates, and patterns of residential segregation suggest that places where Blacks or Other races lived might differ from those where Whites lived, and this could affect outcomes. A second possible explanation is differences in the healthcare infrastructure where people lived (e.g., access to hospitals and doctors, as well as to Community Health Centers, which were heavy providers of healthcare to minority groups during the 1980s). A third explanation is the racial animus of the time, with Black mothers (and Other mothers) facing a less welcoming environment (we acknowledge this is the hardest to model well). Thus, it is plausible that for all of these reasons, by improving nutritional intake during pregnancy and possibly through referrals or nutritional education, WIC can reduce the incidence of low birth weight and increased birth weight.

Our paper revisits prior work by Hoynes et al. (2011)[3] who examined the effect of WIC

[2]We exclude Native Americans from this study, but are examining them in another paper. Native Americans who reside on so-called Indian Land Areas often have access to WIC run by Indian Tribal Organizations, which are quite different from the clinics and local agencies which operate the program elsewhere. Further, much of the rest of the social safety net there is distinct from that offered in the rest of the US. For the rest of this paper, "other" excludes Native Americans and primarily includes Asians, Pacific Islanders, and Hawaiian Natives.

[3]Sometimes we use "HPS" to reference this important work.

adoption on birth outcomes using two-way fixed effects (TWFE) models. We have augmented their rollout data with extensive new data from the National Archives on State WIC plans through 1980, allowing us to detect with more granularity the time and geographic coverage of WIC introduction. We also bring new methods that are robust to treatment effect heterogeneity across places and over time. In addition, we focus on examining differential effects by race and explore mechanisms that could explain that heterogeneity.[4]

Because places that adopt WIC have different pre-WIC adoption characteristics, our preferred estimates use inverse propensity score weights to adjust the control group observations so that the pre-WIC distribution of economic conditions, demographics, characteristics of the health care system, other War on Poverty Programs, and birth outcomes are balanced across the treatment and control groups. Our preferred estimates combine this with Sun and Abraham's approach, finding that WIC adoption led to a statistically significant increase in birth weight of 8.8 grams for Black infants and a statistically significant decline in low birth weight of 0.3055 percentage points, both economically meaningful. This compares to an increase in average birth weight of 4.4 grams for White infants and a statistically insignificant decline of 0.05 percentage points for White infants. This suggests that WIC lead to a decline of around 4 grams on average in the overall Black White birth weight gap or 1.7 percent and a decline of about 0.26 percentage points, or 3.7 percent. $^{N}ext, wediscusstheWICprograminmoredetailinsection2, touchondatainsection3, discussouranalyticappr$

2 The WIC Program and WIC Rollout

Background

As noted above, the WIC program during our time period provided access to either vouchers to obtain healthful foods rich in nutrients of concern or to home-delivered food or access to food at warehouses or clinics to pregnant, postpartum, and breastfeeding women and young children using or eligible for free or subsidized health care, who were also nutritionally at risk.

[4] Malinovskaya (2023) looks at long-run effects of WIC exposure in utero on adults, using a combination of the HPS WIC rollout and more detailed information for the state of Texas combined with restricted use Census data. She finds significant, economically meaningful effects for Black adults' health (concentrated in places with higher teen pregnancy rates and poverty rates), and similarly large effects for White adults' self-sufficiency.

Rollout of WIC between 1974 and 1980

The WIC program was established as law in 1972, but the first clinic became operational in early 1974. A series of lawsuits from outside groups and efforts by the Nixon, and Ford administrations to shrink, change, or end the WIC program led to considerable variation over time and across places when WIC programs were established. The WIC program has never been an entitlement, and the process for selecting sites varied extensively across the early period of its rollout. Numerous congressional hearings include presentations from non-profits who wanted to establish WIC clinics but were not selected. This is important for establishing the plausibility of our claim that the location of WIC clinics is idiosyncratic. We also explore below the extent to which the timing and location of WIC clinics are explained by the presence of the other War on Poverty programs or economic or demographic conditions.

We build upon WIC rollout data originally collected by Hoynes et al. (2011), who assembled information on the year of the first WIC program implementation in a county from four sources: i) A list of local agencies from 1974 Congressional Hearings; ii) A list of local agencies from a 1975 WIC report by the Children's Foundation; iii) A list of counties served by WIC programs in 1978 in 13 states that participated in the Migrant WIC program (WIC Migrant Directory); and iv) A list of local agencies operating in 1979 from the Children's Foundation directory of Special Supplemental Food Programs for Women, Infants and Children.

We fill in many of the resulting data gaps using National Archives sources and some other documents.[5] We digitized information from WIC Program State plans that states had to provide to USDA from fiscal year 1978[6] to 1981.[7] In 1976, a court order based on a lawsuit that USDA lost required USDA to ensure that the program was extended to those women and infants most in need. As a result, USDA required State agencies to develop Affirmative Action Plans as part of the WIC program's state plans and this resulted in our having access to these data.

Each state published lists and/or maps that listed WIC agencies currently participating and counties served, counties planning to participate, and counties not participating; some

[5] Hoynes et al. (2011) have limited data for 1976 and 1977, but we also have less granularity that year. This is due in part to 37 states and DC that are not in the Migrant WIC Program and hence are not in the WIC Migrant Directory that have omitted data in those years. It is also due to the fact that WIC state plans were not available earlier than FY 1978 before USDA lost a lawsuit about opening the program to communities with needy applicants.

[6] We have State Plans for seven states in FY 1978.

[7] The Federal Government's fiscal year currently runs from October 1st to September 30th. During our sample period, the Fiscal Year moved by one quarter, so the Fiscal Year ended earlier in the year, on June 30.

states included information by county of special populations served; the specific information included and how it was presented varied by state. We digitized these state plans as well as some other documents to measure rollout, and for January 1981, data on take-up and caseloads at the county level from 1981 Congressional hearings. (Appendix A describes our data and the digitization process.)

Figure 1 Panel A shows the evolution of WIC adoption over time. In 1974, WIC started in 359 counties, and its adoption expanded significantly throughout the rest of the 1970s, with 2,390 counties having adopted by 1980.[8] Figure 1 Panel B depicts the roll-out of WIC across counties over time on a map of the U.S. The map clearly illustrates that there is considerable variation both across time and within states across counties.[9]

3 Data

Data on birth outcomes are from Vital Statistics birth records from 1968 to 1981.[10] These data are created from individual birth certificate records and represent either a 50% or 100% sample of births occurring in each state (more detail about our sample selection is available in the Data Appendix, Section B). Our primary outcomes of interest are birth weight and whether the infant is considered low birth weight (birth weight $< 2,500$ grams, an important threshold at the time). Also, we examine several additional outcomes from the birth certificate: whether the infant was classified as having a very low birth weight (birth weight $< 1,500$ grams), having a very high birth weight (birth weight $> 4,000$ grams), and whether the infant was small for gestational age or large for gestational age;[11] and whether the infant was born prematurely (before 37 weeks of gestation). The prenatal care measure we use is any prenatal care (we intend to update this with a prenatal care adequacy index later).

[8] First, note we exclude Virginia, Alaska, and Hawaii from our sample. Second, note that we do not have comprehensive roll-out documents in 1976 and 1977, and the number of counties in those years comes from retrospective information in some of the State WIC plans. We do note that other documents show that roll-out in those years was relatively rare.

[9] Figure A.1 compares our compilation of WIC roll-out with that from Hoynes et al. (2011), showing we found a substantive share of new roll-out locations relative to this preexisting literature due to our novel sources for rollout.

[10] Vital Statistics micro-data are available starting in 1968, and county identifiers are publicly available through 1988. We stopped in 1981 because this was the end of our digitized data on WIC adoption timing, and there were also program cutbacks in FY 1981 due to Reagan Administration policy choices. For the end of the period, we also have novel data on participation and take-up by county in 1981, but nothing more comprehensive for the intervening period.

[11] "Small for gestational age" is defined as being in the bottom 10% in birth weight of all infants born at the same gestational age in the same year, while "large for gestational age" is defined as being in the top 90% among infants born at the same gestational age.

The birth certificate data also includes information on the mother's age, race, child gender, and, in some states and years, marital status, place of residence of mom, and mom's educational attainment. The data are collapsed into cells by county, year of second trimester of birth (the most common time for women to join WIC), and race. Our results focus primarily on Blacks and Whites, but we do present some results for an "Other" group, as discussed in Appendix B. Regressions and summary statistics are then either weighted by the number of births in each cell (race by county by year of second trimester), or as discussed below, by this times an adjustment for the control group to make it balance some pre-WIC Xs across treatment and control. We do this cell-based regression to facilitate computation and, more importantly, because this is the relevant level of aggregation for the difference-in-differences (DD) models we use, which allow for heterogeneity in effects across a place or over time by race group. However, our results are robust to using individual-level data and diverse sets of controls.

We combine these Vital Statistics data with the WIC roll-out and various other county-level characteristics; including the population in 1970; exposure to other important War on Poverty programs shown to affect birth outcomes (Food Stamps, Community Health Centers); and economic, safety net, and demographic characteristics (such as spending on Medicare and unemployment insurance compensation).

As mentioned above, we assign exposure to WIC and other covariates based on the calendar year of the second trimester of the birth, using the reported gestational age where available, and using 40 weeks when gestational age is missing. We do so because women typically become aware of their pregnancy status after approximately five weeks of gestation and thus are unlikely to enroll in the WIC program until then. To calculate the year of the second trimester, we first compute the month and year of conception using information on the month and year of birth and gestational age in weeks (converted to months). Around 30% of births have missing gestational age, and for them, we assume 40 weeks (the median). After calculating the month and year of conception, we calculate the month and year of the second trimester. It is worth noting that our results are robust to assigning 38 or 39 weeks of gestation for those births with missing data and using the year of the third trimester to assign exposure to WIC and other covariates.

4 Empirical Strategies

We exploit temporal and geographic variation in the rollout of WIC to estimate the causal effect of access to nutritional investments during pregnancy on birth outcomes. We employ 2

main strategies. The first is a standard difference-in-differences (DD) approach (or a related approach of (Sun and Abraham, 2021) to deal with bias issues in staggered DD designs when there is heterogeneity in treatment effects across locations over time). We discuss this first. Then, we consider a complementary approach related to the doubly robust approach of (Sant'Anna and Zhao, 2020) used in a similar setting by (Cunningham and Goodman-Bacon, ming).

Our difference-in-difference specifications is:

$$Y_{rct} = \alpha + \beta \cdot WIC_{ct} + C_{ct} + \gamma_c + \tau_t + \epsilon_{rct} \tag{1}$$

where Y_{rct} is the birth outcome by cell defined at the r race, c county, and t year of the second trimester level. WIC_{ct} is an indicator equal to 1 if individuals are exposed to WIC in the year of their second trimester.[12] C_{ct} are county time-varying controls that could confound the effects of WIC and include the 1970 population as well as hospitals per capita, the presence of Food Stamps, and Community Health Centers in the county. γ_c, τ_t are county and year of the second trimester fixed effects, which absorb time-invariant county characteristics that could be correlated with WIC rollout and time-varying national changes, respectively. Each cell observation is weighted by the number of births in the cell, and our estimates generally are stratified by race, with a focus on black and white mothers.[13] Standard errors are clustered at the county level. The coefficient of interest is β, which measures the static DD estimate of the effect of WIC. This coefficient is identified from changes in birth outcomes between births exposed to WIC and non-exposed before and after the rollout. Our control group in the two-way fixed effects models is the set of counties that have not adopted WIC by 1980.

We also implement the approach of (Sun and Abraham, 2021) to deal with such DD models in settings where there may be heterogeneity across groups adopting over time (here across counties adopting in the same year of the second trimester and across counties adopting in different years of the second trimester). Lastly, to examine dynamic treatment effects, we estimate an event-study version of equation 1.

4.1 Determinants of WIC adoption

The validity of our research design relies on the assumption that the timing of WIC rollout across counties is uncorrelated with other county, time-varying determinants of our

[12] Our results are robust to defining exposure according to the third trimester of pregnancy.
[13] Results for non-Native Other Mothers are in the Appendix.

outcomes of interest. To provide evidence on this assumption, we test whether 1970 county characteristics (pre-program) predict the timing of a county's WIC program implementation in Table A.1, following a similar approach to that used by other WOP studies (Hoynes and Schanzenbach, 2009; Bailey, 2012; Bailey et al., ming). The dependent variable is the year of WIC's introduction, expressed as an index equal to one beginning in 1974. The results, presented in Table A.1, include models with and without state-fixed effects, both unweighted and weighted by county population in 1970. We find that urban city, population, poverty level, the number of hospitals per capita, and the presence of a Community Health Center (CHC) before 1975 are all associated with earlier WIC introduction. However, the quantitative importance of these predictors is small, and most of the variation remains unexplained (as illustrated by the low R-squared, which ranges from 0.1 and 0.37). It is also important to note that despite the requirement to create an affirmative action plan to consider where to expand WIC after USDA lost a lawsuit in 1976, there is no evidence that the share of non-White persons in the state or the infant mortality rate predict timing in our sample period (the coefficients are quite small and statistically insignificant).[14] This supports our identification strategy as there is no strong evidence of endogeneity in the timing of WIC roll-out. However, unobservables may still be a concern. To ameliorate this issue, we take two approaches, explained in detail below.

4.2 Propensity-score weights

First, we note that, of course, any such approach is reliant on our adopting counties being comparable to our non-adopting counties. Thus, in addition to TWFE and Sun and Abraham (2021) estimates using all counties that adopted by 1980 and all other non-adopting counties (except for Alaska, Hawaii, and Virginia), our preferred estimates use an alternative approach related to Sant'Anna and Zhao (2020)'s doubly robust approach and that of Cunningham and Goodman-Bacon (ming) by using a propensity score that predicts whether a county had adopted WIC by year 1980 as a function of 1970 county characteristics and whether the county had other War on Poverty programs pre-WIC implementation. We then adjust the weights of possible control county cells by the counties' probability of being treated counties, based on pre-1974 county characteristics. This involves estimating a logistic model of having adopted WIC by 1980 as a function of pre-1974 county characteristics, which include birth outcomes, the presence of Community Health Centers and the presence of Food Stamps by 1973, county demographics, measures of the medical system, as well as 1970 poverty and population. More precisely, the models include measures used to designate counties as

[14] In future work, we will explore whether there was a role for these measures after 1976.

medically under-served in the 1980s (the share of the population under poverty in 1969, the share of the population 65 and older in 1970, the infant mortality rate in 1970, and the number of doctors per capita in 1960), and additional population controls such the share of the population under 5 years old, the share of the adult population with various levels of education in 1970, the share non-white in 1970, the share urban/rural in 1970, 1970 real spending on Medicare, State Unemployment Insurance payments, and the log of the county population. It also includes the infant mortality rate in 1970, the teen birth rate in 1970, the share of births with low birth rate in 1970, and measures of white and black AFDC participation by women and children (the latter used by (Goodman-Bacon, 2021) as a proxy for Medicaid eligibility for those on AFDC). We then drop or "trim" counties if their predicted probability of being treated $\hat{p}$ is more than 0.99. For the remaining counties, the cell weight is left as is (the number of births in the cell) for treated counties. For control counties, we weight the cells by the number of cell births times $\hat{p}/(1-\hat{p})$, where $\hat{p}$ is the county probability of having adopted WIC by 1980.[15] This is what we present in Tables 1 and 2 and the event study results (Figure 3). This has the advantage of making sure our counties are similar along all these dimensions before WIC was implemented without our controlling for a host of other county time-varying controls, which can themselves also contaminate the ATT estimates.

Second, our next most preferred specification controls for county Community Health Center exposure, population, and the number of hospitals per capita each year, as well as Food Stamp Program roll-out. Importantly, our conclusions do not rely on the inclusion of these covariates, and these second most preferred estimates are very similar to those from the preferred doubly-robust (e.g., Sant'Anna and Zhao (2020) and other specifications that only include county and year-fixed effects, as we show in the robustness checks. Also, our findings are robust to further alternative specifications that include 1970 county characteristics interacted with year dummies (e.g., as in (Almond et al., 2018)), and even state-by-year fixed effects.

Finally, we acknowledge concerns raised by recent work discussed below about heterogeneity across timing of adoption and group adopting in group-time average treatment effects. We discuss this more below, but note that for the event studies, we rely on the approach Sun and Abraham (2021), which addresses possible contamination in pre-trend estimates from post-treatment effects.

[15]Note that the controls in this regression which include the main controls about the safety net later and others do not vary over time and are absorbed by the county FE thus we do not control for them as is normal in a doubly robust setting.

4.3 Parallel trends with p-score weighting

The second key assumption is the parallel trends assumption. We assume that in the absence of the program, counties with and without WIC would have had similar trends in birth outcomes. Figure 3 shows our tests of parallel trends, using the propensity score weighting and Sun and Abraham (2021). Figure 3 establishes that for Black mothers, using the Sun and Abraham (2021) approach, there is no strong evidence of pre-trends in birth weight across the time period, although the 3-year pre-dummy is statistically significant.[16] Pre-trends are somewhat more present among the births to White mothers for birth weight, although we note that they are only significant for year 5 before WIC adoption.

Next, we acknowledge that the standard practice until recently has been to estimate these models using two-way fixed effects (TWFE) models, which we present. However, recent developments in econometrics have shown that this method may lead to coefficients for the ATT to be biased in staggered designs such as ours (Goodman-Bacon, 2021; Sun and Abraham, 2021; Callaway and Sant'Anna, 2020; de Chaisemartin and D'Haultfœuille, 2020). These studies have shown that causal identification under TWFE relies on the assumption of homogeneous treatment effects across location and year of adoption of the policy, which fails if treatment effects vary on average across cohorts (groups of counties that adopted the policy in the same year) or across time. The bias here can arise because earlier-treated units are used as comparison groups for later-treated units, which is only valid in the case of constant treatment effects, and the situation is more complicated with time-varying controls and groups of different sizes across time. In the presence of such heterogeneous treatment effects, on average by adopting cohort and time of adoption, this comparison may lead to bias since the parallel trends assumption may no longer hold for some of the comparisons of later-adopting locations to already-adopted locations in the presence of non-constant effects.

4.4 Evidence about negative weights and correlation of weights with timing and other factors

To partly assess whether treatment effect heterogeneity is a potential issue in our setting, we perform a diagnostic test proposed by de Chaisemartin and D'Haultfœuille (2020). These authors show that the TWFE estimator is a weighted sum of several difference-in-differences estimators across cohorts and periods;[17] These weights sum to one, and some may be neg-

[16] We further note that in estimates not reported, when we restrict our sample to counties with at least 3 years before and 3 years after WIC adoption, this coefficient is not significant and is considerably smaller.

[17] These difference-in-differences estimators can be of the following types: For early treated groups using never treated as a comparison, for later treated groups using never treated as a comparison, for early treated

ative. Their proposed test first estimates the standard TWFE model extract the implied weights and examines whether these estimated weights are correlated with factors that are associated with the size or the intensity of the treatment effects. In our context, these test results are presented in Appendix Table A.3.[18] The TWFE weights are correlated with treatment year, mother's race, hospitals per capita, and State unemployment insurance compensation indicating the possible presence of treatment effect heterogeneity. Also, around 15% of the TWFE weights are negative. This evidence may show that TWFE may not be appropriate in our setting because heterogeneous treatment effects can lead to bias.

For this reason, we use a procedure developed by Sun and Abraham (2021) (SA) that accounts for dynamic treatment effects across cohorts. This methodology divides units into different cohorts depending on when they receive the policy, plus a never-treated group that is used as a comparison group. The estimation procedure identifies the cohort-specific average treatment effect on the treated, $\text{CATT}_{e,l}$, in relative time period l for the cohort who received the intervention at time e. Their interaction-weighted estimator uses a saturated regression, interacting relative time dummies with cohort dummies (excluding indicators for the comparison group). Then, to calculate the static DID estimator, the estimated CATTs are averaged across the post-period using the sample share of each cohort as weights. This method gives a consistent estimate of the treatment effect under the parallel trends and no anticipation assumptions. Sun and Abraham (2021) show that their estimator is robust to heterogeneous treatment effects. For comparison, we present estimations using both TWFE and SA. We note that in our setting, the "never treated group" is the set of counties that had not adopted WIC by the fiscal year 1980, being the second trimester of pregnancy.

5 Results

5.1 Vital Statistics outcomes

5.1.1 Propensity score adjusted approach

Tables 1 and 2 present our results, using our approach which resembles the double-robust Sant'Anna and Zhao (2020) approach, using both TWFE (Table 1) and Sun and Abraham (2021) (Table 2). These results show that the effects of WIC coming to your county are significant and meaningful. Column 1 of Table 1 shows that children of Black mothers

groups using later treated as a comparison, and for later treated groups using early treated as a comparison. The last type is particularly problematic as early treated groups may not be a valid comparison group for later treated groups in the presence of treatment effect heterogeneity (Goodman-Bacon, 2021).

[18] We note that since we weight our regressions by population and adoption increases over time, there is also a potential mechanical correlation with treatment year.

exposed to WIC in their county experienced a statistically significant birth weight increase of 7.5 grams, and a statistically significant decline in low birth weight of 0.2752 percentage points. Children of White mothers experienced an increase in birth weight of 3.6 grams, and no significant improvements in the prevalence of low birth weight. Analogous Sun and Abraham (2021) estimates are even larger, suggesting a birth weight increase with WIC adoption of 8.8194 grams and a decline in low birth weight prevalence of 0.3055 percent. Effects for White mothers are about half as big and the effects on low birth weight prevalence are small, negative, and statistically insignificant.

To translate the ITT estimates here into average TOT effects, we need information on the fraction of pregnant women who participated in WIC by race during our study period. These are reported in Figure 2, and the data sources are listed in the table notes. To approximate that information, we use the only information available to the best of our knowledge about WIC participation by race, from 1986 from Food Research and Action Center (1988). The WIC participation rate (the ratio of the number of Black participants who are women to the number of singleton births in a given year) for Black pregnant women was 36% and for White women, it was 15%. If every county had WIC by 1986, then this would be a crude estimate of a long difference of the first stage, as no one was on WIC in 1968–1973, and 36% or 15% were on in 1986. Of course, these numbers are averaging participation in places with WIC with that in places that don't have WIC, so the right TOT adjustment would surely be to divide by something larger than these participation numbers, as the 36% for Blacks for example mixes a 0 in some places with a higher number in others, and it is that higher number we would ideally use. Using this information to scale our ITT thus provides an upper bound for the TOT, Sun and Abraham (2021) estimates give an estimated TOT effect for birth weight of at most 24.5 grams for Blacks and at most 29 grams for Whites, and a decline in low birth weight of at most 0.85 percentage points for Blacks, and at most 0.33 percentage points for Whites, respectively.

We note here that we eventually intend to focus primarily on this Sant'Anna and Zhao (2020)-like approach but have not run all the robustness across outcomes and samples. Thus, from here on, we present the TWFE and Sun and Abraham (2021) estimates.

5.1.2 DD results

Next, we turn to results from two alternative approaches, which use two-way fixed effects (TWFE) or Callaway and Sant'Anna (2020), weighting only by the number of births in the county/race cell. Table 3 and 4 present these results by race using TWFE and Sun and Abraham (SA), respectively. The outcomes analyzed are the following: Birth weight, low

birth weight, very low birth weight, high birth weight, small for gestational age, large for gestational age, preterm birth, and any use of prenatal care, in columns 1 to 8, respectively. We find that the improvements in health at birth as measured by birth weight and the probability of low birth weight are larger among Black births than among White births. The intent-to-treat (ITT) results from SA indicate that WIC led to an increase in birth weight of 12 grams for Black births compared to 3.4 grams for White births. Relative to the pre-period mean, the results imply ITT effects 0.2% and 0.001%, respectively. Turning to the incidence of low birth weight, we find that relative to the mean, exposure to WIC decreases the likelihood of low birth weight by 2% for Black babies compared to 0.4% for White babies. Overall, the estimates are very similar across TWFE and SA.

Again, we translate the ITT estimates here into upper bounds on average TOT effects, using the same participation shares from above. Using this information to scale our ITT estimates gives an estimated TOT effect for birth weight of at most 30 grams for Blacks and at most 20 grams for Whites, and for low birth weight of at most 0.7 percentage points and at most 0.2 percentage points, respectively.

The rest of the table examines other birth outcomes in the Vital Statistics data that could help explain our findings. There are no statistically significant impacts on very low birth weight. However, we find that WIC exposure increases the probability of high birth weight and large for gestational age, particularly for Black births. These findings may suggest that as a nutritional intervention, WIC not only affected birth weight on the left tail (low birth weight) but also moved some births from normal birth weight to high birth weight (we explore this below). Lastly, we find no impacts on preterm delivery and the use of any prenatal care, which may not be surprising given that those outcomes are not directly related to prenatal nutrition investments.

5.1.3 Distributional effects for birth weight

We explore further heterogeneity in the effects of WIC on birth weight by looking at various cuts across the birth weight distribution beyond just low birth weight. Figure 4 shows baseline means across various cut points for birth weight. Panel (a) shows the share of the sample with birth weight under each cut point. So, for example, 13.3 percent of Black mothers had children with birth weight under 2500 grams (low birth weight), while only 6.28 percent of White mothers did. These baseline means show that the White advantage in birth weight is present at a number of points, with Blacks also being more likely to have birth weight below 1500, 2000, 3000, 3250, 3500, 3750, and 4000 grams. They are also slightly

Panel (c) shows the Sun and Abraham (2021) point estimates for these outcomes, now using individual-level data. WIC also had a positive impact on reducing the share of Black births with birth weights under 2000 grams, 3000 grams, 3250 grams, and 3500 grams (normal birth weight), as well as 3750 grams, and 4000 grams. It lead to a small increase in the probability of being high birth weight/reduction in being below 4500 grams. For each of these measures, the White estimates are much smaller in magnitude, and while some 95% CIs overlap, it is likely that these reject at the 90% level the estimates are the same, and some may even reject at the 95% level. Panels (b) (TWFE) and (d) Sun and Abraham (2021) convert these estimates into percent effects by dividing the point estimates by the baseline means. Here again, you see that across the distribution, the percent effects are even larger in magnitude for Blacks than Whites. Thus, the difference in effects is not simply driven by the fact that the baseline means for Blacks and Whites are so different.

5.2 Potential explanations underlying the race heterogeneity impacts

There is a puzzle to be explained here, why do we find such large effects for Blacks relative to Whites even after adjusting for differences in the participation rate?[19]

We first remind the reader that we don't have county-level data on eligibility by race, or participation by race. Thus, we can't do much better than our crude upper bound above for the magnitude of the TOT. Even that adjustment shows that the effects of WIC on low birth weight are likely larger in magnitude for Blacks.

Thus far, we have explored six additional possible explanations for finding larger effects for Blacks. For five of the six, we do so by stratifying the samples by either the individual or baseline county/state explanatory factors or other factors and estimating effects of WIC within each sample.

The first two explanations we consider is the role of eligibility and take-up. Figure 2 shows the average of state level eligibility for the program, calculated using the March CPS for 1988–1990 for 0-year-olds. We note that the March CPS collects income and program participation data for the previous calendar year. Thus, those who are 0-years-old in March were likely born in the previous calendar year and we can use the income and program participation levels of their household in the previous calendar year to approximate eligibility

[19]We note that we have also estimated models for those of Other race, which combines pregnant women who are Asians, Alaska Natives, Pacific Islanders; and found quite substantive effects for them as well, generally between the estimated effects for Black and White women. These are reported in Appendix Tables 3–6.

by race.) We determine eligibility as being in a family whose income is under 185% of the Federal poverty guideline or were participating in Food Stamps, the National School Lunch Program, AFDC, or Medicaid. Food Stamps, AFDC and Medicaid confer automatic also known as adjunctive eligibility for the WIC program by 1989. The School Meals shared the same eligibility threshold and also conferred eligibility in some places, while the other 3 programs had thresholds below the maximum WIC threshold. We then summarize this by race for the 0-year-olds, constructing a weighted sum using the CPS person weights for the infants. Blacks have a much higher eligibility rate than do Whites, with 74% of Black infants likely having been eligible compared to 36% of Whites.

A second possibility is that take-up rates are higher for Blacks than Whites. We explore this by combining the by race participation numbers with our share eligible numbers (ratio of numbers in columns 1 and 2 of Figure 2). This suggests a take-up rate among eligibles of about 47.4 % for Blacks, compared to one of 44% among Whites. Together these suggest a limited role for take-up differences by race but a possible role for eligibility in explaining part of these differences. We discuss below what we find with a 1-year take-up measure below.

Next, we turn to the factors we can explore in the regressions. A third explanation we explored was the level of individual risk. We first show in Tables 5 and 6 that WIC did not lead to large compositional changes in the share of births with these risk factors. For example, we found no effects on the birth rate (column 1), on the log of the number of births, on the share with time mom, or low or high education. There were some very small in magnitude changes in the share within each county cell that are to Black or White mothers, but we are already stratifying on this. Age of mother and marital status were also correlated with WIC but these differences are very small. Having ruled any large amounts of compositional change in who is having children, we turn to regressions stratifying on these risk factors. These results are in Figure 4, with estimates for Blacks on the left and Whites on the right. We compared the effect of WIC by race for teen births to those for non-teen births, effects for births to married mothers versus those along births to unmarried mothers, and births to more or less highly educated women in the restricted number of states that collect education status. Here we found somewhat contradictory results, effects were smaller for teen vs. non-teen mothers, and for married vs. single mothers, but larger for the less educated mothers. Equally important, none of these are likely to be statistically different from one another.

We also explored a fourth set of factors, place-based differences across locations at baseline such as poverty, racial composition of the county, and urbanicity in 1970, but these

comparisons were not very informative.

The fifth factor we explored was the degree of medical need at the county level. We did this by comparing the county's baseline 1970 levels of poor baseline county birth outcomes; including infant mortality and low birth weight as well as the medical system, measured by hospitals per capita and doctors per capita. These results suggest some role for medical need. We also explored whether the state had above the median share of black participation in AFDC for women, this is a proxy for Medicaid eligibility. Here, we found that those places likely to have higher Medicaid eligibility for AFDC participants had smaller effects of WIC.

Lastly, we considered the role of proxies for structural racism. We do so by first comparing results within the states of the old confederacy with the rest of the US, and do not find this to be informative. The second approach follows Almond, Chay, and Greenstone, and uses the share of births taking place outside the hospital for Blacks in 1968 as a measure of where Hospitals were likely to not to be integrated. This set of states resembles the Old Confederacy, and effects here seem to be larger in these places for Blacks but not for Whites. We intend to further investigate this.

To summarize, the differences in the effects of WIC by race are not explained by individual or place-based risk factors or structural racism as currently measured. The results may be explained by medical need at the county level and WIC program take-up and eligibility.

Finally, we use the only county-level measure of take-up we could find. One of the Congressional reports had a list of counties on WIC in 1981, along with take-up at the county level, using county participation divided by county eligibility as estimated by 2 researchers in ranges. We predicted this take-up as a function of the baseline Xs, and then estimated effects for counties where this predicted take-up number was high or low. Again, there was a suggestion that this explained more of the differences for Blacks than Whites.

5.3 Robustness checks

We have estimated a host of robustness checks. Our results are highly robust to alternative specifications, which are shown in Tables A.4–A.7. We present specifications that only control for county and year fixed effects and progressively add War on Poverty program covariates, county time-varying socio-demographic characteristics, 1970 significant determinants interacted with linear county time trends, and state-by-year fixed effects. Overall, our results are not sensitive to the different sets of controls.

Second, an added concern is that there may be counties with a small or zero fraction of Black births, which implies that the set of counties in the analyses by race may be different and the county composition may explain the different results by race. To address that, we present estimations that limit the sample to a balanced set of counties that have at least 6 Black and White births each year. Tables A.8–A.11 show that the results are remarkably similar to the sample of all counties presented above.

Third, we have performed additional robustness checks that include: Alternative assignment of WIC timing (birth year; year of the third trimester; month-year of the second trimester); alternative use of gestational age; using individual-level data; and dropping counties served by WIC special population programs.

6 Conclusion and next steps

TBD.

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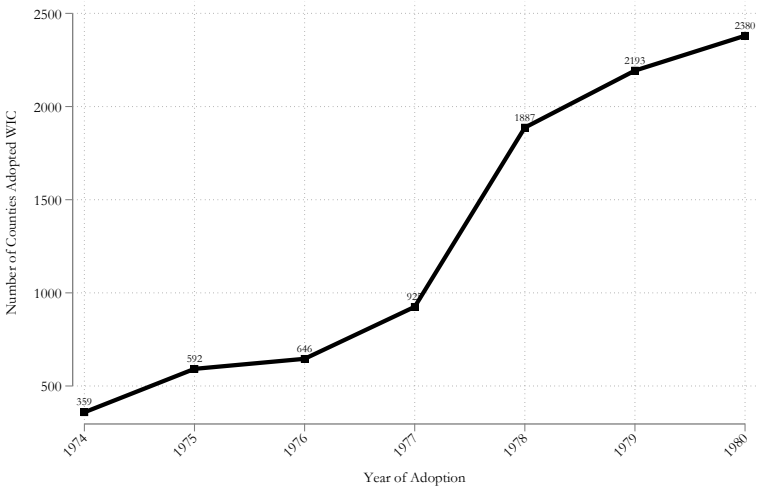
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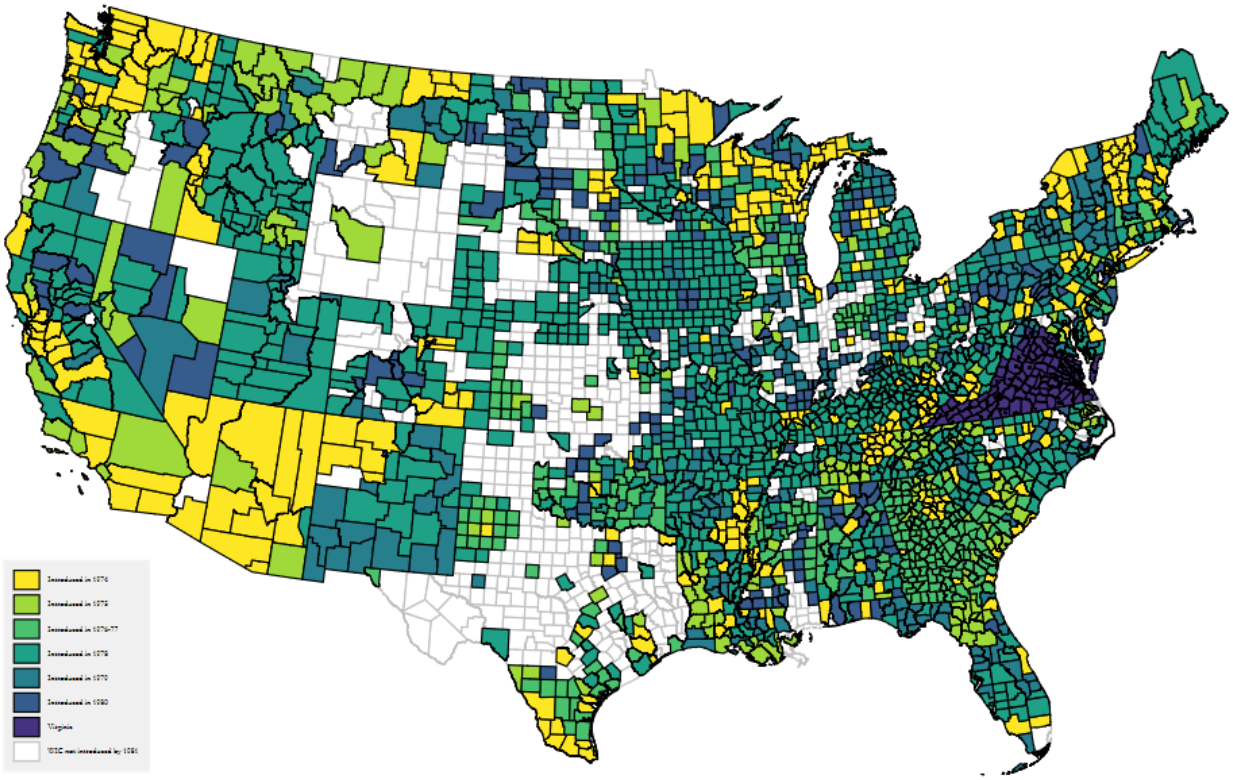
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Figures

Figure 1: Geographic Variation and Timing of WIC Adoption



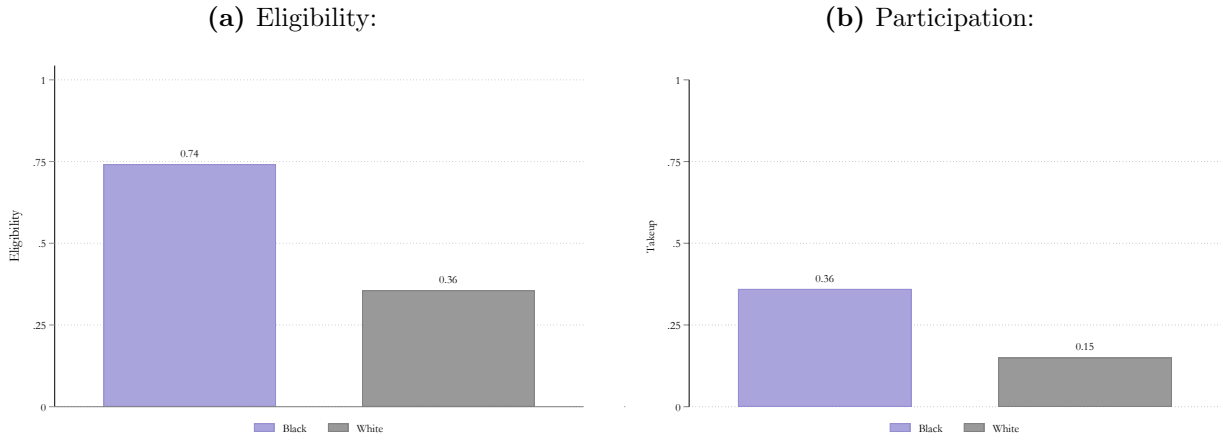
(a) Number of Counties Adopting WIC over Time



(b) Geographic Variation in WIC Adoption Timing

We do not include Virginia, Alaska, or Hawaii in our study.

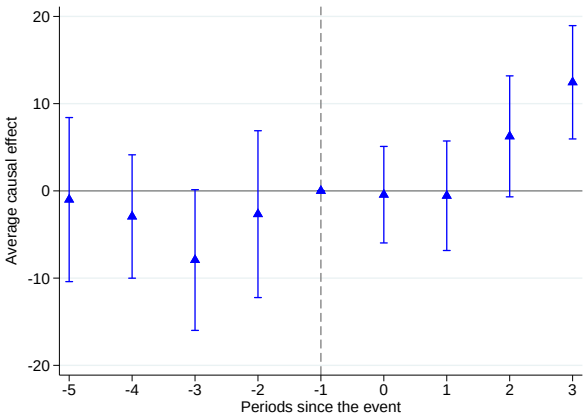
Figure 2: WIC Eligibility and Participation Are Higher among Blacks than Whites



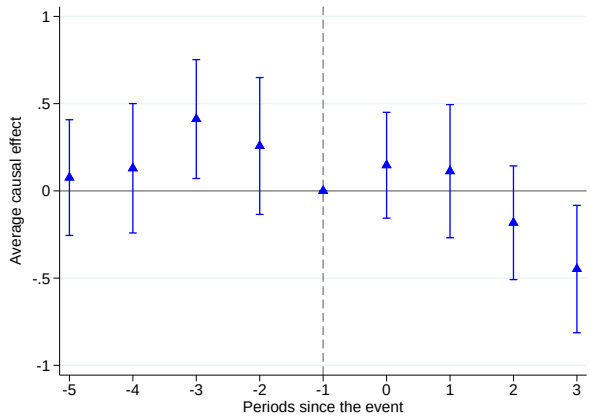
Notes: Eligibility calculations use measures of participation in WIC by race (Black, White, Asian/Pacific Islander, Native American, and Hispanic), and also broken down into women, infants, and children for Fiscal Year 1986 from (Food Research and Action Center, 1988). First, we combine the ITO counts with the counts for states where the ITO headquarters is located. We construct the estimates of participation by pregnant women by race as the product of the total number of black participants times the share of participants in the state (note that the share of lactating/postpartum participants is quite low across our time period), combining Hispanics with Whites for a "White" measure similar to our Natality data. Eligibility rates for White and Black Women are shown in panel (a) and use the above participation measure as the numerator and a measure of eligibility from the March CPS for 1986-1987 for the denominator. The number of eligible pregnant women by race is given by the weighted sum of mothers of the relevant race living with a 0-year-old in the March CPS (and thus likely pregnant the previous year) with their CPS family (pooling related subfamilies with the heads) having total income under the upper-income limit at the time from (Food Research and Action Center, 1988) or being on AFDC or getting food stamps or on free or reduced school lunch or on Medicaid, summed with the person weight for the 0-year-olds. Participation shares (panel (b)) use the participants as the numerator and the weighted sum of births in the state from the Natality data in the denominator. The CPS data report neither Medicaid use nor break out totals by race before that.

Figure 3: Event Study: Preferred Specification (Propensity Score Reweighting of Untreated Counties)

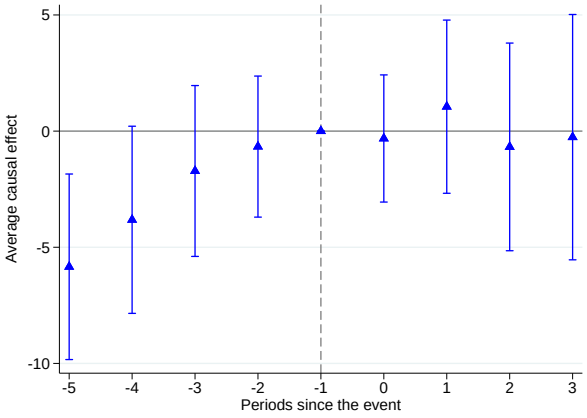
(a) Black Mothers: Birth Weight



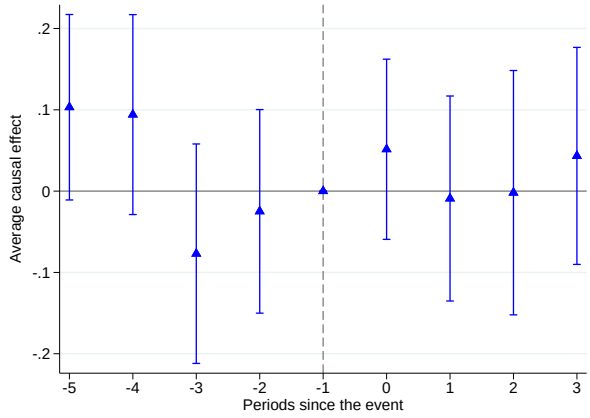
(b) Black Mothers: Low Birth Weight



(c) White Mothers: Birth Weight



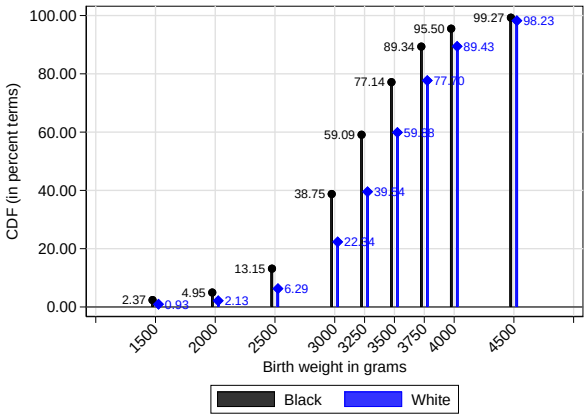
(d) White Mothers: Low Birth Weight



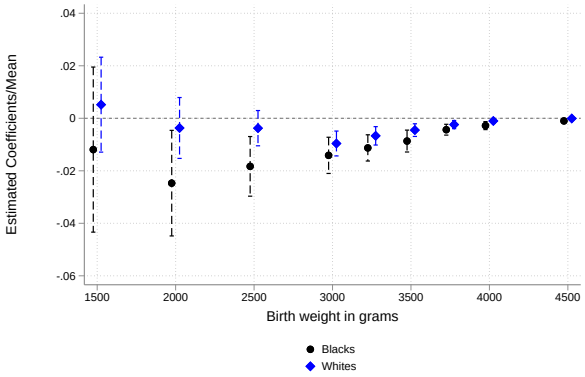
Notes: Figures report the estimated coefficients and standard errors using Sun and Abraham (2021) method. Our preferred specification re-weights untreated counties using an estimate of the propensity of WIC adoption based on pre-program characteristics, and trim scores greater than 0.99. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level. We binned relative time periods more than 6 years before (BW Coefficients: Black 2.97; White -4.37) (LBW Coefficients: Black 0.11; White 0.11) or more than 4 years after WIC adoption (BW Coefficients: Black 14.8***; White 2.02) (LBW Coefficients: Black 0.54**; White 0.01). Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Figure 4: Effects of WIC on various cut points in the distributional of birth weight

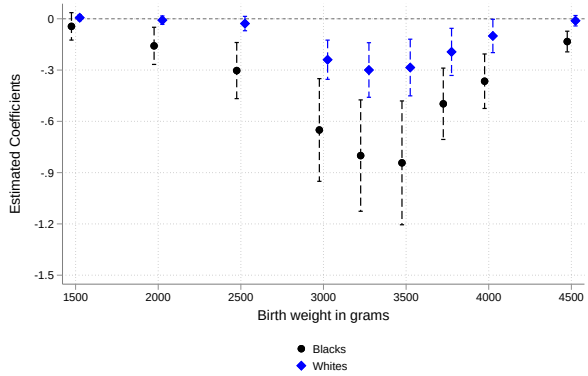
(a) CDF (in percent terms) at the Birth Weight Cuts



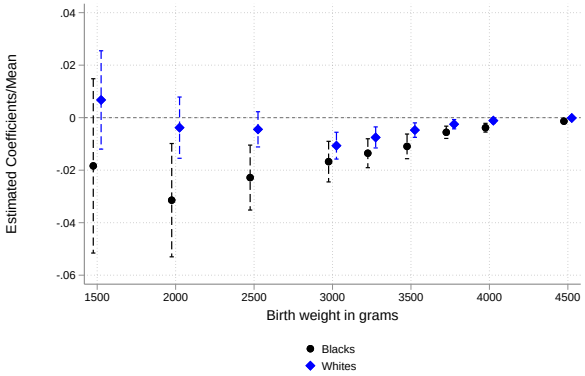
(b) Percent Impacts—TWFE



(c) Point Estimates—SA



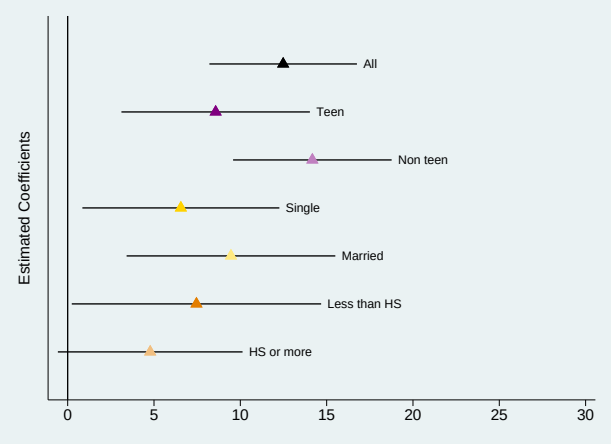
(d) Percent Impacts—SA



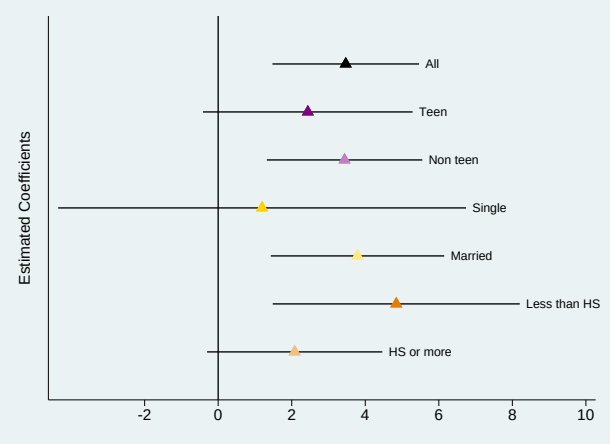
Notes: We estimate the effect of WIC on the probability that birth weight is below a given gram threshold using individual level data: 1,500; 2,000; 2,500; 3,000; 3,250; 3,500; 3,750; 4,000; or, for 4,500 grams, the probability that it is above that number (Almond et al., 2011).We plot the point estimates and the 95% confidence intervals and "% Impacts [coef./mean]" separately.

Figure 5: Heterogeneity Analyses: Individual Risk Factors

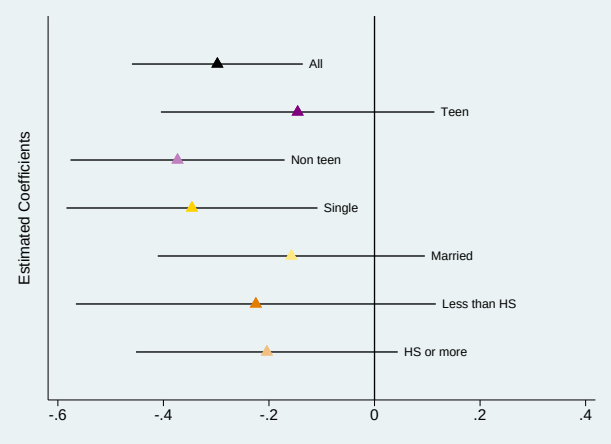
(a) Birth Weight—Black



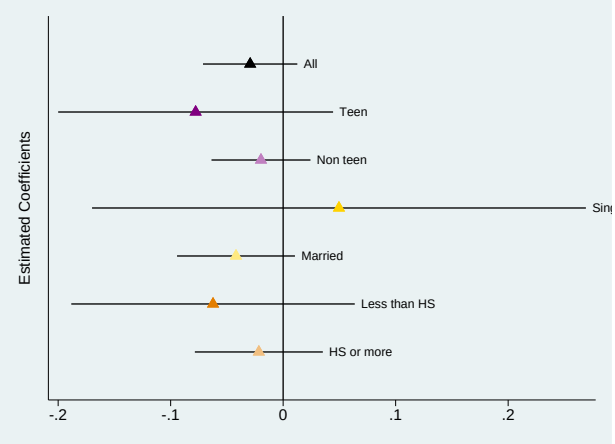
(b) Birth Weight—White



(c) Low Birth Weight—Black



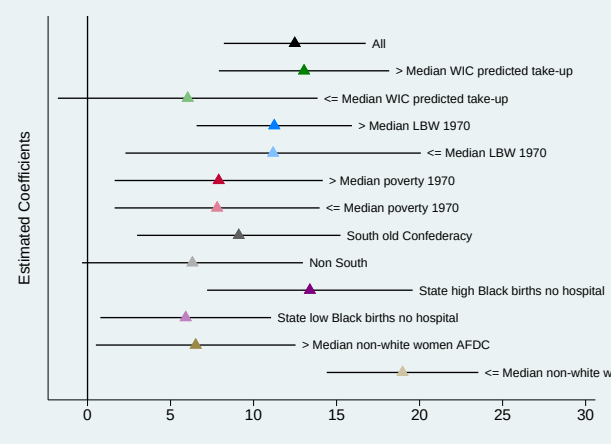
(d) Low Birth Weight—White



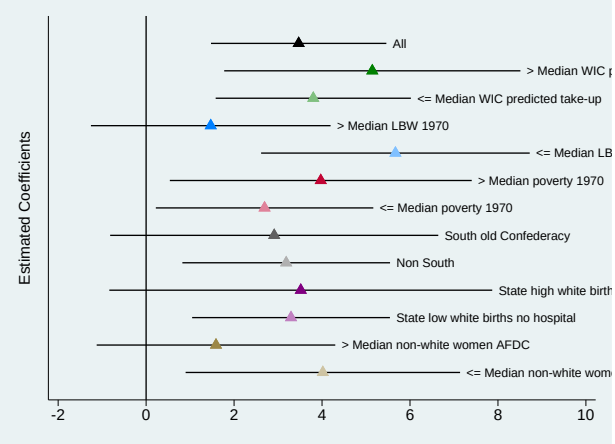
Notes: Static estimates using Sun and Abraham procedure. Each row presents an estimate for a single subsample (triangle) along with 95% confidence levels, for Blacks (left) and Whites (right), for birth weight (upper panels) and low birth weight (lower panels). Each row from a separate regression.

Figure 6: Heterogeneity Analyses—Place-Based Factors

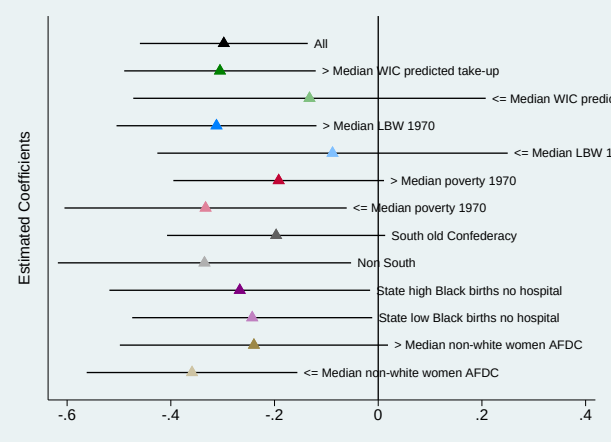
(a) Birth Weight—Black



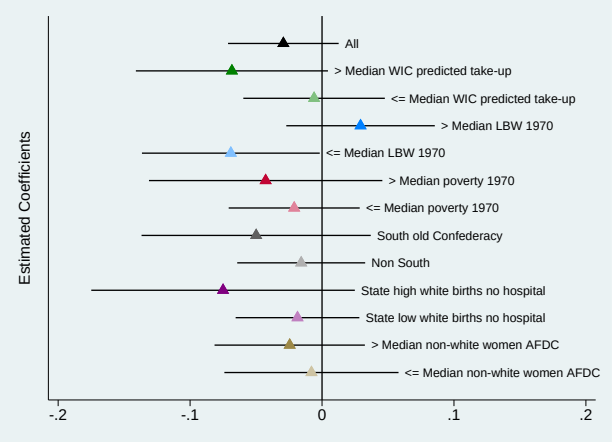
(b) Birth Weight - White



(c) Low Birth Weight—Black

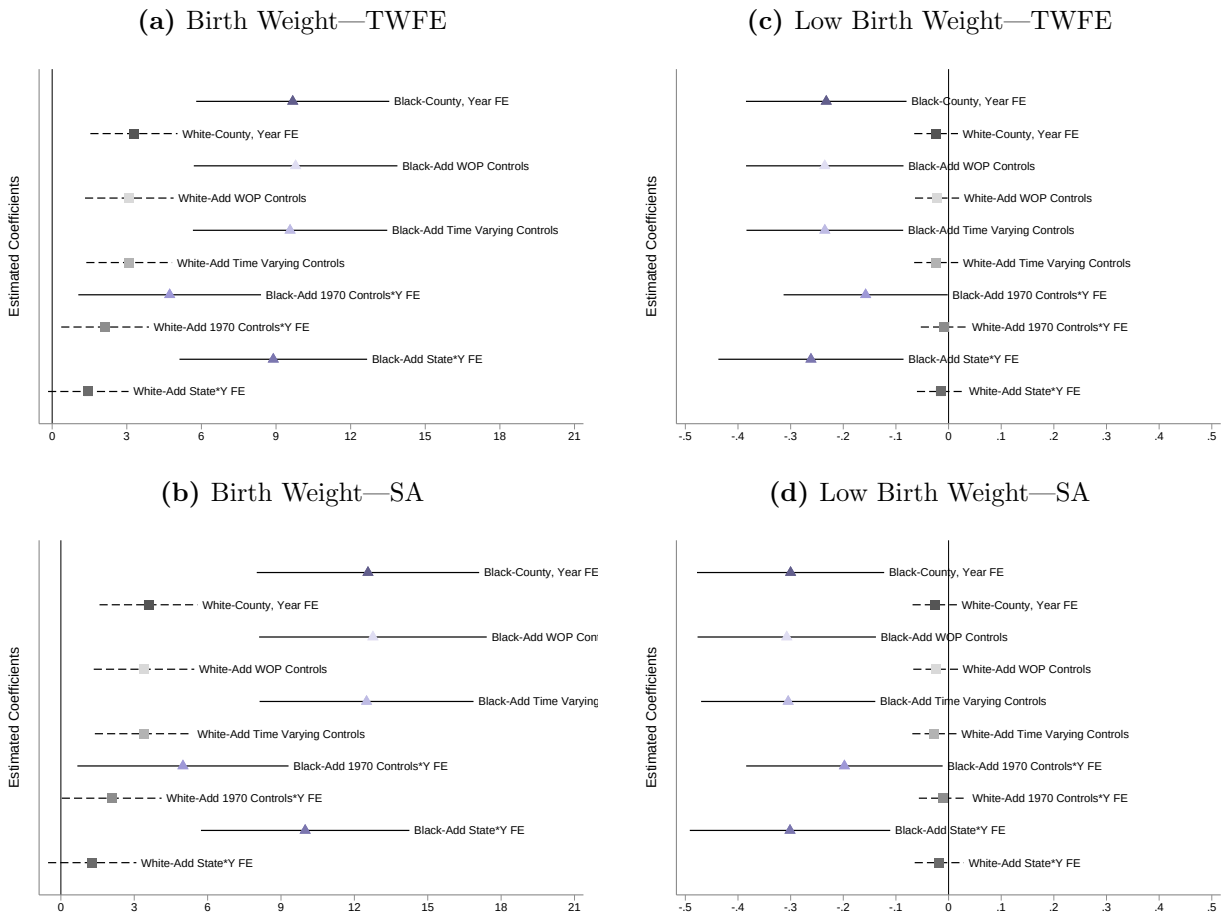


(d) Birth Weight - Place-based Factors



Notes: Static estimates using Sun and Abraham procedure. Each row presents an estimate for a single subsample (triangle) along with 95% confidence levels, for Blacks (left) and Whites (right), for birth weight (upper panels) and low birth weight (lower panels). Each row from a separate regression.

Figure 7: Robustness to Specification, The Effect of WIC on Main Birth Outcomes 1968–1981 using TWFE and Sun and Abraham (2021) by Race-County-Year of Second Trimester Cells: All Counties



Notes: Figures show robustness to specification for TWFE (upper panels) and (Sun and Abraham, 2021) (lower panels). Each row has a filled in triangle (Blacks) or square (Whites) for the point estimate and the width of the line represents the 95% confidence interval. Each row from a separate regression.

Tables

Table 1: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Two-Way Fixed Effects Estimates, Propensity Score Specification

	Birth Weight	Low Birth Weight
	(1)	(2)
A: Black Mothers		
WIC-year-trim2	7.5129**	-0.2752***
	(2.9822)	(0.0976)
Y-mean	3083	13
Adj. R-Squared	0.340	0.141
Obs	23241	23241
B: White Mothers		
WIC-year-trim2	3.6089*	-0.0354
	(2.1095)	(0.0427)
Y-mean	3341	6
Adj. R-Squared	0.785	0.378
Obs	38165	38165
C,Year FE	Y	Y
1970 controls -pscore weighting	Y	Y

Notes: Table reports the estimated coefficients and standard errors using the two-way fixed effect method, controlling for county and year of the second trimester. Panel A presents results for Black Mothers, and Panel B for White Mothers. Our preferred specification re-weights untreated counties using an estimate of the propensity of WIC adoption, $\hat{p}$, by 1980 based on pre-program county characteristics, and trims propensity scores greater than 0.99. The cells are weighted by the number of births in the cell (treatment group) and $\hat{p}/(1-\hat{p})$ times the number of births in the cell (control group). The outcome data are from Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table 2: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, Propensity Score Specification

	Birth Weight	Low Birth Weight
	(1)	(2)
A: Black Mothers		
WIC-year-trim2	8.8194***	-0.3055***
	(3.1621)	(0.0968)
Y-mean	3083	13
Adj. R-Squared	0.346	0.146
Obs	23000	23000
B: White Mothers		
WIC-year-trim2	4.3698**	-0.0490
	(2.1057)	(0.0427)
Y-mean	3341	6
Adj. R-Squared	0.785	0.378
Obs	38165	38165
C,Year FE	Y	Y
1970 controls -pscore weighting	Y	Y

Notes: Table reports the estimated coefficients and standard errors using Sun and Abraham (2021) method, controlling for county and year of the second trimester. Panel A presents results for Black Mothers, and Panel B for White Mothers. Our preferred specification re-weights untreated counties using an estimate of the propensity of WIC adoption, $\hat{p}$, by 1980 based on pre-program county characteristics, and trims propensity scores greater than 0.99. The untreated cells are weighted by the number of births in the cell (treatment group) and $\hat{p}/(1-\hat{p})$ times the number of births in the cell (control group). The outcome data are from Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table 3: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: TWFE Estimates, All Counties

	Birth Weight	Low Birth Weight	Very Low Birth Weight	High Birth Weight	Small for Gest. Age	Large for Gest. Age	Preterm	Prenatal Care
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A: Black Mothers								
WIC-year-trim2	9.5519***	-0.2285***	-0.0249	0.0974***	-0.1524	0.1574*	0.0396	-0.3905
	(1.9719)	(0.0751)	(0.0380)	(0.0283)	(0.1518)	(0.0849)	(0.2603)	(0.3246)
Y-mean	3079	13	2	1	15	6	17	96
Adj. R-Squared	0.357	0.169	0.073	0.122	0.156	0.146	0.231	0.537
Obs	25428	25428	25428	25428	21172	21172	21172	23283
B: White Mothers								
WIC-year-trim2	3.1766***	-0.0257	0.0052	0.0088	-0.0657*	0.1295***	0.0126	-0.0226
	(0.8798)	(0.0213)	(0.0084)	(0.0138)	(0.0386)	(0.0396)	(0.0342)	(0.0441)
Y-mean	3336	6	1	2	9	10	8	99
Adj. R-Squared	0.790	0.393	0.060	0.367	0.429	0.464	0.244	0.643
Obs	41440	41440	41440	41440	38838	38838	38838	40400
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table reports the estimated coefficients and standard errors using the TWFE method, controlling for county, year of second trimester, and selected other controls. Panel A presents results for Black Mothers, and Panel B for White Mothers. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level, and cells are weighted by the number of births in each cell. Birth weight is in grams. High birth weight is BW more than 4000 grams, low birth weight is BW less than 2500 grams, very low birth weight is BW less than 1500 grams, small/large for gestational age are defined by the birth weight being below the 10th percentile or above the 90th percentile for the baby's gestational age in weeks. Premature birth means gestational age below 37 weeks. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table 4: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, All Counties

	Birth Weight	Low Birth Weight	Very Low Birth Weight	High Birth Weight	Small for Gest. Age	Large for Gest. Age	Preterm	Prenatal Care
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A: Black Mothers								
WIC-year-trim2	12.4815***	-0.2978***	-0.0425	0.1326***	-0.1726	0.2702**	0.0303	-0.6099*
	(2.1978)	(0.0829)	(0.0406)	(0.0308)	(0.1664)	(0.1057)	(0.2791)	(0.3630)
Y-mean	3079	13	2	1	15	6	17	96
Adj. R-Squared	0.364	0.174	0.079	0.131	0.161	0.152	0.237	0.547
Obs	25172	25172	25172	25172	20886	20886	20886	23011
B: White Mothers								
WIC-year-trim2	3.4693***	-0.0293	0.0067	0.0126	-0.0688	0.1658***	0.0379	-0.0227
	(1.0179)	(0.0214)	(0.0088)	(0.0155)	(0.0421)	(0.0456)	(0.0356)	(0.0612)
Y-mean	3336	6	1	2	9	10	8	99
Adj. R-Squared	0.791	0.393	0.060	0.368	0.430	0.465	0.245	0.643
Obs	41439	41439	41439	41439	38837	38837	38837	40399
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Notes: This table reports the estimated coefficients and standard errors using the Sun and Abraham (2021) method, controlling for county, year of second trimester, and selected other controls. Panel A presents results for Black Mothers, and Panel B for White Mothers. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level, and cells are weighted by the number of births in each cell. Birth weight is in grams. High birth weight is BW more than 4000 grams, low birth weight is BW less than 2500 grams, very low birth weight is BW less than 1500 grams, small/large for gestational age are defined by the birth weight being below the 10th percentile or above the 90th percentile for the baby's gestational age in weeks. Premature birth means gestational age below 37 weeks. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table 5: The Effect of WIC on the Birth Rate and the Composition of Births 1968–1981 by Race-County-Year of Second Trimester Cells: TWFE Estimates, All Counties

	Birth Rate	Ln(Births)	% Married	Parity	Mother's Age	% Teen Mother	%< HS Graduate	% HS Graduate	% > HS Graduate	% Black	% White
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
WIC-year-trim2	-0.0007	-0.0104	-0.0053**	0.0077	0.0372***	0.0005	0.0014	0.0011	-0.0025**	0.0055***	-0.0067***
	(0.0005)	(0.0079)	(0.0023)	(0.0050)	(0.0137)	(0.0009)	(0.0018)	(0.0017)	(0.0011)	(0.0014)	(0.0017)
Y-mean	0.084	8.069	0.882	2.111	24.399	0.180	0.283	0.467	0.251	0.143	0.847
Adj. R-Squared	0.942	0.984	0.936	0.853	0.906	0.879	0.938	0.825	0.943	0.986	0.980
Obs	41360	41360	39458	41460	41460	41460	38186	38186	38186	41460	41460
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table reports the estimated coefficients and standard errors using the TWFE method, controlling for county, year of second trimester, and selected other controls. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level, and cells are weighted by the number of births in each cell, or in the case of the birth rate, the number of women aged 15-44. Not all states report education or marital status, so these samples are smaller. Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Table 6: The Effect of WIC on Composition of Births 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, All Counties

	Birth Rate	Ln(Births)	% Married	Parity	Mother's Age	% Teen Mother	%< HS Graduate	% HS Graduate	% > HS Graduate	% Black	% White
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
WIC-year-trim2	-0.0005	-0.0146	-0.0074***	0.0112**	0.0430***	0.0012	0.0030	-0.0004	-0.0026*	0.0073***	-0.0098***
	(0.0006)	(0.0105)	(0.0025)	(0.0055)	(0.0157)	(0.0009)	(0.0022)	(0.0021)	(0.0013)	(0.0015)	(0.0019)
Y-mean	0.084	8.069	0.882	2.111	24.399	0.180	0.283	0.467	0.251	0.143	0.847
Adj. R-Squared	0.942	0.985	0.938	0.854	0.906	0.880	0.939	0.828	0.944	0.986	0.981
Obs	41359	41359	39457	41459	41459	41459	38169	38169	38169	41459	41459
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table reports the estimated coefficients and standard errors using the Sun and Abraham (2021) method, controlling for county, year of second trimester, and selected other controls. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level, and cells are weighted by the number of births in each cell, or in the case of the birth rate, the number of women aged 15-44. Not all states report education or marital status, so these samples are smaller. Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.This table reports the estimated coefficients and standard errors using the TWFE method. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level collapsed at county and year of the second trimester. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Appendix

A Procedure for Digitizing Data from the National Archives

- Scanned and took pictures of plans at the National Archives in D.C. Members of the research team went to the National Archives, in Hyattsville MD, and requested archival materials that included State Plans for WIC (required after 1977 for some states, and 1978 for all states and Indian Tribal Organizations operating WIC). They also contained various memos from USDA to States and the USDA regional offices. We photographed all the information about WIC locations, discussed below, and then digitized it, as described below. Note that the state plans allowed us to fill in many counties/states excluded from (Hoynes et al., 2011) for years between 1978 and 1980 for some states not included in the HPS data.
- FIPS code changes: Counties can change their boundaries, with new counties being created by merging existing counties, splitting existing counties, and combining independent cities with their surrounding counties. We exclude Hawaii, Alaska and Virginia from our analysis. We constructed "Super Counties" for our control measures by these splitting and merging counties, where the new "Super County" is the smallest consistent county, merged onto 2016 FIPS codes and county definitions. So, for example, the Yuma-La Paz "Super County" includes Yuma county until 1983, after which Yuma county was split into two counties, La Paz and Yuma. For 1983 and after, Yuma and La Paz are combined into one "Super County". The BEA, REIS and SEER used slightly different county codes across part of the time period, we have mapped these to standard Census FIPS codes.
- In addition to the state planes, data sources used to digitize WIC implementation included:
  - To Save the Children Nutritional Intervention Through Supplemental Feeding (FY 1974): included the USDA announcement of first grantees on August 1973
  - Maternal, Fetal, and Infant Nutrition (FY 1974): Listed sites selected to participate in the Special Supplemental Food Program for Women, Infants, and Children, prepared in December 1973
  - Agriculture-Environmental and Consumer Protection Appropriations for 1975 (FY 1974): Listed the USDA approved WIC Project Area Summary of Grants as of March 1974
  - Women and Children First, or Last? A report on the Special Supplemental Food Program for Women, Infants and Children, Prepared by Virginia Fleming, The Children's Foundation, Washington DC (FY 1975): Listed WIC sites as of April 1975, plus an update of an additional 45 grantees
  - Special Supplemental Food Program for Women, Infants, and Children, WIC program directory of local agencies (FY 1978): Included lists of local agencies serving migrant populations

  - Special Supplemental Food Programs for Women Infants and Children, The Children's Foundation, Washington DC (FY 1979): Published a list of participating counties by state
  - State Plans (FY 1979–FY 1981): each state published lists and/or maps that listed WIC agencies currently participating and counties served, counties planning to participate, and counties not participating; some states included information by county of special populations served; the specific information included and how it was presented varied by state
  - Impact of administration's economic proposals on programs under the jurisdiction of the Education and Labor Committee (FY 1981): Hearings before the Committee on Education and Labor, House of Representatives, Ninety-seventh Congress, first session, hearings held in Washington, D.C. held between March and May 1981 that included lists of counties served by WIC on January and September 1980

- Undergraduate research assistants and some consultants hand-entered all available data from the National Archives and other sources into Excel spreadsheets including: Plan date, state, clinic address, county name, county FIPS, special populations served, and the number of counties served as available from the sources listed above (special populations included Native Americans or Migrants)
- The research team then converted the digitized data by state and source into STATA datasets with indicator variables for WIC participation by fiscal year and specific date (if available), special population(s) served, and variables to flag counties that required additional scrutiny to determine WIC participation
- The resulting datasets were validated in a number of ways
  - Counties participating in WIC per our digitization were compared to counties participating in WIC from earlier research generously shared with us by Hoynes et al. (2011), where the Migrant Directory and Children's Book were used to identify which counties participated in WIC; each discrepancy was investigated by the research team to validate the inclusion (or exclusion) of a given county from our data
  - Data was assessed for consistency across years with additional validation for counties that had and subsequently lost WIC
  - Data was validated across and within sources. For example, many state WIC plans included a list of participating counties and agencies in addition to map(s) that indicated participation; due to the risk for error with hand-entered data on the part of the original state agencies and our subsequent digitization, sometimes the counties included in the list were different from those indicated by a map; in all cases after confirming correct data entry, we looked for a third source of information to confirm the presence or absence of WIC when two sources disagreed; each county that had a discrepancy was flagged for inconsistency and detailed information about the issue was recorded in a log

  - The research team met regularly to review the digitization process; in those meetings, we discussed each state's counties with WIC by fiscal year and assessed any counties with inconsistencies
  - Regarding inconsistent source reporting of WIC, the research team reviewed each original source of information and established rules for indicating the presence of WIC in a given county in a given fiscal year; all counties with differing information were flagged as, "internal conflict"
    * If at least two out of three sources of information indicated the presence of WIC, the county in question had WIC
    * If only a list and map that disagree are available in state WIC plans, we assumed that information from a list of WIC agencies/counties was more reliable than a map where shading and a map key may not be as accurate, see example below
    * If only two sources of information are available and they disagree regarding the presence of WIC in a county, the county was coded as having WIC if WIC was present in the county in the prior fiscal year
    * We also individually assessed counties where the source information was unclear (i.e., smudged and/or hard to read) and where information across years was inconsistent, e.g., a county was indicated to have WIC in fiscal year t but not in $t + a$; these counties were flagged as "problematic" if we were unable to determine the presence of WIC with certainty
    * Each county was reviewed with all members of the research team evaluating the source information to determine the best likelihood of the presence or absence of WIC in a given county in a given fiscal year
  - The digitization and review process resulted in 13 problematic county-years; 22 county-years with internal conflicts
- Plans also included information on special populations that were served by WIC agencies; we created variables that indicated the presence of WIC for any individual in the county and a variable that excluded counties where the only population served was a special population, these included:
  - Migrant families
  - Military families
  - Native American families
- Some Native American Reservations had WIC clinics that served Native American residents; the program area for these programs mostly run by Indian Tribal Organizations were not always contained within county boundaries; a county that included a clinic that served families of a specific Indian Tribe or Tribes was determined to have WIC; these counties were also flagged to indicate that only a portion of the county boundary was served by WIC

- A detailed explanation of the digitization process by fiscal year and state including raw source information for counties with conflicting WIC indications was maintained by the research team; this includes all internal conflict counties, special population counties, and decisions regarding the presence of WIC

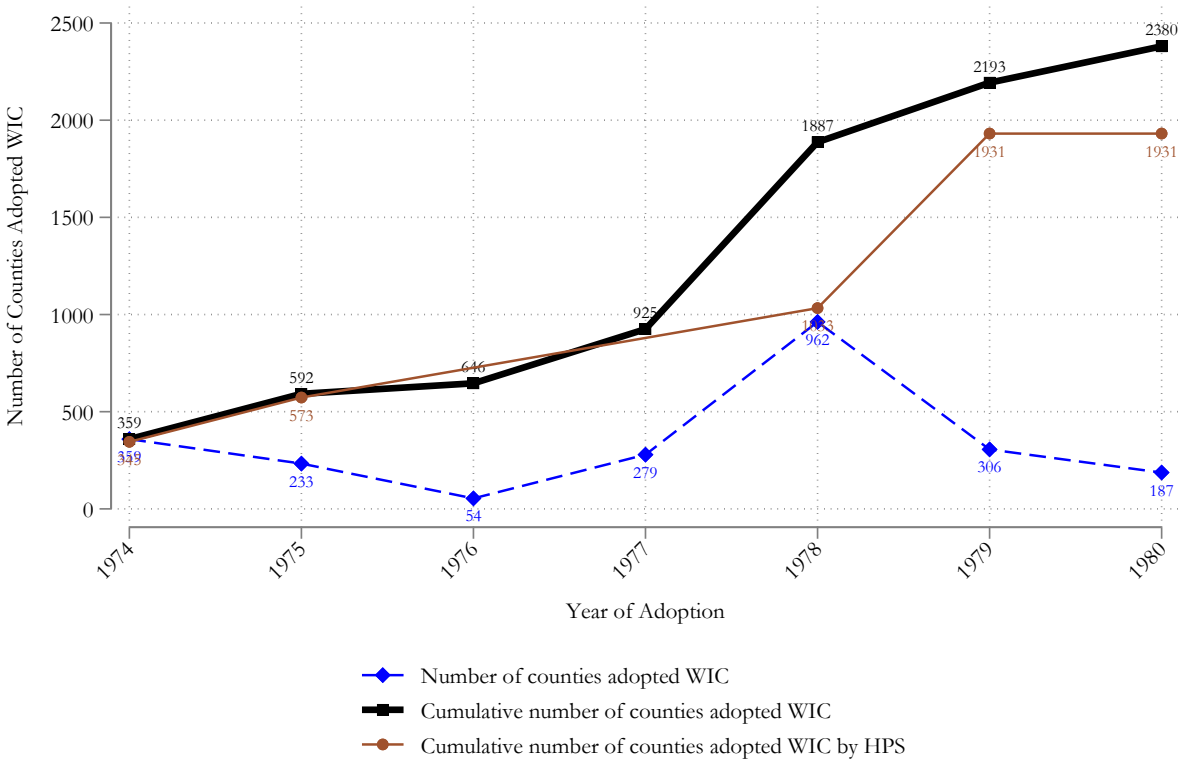
B Sample Restrictions

We begin by using all the observations in the Vital Statistics Natality Data. We exclude births mothers who are Native American; we are exploring these birth outcomes in another paper that is focused on WIC as operated by Indian Tribal Organizations. We include some results for the births to non-Native American, non-Black, and Non-White mothers in the Appendix tables. The results for Other mothers tend to be between those for Blacks and Whites. Earlier states and years of the data are a 50% sample of birth certificates, so we weight these observations by 2. We exclude twin and higher order births in the years this is available and also exclude mothers who do not reside in a US state. We code according to WIC availability in the year of the mother's second trimester of pregnancy. When gestational age at birth is unavailable, we impute it to be 40 weeks, which includes a number of states and years of occurrence as well as births where this was not reported for a specific birth certificate but the state of occurrence reported it. Marital status, education, some of the components of adequacy of prenatal care are not available for all states and years of occurrence.

Appendix Figures

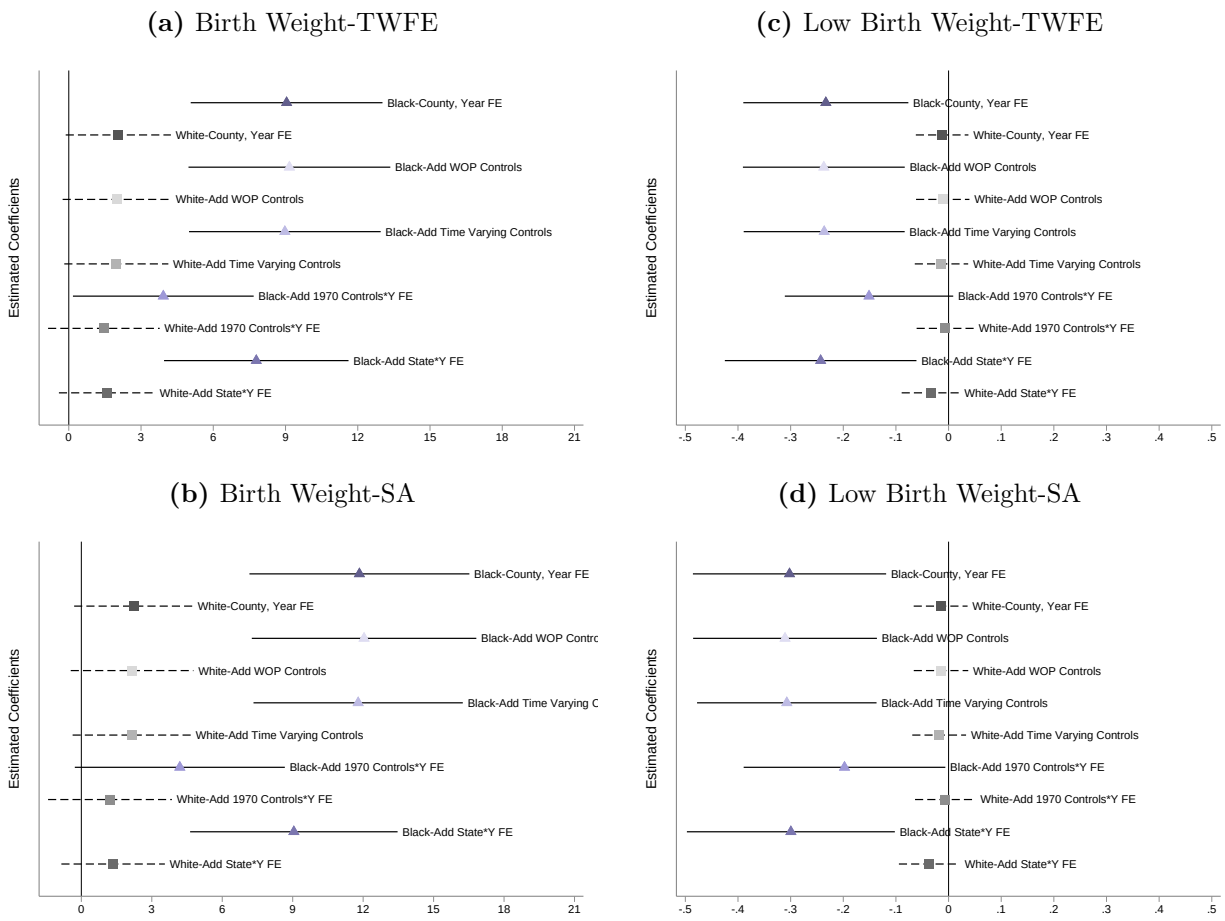
Figure A.1: Number of Counties Adopting WIC over Time, between 1974 and 1980:

Our Data Compilation vs. Hoynes et al. (2011)



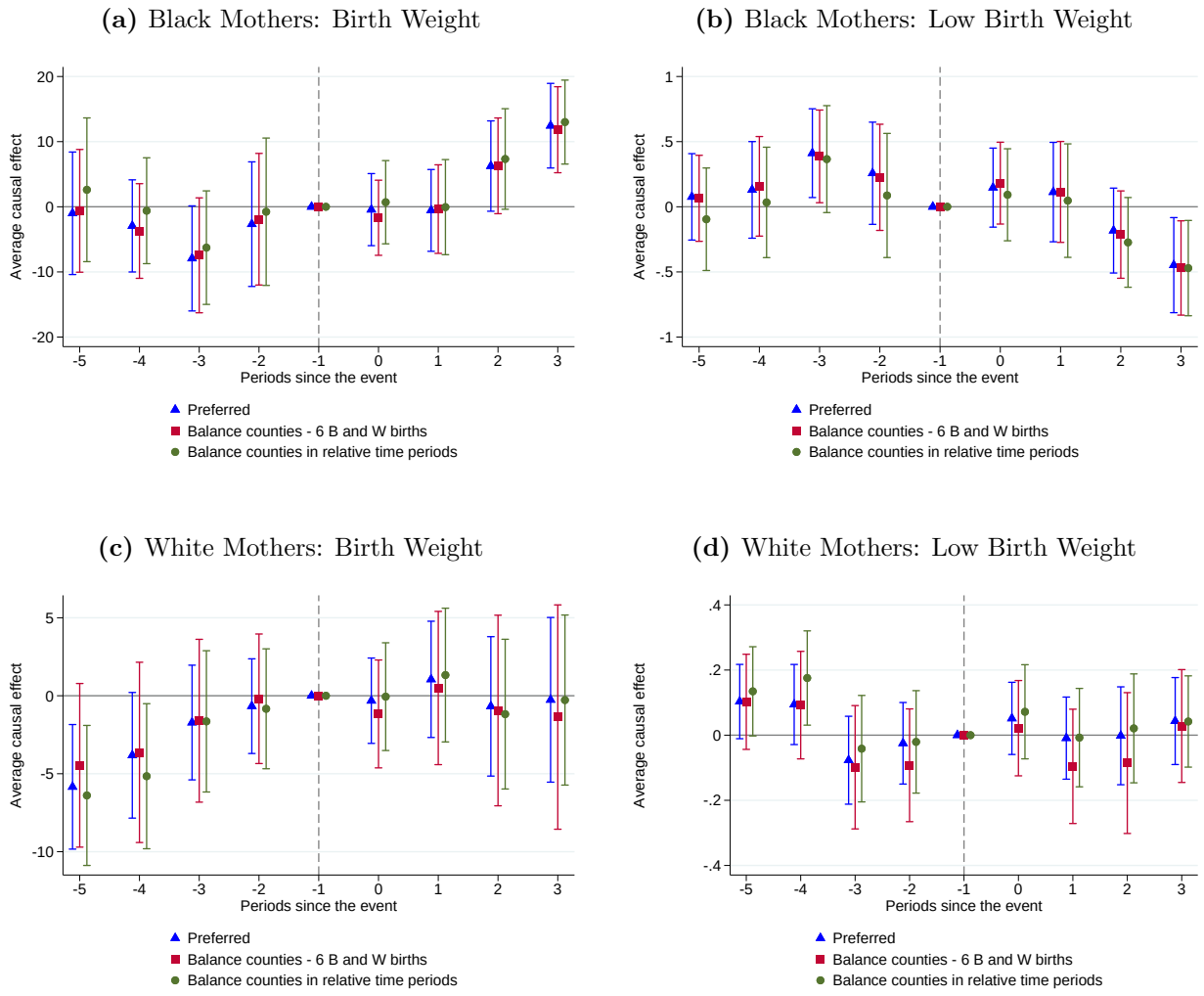
Notes: Hoynes et al. (2011) (HPS) generously shared their data for the counties in their sample. HPS had information for 1978 for 13 states' migrant programs only and for 1979 information from a WIC directory. The State plans include detailed information on local agencies and counties served and add WIC rollout information for the years 1978, 1979, and 1980.

Figure A.2: Robustness to Specification for Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 using TWFE and Sun and Abraham (2021) by Race-County-Year of Second Trimester Cells, Balanced Sample of Counties



Notes: Notes: This table reports the estimated coefficients and standard errors using the TWFE method (Panels (a) and (c) or Sun and Abraham (2021) method (Panels (b) and (d), controlling for county, year of second trimester, and selected other controls as noted in the rows. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the cell level, and cells are weighted by the number of births in each cell, using the sample of counties with a balanced panel of counties with at least 6 observations per cell. Each row presents the results for Blacks (solid lines, triangles for point estimates) and Whites (dashed lines, rectangles for point estimates). Standard errors are clustered at the county level. * p<0.10, ** p<0.05, *** p<0.01.

Figure A.3: Event Study: Robustness Checks using Propensity Score Weights for Control Counterfactual and Alternative Samples



Notes: Figures report the estimated coefficients and standard errors using the Sun and Abraham (2021) method. Our preferred specification re-weights untreated counties using an estimate of the propensity of WIC adoption, $\hat{p}$, by 1980, based on pre-program county characteristics, and trims propensity scores greater than 0.99. The cells are weighted by the number of births in the cell (treatment group) and $\hat{p}/(1-\hat{p})$ times the number of births in the cell (control group). The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Appendix Tables

Table A.1: Determinants of WIC Rollout Timing by County, Using 1970 County Characteristics

	Unweighted				Weighted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
% below poverty level- 1969	-0.177*	-0.338***	-0.231**	-0.370***	-0.526**	-0.603**	-0.650**	-0.672**
	(0.103)	(0.115)	(0.104)	(0.116)	(0.263)	(0.287)	(0.267)	(0.291)
% population age <5	0.175	0.351	0.355	0.531	-2.206	-3.106	-2.312	-2.992
	(0.528)	(0.560)	(0.528)	(0.561)	(1.918)	(1.932)	(2.039)	(2.090)
% population aged 65+	0.893***	0.853***	0.993***	0.937***	0.163	-0.356	0.299	-0.271
	(0.237)	(0.249)	(0.235)	(0.249)	(0.616)	(0.688)	(0.637)	(0.746)
% persons 25+ w/ <4 yrs sch	-0.414**	-0.038	-0.404**	-0.038	-0.113	0.101	0.023	0.184
	(0.171)	(0.183)	(0.172)	(0.185)	(0.368)	(0.375)	(0.374)	(0.386)
% persons 25+ w/ 12+ yrs sch	-0.031	0.151*	-0.037	0.172**	0.054	0.326*	0.095	0.375**
	(0.067)	(0.087)	(0.068)	(0.087)	(0.135)	(0.188)	(0.137)	(0.190)
% nonwhite	0.015	0.018	-0.001	-0.019	0.058	0.096	0.023	0.012
	(0.038)	(0.049)	(0.038)	(0.049)	(0.085)	(0.113)	(0.086)	(0.116)
% urban	-0.016	0.007	-0.014	0.014	-0.166***	-0.229***	-0.171***	-0.218***
	(0.026)	(0.027)	(0.026)	(0.027)	(0.061)	(0.057)	(0.060)	(0.059)
% rural farm	-8.499*	-0.592	-9.149**	-1.130	-23.410***	-39.693***	-26.717***	-40.012***
	(4.505)	(5.436)	(4.513)	(5.476)	(8.896)	(13.914)	(8.873)	(13.662)
Medicare benefits pc (1000s 2006)	-0.016	-0.017	-0.022**	-0.023**	0.017	0.019	0.005	0.007
	(0.011)	(0.011)	(0.011)	(0.011)	(0.027)	(0.028)	(0.028)	(0.030)
Pub assist medical care benefits pc (1000s 2006)	-0.008	-0.002	-0.010*	-0.004	0.001	-0.003	-0.001	-0.005
	(0.006)	(0.007)	(0.006)	(0.007)	(0.019)	(0.019)	(0.020)	(0.020)
Supplementary security income pc (1000s 2006)	0.001	-0.013	0.003	-0.010	0.003	0.030	0.004	0.036
	(0.007)	(0.010)	(0.007)	(0.010)	(0.027)	(0.031)	(0.027)	(0.032)
State UI compensation pc (1000s 2006)	-0.024***	-0.009	-0.022***	-0.006	-0.022	0.007	-0.019	0.008
	(0.008)	(0.010)	(0.008)	(0.010)	(0.015)	(0.019)	(0.015)	(0.019)
Adopted FS before 1970	-0.790	0.106	-1.090	-0.243	2.238	2.710	1.366	1.991
	(0.863)	(1.105)	(0.868)	(1.115)	(1.965)	(2.263)	(2.077)	(2.439)
Log 1970 population	-2.382***	-4.313***	-3.345***	-5.359***	-4.748***	-4.831***	-6.007***	-6.219***
	(0.615)	(0.659)	(0.614)	(0.656)	(1.240)	(1.380)	(1.265)	(1.417)
Active MDs pc -1960	-2.271***	-2.594***	-3.217***	-3.523***	-3.314*	-3.043**	-4.496**	-4.112**
	(0.842)	(0.797)	(0.941)	(0.970)	(1.709)	(1.521)	(1.813)	(1.695)
Infant mortality rate	0.031	-0.006	0.032	-0.004	0.071	0.084	0.092	0.102
	(0.033)	(0.030)	(0.032)	(0.030)	(0.097)	(0.086)	(0.097)	(0.087)
Beds pc	0.084	0.068	0.103	0.085	0.608**	0.306	0.662**	0.352
	(0.110)	(0.103)	(0.113)	(0.104)	(0.282)	(0.237)	(0.292)	(0.245)
Hospitals pc	-0.018**	-0.007	-0.019**	-0.008	-0.073***	-0.044**	-0.082***	-0.049**
	(0.008)	(0.007)	(0.008)	(0.007)	(0.020)	(0.021)	(0.021)	(0.021)
Adopted CHC before 1975	-11.934***	-11.071***			-10.609***	-9.295***		
	(2.283)	(2.352)			(3.398)	(3.246)		
CHC opened before WIC			3.112	2.488			-3.173	-1.119
			(2.018)	(1.945)			(3.105)	(2.819)
R-Squared	0.094	0.209	0.084	0.201	0.317	0.391	0.298	0.377
Obs	2298	2298	2298	2298	2298	2298	2298	2298
Weighted	N	N	N	N	Y	Y	Y	Y
State FE		Y		Y		Y		Y

Notes: The data are at the county level and the dependent variable is the year (normalized to be one in 1974) that WIC was introduced in the county, for counties adopting WIC in our time period. The covariates come from the City and County Data Book for 1970 and 1960. Heteroskedasticity-robust standard errors in parenthesis. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table A.2: Summary Statistics for Outcomes and Controls, Full Sample, Counties That Ever Had WIC and Counties That Never Had WIC using Vital Statistics Data 1968–1981, Collapsed by Race-County-Year of Second Trimester Cells

	Full Sample			Counties with WIC			Counties without WIC		
	All	Black	White	All	Black	White	All	Black	White
Outcomes									
Birth Weight	3310.164	3087.678	3352.666	3309.319	3087.719	3352.370	3321.261	3087.012	3356.387
	(114.838)	(63.491)	(61.153)	(114.048)	(61.482)	(59.174)	(124.218)	(89.814)	(81.950)
Low Birth Weight	0.073	0.132	0.062	0.073	0.132	0.062	0.071	0.134	0.062
	(0.031)	(0.028)	(0.014)	(0.031)	(0.027)	(0.013)	(0.035)	(0.043)	(0.020)
Very Low Birth Weight	0.011	0.024	0.009	0.012	0.024	0.009	0.011	0.022	0.009
	(0.009)	(0.012)	(0.004)	(0.008)	(0.011)	(0.004)	(0.011)	(0.018)	(0.007)
High Birth Weight	0.016	0.007	0.018	0.016	0.007	0.018	0.017	0.008	0.018
	(0.009)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.012)	(0.012)	(0.011)
Small for Gest. Age	0.096	0.148	0.086	0.096	0.148	0.086	0.097	0.152	0.089
	(0.060)	(0.070)	(0.053)	(0.058)	(0.069)	(0.049)	(0.086)	(0.075)	(0.084)
Large for Gest. Age	0.094	0.059	0.101	0.094	0.059	0.101	0.096	0.060	0.102
	(0.052)	(0.051)	(0.049)	(0.051)	(0.050)	(0.048)	(0.063)	(0.053)	(0.062)
Preterm	0.094	0.172	0.080	0.094	0.172	0.080	0.089	0.175	0.077
	(0.072)	(0.095)	(0.057)	(0.072)	(0.095)	(0.056)	(0.077)	(0.088)	(0.066)
Any Prenatal Care	0.985	0.964	0.989	0.985	0.965	0.988	0.985	0.956	0.990
	(0.032)	(0.055)	(0.023)	(0.032)	(0.055)	(0.024)	(0.027)	(0.054)	(0.016)
WOP exposure									
Food Stamps Exposure	0.876	0.904	0.870	0.878	0.906	0.872	0.848	0.883	0.843
	(0.329)	(0.294)	(0.336)	(0.327)	(0.292)	(0.334)	(0.359)	(0.322)	(0.364)
CHC Exposure	0.370	0.537	0.335	0.388	0.544	0.354	0.137	0.423	0.095
	(0.483)	(0.499)	(0.472)	(0.487)	(0.498)	(0.478)	(0.344)	(0.494)	(0.293)
Expenditures, Hospitals and Population									
UI State Expenditures per capita	138.548	139.071	138.039	142.885	142.967	142.479	81.646	76.477	82.315
	(121.293)	(131.112)	(119.467)	(122.853)	(133.531)	(120.854)	(78.927)	(52.363)	(82.082)
Medicare Expenditures per capita	285.835	309.288	280.209	288.170	312.308	282.277	255.207	260.796	254.261
	(181.761)	(222.453)	(172.347)	(185.501)	(227.319)	(175.705)	(118.356)	(108.886)	(119.631)
Number of Hospitals per capita	0.031	0.028	0.032	0.030	0.027	0.030	0.050	0.040	0.052
	(0.030)	(0.020)	(0.031)	(0.026)	(0.019)	(0.027)	(0.056)	(0.034)	(0.059)
Population (000s)	1065.704	1579.415	950.482	1135.288	1655.428	1016.498	152.489	357.718	121.668
	(1973.379)	(2345.886)	(1855.186)	(2029.472)	(2396.075)	(1911.518)	(223.779)	(305.515)	(190.838)
1970 Characteristics									
1970 Percent Rural	0.042	0.026	0.046	0.038	0.025	0.041	0.093	0.036	0.102
	(0.073)	(0.052)	(0.077)	(0.069)	(0.051)	(0.072)	(0.102)	(0.054)	(0.104)
1969 Percent Living Below Poverty	11.153	13.719	10.716	11.040	13.396	10.636	12.624	18.904	11.719
	(7.328)	(9.002)	(6.911)	(7.346)	(9.051)	(6.934)	(6.924)	(6.196)	(6.540)
N	87426	25444	41475	72368	21610	33196	15058	3834	8279

Notes: The outcomes are from the Vital Statistics Natality Data from 1968–1981. The WOP exposure to Food Stamps and Community Health Centers comes from Hoynes et al. (2011) and Kose et al. (2022). The other controls come from Almond et al. (2011).

Table A.3: de Chaisemartin and D'Haultfœuille (2020): Regression of TWFE weights (W_{gt}) on Factors Associated with The Treatment Effect

	Correlation	Coef.	S.E	T-stat
Year	-0.731	-1.564	0.009	-180.456
Black	-0.014	-0.003	0.001	-2.615
State UI compensation per capita	0.097	11.358	1.076	10.559
Medicare benefits per capita	-0.245	-32.293	0.913	-32.293
Hospitals per capita	0.029	0.0017	0.0003	6.156

Notes: The outcome data are from the Vital Statistics Natality Files that cover the years between 1968 and 1981. This table reports results using a diagnostic test introduced by de Chaisemartin and D'Haultfœuille (2020).

Table A.4: Robustness to Specification for Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: TWFE Estimates, All Counties

	Birth Weight (in Grams)				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	4.0091***	3.9982***	4.0019***	2.7400***	2.2211***
	(0.8673)	(0.8793)	(0.8709)	(0.8692)	(0.7943)
Y-mean	3298	3298	3298	3298	3298
Adj. R-Squared	0.888	0.888	0.888	0.890	0.893
Obs	87220	87220	87220	87220	87220
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	9.6718***	9.7873***	9.5648***	4.7238**	8.8900***
	(1.9791)	(2.0875)	(1.9923)	(1.8730)	(1.9235)
Y-mean	3079	3079	3079	3079	3079
Adj. R-Squared	0.350	0.350	0.351	0.374	0.394
Obs	25390	25390	25390	25390	25390
N States	48	48	48	48	48
N Counties	2465	2465	2465	2465	2465
Min Cell Size	1	1	1	1	1
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	3.2870***	3.1009***	3.0971***	2.1274**	1.4529*
	(0.8933)	(0.9083)	(0.8796)	(0.8992)	(0.8253)
Y-mean	3336	3336	3336	3336	3336
Adj. R-Squared	0.790	0.790	0.790	0.794	0.803
Obs	41384	41384	41384	41384	41384
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	10.3222**	10.6846**	10.7928**	7.1327	7.7480*
	(5.0568)	(5.0405)	(4.9421)	(5.1858)	(4.6593)
Y-mean	3192	3192	3192	3192	3192
Adj. R-Squared	0.164	0.165	0.165	0.166	0.173
Obs	20446	20446	20446	20446	20446
N States	48	48	48	48	48
N Counties	2783	2783	2783	2783	2783
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.5: Robustness to Specification, Low Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells, TWFE Estimates, All Counties

	Fraction below 2,500 Grams				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	-0.0653***	-0.0650***	-0.0652***	-0.0378	-0.0504**
	(0.0225)	(0.0229)	(0.0227)	(0.0236)	(0.0235)
Y-mean	7	7	7	7	7
Adj. R-Squared	0.729	0.729	0.729	0.729	0.731
Obs	87220	87220	87220	87220	87220
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	-0.2323***	-0.2352***	-0.2351***	-0.1575**	-0.2614***
	(0.0778)	(0.0763)	(0.0759)	(0.0795)	(0.0897)
Y-mean	13	13	13	13	13
Adj. R-Squared	0.167	0.167	0.168	0.171	0.186
Obs	25390	25390	25390	25390	25390
N States	48	48	48	48	48
N Counties	2465	2465	2465	2465	2465
Min Cell Size	1	1	1	1	1
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	-0.0237	-0.0219	-0.0235	-0.0085	-0.0153
	(0.0212)	(0.0214)	(0.0213)	(0.0225)	(0.0228)
Y-mean	6	6	6	6	6
Adj. R-Squared	0.391	0.391	0.391	0.393	0.400
Obs	41384	41384	41384	41384	41384
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	-0.3499*	-0.3548*	-0.3694**	-0.2796	-0.3172*
	(0.1821)	(0.1859)	(0.1841)	(0.1846)	(0.1808)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.046	0.046	0.046	0.046	0.052
Obs	20446	20446	20446	20446	20446
N States	48	48	48	48	48
N Counties	2783	2783	2783	2783	2783
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.6: Robustness to Specification, Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, All Counties

	Birth Weight (in Grams)				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	4.4255***	4.4564***	4.4433***	2.7423***	1.9526**
	(0.9779)	(0.9892)	(0.9835)	(1.0023)	(0.8818)
Y-mean	3298	3298	3298	3298	3298
Adj. R-Squared	0.888	0.888	0.888	0.890	0.893
Obs	87220	87220	87220	87220	87220
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	12.5557***	12.7587***	12.4981***	4.9915**	9.9884***
	(2.3185)	(2.3727)	(2.2302)	(2.2015)	(2.1729)
Y-mean	3079	3079	3079	3079	3080
Adj. R-Squared	0.356	0.357	0.358	0.378	0.395
Obs	25134	25134	25134	25134	25118
N States	48	48	48	48	47
N Counties	2209	2209	2209	2209	2208
Min Cell Size	1	1	1	1	1
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	3.5842***	3.3991***	3.3838***	2.0776**	1.2820
	(1.0219)	(1.0483)	(1.0174)	(1.0402)	(0.9208)
Y-mean	3336	3336	3336	3336	3336
Adj. R-Squared	0.790	0.790	0.790	0.794	0.803
Obs	41383	41383	41383	41383	41369
N States	48	48	48	48	47
N Counties	2960	2960	2960	2960	2959
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	9.9930*	10.3254*	9.8795*	4.9497	4.7883
	(5.8484)	(5.7200)	(5.6689)	(5.7985)	(4.9652)
Y-mean	3192	3192	3192	3192	3193
Adj. R-Squared	0.165	0.165	0.166	0.167	0.170
Obs	20194	20194	20194	20194	20180
N States	48	48	48	48	47
N Counties	2531	2531	2531	2531	2530
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.7: Robustness to Specification, Low Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) estimates, All Counties

	Fraction below 2,500 Grams				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	-0.0755***	-0.0763***	-0.0771***	-0.0464*	-0.0585**
	(0.0228)	(0.0230)	(0.0230)	(0.0259)	(0.0250)
Y-mean	7	7	7	7	7
Adj. R-Squared	0.729	0.729	0.729	0.729	0.731
Obs	87220	87220	87220	87220	87220
N States	48	48	48	48	48
N Counties	2961	2961	2961	2961	2961
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	-0.3001***	-0.3074***	-0.3046***	-0.1978**	-0.3012***
	(0.0907)	(0.0864)	(0.0844)	(0.0952)	(0.0971)
Y-mean	13	13	13	13	13
Adj. R-Squared	0.171	0.172	0.172	0.175	0.188
Obs	25134	25134	25134	25134	25118
N States	48	48	48	48	47
N Counties	2209	2209	2209	2209	2208
Min Cell Size	1	1	1	1	1
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	-0.0263	-0.0245	-0.0269	-0.0103	-0.0177
	(0.0215)	(0.0217)	(0.0214)	(0.0235)	(0.0238)
Y-mean	6	6	6	6	6
Adj. R-Squared	0.391	0.391	0.392	0.393	0.400
Obs	41383	41383	41383	41383	41369
N States	48	48	48	48	47
N Counties	2960	2960	2960	2960	2959
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	-0.2650	-0.2733	-0.2937	-0.1844	-0.1999
	(0.2183)	(0.2230)	(0.2180)	(0.2192)	(0.2253)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.047	0.047	0.047	0.047	0.046
Obs	20194	20194	20194	20194	20180
N States	48	48	48	48	47
N Counties	2531	2531	2531	2531	2530
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.8: Robustness to Specification, Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: TWFE Estimates, Balanced Panel of Counties

	Birth Weight (in Grams)				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	3.6836***	3.7380***	3.7197***	1.9131*	2.2224**
	(1.0776)	(1.0973)	(1.0852)	(1.0857)	(0.9872)
Y-mean	3282	3282	3282	3282	3282
Adj. R-Squared	0.920	0.920	0.920	0.922	0.924
Obs	40511	40511	40511	40511	40511
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	9.0454***	9.1614***	8.9722***	3.9248**	7.7860***
	(2.0294)	(2.1355)	(2.0279)	(1.9125)	(1.9521)
Y-mean	3079	3079	3079	3079	3079
Adj. R-Squared	0.435	0.436	0.437	0.464	0.486
Obs	15260	15260	15260	15260	15260
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	6	6	6	6	6
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	2.0561*	1.9903*	1.9741*	1.4571	1.5837
	(1.1131)	(1.1443)	(1.1015)	(1.1810)	(1.0162)
Y-mean	3328	3328	3328	3328	3328
Adj. R-Squared	0.844	0.844	0.844	0.848	0.860
Obs	15260	15260	15260	15260	15260
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	6	6	6	6	6
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	4.5873	5.0218	5.0624	0.6196	2.0296
	(5.2994)	(5.2785)	(5.1245)	(5.3351)	(5.0126)
Y-mean	3187	3187	3187	3187	3187
Adj. R-Squared	0.236	0.237	0.237	0.239	0.251
Obs	9991	9991	9991	9991	9991
N States	46	46	46	46	46
N Counties	1072	1072	1072	1072	1072
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.9: Robustness to Specification, Low Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: TWFE Estimates, Balanced Panel of Counties

	Fraction below 2,500 Grams				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	-0.0622**	-0.0630**	-0.0632**	-0.0376	-0.0693**
	(0.0270)	(0.0274)	(0.0272)	(0.0290)	(0.0289)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.818	0.818	0.818	0.818	0.820
Obs	40511	40511	40511	40511	40511
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	-0.2331***	-0.2369***	-0.2363***	-0.1511*	-0.2430***
	(0.0799)	(0.0783)	(0.0779)	(0.0815)	(0.0928)
Y-mean	13	13	13	13	13
Adj. R-Squared	0.230	0.231	0.231	0.234	0.254
Obs	15260	15260	15260	15260	15260
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	6	6	6	6	6
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	-0.0122	-0.0111	-0.0135	-0.0062	-0.0341
	(0.0255)	(0.0258)	(0.0259)	(0.0278)	(0.0280)
Y-mean	7	7	7	7	7
Adj. R-Squared	0.507	0.508	0.508	0.510	0.518
Obs	15260	15260	15260	15260	15260
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	6	6	6	6	6
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	-0.3056	-0.3079	-0.3259*	-0.2076	-0.2925
	(0.1946)	(0.1966)	(0.1967)	(0.2006)	(0.1993)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.071	0.071	0.071	0.073	0.080
Obs	9991	9991	9991	9991	9991
N States	46	46	46	46	46
N Counties	1072	1072	1072	1072	1072
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.10: Robustness to Specification, Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, Balanced Panel of Counties

	Birth Weight (in Grams)				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	4.1614***	4.2646***	4.2226***	1.7217	1.8003*
	(1.2224)	(1.2376)	(1.2299)	(1.2341)	(1.0879)
Y-mean	3282	3282	3282	3282	3282
Adj. R-Squared	0.920	0.920	0.920	0.922	0.924
Obs	40511	40511	40511	40511	40511
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	11.8409***	12.0393***	11.7875***	4.1934*	9.0493***
	(2.3865)	(2.4363)	(2.2711)	(2.2790)	(2.2513)
Y-mean	3079	3079	3079	3079	3080
Adj. R-Squared	0.439	0.440	0.441	0.464	0.485
Obs	15260	15260	15260	15260	15190
N States	46	46	46	46	41
N Counties	1090	1090	1090	1090	1085
Min Cell Size	6	6	6	6	6
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	2.2244*	2.1609	2.1451*	1.2192	1.3532
	(1.2899)	(1.3316)	(1.2824)	(1.3434)	(1.1230)
Y-mean	3328	3328	3328	3328	3328
Adj. R-Squared	0.845	0.845	0.845	0.848	0.859
Obs	15260	15260	15260	15260	15190
N States	46	46	46	46	41
N Counties	1090	1090	1090	1090	1085
Min Cell Size	6	6	6	6	6
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	3.8590	4.1646	3.7877	-0.9282	0.1037
	(6.1668)	(6.0186)	(5.9989)	(6.1600)	(5.5235)
Y-mean	3187	3187	3187	3187	3189
Adj. R-Squared	0.234	0.235	0.235	0.238	0.243
Obs	9946	9946	9946	9946	9876
N States	46	46	46	46	41
N Counties	1027	1027	1027	1027	1022
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.11: Robustness to Specification, Low Birth Weight: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race-County-Year of Second Trimester Cells: Sun and Abraham (2021) Estimates, Balanced Panel of Counties

	Fraction below 2,500 Grams				
	(1)	(2)	(3)	(4)	(5)
A: All Mothers					
WIC-year-trim2	-0.0752***	-0.0774***	-0.0783***	-0.0463	-0.0760**
	(0.0277)	(0.0276)	(0.0277)	(0.0322)	(0.0308)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.818	0.818	0.818	0.819	0.820
Obs	40511	40511	40511	40511	40511
N States	46	46	46	46	46
N Counties	1090	1090	1090	1090	1090
Min Cell Size	1	1	1	1	1
Max Cell Size	107620	107620	107620	107620	107620
B: Black Mothers					
WIC-year-trim2	-0.3021***	-0.3107***	-0.3073***	-0.1977**	-0.2996***
	(0.0935)	(0.0890)	(0.0869)	(0.0976)	(0.1007)
Y-mean	13	13	13	13	13
Adj. R-Squared	0.231	0.232	0.232	0.235	0.253
Obs	15260	15260	15260	15260	15190
N States	46	46	46	46	41
N Counties	1090	1090	1090	1090	1085
Min Cell Size	6	6	6	6	6
Max Cell Size	38322	38322	38322	38322	38322
C: White Mothers					
WIC-year-trim2	-0.0151	-0.0144	-0.0178	-0.0063	-0.0364
	(0.0261)	(0.0264)	(0.0260)	(0.0292)	(0.0295)
Y-mean	7	7	7	7	7
Adj. R-Squared	0.508	0.508	0.508	0.510	0.517
Obs	15260	15260	15260	15260	15190
N States	46	46	46	46	41
N Counties	1090	1090	1090	1090	1085
Min Cell Size	6	6	6	6	6
Max Cell Size	107620	107620	107620	107620	107620
D: Other Mothers					
WIC-year-trim2	-0.2184	-0.2219	-0.2487	-0.1512	-0.1883
	(0.2387)	(0.2414)	(0.2386)	(0.2411)	(0.2496)
Y-mean	8	8	8	8	8
Adj. R-Squared	0.069	0.069	0.069	0.070	0.065
Obs	9946	9946	9946	9946	9876
N States	46	46	46	46	41
N Counties	1027	1027	1027	1027	1022
Min Cell Size	1	1	1	1	1
Max Cell Size	11650	11650	11650	11650	11650
C,Year FE	Y	Y	Y	Y	Y
Ind. Conts: Race FE	Y	Y	Y	Y	Y
FS+CHC exp		Y	Y	Y	Y
Cnty Time Varying Conts			Y	Y	Y
1970 controls*Year FE				Y	Y
State*Year FE					Y

Table A.12: Robustness to Missing Data on Gestational Age: The Effect of WIC on Main Birth Outcomes 1968–1981, by Race, Individual-Level Data: TWFE Estimates

	Black Mothers				White Mothers			
	Pref: 30.5 days, 40 weeks to miss	30 days, 40 wks to miss	30.5 days, 39 wks to miss	30.5 days, . to miss	Pref: 30.5 days, 40 weeks to miss	30 days, 40 wks to miss	30.5 days, 39 wks to miss	30.5 days, . to miss
A: Birth Weight (in Grams)								
WIC-year-trim2	9.9807***				3.1222***			
	(1.9975)				(0.9008)			
WIC-year-trim2		8.8312***				2.1732**		
		(1.9391)				(0.9046)		
WIC-year-trim2			9.9807***				3.1222***	
			(1.9975)				(0.9008)	
WIC-year-trim2				6.5959***				3.1296***
				(2.1318)				(1.0002)
Y-mean	3085	3085	3085	3102	3350	3350	3350	3364
X-mean	0.422	0.422	0.422	0.470	0.371	0.370	0.371	0.411
Adj. R-Squared	0.004	0.004	0.004	0.004	0.009	0.009	0.009	0.009
Obs	6597827	6597827	6597827	4291160	35753575	35753575	35753575	24815462
B: Fraction below 2,500 Grams								
WIC-year-trim2	-0.2431***				-0.0236			
	(0.0769)				(0.0215)			
WIC-year-trim2		-0.2018***				0.0039		
		(0.0770)				(0.0213)		
WIC-year-trim2			-0.2431***				-0.0236	
			(0.0769)				(0.0215)	
WIC-year-trim2				-0.1157				-0.0260
				(0.0960)				(0.0253)
Y-mean	13.275	13.275	13.275	12.542	6.275	6.275	6.275	5.899
X-mean	0.422	0.422	0.422	0.470	0.371	0.370	0.371	0.411
Adj. R-Squared	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
Obs	6597827	6597827	6597827	4291160	35753575	35753575	35753575	24815462
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table reports the estimated coefficients and standard errors using the TWFE method. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the individual level. Observations are weighted by 2 during the period when the state used a 50% sample of birth certificates. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.

Table A.13: Robustness to Missing Gestational Age: The Effect of WIC on Main Birth Outcomes 1968–1981 by Race, Individual-Level Data: Sun and Abraham (2021) Estimates

	Black Mothers				White Mothers			
	Pref: 30.5 days, 40 weeks to miss	30 days, 40 wks to miss	30.5 days, 39 wks to miss	30.5 days, . to miss	Pref: 30.5 days, 40 weeks to miss	30 days, 40 wks to miss	30.5 days, 39 wks to miss	30.5 days, . to miss
A: Birth Weight (in Grams)								
WIC-year-trim2	12.6295***				3.4084***			
	(2.2209)				(1.0286)			
WIC-year-trim2		11.4587***				2.5039**		
		(2.1870)				(1.0365)		
WIC-year-trim2			12.6295***				3.4084***	
			(2.2209)				(1.0286)	
WIC-year-trim2				9.4331***				3.5079***
				(2.6905)				(1.1923)
Y-mean	3085	3085	3085	3102	3350	3350	3350	3364
X-mean	0.422	0.422	0.422	0.470	0.371	0.370	0.371	0.411
Adj. R-Squared	0.004	0.004	0.004	0.004	0.009	0.009	0.009	0.009
Obs	6597706	6597706	6597706	4291017	35753575	35753575	35753575	24815462
B: Fraction below 2,500 Grams								
WIC-year-trim2	-0.3029***				-0.0279			
	(0.0838)				(0.0215)			
WIC-year-trim2		-0.2613***				-0.0012		
		(0.0848)				(0.0215)		
WIC-year-trim2			-0.3029***				-0.0279	
			(0.0838)				(0.0215)	
WIC-year-trim2				-0.2029*				-0.0289
				(0.1139)				(0.0263)
Y-mean	13.275	13.275	13.275	12.542	6.275	6.275	6.275	5.899
X-mean	0.422	0.422	0.422	0.470	0.371	0.370	0.371	0.411
Adj. R-Squared	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001
Obs	6597706	6597706	6597706	4291017	35753575	35753575	35753575	24815462
C,Year FE	Y	Y	Y	Y	Y	Y	Y	Y
FS+CHC exp	Y	Y	Y	Y	Y	Y	Y	Y
Cnty Time Varying Conts	Y	Y	Y	Y	Y	Y	Y	Y

Notes: This table reports the estimated coefficients and standard errors using the Sun and Abraham (2021) method. The outcome data are from the Vital Statistical Natality Files that cover the years between 1968 and 1981. We compile data on WIC timing from multiple sources between 1974 and 1980. The analysis is run using data at the individual level. Observations are weighted by 2 during the period when the state used a 50% sample of birth certificates. Standard errors are clustered at the county level. $*$ p<0.10, $**$ p<0.05, $***$ p<0.01.