Long-Term Own and Dynamic Complementarity Effects of the WIC Program[1]

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[1] *Any views expressed are those of the authors and not those of the U.S. Census Bureau. The Census Bureau has reviewed this data product to ensure appropriate access, use, and disclosure avoidance protection of the confidential source data used to produce this product. This research was performed at a Federal Statistical Research Data Center under FSRDC Project Number 2494. (CBDRB-FY23-P2494-R10735 and CBDRB-FY23-P2494-R10799)*

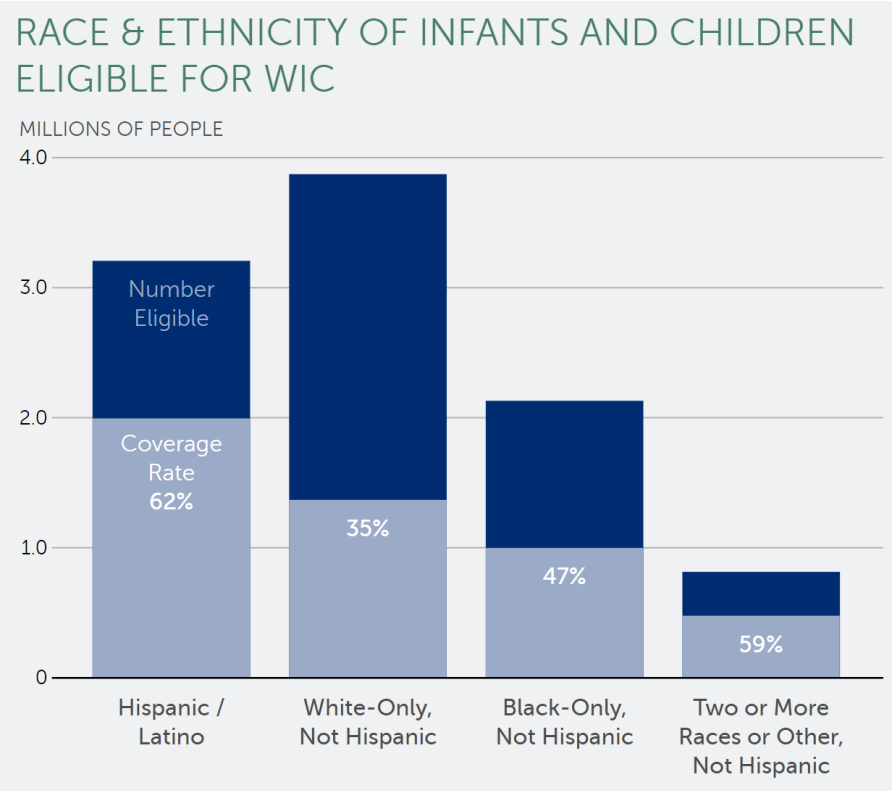
Outline

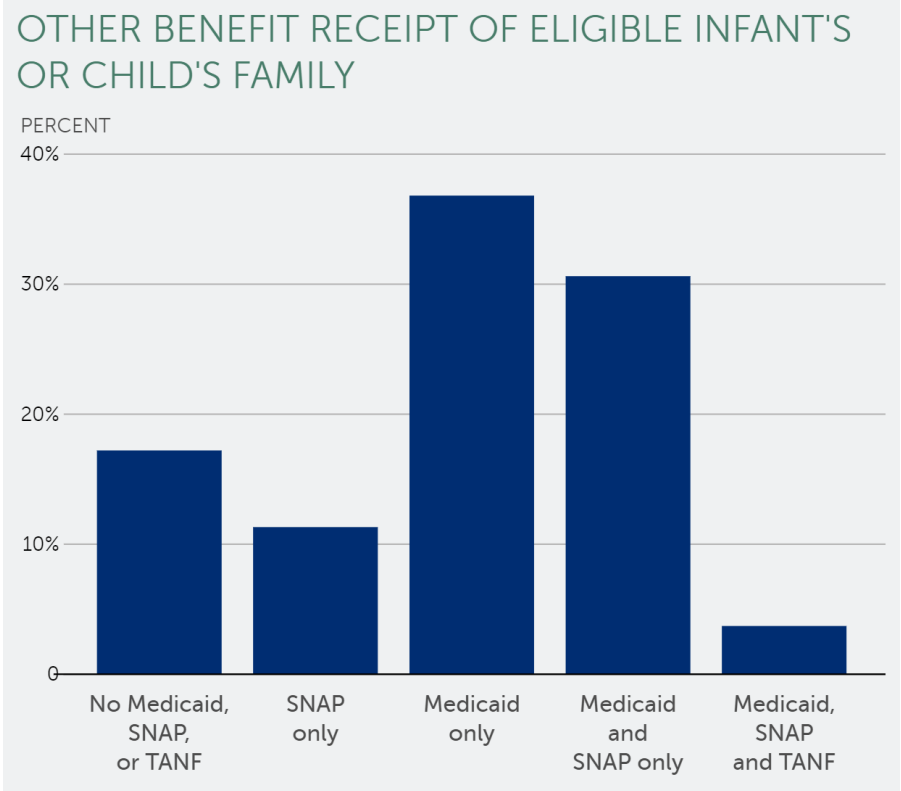
Background

- WIC has been in effect since the 1970s.
- WIC provides
  - nutrition counseling
  - healthy foods
  - referrals to health insurance programs, childcare, medical and dental care referrals
  - immunization screenings
- The average monthly WIC-eligible population was 12.5 million in 2019.
- In the average month of 2019, WIC served an estimated 50.5 percent of those eligible for WIC.
- WIC participation rate varies by race and ethnicity.

Source: USDA, 2023.

Background





Source: U.S. Department of Agriculture, 2023.

Background

Eligibility requirements for WIC include:

- Categorical requirement
  - **Women**
    - Pregnant: during pregnancy and 6 weeks after
    - Postpartum: 6 months after giving birth / the end of the pregnancy
    - breastfeeding: up to the infant's first birthday
  - **Infants**
    - up to the infant's first birthday
  - **Children**
    - up to the child's fifth birthday
- Residential requirement
- Income requirement
  - Income must be between 100-185% of the federal poverty guidelines, as set by the state agency.
  - Automatic income eligibility if eligible for SNAP, Medicaid, or TANF.
- Nutrition risk requirement
  - Must be evaluated by a health professional.

Background

- **Existing research focuses on the short-term effects of WIC**, such as birth outcomes, infant health, and dietary intake.
  - For example, Hoynes et al. (2011) study the roll-out of WIC in the 1970s and find that county-level exposure to WIC raised mean birth weight, especially among births to women with less than a high school degree.
  - Chorniy et al. (2018) found that WIC participants have a lower incidence of ADHD and other common childhood mental health conditions as well as fewer grade repetitions.
  - Figlio et al. (2009) exploit a policy change in Florida that differentially affected families around the income eligibility threshold for WIC and find no effects of WIC on birth weight but a reduction in the likelihood of birth weights below 2500 grams.

Background

The empirical approaches used in existing research on WIC include

- Comparing WIC participants to non-participants with plausibly similar characteristics, including using propensity-score matching and/or maternal fixed effect models (Joyce et al., 2005; Bitler and Currie, 2005; Khanani et al., 2010; Foster et al., 2010; Sonchak, 2016; Currie and Rajani, 2015; Gueorguieva et al., 2009; Lazariu-Bauer et al., 2004; Kowaleski-Jones and Duncan, 2002);
- Exploiting a policy change in Florida using a regression discontinuity approach (Figlio et al., 2009);
- Using an instrumental variable approach (Gai and Feng, 2012);
- Exploiting variation across counties and over time from WIC historical roll-out in the 1970s (Hoynes et al., 2011).

Identification Strategy: Event Study

In this approach, I exploit variation across counties and over time from WIC historical roll-out in the 1970s.

$$y_{ict} = \alpha + \sum_{i=-5}^{5} \delta_i 1(\omega_{ct} = i) + \beta_1 \cdot Z_c \cdot t + \beta_2 \cdot GT_{ct} + \beta_3 \cdot X_{ct} + \\ + \beta_4 \cdot V_{ict} + \mu_c + \nu_t + \gamma_{st} + \theta_h + \epsilon_{ict}$$

where

- w_{ct} are event study dummies;
- Z_c are pre-treatment birth-county-level characteristics (interacted with a linear time trend);
- GT_{ct} are birth-county-level government transfers;
- X_{ct} are time-varying birth-county characteristics;
- V_{ict} is a quadratic polynomial in age;
- μ_c is the set of birth-county fixed effects;
- ν_t is the set of birth-year fixed effects;
- γ_h is the set of birth-state-birth-year fixed effects;
- θ_h is the set of survey-year fixed effects;
- ϵ_{ict} is the error term.

The **well-being index** includes... following Bailey et al. (2020)

neighborhood quality index:	**economic self-sufficiency index:**
home value	in labor force
home ownership	worked last year
residence in a single-family home	weeks worked last year
income-to-poverty ratio in tract	usual hours worked per week
reverse-coded teen pregnancy in tract	labor income
reverse-coded share of single-headship in tract	other income not from public sources
reverse-coded share of poor children in tract	income-to-poverty ratio
share of home ownership in tract	reverse coded income from welfare
median house price index in tract	
median gross rent in tract	
county absolute mobility score (Chetty et al. 2014)	
health index:	**human capital index:**
no work disability	completed BA
no ambulatory difficulty	completed any college
no cognitive difficulty	high school graduate
no independent living difficulty	professional degree
no vision or hearing difficulty	professional occupation
no self-care difficulty	years of education

Controls include, but are not limited to,

Controls Z_c

- the percent of the county population in 1970 that lived in an urban area, on a farm, was black, was less than 5, was 65 or older, or was poor, and the log of the county population in 1970.

Controls X_{ct}

- community health center (CHCs) grants;
- population of women ages 15-44 by county-year;
- rate of pregnancies and rate of teenage pregnancies;
- percent of premature births and the percent of children born to unmarried mothers;
- average length of prenatal care;
- the number of per capita doctors, medical students, and hospitals;
- state-level unemployment, state-level real AFDC benefit standards, and per capita AFDC caseloads;
- an indicator if the adult was conceived in a state and year with legalized abortion;
- an indicator variable for Food Stamp program availability;
- total average annual public spending per capita at the county-birth-cohort level through age 4;
- overall and cause-specific child and adult mortality, as well as infant, neonatal, and perinatal mortality.

Controls GT_{ct}

- measures of real annual county employment, per capita income and government transfers, including cash public assistance benefits, medical spending, and cash retirement and disability payments.

Additional things to note

- I do not observe *enrollment* in WIC in childhood; I only observe *exposure* to WIC in childhood, so I am estimating *intent-to-treat* effects.
- Additional outcome variables include
  - *not incarcerated dummy*
  - *survival to 2020*
- WIC started spreading in 1974. My sample is **individuals born in 1972-1979** in counties and years for which the historical information on the launch of WIC is available.
- I reverse-code negative outcomes.
- I convert all index components into **z-scores** where means and standard deviations are county-level means and standard deviations for **individuals born in 1968-1972**.
- I use individual-level data and person weights in all regressions.
- I cluster standard errors at the birth county level.
- I keep in the sample only county-year cells with at least 25 obs.
- I keep in my sample only counties treated by 1979 (almost all were treated by 1979).
- An individual is counted as exposed to WIC if there was a WIC program in their county of birth when their mother was in her third trimester of pregnancy.

Main identification assumption

The unknown

- Whether the roll-out of WIC across counties and over time was close to random.

The known

- Hoynes et al. (2011) used various county characteristics to predict WIC adoption and found a statistically significant association between earlier WIC adoption and higher county-level poverty rates. However, the association was small.
- I repeated Hoynes et al.'s analysis with a wider range of predictors (from public data) and found that earlier WIC adoption was also strongly associated with lower county-level average length of prenatal care.
- WIC historical roll-out was **not random in at least one state**, Texas.

$\Rightarrow$ But if the estimated effects of the WIC program are biased, they are likely biased downward.

Data

Main data on outcomes

- **Decennial Census 2000**
  - The Decennial sample is of limited use because to measure most outcomes in adulthood, I need to restrict the sample to individuals who are at least 24-25 years old at the time when they are observed (remember that they must be born in the 1970s), so I would have to draw the cut off line around the 1975 birth year, the second year WIC was spreading across the country.
- **American Community Survey [ACS] 2005-2020**
  - **My sample size is over 1,500,000 (includes only white or black by race)**.
- **Social Security Administration's Numident File**

It is linking to the Numident File that allows me to determine county of birth for individuals observed in Census 2000 or in ACS 2005-2020.

I do **not** merge the Census 2000 with ACS.

Other data

Summary Statistics

Distribution of the ACS sample by race / ethnicity

Non-Hispanic Whites	1,290,000
Non-Hispanic Blacks	120,000
White Hispanics	193,000
Total	1,603,000

Distribution of the ACS sample by quartile of

1970 poverty		**1970 teen pregnancy rate**	**1970 fraction born with low BWT**
1st	53.78%	27.12%	7.55%
2nd	25.31%	38.33%	21.21%
3rd	11.70%	23.88%	37.77%
4th	9.21%	10.67%	33.47%

- The numbers in the tables above might not add up to 100% due to rounding.
- The 4th quartile above corresponds to the highest poverty rate, highest teen pregnancy rate, and highest fraction born with low birthweight.
- This sample includes 850 counties, which make up about 63% of the US population in 1970 (127,900,000 out of 203,392,031).

Project 2494. Disclosure clearance CBDRB-FY23-P2494-R10735 & CBDRB-FY23-P2494-R10799.

Preliminary Results Summary

- I estimate my event study model for the entire sample, as well as separately for whites, blacks, and Hispanics. I find no statistically significant results in the *full* samples of whites or Hispanics, but I find positive and statistically significant health effects in the sample of blacks.
- Next, I break down my samples of whites, blacks, and Hispanics by 1970 poverty rate quartiles, 1970 teenage pregnancy rate quartiles, and 1970 fraction born with low birthweight quartiles.
  - I find no statistically significant results for whites or Hispanics in high poverty quartiles. I notice that standard errors are very large for whites in high poverty quartiles. However, I find positive and statistically significant health effects for blacks in high poverty quartiles. I show that the effects are smaller and mostly not statistically significant in the lowest poverty quartile.
  - I find positive and statistically significant well-being / health / economic self-sufficiency effects for whites born in counties in high teen pregnancy quartiles. I also find positive and statistically significant health effects for blacks in all teen pregnancy quartiles. I show that this effect for blacks is larger in higher teen pregnancy quartiles.
  - I find positive and statistically significant health effects for blacks born in counties in high fraction born with low birthweight quartiles. I show that the effects are smaller and mostly not statistically significant in low fraction born with low birthweight quartiles.

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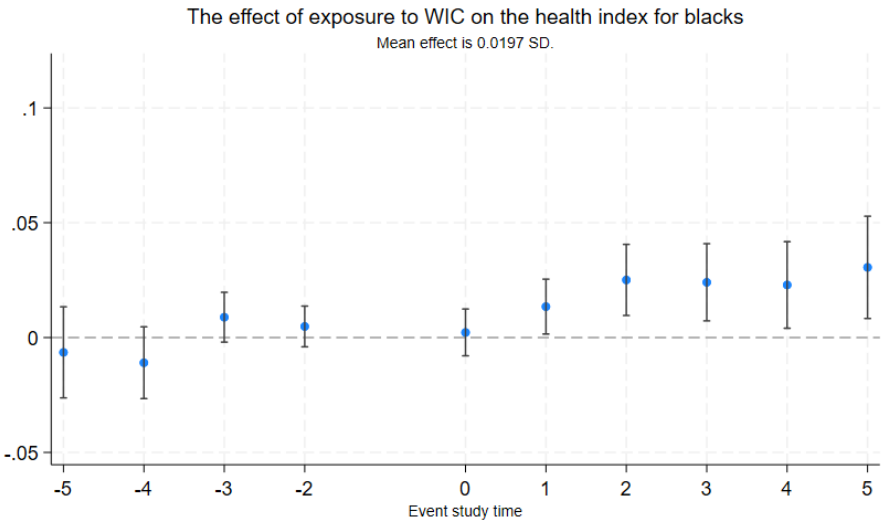
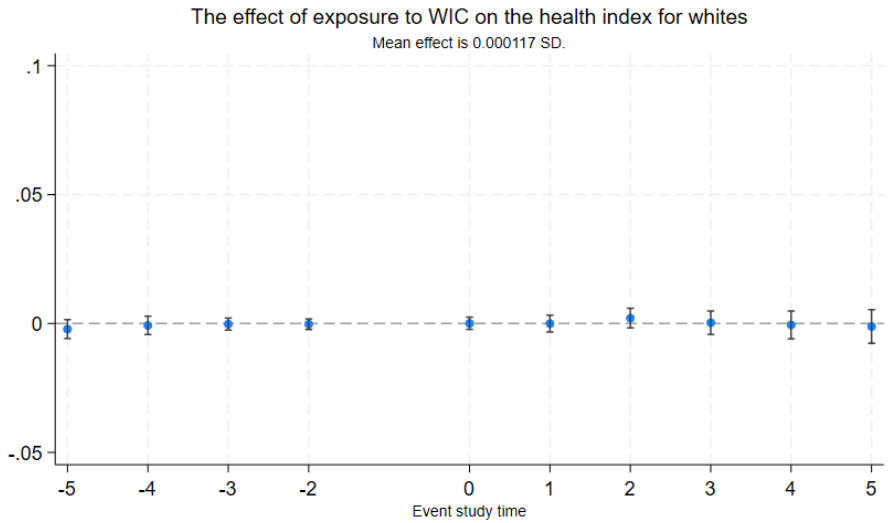
Blacks and Whites, full sample





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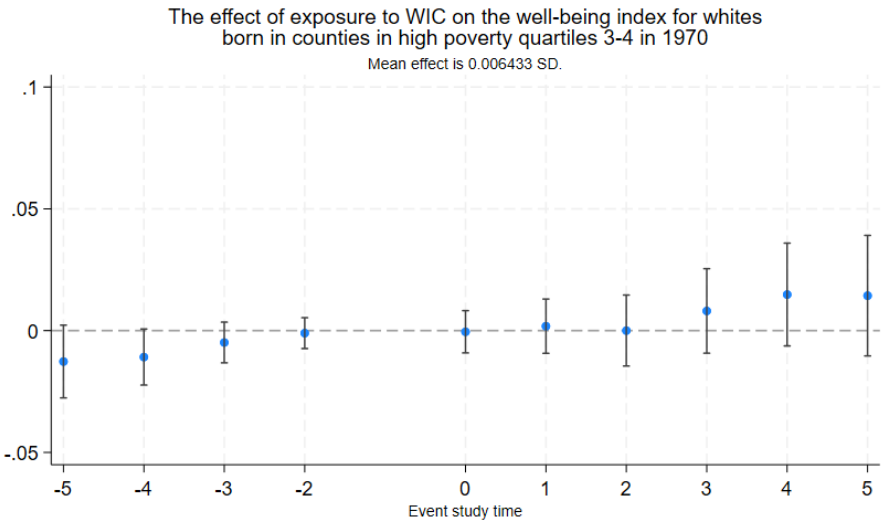
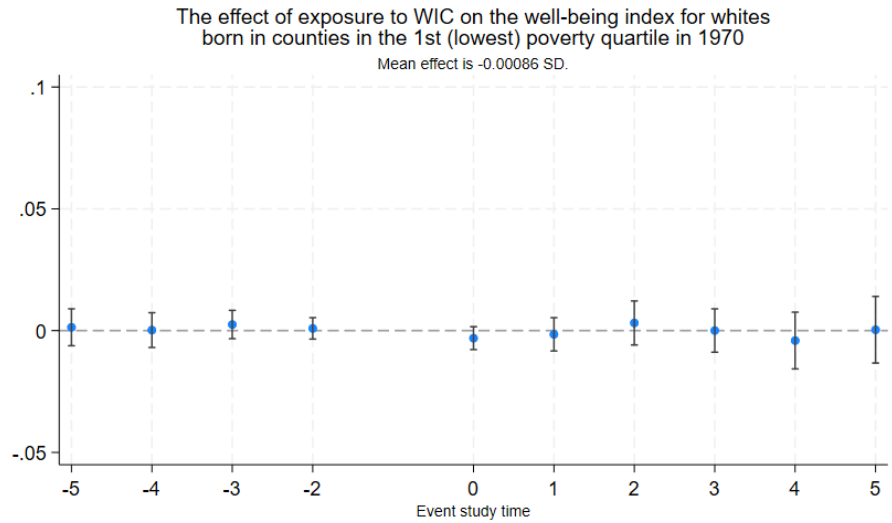
Whites, by poverty quartile





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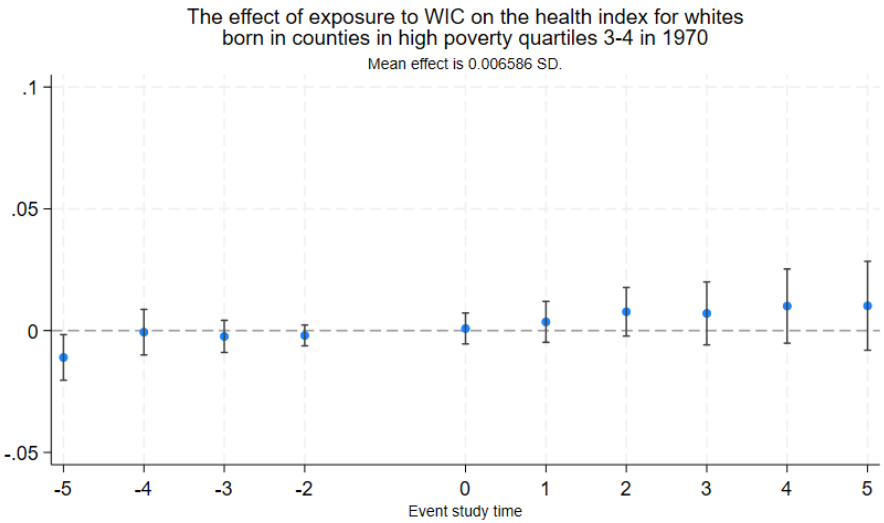
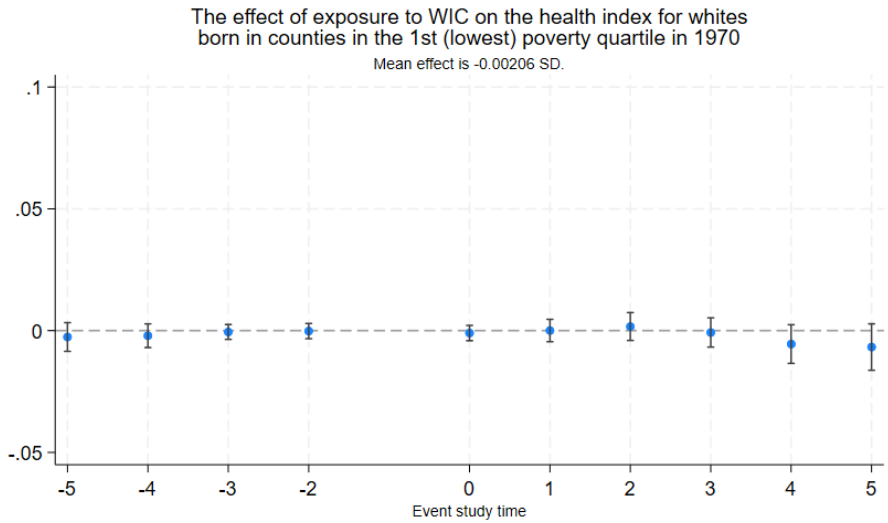
Whites, by poverty quartile *(continued)*





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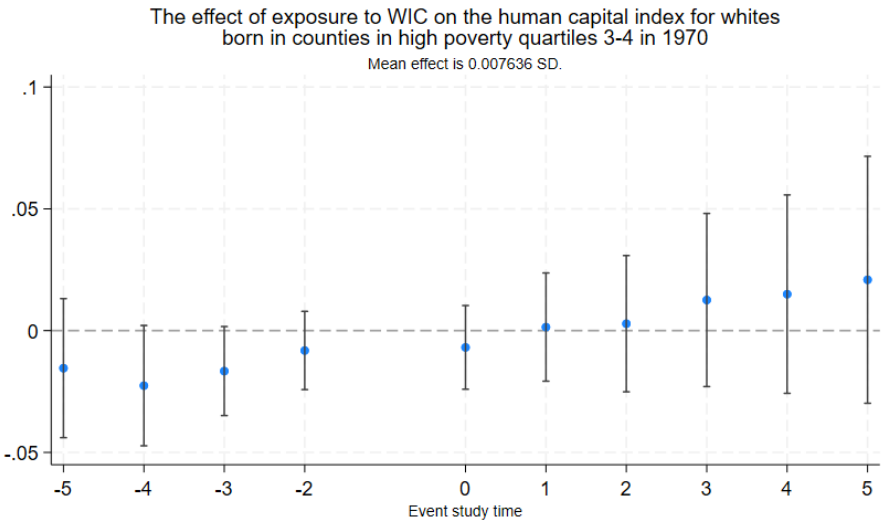
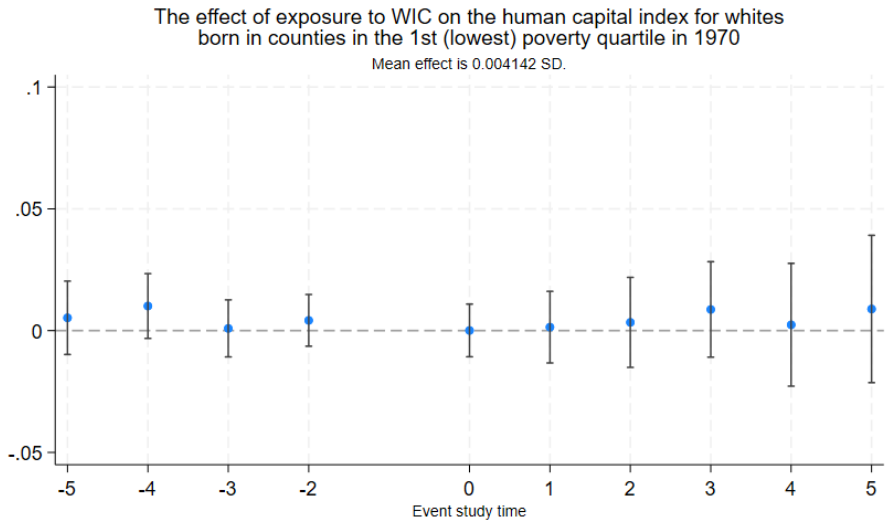
Whites, by poverty quartile *(continued)*





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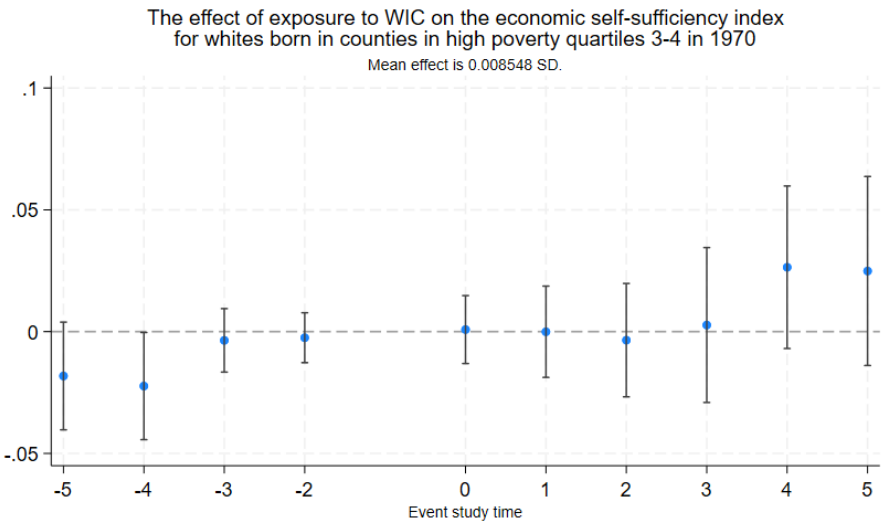
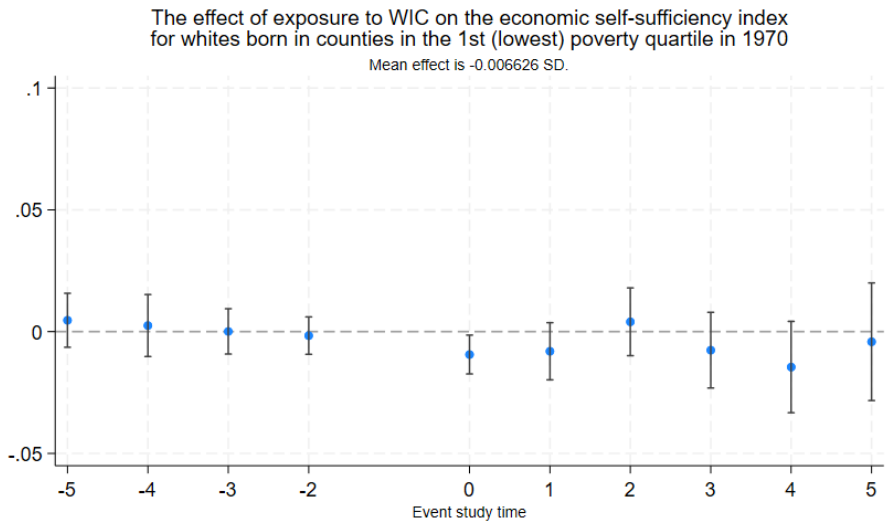
Whites, by poverty quartile *(continued)*





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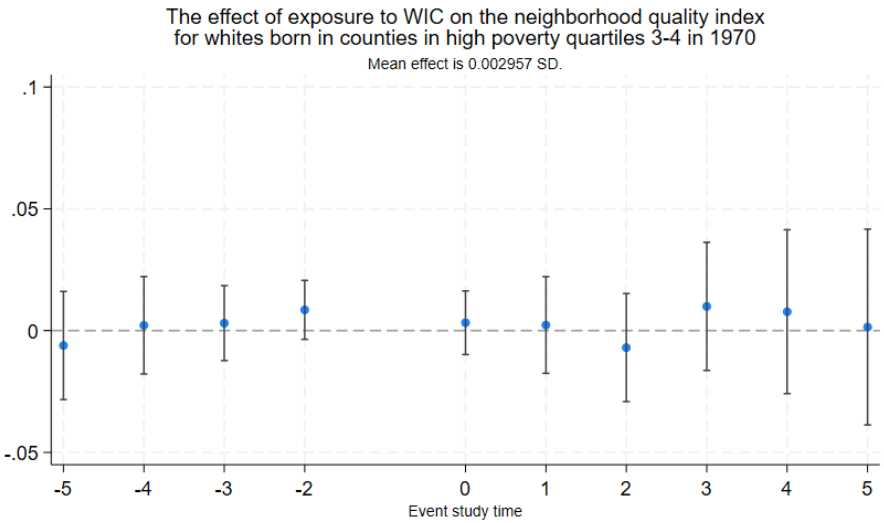
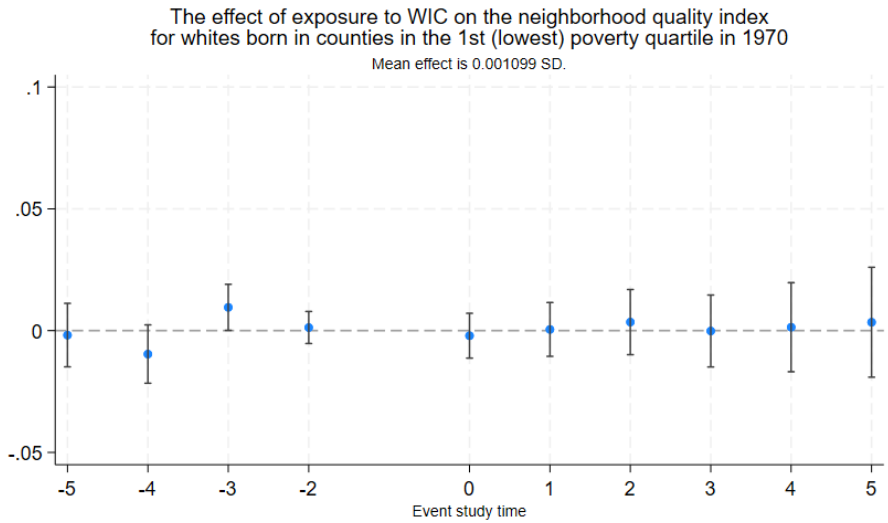
Whites, by poverty quartile *(continued)*





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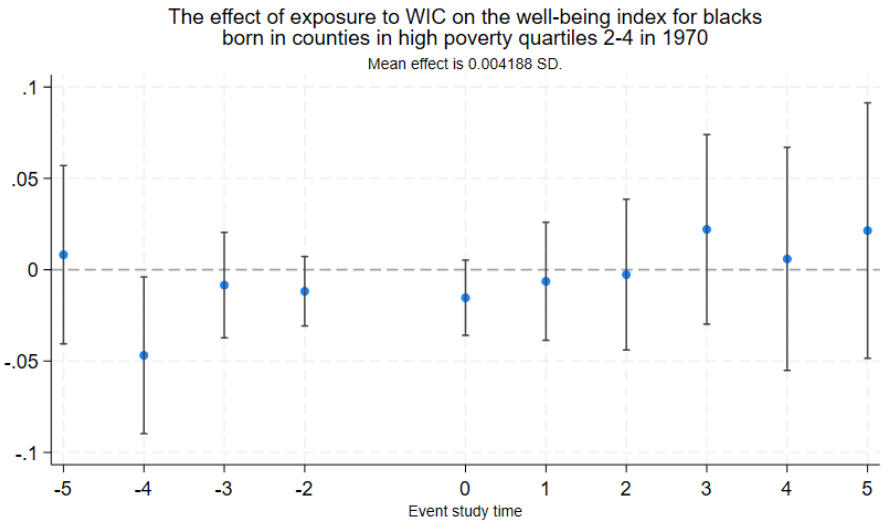
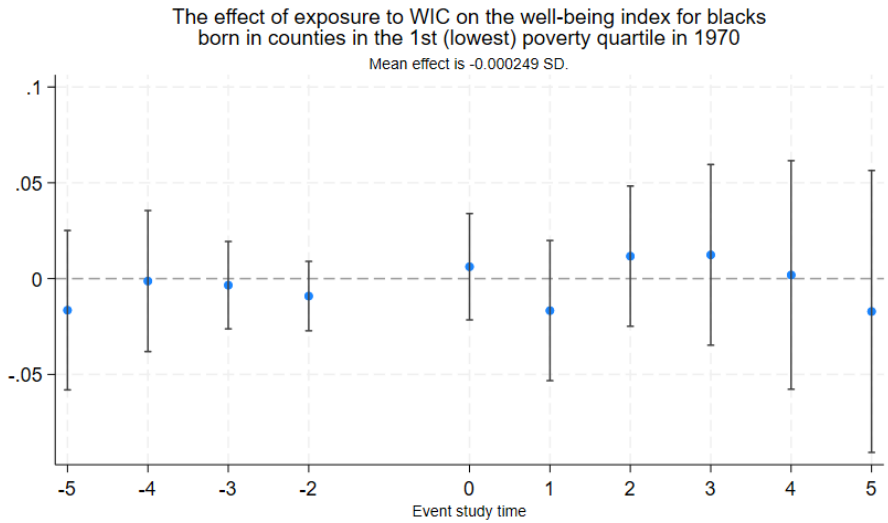
Blacks, by poverty quartile





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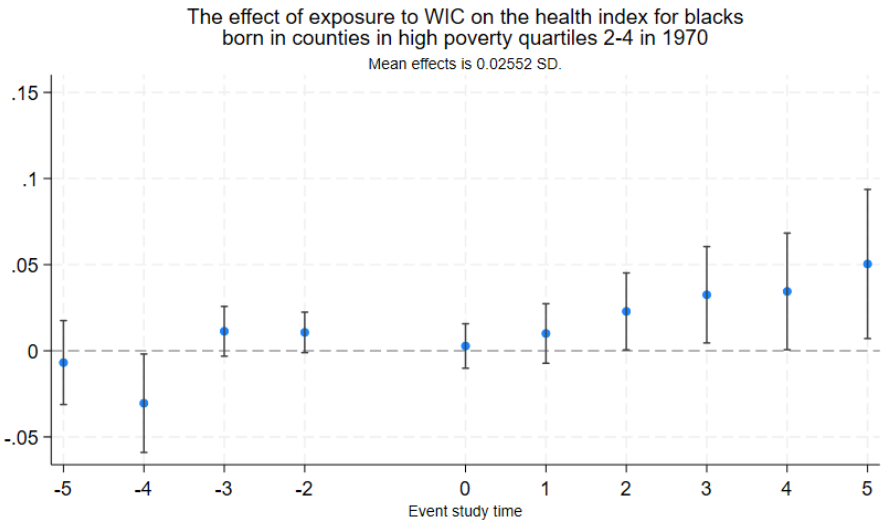
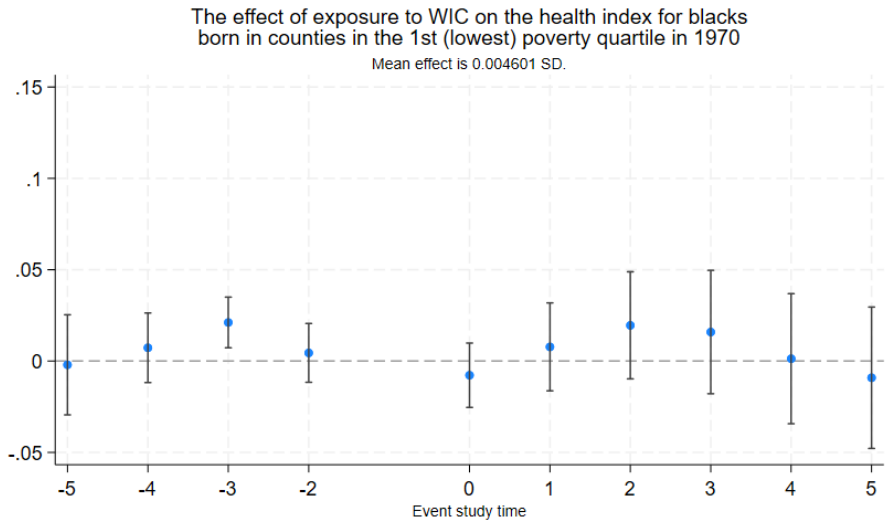
Blacks, by poverty quartile *(continued)*





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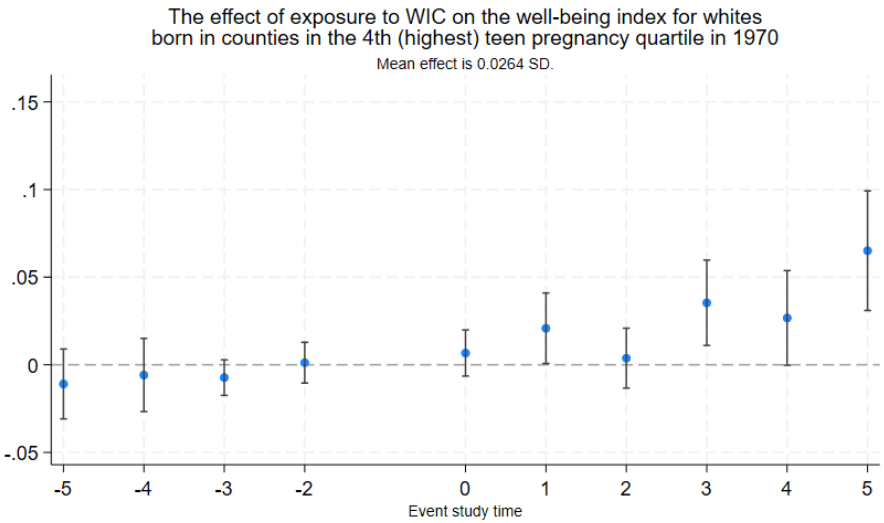
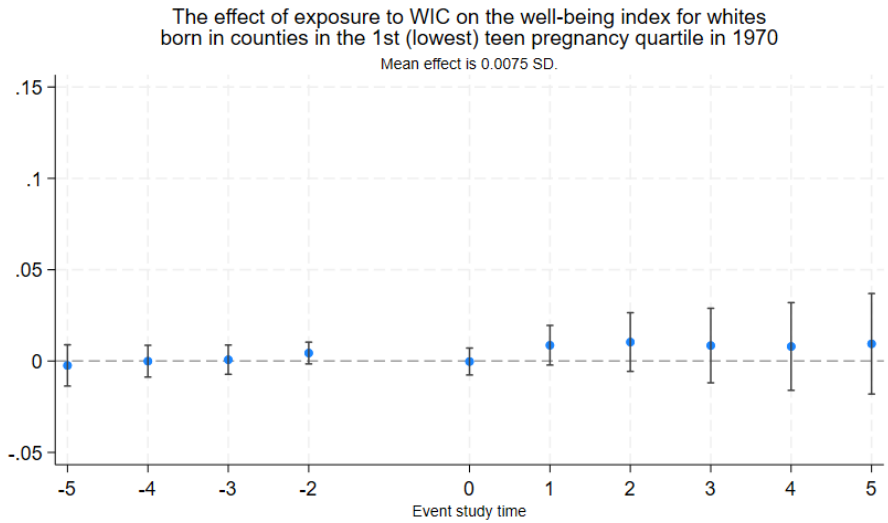
Whites, by teen pregnancy quartile





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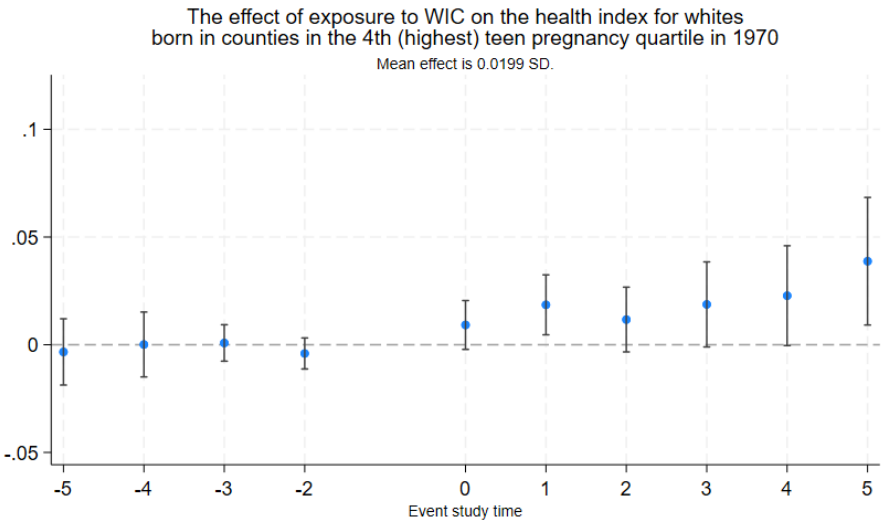
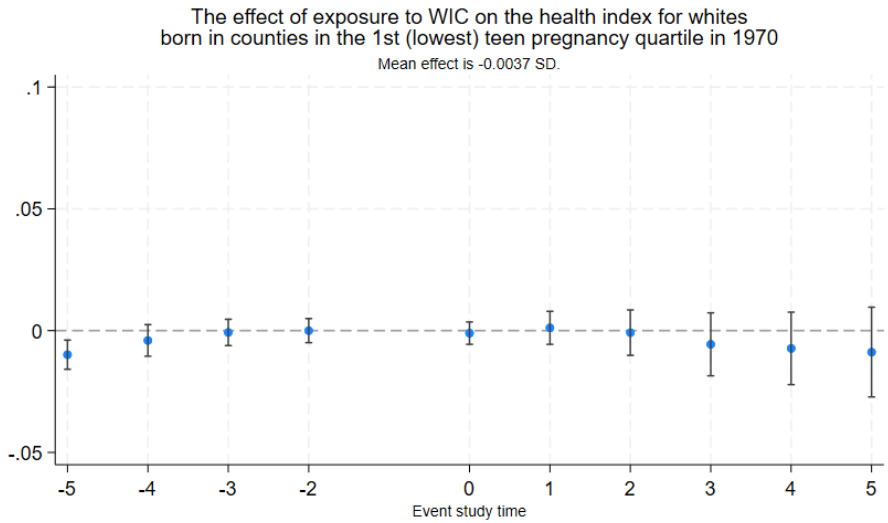
Whites, by teen pregnancy quartile *(continued)*





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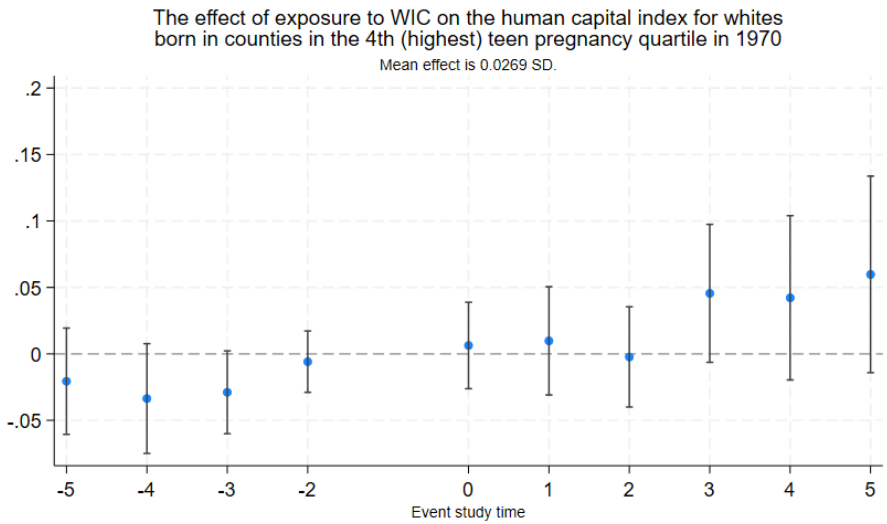
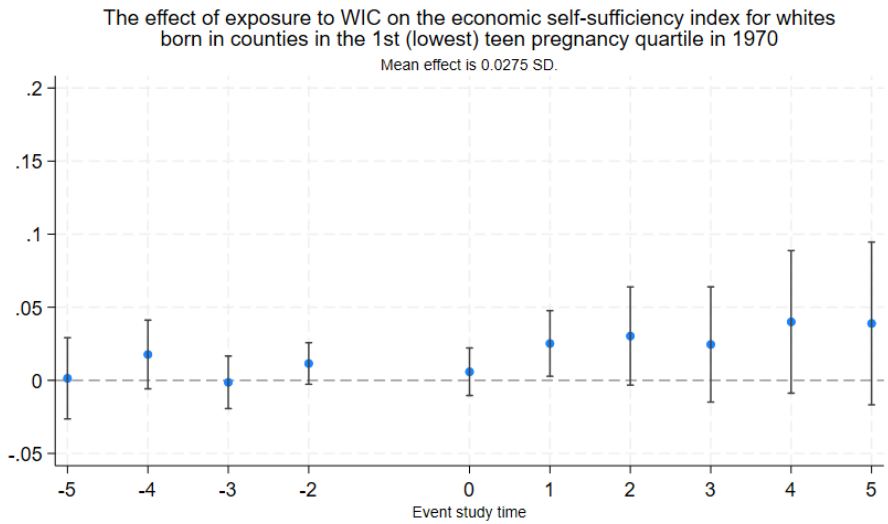
Whites, by teen pregnancy quartile *(continued)*





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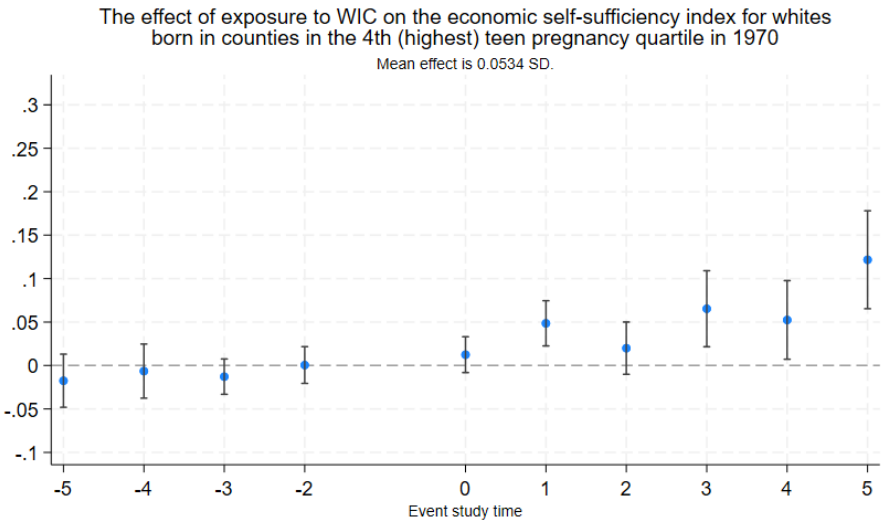
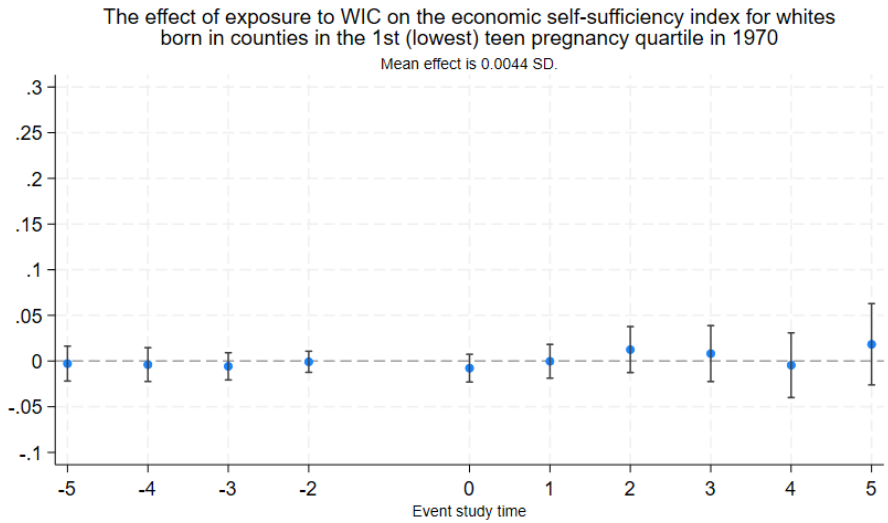
Whites, by teen pregnancy quartile *(continued)*





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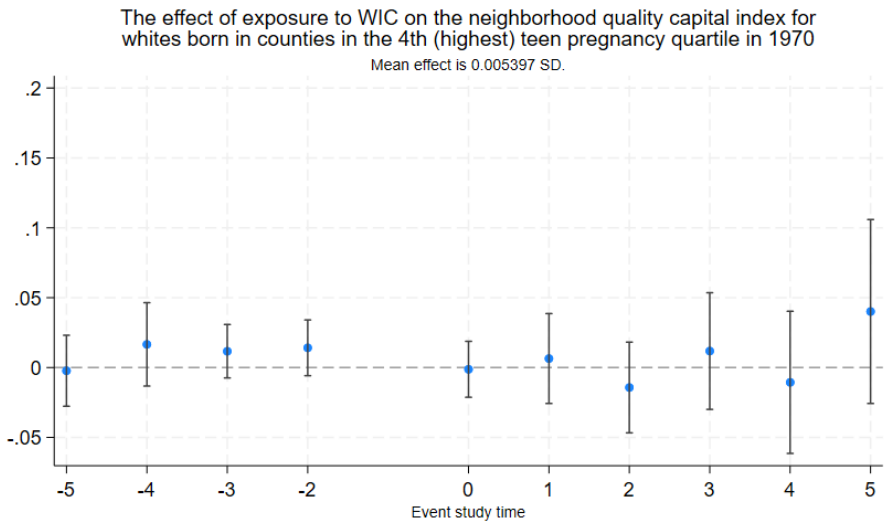
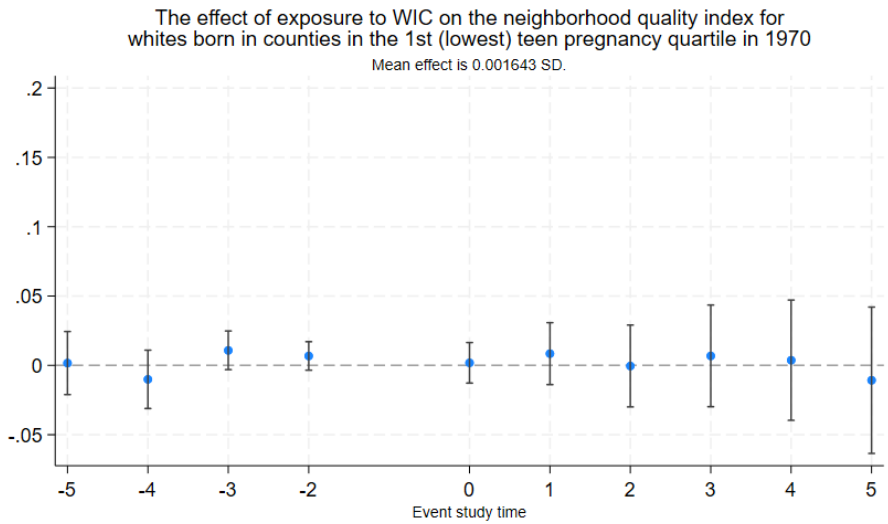
Whites, by teen pregnancy quartile *(continued)*





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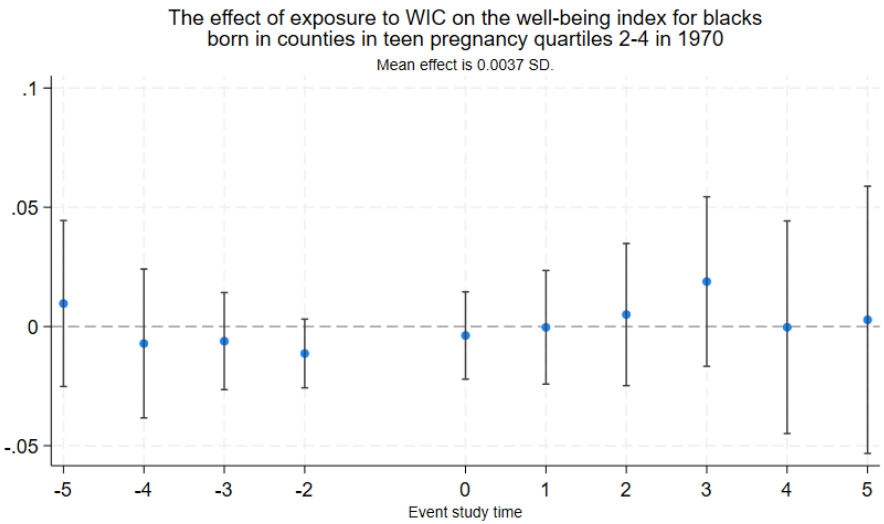
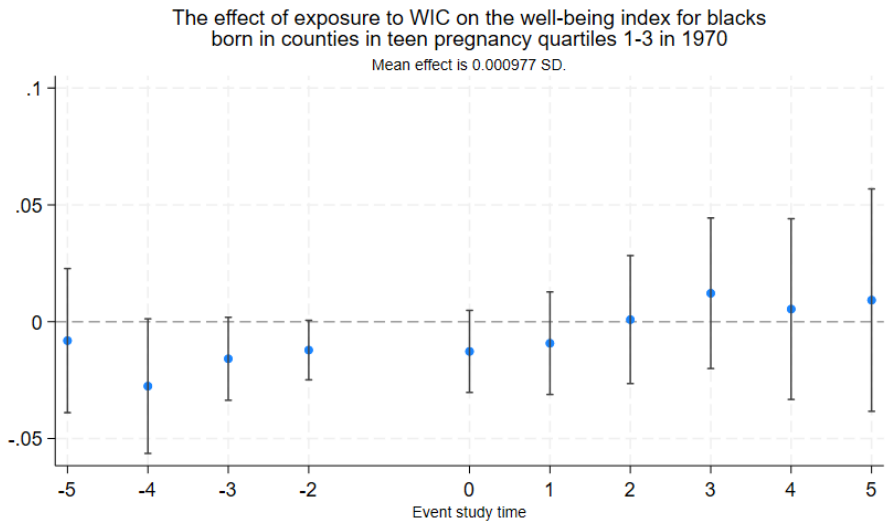
Blacks, by teen pregnancy quartile





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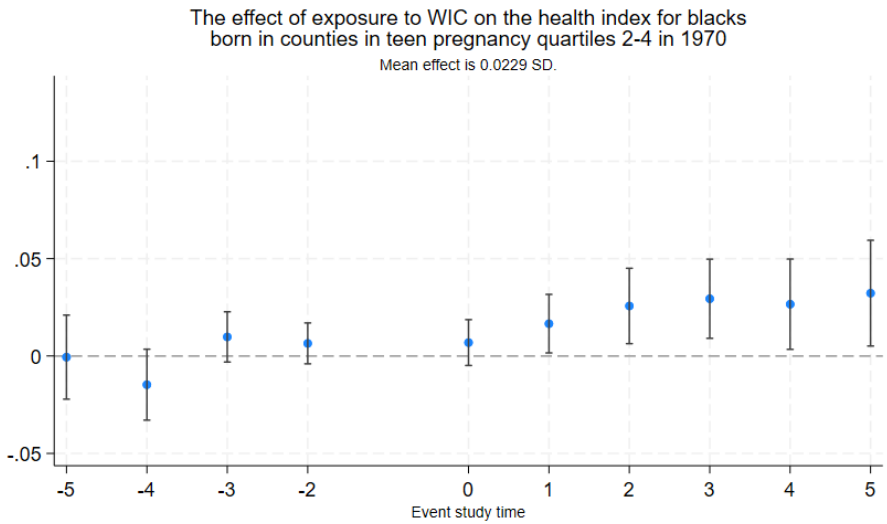
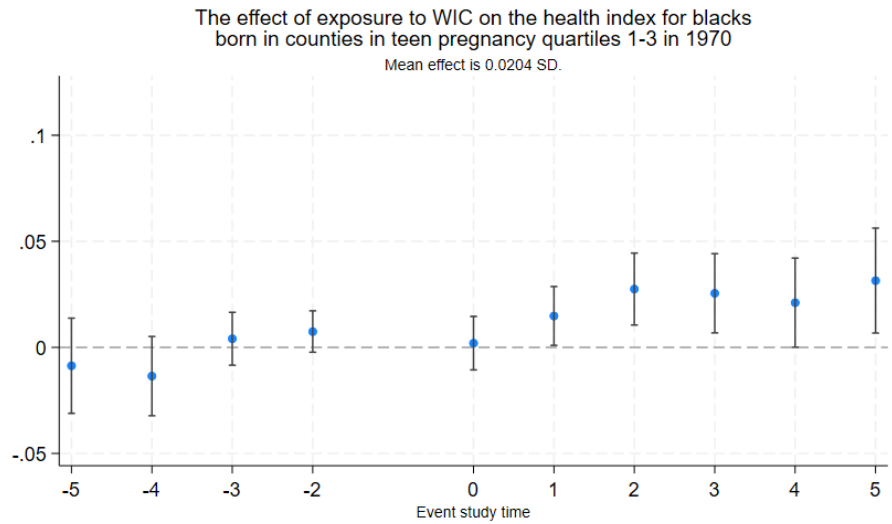
Blacks, by teen pregnancy quartile *(continued)*





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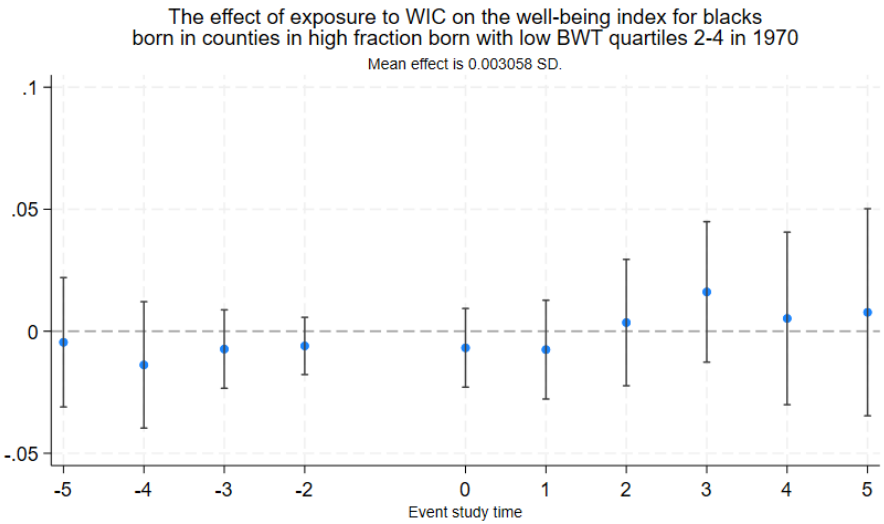
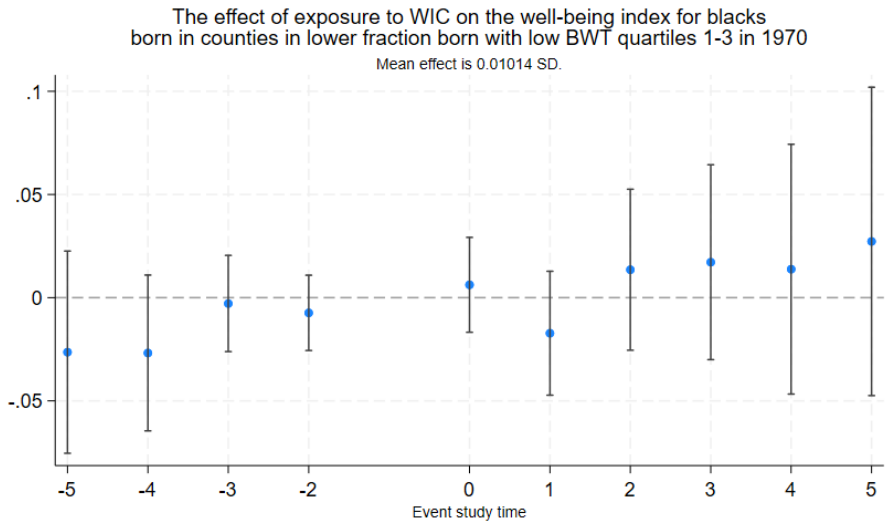
Blacks, by fraction born with low birthweight quartile





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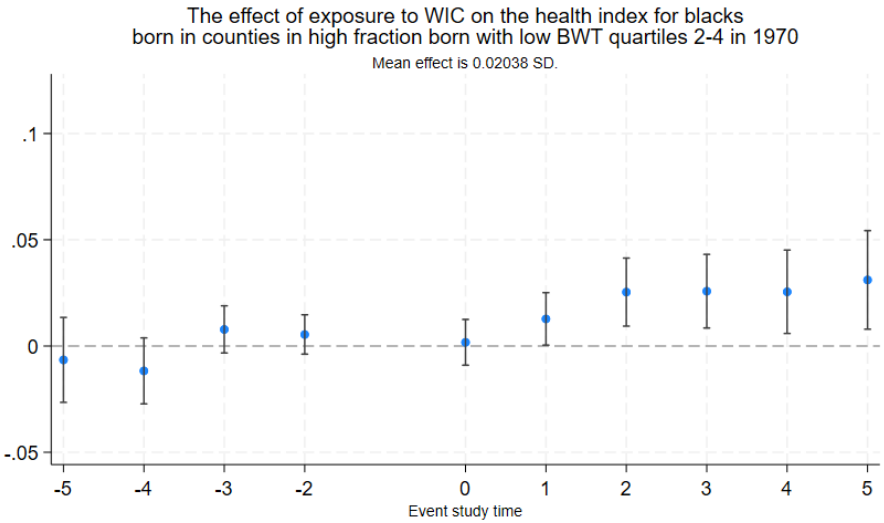
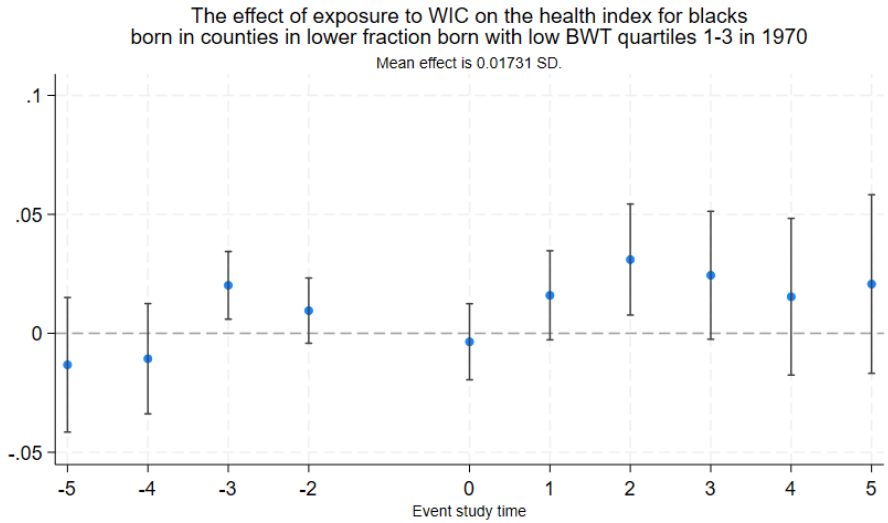
Blacks, by fraction born with low birthweight quartile *(continued)*





Project 2494. Disclosure clearance CBDRB-FY23-P2494-R10735 & CBDRB-FY23-P2494-R10799.

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