

The Effect of Aging Out of WIC on Food Insecurity

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Background

- Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
 - Nutrition assistance, education, and health screenings for pregnant, postpartum, and breastfeeding women, infants, and children up through age four
 - The income limit is 185 percent of the Federal Poverty Level (FPL).
- National School Lunch Program (NSLP)
 - Children enrolled in a public school, non-profit private school, or a residential child care institution are eligible for free or subsidized school meals.
 - Income at or below 130 percent of the FPL: Free school meals
 - Income between 130 to 185 percent of the FPL: Reduced-price school meals
- Kindergarten Entrance Age Rule
 - Most states have statutes to require children to turn five in the year they enter kindergarten.
 - Snyder et al. (2019) show that about 70 percent of five-year-old children in the U.S. enrolled in kindergarten or beyond.

Motivation

- Some children who are aging out of WIC will not be able to enroll in kindergarten and thus are not eligible for the NSLP.
- The Wise Investment in our Children Act
 - Introduced in House attempted to eliminate this gap in 2015
 - Extend eligibility for WIC until a child enters kindergarten or reaches his or her sixth birthday
 - Did not make it out of committee

Data: Current Population Survey

- School enrollment supplement (October)
 - School enrollment and educational attainment
- Food security supplement (December)
 - Annual family income in categories
 - Receive WIC benefits during the past 30 days
 - Child and household food security status, 30-day recall

Sample

- Children from households with income below 185 percent of the FPL
- Group W
 - Four-year-old children
- Group I
 - Five-year-old children who do not enroll in full-day kindergarten or beyond

	Group W		Group I
Receive WIC, NSLP	No, No	Yes, No	No, No
Child food insecurity rate	8.16	12.52	9.82
Household food insecurity rate	14.66	22.69	17.12
Observations	2,202	1,060	1,307

Note: Yes and No indicate the participation in each program.

Empirical Model

- The partial identification method addresses the dual identification challenges of endogenous self-selection of households into WIC and systematic underreporting of program participation.
- Let D^* denote treatment assignment; $D^* = 1$ indicates that children receive WIC and $D^* = 0$ indicates that they do not.
- Coefficient of Interest

$$\beta = P[Y(D^* = 1) = 1 | \text{Group I}] - P[Y(D^* = 0) = 1 | \text{Group I}]$$
 where $Y(D^*)$ denotes the potential outcomes from treatment D^* . The potential outcome is 1 if the children are food secure and 0 if the children are food insecure.
- Since all the children from Group I do not receive WIC benefits, the counterfactual terms $P[Y(1) = 1 | \text{Group I}]$ cannot be identified. To address the problem, I assume that the average food security status in Group I and Group W is the same if they receive WIC benefits.
- Under this assumption, the coefficient of interest can be written as

$$\beta = P[Y(1) = 1 | \text{Group W}] - P[Y(0) = 1 | \text{Group I}]$$
- Three monotonicity assumptions are imposed to tighten bounds.
 1. Monotone Treatment Selection (MTS) assumption

$$P[Y(i) = 1 | \text{Group W}, D^* = 0] \geq P[Y(i) = 1 | \text{Group W}, D^* = 1]$$
 for $i = 0, 1$
 2. Monotone Treatment Response (MTR) assumption

$$P[Y(1) = 1 | D^* = j] \geq P[Y(0) = 1 | D^* = j]$$
 for $j = 0, 1$
 3. Monotone Instrumental Variable (MIV) assumption
 Let v be household's income relative to the FPL.

$$u_1 \leq v \leq u_2 \rightarrow P[Y(1) = 1 | \text{Group W}, v = u_1] \leq P[Y(1) = 1 | \text{Group W}, v = u_2]$$
- Two assumptions regarding underreporting of program participation are imposed to tighten bounds.
 1. No false positives assumption
 Reported WIC participation status is only trusted for the respondents who claim to receive WIC benefits.
 2. Error independence assumption
 False reports arise independently of food security status.

Results: WIC Misclassification

	2006	2008	2010	2012	2014	2016
Self-reported WIC coverage rate	32.7	33.4	34.5	35.5	25.9	26.5
Administrative WIC coverage rate	35.2	35.7	37.8	39.1	29.9	30.5
WIC misclassification	2.5	2.3	3.3	3.6	4.0	4.0

- Two different reports published by the United States Department of Agriculture are utilized to estimate the degree of WIC misclassification.
- From 2006 to 2016, the degree of WIC misclassification ranges from 2.3 to 4.0 percentage points.

Results: Joint MIV-MTS Assumption

- The following empirical results summarize the most preferred model, joint MIV-MTS assumption with the no false positives and the error independence model.
- $P[Y(0) = 0 | \text{Group I}]$ indicates the estimated food insecurity rates of five-year-old children who do not enroll in full-day kindergarten or beyond. The rates are the weighted average of $P[Y(0) = 0]$ across all the cells utilized in the joint MIV-MTS assumption.

Misclassification	Aging Out Effect	$P[Y(0) = 0 \text{Group I}]$	Improvement
Child food security, Income below the 185 percent of the FPL			
0	[0.013, 0.051]	0.074	$\geq 17.6\%$
0.02	[0.012, 0.049]	0.074	$\geq 16.2\%$
0.04	[0.011, 0.045]	0.074	$\geq 14.9\%$
Child food security, Income below the 130 percent of the FPL			
0	[0.017, 0.059]	0.086	$\geq 19.8\%$
0.02	[0.016, 0.057]	0.086	$\geq 18.6\%$
0.04	[0.015, 0.054]	0.086	$\geq 17.4\%$

- Aging out of WIC increases child food insecurity by at least 1.1 percentage points among households with income below 185 percent of the FPL.
- It implies that 14.9 percent (0.011/0.074) of child food insecurity would be reduced if WIC extended its cutoff age until children enroll in kindergarten.
- It cannot conscientiously indicate that the effect of aging out of WIC on child food security status varies with income level.

Misclassification	Aging Out Effect	$P[Y(0) = 0 \text{Group I}]$	Improvement
Household food security, Income below the 185 percent of the FPL			
0	[0.015, 0.084]	0.136	$\geq 11.0\%$
0.02	[0.014, 0.080]	0.136	$\geq 10.3\%$
0.04	[0.013, 0.075]	0.136	$\geq 9.6\%$
Household food security, Income below the 130 percent of the FPL			
0	[0.038, 0.106]	0.146	$\geq 26.0\%$
0.02	[0.036, 0.101]	0.146	$\geq 24.7\%$
0.04	[0.035, 0.095]	0.146	$\geq 24.0\%$

- When implemented, the WIC Act will reduce the prevalence of household food insecurity by at least 24.0 percent (0.035/0.146) and 9.6 percent (0.013/0.136) for households with income below 130 and 185 percent of the FPL.
- The effect of aging out of WIC on household food security status has significantly different from two income criteria.

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