The Effects of Food Stamp Program Participation and Childhood Neighborhood Conditions on Adult BMI and Health Outcomes

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Specific Study Objectives

- *Identify the long-term effects of childhood food stamp use on adult outcomes, including:*
  - Body Mass Index (BMI)
  - Measures of overall adult health

Specific Study Objectives (cont.)

- Examine relationships between FS use and adult outcomes in the context of and in interaction with neighborhood conditions, including concentrated poverty, income inequality, residential segregation, and larger area crime.

- Explore the ways in which selection may bias estimates of FSP participation effects over the long run, by comparing sibling fixed effect estimates and estimates derived from models using instrumental variables, to estimates derived from ordinary least squares models.

Rationale

- Goals of the FSP include both to…
  - achieve a sufficient diet among those at risk of undernutrition, and
  - help people lead healthier and more productive lives.
- Its success should thus be examined in terms of both immediate and longer-term effects.
- Moreover, closer examination of the ways in which program participation interacts with neighborhood conditions has the potential to point the way to community-level interventions with broad impacts.

OUTCOME #1: OBESITY AND BODY MASS INDEX (BMI)

Linking Childhood FSP Participation with Adult Obesity

- Obesity affects disproportionate numbers of those in the low-income population of the U.S.
- Does FSP participation play some role in this finding?
- Most perspectives linking participation with adult outcomes would predict worse long-term outcomes for children from FSP participant families.

Theories

- *Food stamps provide the incentive to purchase, and thus potentially to consume, too much food (*Fraker, Martini, & Ohls, 1995).

- *Food stamps allow recipients to choose healthier foods, thus potentially leading to better health outcomes*.

- *Food stamps lead to a cycle of abundance and deprivation, with cyclical overeating leading to long-term weight gain* (Ver Ploeg & Ralston, 2000).

Current Research

- To date, research has given mixed results for the association between food stamp participation and higher BMI values or obesity.
- Cross-sectional studies:
  - No association between FS use and obesity for children of either gender (Bhattacharya & Currie, 2000; Boumtje, Huang, Lee, & Lin, 2005; Gibson, 2001; Jones, Jahns, Laraia, & Haughton, 2003; Ver Ploeg, Mancino, & Lin, 2007)
  - Small or no association for adult men or women (Ver Ploeg, Mancino, & Lin, 2007)
  - Positive relationship between FS use and obesity for adult women aged 20 and over but not for men (Townsend, Peerson, Love, Achterberg, & Murphy, 2001)

Current Research (cont.)

- Longitudinal studies without accounting for selection:
  - No relationship between FSP participation and being overweight (Jones & Frongillo, 2006; Kim & Frongillo, 2007)

- Longitudinal studies with accounting for selection:
  - Strong, positive effects on being overweight for girls, especially those girls who use food stamps for an extended time, but negative effects for boys (Gibson, 2004)
  - Positive effects on BMI for women (Baum, 2007; Gibson, 2003; Meyerhoefer & Pylypchuk, 2008; and Chen, Yen, & Eastwood, 2005) and for men (Baum, 2007)
  - No effect on BMI for women (Kaushal, 2007)
  - No effect on BMI for men (Gibson, 2003; Meyerhoefer & Pylypchuk, 2008; and Chen et al., 2005)

OUTCOME #2:
ADULT HEALTH MEASURES

Linking Childhood FSP Participation with Adult Health

- If FSP leads to better nutritional intake, then those who receive food stamps should have better long-run health outcomes (Perez-Escamilla, Ferris, Drake, Haldeman, Peranick, Campbell, Peng, Burke, & Bernstein, 2000).

- However, if nutritional intake is negatively affected by FSP, then we would expect poorer health outcomes over the long-run (Butler & Raymond, 1996).

CONTEXTUALIZING FOCUS ON NEIGHBORHOOD EFFECTS

Rationale for Attending to Neighborhood Effects

- Neighborhoods may affect the way food stamps can be used in ways that ultimately impact recipient outcomes.
  - For example, by conditioning the availability of a variety of food sources
- Neighborhoods may also exert direct effects on the outcomes under consideration.
  - For example, links between neighborhood safety and obesity

Neighborhood Advantage: General Theory

- Children growing up in higher income, more affluent, or otherwise advantaged areas will generally fare better than those growing up in relatively less advantaged areas (Vartanian & Buck, 2005).

- Socioeconomically integrated neighborhoods can sustain as well as attract more durable and reliable basic institutions (e.g., families, schools, social services) than can poorer, isolated neighborhoods (Wilson, 1987).

Neighborhood Advantage: Applications to the FSP

- Does receiving food stamps in relatively disadvantaged neighborhoods have a less positive effect (or more negative effect) on outcomes than receipt in an affluent area?
  - Constrained access to beneficial institutions
  - Disproportionate exposure to harmful ones
- Previous research, for example, has shown a link between living in poor neighborhoods and obesity (see Black & Macinko, 2008)

Relative Deprivation: General Theory

- Those who are poor *relative to* their neighbors will have less favorable health and economic outcomes.
  - strain related to persistent reminders of individuals' relatively disadvantaged status vis-a-vis more affluent community residents (Galea & Ahern, 2005; Lynch, Harper, Kaplan, & Davey Smith, 2005; Muller, 2006)
  - difficulty competing or even socializing within a relatively advantaged context

Relative Deprivation: Applications to the FSP

- Long-term health and economic outcomes for children from low-income families in relatively high-income areas may be negatively impacted by **isolation, persistent strain, or constrained opportunities** for socialization and activity.
- Food stamp receipt may further **distinguish / stigmatize** low-income recipient children from their non-recipient neighbors with ramifications for adult outcomes.

Relative Deprivation: Alternative Understanding

- Living among those with relatively greater command of resources may have protective health and economic effects.

- Calls for models using relative, rather than absolute understandings of affluence.

Disadvantaged Neighborhoods and the Accumulation of Stress on Health (Wheaton and Clarke, 2003)

- Effects may be accrued **directly** during childhood, through heightened exposure to unhealthy environments, such as crime, neighborhood blight, pollution, or other unhealthy living conditions.
- Children may also be affected **indirectly**, as when living in disadvantaged neighborhoods affects parental health, which may then in turn have detrimental effects on the child's health.

RESEARCH METHODS

Research Methods

- The effects of FS may be confounded by self-selection
- OLS and other standard regression methods may therefore give biased estimates
  - Unable to control for unobserved characteristics
    - Examples
      - May be a genetic component to chronic poor health, which may increase the likelihood of FS use
      - May have shared family norms for gov't assistance that may not be manifest in reports of current use but that exist nonetheless.

Standard Regression Model

$$Y_{ij} = \alpha_j + \beta_1 FP_j + \beta_2 FIV_{ij} + \gamma_1 N_{ij} + \gamma_2 FS_{ij} + \gamma_3 FS_{ij} N_{ij} + \mu_{ij}$$

- Where FP are the family permanent variables for family j.
- FIV are the family and individual variables for individual i in family j.
- FS is food stamp receipt for individual i in family j.
- N is neighborhood condition for individual i in family j.
- FS*N is the interaction of FS and neighborhood condition.
- Primarily interested in the FS effect, the neighborhood effect, and the interaction of these two.

Assumptions

- If we assume no self-selection, standard regression models will give unbiased estimates.

- If there is self-selection, which is correlated with an individual's FS participation in childhood, standard models will give biased estimates.

Sibling Fixed Effect Model

$$Y_{ij} - Y_{.j} = (\alpha_j - \alpha_j) + \beta_1(FP_j - FP_{.j}) + B_2(FIV_{ij} - FIV_{.j}) + \gamma_1(N_{ij} - N_{.j}) + \gamma_2(FS_{ij} - FS_{.j})$$
$$+ \gamma_3(FS_{ij}N_{ij} - FS_{.j}N_{.j}) + (\mu_{ij} - \mu_{.j})$$

- The FE model is estimated by using data from individuals in families with more than a single child, and subtracting the family mean from each individual sibling's observation, as shown above.
- The fixed effect does not vary across siblings and thus drops out of the model even though it is unobserved.
- The observed permanent family characteristics also drop out of the model

Some Parental Factors that May Be Captured in FE Models

- IQ
- Parenting practices
  - Involvement in children's lives
  - Strict or lenient rules
- Genetic influences
- Mental health
- Health not captured in the data
- Aspirations for children

Fixed Effect Models and Their Limitations

- Allow us to control for unobserved and time-invariant factors
- Limitations include…
  - Limited to families with more than 1 child
  - Sample sizes will be smaller than standard models and therefore estimates will be less precise
  - Unobserved factors that vary over siblings are not captured.

Data

- 1968-2005 PSID
  - 38 year longitudinal data
  - 5,000 families and 18,000 individuals in 1968
  - 8,000 families and 23,000 individuals in 2005
  - Annual data from 1968-1997
  - Biannual data from 1999-2005
- Census Data
  - 1970-2000 Decennial Census data, usually at the census tract level,
  - Neighborhood variables
- County and City Data Book
  - 1967-2007
  - Crime data

Samples

- Respondents (and their siblings, in the FE models) must have at least 4 years of data from ages 0 to 18.

- Must have at least 2 year of adult data (some have 30 years of adult data), where they are either the head of household or a wife

Dependent Variables
All Measured as an Average in Adulthood

- Health outcomes – all self-reported
  - BMI, overweight, obesity (1999-2005 PSID)
  - Overall self-reported health (1984-2005 PSID)
  - Proportion of time with self-reported poor or fair health (1984-2005 PSID)

Independent Variables
Generally averaged over the childhood years

- Income, FS, and AFDC use: percentage of years with
  - Food stamp use
  - AFDC/TANF use
  - Both
  - Neither w/income>=150% of the PL
  - Neither w/income<150% of the PL
- Alternatively, examine the amount of FS and AFDC/TANF income
- Health
  - Smoking
  - Self-reported health from ages 0 to 16
  - Whether mental/physical health problems limited work for parents.

Independent Variables

- Neighborhood variables, used separately
  - % w/income above respondent's
  - Poverty rate
  - % w/incomes below $15,000
  - % w/incomes above $60,000
  - % high school dropouts and college grads
  - % black and % white
  - Crime rate at the county level
  - Neighborhood index, with principal components
- Interaction between FS use and NB condition

Childhood Covariates

- Marital status of head/wife
- Education level of head
- # of siblings
- Child order
- Gender
- Year entering the sample
- Become a head/wife before age 18
- Years of childhood used

Independent Variables
Adult Variables averaged over adult years

- Marital status
- # of children
- Level of education
- Age and age squared at the end of the sampling period
- Years of adulthood used

Weighted Mean Values

	OLS Models			Fixed Effect Models, with Siblings		
	All	Ever Receive Food Stamps	Ever Receive AFDC	All	Ever Receive Food Stamps	Ever Receive AFDC
BMI	28.43 (6.59)	29.36 (7.21)	29.59 (6.99)	28.50 (6.60)	29.59 (7.34)	29.85 (7.31)
%time w/poor or fair Health	.07 (.18)	.11 (.23)	.14 (.26)	.07 (.17)	.11 (.22)	.15 (.25)
Health Index	.82 (.15)	.78 (.17)	.75 (.19)	.82 (.15)	.78 (.17)	.75 (.19)
% time only FS	.06 (.13)	.20 (.17)	.18 (.17)	.06 (.13)	.20 (.17)	.19 (.18)
% time both FS&AFDC	.05 (.15)	.15 (.24)	.29 (.27)	.05 (.15)	.15 (.24)	.30 (.27)
% time only AFDC	.02 (.08)	.04 (.10)	.10 (.17)	.01 (.07)	.04 (.10)	.09 (.15)
% time poor, no FS/AFDC	.15 (.23)	.24 (.23)	.22 (.21)	.15 (.23)	.25 (.23)	.23 (.22)
% time not poor	.73 (.36)	.38 (.34)	.21 (.27)	.73 (.36)	.37 (.34)	.19 (.26)
% in NB w/income<$15k	9.49 (7.63)	13.87 (9.08)	16.57 (9.93)	9.31 (7.43)	13.59 (8.89)	16.42 (9.75)
Neighborhood Pov Rate	13.05 (10.13)	18.87 (11.89)	22.91 (12.73)	12.83 (9.88)	18.50 (11.65)	22.64 (12.27)
African American	.15 (.36)	.35 (.48)	.52 (.50)	.14 (.35)	.33 (.47)	.53 (.50)
White	.81 (.39)	.61 (.49)	.41 (.49)	.82 (.38)	.63 (.48)	.42 (.49)
Othrace	.03 (.18)	.04 (.19)	.06 (.24)	.03 (.18)	.03 (.18)	.05 (.21)
female	.52 (.50)	.55 (.50)	.59 (.49)	.52 (.50)	.55 (.50)	.59 (.49)
Family income-to-needs	2.80 (1.80)	1.62 (.90)	1.25 (.70)	2.71 (1.81)	1.59 (.92)	1.19 (.69)
smoke	.38 (.49)	.47 (.50)	.49 (.50)	.37 (.48)	.47 (.50)	.49 (.50)
N	5136	2,219	1,258	3,739	1,632	914

Body Mass Index, OLS and Fixed Effect Models, with Full set of Controls

	All Observations		Females	
	OLS	Fixed Effect	OLS	Fixed Effect
Neighborhood Index	.00 (.18)	.18 (.95)	-.13 (.23)	1.89 (1.64)
% time only FS	1.17 (.81)	5.47 (2.41)*	-.03 (1.06)	6.63 (3.86)+
% time both FS&AFDC	.31 (.72)	4.89 (2.57)+	-.16 (.93)	3.80 (3.98)
% time only AFDC	-1.55 (1.16)	-1.39 (3.55)	-1.38 (1.57)	-6.29 (5.55)
% time poor, no FS/AFDC	.02 (.53)	.67 (1.93)	-.27 (.72)	-3.85 (3.33)
% time poor, no FS or AFDC (comparison group)				
African American	1.28 (.36)***	4.67 (2.02)*	1.90 (.47)***	7.59 (2.79)**
N	4,690	3,467	2,629	1,368
BMI Prediction, Overall	28.80	28.78	28.70	29.10
BMI prediction for % of time on FS only of .25		29.89		31.79
BMI prediction for % of time on FS only at .50		31.26		33.45

Percentage of Time with Poor or Fair Health, OLS and Fixed Effect Models, with Full set of Controls

	All Observations		Females	
	OLS	Fixed Effect	OLS	Fixed Effect
Neighborhood Index	-.01 (.00)	-.11 (.03)***	-.01 (.01)+	-.11 (.03)***
% time only FS	.04 (.02)+	.06 (.07)	.02 (.03)	.06 (.10)
% time both FS&AFDC	.06 (.02)***	-.09 (.07)	.04 (.03)	-.15 (.11)
% time only AFDC	.08 (.03)*	.13 (.10)	.05 (.05)	-.09 (.15)
% time poor, no FS/AFDC	-.01 (.02)	.11 (.05)*	.00 (.02)	.19 (.09)*
% time poor, no FS or AFDC (comparison group)				
African American	.03 (.01)***	-.10 (.02)***	.04 (.01)***	.11 (.08)
N	5,144	3,744	2,858	1,518
Overall Prediction	.085	.083	.095	.094
% of time with poor/fair health prediction for NB index 1 SD below the mean		.191	.105	.206

Health Index (0=worst, 1=best), OLS and Fixed Effect Models, with Full set of Controls

	All Observations		Females	
	OLS	Fixed Effect	OLS	Fixed Effect
Neighborhood Index (higher values are more advantaged)	.00 (.00)	.06 (.02)***	-.01 (.00)+	.08 (.02)***
% time only FS	-.03 (.02)	-.02 (.05)	-.01 (.02)	-.01 (.07)
% time both FS&AFDC	-.03 (.02)*	.07 (.05)	-.02 (.02)	.14 (.08)+
% time only AFDC	-.04 (.03)	-.01 (.07)	-.01 (.04)	.12 (.11)
% time poor, no FS/AFDC	.01 (.01)	-.05 (.04)	.01 (.02)	-.11 (.07)+
% time poor, no FS or AFDC (comparison group)				
African American	-.03 (.01)***	-.08 (.04)*	-.05 (.01)***	-.07 (.06)
N	5,144	3,744	2,858	1,518
Overall Prediction	.803	.805	.789	.787
% of time with poor/fair health prediction for NB index 1 SD below the mean	.800	.746	.782	.711

Conclusions

- FSP as a child has some small negative consequences for BMI and time with poor/fair health, which become more pronounced when using FE models.
- Childhood FSP has no effect on overall health.
- Those growing up in more advantaged neighborhoods have less time in poor/fair health and better overal health.