

SCHOOL FOOD, SCHOOL PERFORMANCE, AND THE PRICE OF SCHOOL MEALS

Jacob Leos-Urbel

Amy Ellen Schwartz

Meryle Weinstein



I N S T I T U T E F O R
Education and Social Policy

Accountability

- Schools are held accountable for academic success even though outside influences are important contributors to academic achievement
- Difficult to target resources since schools and districts have little control over these resources
- Administrative data are already available to study many of these contributors

Outside influences on academic achievement

- Housing
 - Public Housing
 - Foreclosures
- Out-of-School Time
 - After-school Programs
 - Cultural Organizations
- Health
 - Disease
 - Physical Disabilities

Schools and Housing

□ Public Housing

- New York City Housing Authority
- Student address data

■ Students concentrated in a small numbers of schools

■ Different teaching staffs

■ Lower attendance rates and lower performing

□ Foreclosures

- Lis pendens (LP) filings from Public Data Corporation

■ Lower performing schools and students

■ Small number of schools concentrated in specific areas

Out-of-School Time

- After-School Programs
 - Resources not evenly distributed across school districts
 - Participation can lead to improved academic outcomes
- Libraries
 - Distance to libraries impacts use
 - Use positively impacts homework completion and amount of time spent reading (Bhatt 2010)

Health

- Asthma
 - One of most common chronic childhood diseases and most common cause of school absenteeism
- Vision
 - Undetected vision problems one of leading causes of problems in the classroom
- Teen Pregnancy
 - Higher rates of dropping out of high school among teenage mothers

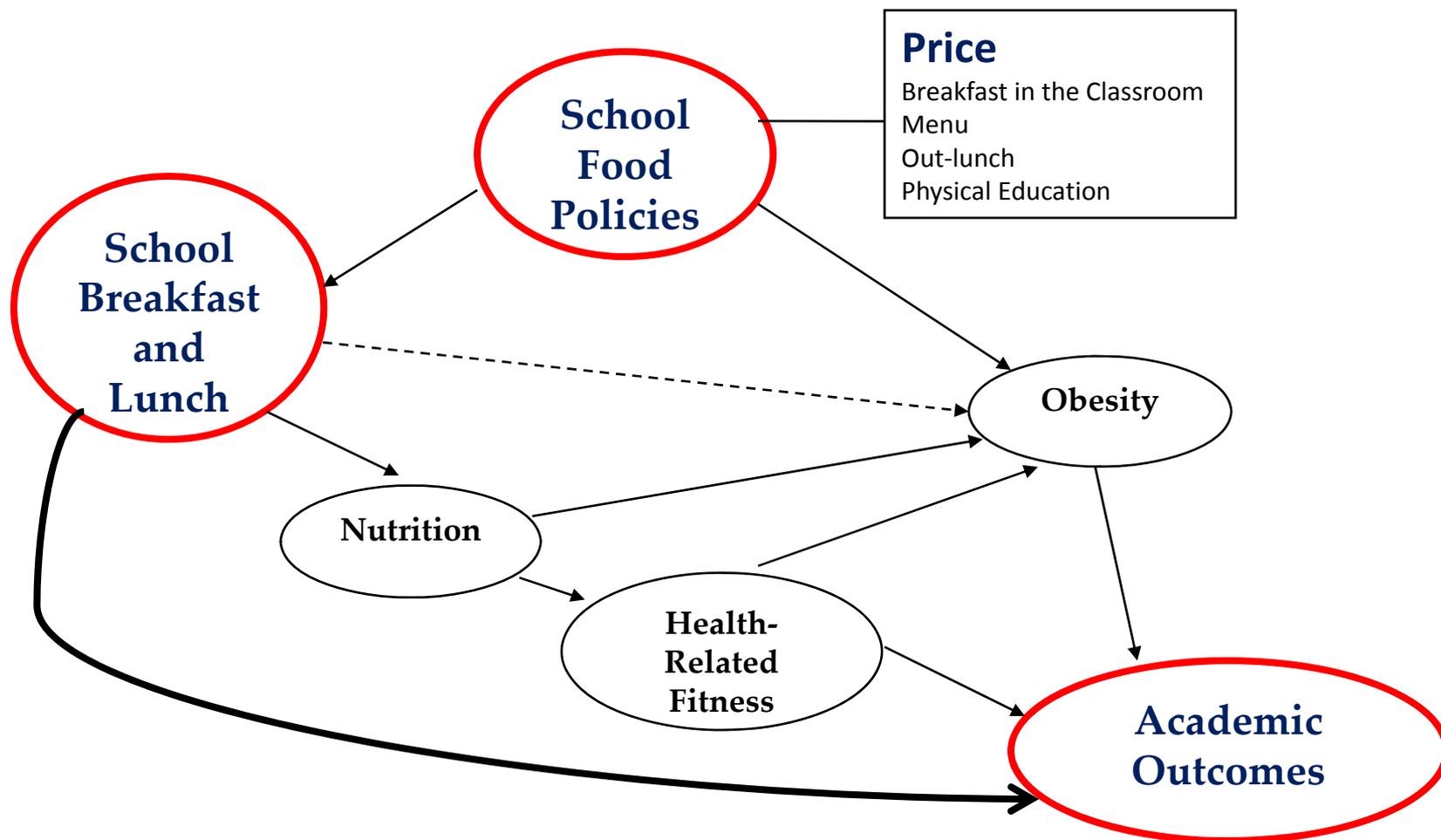
Our Focus Today: School meal program

- Untapped data source
 - Data already collected
 - Typically used as proxy for poverty
- Affects large number of children in almost all districts nationwide
- Unexplained source of variation that may influence academic outcomes

Our Question

- How did a 2004 change in the price of school meals in New York City impact student meal consumption, attendance, and academic performance?

Linking School Food Policies and Student Health and Fitness to Academic Outcomes



National School Food Policy

- In 1946, Congress passed the National School Lunch Act
 - In 2008, the National School Lunch Program (NSLP) served more than 30.9 million children daily, at an annual cost of \$9.3 billion
- The School Breakfast Program became permanent in 1975
 - In 2008, the SBP served 10.6 million children each school day, at a cost of \$2.4 billion
- Today, Congress is considering a law to expand enrollment in the federal free school lunch program by allowing schools in high-poverty areas to provide free meals to all students without requiring paper applications

Meal subsidization for eligible students

- Any child at a participating school may purchase a meal through the National School Lunch Program
- Students from families with incomes below 130 percent of the poverty line pay nothing for lunch
- Those with incomes between 130 percent and 185 percent of the poverty level are eligible for reduced-price meals

Previous Research on School Food & Academics

- Positive effects of eating breakfast on memory, attention, concentration, and academic outcomes for students (Benton and Parker, 1998; Pollitt et al 1998; Wesnes 2003; Geier et. al 2007).
- National School Lunch Program may have impacts on long-term education outcomes (Hinrichs 2010)

Previous Research on School Food & Price

- For students not eligible for fully subsidized school meals, price influences participation rates for school meals (Gordon 2007)
- Families are especially sensitive to the price of breakfast (Maurer 1984; Gleason 1995)

NYC Policy Change

- In school year 2003-2004, NYC:
 - began providing free school breakfast for all
 - raised the price of lunch from \$1.00 to \$1.50 for students paying full price
- Policy change creates variation within and between groups over time
- Universal free meal schools experienced no change

NYC Policy Change

	Breakfast		Lunch	
Category:	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>
<i>Free</i>	\$0.00	= \$0.00	\$0.00	= \$0.00
<i>Reduced</i>	0.05	 0.00	0.25	= 0.25
<i>Full</i>	0.25	 0.00	1.00	 1.50

Why should price matter?

□ **Economic theory**

■ **Payment:**

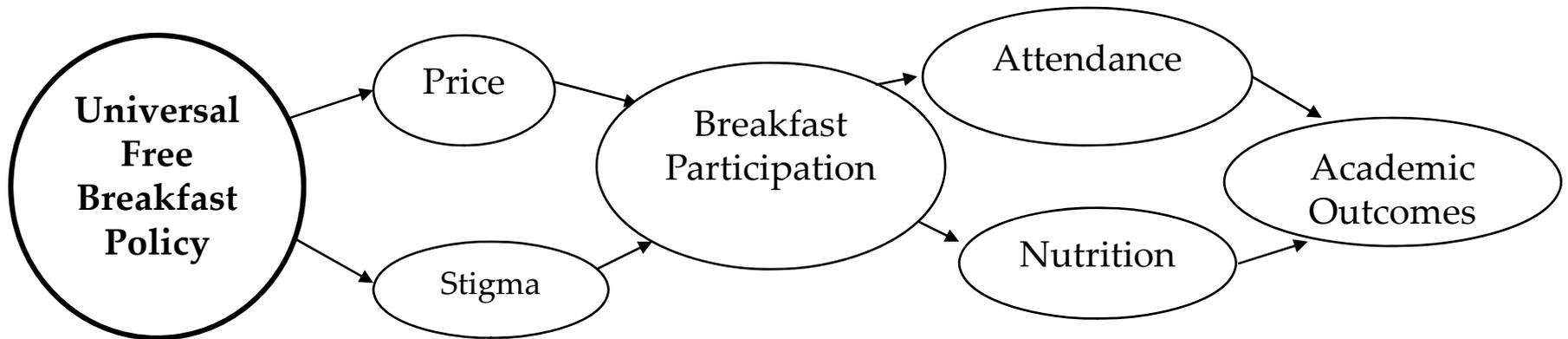
- decrease in price of breakfast for reduced- and full-price lunch students should increase consumption
- increase in price of lunch for full-price lunch students should decrease consumption

□ **Under consumption of meals**

■ **Stigma:**

- universal free breakfast may de-stigmatize school meals and increase consumption for all groups

Theory of Change: Price, Meal Consumption, Attendance & Academic Outcomes



Research Questions

- Did the 2004 policy change affect the number of school meals served?
 - How did this vary by eligibility groups?
 - How did this vary for breakfast vs. lunch?
- Did the policy change have an impact on secondary outcomes including attendance and academic performance?

Data

- Administrative data
- 826 New York City public elementary and middle schools from 2000-01 to 2007-08
- Data on “Universal Free Meal” Schools
- Demographics (race/ethnicity, free/reduced lunch eligibility)
- Test scores and attendance by eligibility group

School Food Variables

- Office of School Food
- Available for 2001-02 through 2007-08 (although we use only 2002-03 and 2003-04 here)
- School level
 - Number of free breakfasts, reduced-price breakfasts, full-price breakfasts served
 - Number of lunches served by each eligibility group
 - Number of students in each eligibility group

Did the price change affect consumption?

- Pre-post analysis (2003 to 2004)
- Difference-in-Difference: compare groups before and after policy change

Method

- Comparison groups
 - Free-lunch group
 - Experienced no change in price
 - May experience decreased stigma
 - Universal Free Meal schools
 - Should not experience price or stigma effects
- Models include indicators for each subgroup and interactions post-policy change, demographic controls, school fixed effects and clustered standard errors

Findings: Breakfast

- After the policy change:
 - Breakfast consumption increased for all eligibility groups
 - The increase was greatest for full-price, followed by reduced-price lunch eligible students
 - Students in Universal Free Meal schools experienced a much smaller increase in breakfasts

Log Breakfasts Served Per Student by Eligibility Group in 2003 and 2004 for USM and non-USM Schools

	Non-USM	USM
Reduced Price	-1.07*** (0.05)	-0.68*** (0.04)
Full Price	-1.79*** (0.08)	-0.61*** (0.08)
Free * 2004	0.11*** (0.03)	0.09*** (0.01)
Reduced * 2004	0.32*** (0.07)	0.11*** (0.02)
Full * 2004	0.64*** (0.08)	0.18*** (0.07)
constant	-0.01 (1.54)	2.73*** (0.95)
Demographic controls	YES	YES
School fixed effects	YES	YES
R-sqr	0.435	0.189
Schools	404	357
N	1945	1932

1) * p<0.10, ** p<0.05, *** p<0.010

2) Demographic controls include percent black, Hispanic, Asian, free-lunch eligible, reduced-lunch eligible

Findings: Lunch

- Overall, little change in consumption of lunch in the year following the policy change

Log Lunches Served Per Student by Eligibility Group, 2003 and 2004 for USM and Non-USM Schools

	Non-USM	USM
Reduced Price	-0.53*** (0.04)	-0.24*** (0.02)
Full Price	-0.92*** (0.06)	-0.09 (0.06)
Free * 2004	-0.03 (0.02)	-0.02** (0.01)
Reduced * 2004	0.02 (0.04)	-0.03** (0.01)
Full * 2004	0.09 (0.07)	0.04 (0.06)
Demographic controls	YES	YES
School fixed effects	YES	YES
R-sqr	0.281	0.049
Schools	405	357
N	2082	1960

- 1) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
- 2) Demographic controls include percent black, Hispanic, Asian, free-lunch eligible, reduced-lunch eligible

Findings: Attendance

- No change in attendance for non-universal schools- which had a greater increase in breakfast
- Small significant *decrease* in attendance for universal schools

Attendance by Eligibility Group, 2003 and 2004, for USM and Non-USM Schools

	Non-USM	USM
Reduced Price	0.02*** (0.00)	0.01*** (0.00)
Full Price	0.02*** (0.00)	0.01*** (0.00)
Free * 2004	0.00 (0.00)	-0.01*** (0.00)
Reduced * 2004	0.00 (0.00)	-0.02*** (0.01)
Full * 2004	0.00 (0.00)	-0.02*** (0.01)
Demographic controls	YES	YES
School fixed effects	YES	YES
R-sqr	0.266	0.077
Schools	397	351
N	2040	1547

- 1) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
- 2) Demographic controls include percent black, Hispanic, Asian, free-lunch eligible, reduced-lunch eligible

Findings: Academics

- No change in reading scores for non-universal schools- which had a greater increase in breakfast
- Small significant *decrease* in reading scores for free and reduced-price eligible students in universal schools

Reading Achievement (z-scores) by Eligibility Group, 2003 and 2004, USM and non-USM Schools

	Non-USM	USM
Reduced Price	0.24*** (0.01)	0.22*** (0.03)
Full Price	0.40*** (0.02)	0.33*** (0.03)
Free * 2004	-0.01 (0.01)	-0.09*** (0.01)
Reduced * 2004	-0.02 (0.02)	-0.14** (0.07)
Full * 2004	-0.02 (0.02)	-0.09 (0.07)
Demographic controls	YES	YES
School fixed effects	YES (0.31)	YES (1.61)
R-sqr	0.398	0.129
observations	396	351
N	2037	1528

- 1) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
- 2) Demographic controls include percent black, Hispanic, Asian, free-lunch eligible, reduced-lunch eligible

Conclusions: Impact on Meals

- Making breakfast free increased consumption
- Making lunch more expensive for some did not decrease consumption

Conclusions: Impact on Academics

- Universal free meal schools, which were not affected by the policy change, experienced small significant decreases in attendance and reading scores
- Non-universal free meal schools, which were affected by the policy change, experienced no change in attendance and reading scores

Policy Implications

- Overall effects of the policy change were small, although the intervention was relatively small
 - Price change not sufficient to effect big changes in consumption
- Need to look at other ways to increase uptake:
 - Environment
 - Food preferences

Future Research

- Expand years under study
- Focus on other outcomes such as obesity and fitness
- Link obesity and fitness to academic outcomes
- Examine school food environments
- Tap other sources of data (surveys, case studies)
- Expand research on USM schools

Descriptive Statistics for NYC Elementary and Middle Schools

	2001	2002	2003	2004	2005	2006	2007	2008
Total Enrollment	877	858	834	801	763	732	714	702
Percent Black	34.3	34.0	33.7	34.2	33.9	33.6	33.3	32.7
Percent Hispanic	35.6	36.0	36.5	37.1	37.5	37.5	37.6	38.0
Percent Asian	12.5	12.9	13.1	12.9	13.2	13.0	13.3	13.5
Percent White	17.7	17.1	16.7	15.8	15.4	15.4	15.4	15.3
Percent Free Lunch	71.0	71.4	72.2	72.5	72.4	70.6	69.8	69.6
Percent Reduced Lunch	8.4	8.7	9.2	10.0	10.3	10.6	10.6	10.3
Percent Full-Price Lunch	20.7	20.1	19.1	18.3	18.1	19.3	19.9	20.5
# Schools	738	749	764	804	810	815	808	802
# Universal Free Meal Schools	102	175	241	329	295	231	221	229