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THE NATIONAL SCHOOL LUNCH PROGRAM: Effects of Recent Legislation on Participation in New York State

by

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The National School Lunch Program was established in 1946 with the passage of the National School Lunch Act. The intent of the Act was to make subsidized lunches available to all school children, regardless of income. The Omnibus Budget Reconciliation Acts (OBRA) of 1980 and 1981, substantially reduced funding for the National School Lunch Program. The reductions in funding were accomplished mainly through cutting the federal reimbursement rate paid to schools per meal and by changing the income eligibility criteria for those families applying for subsidized meals. Three different price categories of lunches are served: free, reduced price, and full price or paid. Lower income students are determined eligible for the free and reduced price lunches according to family income and size. All students are eligible for a paid lunch. Nationally, an average of 27 million children were served lunches per day in 1979, the number served dropped to 23.6 million by 1985. This drop in lunch program participation has been of continuing concern to hunger groups and legislators. Of particular concern is the extent to which the OBRA funding cuts and program changes reduced participation in the school lunch program. The major purpose of this study is to determine the effects of OBRA on school lunch participation in New York State.

Difficulties in identifying the effects of OBRA arise from the simultaneous effects of other important factors on participation. During the period under study, 1979-1981, enrollments declined in New York State and the U.S. economy headed into a deep recession. In addition, structural change may have occurred in participant behavior. Thus, this analysis of the effects of OBRA on school lunch participation in New York State focuses on three important factors: 1) identification of the determinants of participation, 2) examination of evidence regarding structural change in participant behavior, and 3) isolation of program effects on

participation from demographic, economic, and behavioral determinants of participation.

The Participation Model

Studies of participation in the National School Lunch Program completed in the early 1970's, examined the affect of price on the number of participants or on a participation rate (Nicholson, West and Hoppe, and Braley and Nelson). In a more recent analysis of participation, the National Evaluation of School Nutrition Programs (USDA and System Development Corporation), participation frequency is elaborately modeled as a function of program, school, family, and student characteristics. A review of these studies indicate that alternative methods should be used to study the effects of OBRA legislation on lunch participation: 1) the number of participants, not the participation rate, is the appropriate measure of lunch participation, 2) free, reduced, and paid student behavior should be modeled individually, and, 3) it is critical to identify the effect of OBRA income criteria changes on the number of students eligible for lunches in each of the categories because the number eligible will affect the number participating.

Information on the number of participants in the school lunch program in New York State was obtained from the state education offices. School-level data regarding the number of participants in each of the three lunch categories were aggregated to the county level and merged with sociodemographic data available for New York State counties. Average daily participation by county in the months of October 1979 and 1981 are used to represent the pre- and post-OBRA periods. Due to their size and uniqueness, the five New York City counties are omitted from the study, leaving a total of 57 counties for analysis.

Three linear equations are specified, one for each of the lunch categories with participation (the number of participants or ADP) as the dependent variable.

Economic theory and suggestions from previous research, drove the choice of explanatory variables, including: number eligible, deflated income per capita, unemployment rate, urbanization (percent urban), race (percent black), female head of household (percent), education (percent college), and deflated price in the paid category. A price variable could not be included in the reduced participation equation due to the lack of variation across counties. The price for reduced lunches is controlled by legislation.

The number eligible for lunches, a particularly important explanatory variable, is available only for 1979. Therefore, the 1981 eligible set is forecast with 1981 data and 1979 coefficients derived from a logit estimation procedure. That procedure indicates that the number eligible is a function of legislated income criteria, enrollments, and economic conditions.[1]

Tests of Structural Change and Regression Results

The data under study are a pooled time-series (1979, 1981) cross-section (county). Johnston outlines a three-step estimation procedure for testing for structural change (pp. 207-225). The application of that procedure indicated that the least restrictive model, which allows intercepts and coefficients to vary between 1979 and 1981, is appropriate for each lunch category. This indicates that the behavior of participants between 1979 and 1981 with respect to the explanatory variables changed.

The OLS regression results from this model are reported in Table I. The number eligible, income per capita and percent black are significant in the free, reduced, and paid equations. Additionally, percent college and percent urban are significant in the reduced equation, while, unemployment rate, percent urban, percent black, percent college, and percent female head of household are significant in the paid equation. Price is not found to be statistically significant

in the paid equation, but, this is probably due to the small variation in lunch prices across counties.

Analysis of Results: OBRA Effects

School lunch participation is affected by a number of different factors: economic conditions, demographics, participant behavior, and OBRA legislation. In order to measure the effects due to OBRA, all of these factors must be isolated in the equations. This objective is accomplished in two different ways. First, the regression equations are used to simulate participation when controlled changes are made in variables. This method allows the identification of program (OBRA), demographic, and economic effects, but, not behavioral changes. To identify these behavioral effects, an approximation to the total differential of the equations is computed. This approach separates changes that occurred in the behavior of participants (the coefficients of the equations) from changes in variables.

In the first method, the regression equations simulate school lunch participation using hypothetical situations. The effect on participation of changes in four specific variables are simulated: 1) the decline in enrollments from 1979 to 1981, 2) the OBRA change in income criteria from 1979 to 1981, 3) the change in economic conditions from 1979 to 1981, and, for the paid equation, 4) the change in lunch prices from 1979 to 1981.

Using 1981 as the base year, 1979 mean values for enrollments, income criteria, economic conditions, and paid price are substituted into the equations. Subtracting the hypothetical equation from the original equation identifies the impact on participation of the specific variable change:

(1) $(Yo - Yh) = (a + BXo) - (a + BXh)$

where,

Yo = original participation equation

Yh = hypothetical participation equation

a + BXo = equation with original variable

a + BXh = equation with hypothetical variable.

Due to the definition of some of the variables, prior calculation and estimation is required for the simulation of 1979 enrollments, income criteria, and economic conditions.[2] The results of these simulations are illustrated in Table II. The numbers represent how 1981 average county daily participation would have changed if 1979 variables were in effect. The percentage of 1981 mean participation is included to describe the magnitude of the effects.

This analysis is very valuable as a method of identifying the effects on participation of specific factors. It is limited because a base year must be chosen to complete the comparisons and, therefore, the difference in the behavior of participants in response to the variables is not analyzed. By approximating the total differential of the equations, differences in participation between 1979 and 1981 are attributed to their two sources within the estimation technique: differences in coefficients (behavioral) and differences in variable levels (economic, demographic, program).

Examining lunch participation in the two years, an approximation to the total differential can be expressed:

$$(2)\quad Y^{81}-Y^{79} = (a^{81}-a^{79})+x^{81}(c^{81}-c^{79})+c^{81}(x^{81}-x^{79}),$$

where, the first two terms on the right hand side of (2) represent behavioral effects and, the last term represents variable level effects.

An adjustment is made to equation (2) to account for the use of 1981 as a base year, $(Y^{81}-Y^{79})$ rather than $(Y^{79}-Y^{81})$. The averages of x and c for the two years are computed and replaced into equation (2) to yield:

$$(3)\quad Y^{81}-Y^{79} = (a^{81}-a^{79}) + \frac{(x^{81}+x^{79})}{2}(c^{81}-c^{79}) + \frac{(c^{81}+c^{79})}{2}(x^{81}-x^{79}).$$

Table III illustrates the total differential breakdown for each of the lunch categories. All of the variables are evaluated at their means. The figures represent differences in average county daily participation between 1979 and 1981.

The total differential approximation allows the isolation of behavioral effects not possible in the simulations. There are notably large behavioral effects in all three lunch categories. Unfortunately, though the total differential identifies behavioral effects, it cannot identify the source of the change in behavior. For example, it is possible that the passage of OBRA instituted some structural change in the behavior of participants. The total differential approximation cannot confirm or deny such speculation, though it is important to recognize this possibility.

Conclusions

Participation decreased in all lunch categories between 1979 and 1981. The factors explaining this decrease differ for free, reduced, and paid lunches. As Table II illustrates, OBRA income criteria changes had a substantial impact on reduced lunch participation, decreasing participation an average of 35 percent.

While income criteria changes increased participation in the free category by 13 percent, behavioral changes are responsible for decreasing participation. Evident in Table III, the main manifestation of this effect is the large negative shift in the intercept term. It is purely speculation, but, the possibility exists that OBRA legislation is partly responsible for the structural changes in free participation. The quantitative analyses do not take into account the more stringent application procedures legislated by OBRA or the possibility of increased welfare stigma associated with the controversy surrounding subsidized lunches at the time.

The results of the analyses in Tables II and III reveal that paid lunch participation declined due to a number of different factors including: higher price, declining enrollments and economic conditions, and behavioral changes

which more than compensated for the 2.6 percent increase in participation arising from OBRA income criteria changes. It is not possible to attribute any of these factors directly to OBRA legislation, though it is possible that behavioral changes are associated with OBRA legislation.

This study does point the way for further research. The OBRA reduction in per meal reimbursement rates for paid and reduced lunches affected lunch program costs. This increase in costs will drive price in both the paid and reduced lunch categories. In this study, the paid price was accepted as given and the reduced price could not be included due to the econometric problems associated with the lack of variation. The effects of the higher lunch price in the paid category was not trivial, but, under the circumstances it is impossible to attribute any of that effect to OBRA. A study researching the cost side determinants of the school lunch program could address the issue of price, however, the econometric problem in the reduced price category would still be troublesome.

Table I. Regression Results for Free, Reduced, and Paid Lunch Participation Equations

EXPLANATORY VARIABLE	FREE	REDUCED	PAID
Constant, 1979	4,948.00	3,189.00	26,904.00
	(1.62)	(3.63)	(5.06)
Number eligible, 1979	1.02	0.18	0.31
	(22.61)*	(15.37)*	(25.20)*
Income per capita, 1979	-1.14	-0.54	-3.07
	(-3.40)*	(-5.57)*	(-5.08)*
Unemployment rate, 1979	49.57	-25.20	-673.00
	(0.36)	(-0.64)	(-2.90)*
Percent urban, 1979	-3.08	10.25	56.03
	-(0.17)	(1.94)+	(1.90)+
Percent female householder, 1979	1,654.00	1,043.00	6,809.00
	(0.09)	(0.21)	(0.23)
Percent black, 1979	29,517.00	9,022.00	35,534.00
	(2.13)*	(2.35)*	(1.66)+
Percent college, 1979	-6.17	-27.90	-150.00
	(-0.12)	(-1.83)+	(-1.77)+
Paid lunch price, 1979			-8,042.00
			(-1.15)
Constant, 1981	-344.00	1,211.00	25,794.00
	(-0.11)	(1.30)	(4.15)
Number eligible, 1981	.81	0.21	0.25
	(20.37)*	(13.35)*	(19.65)*
Income per capita, 1981	-0.86	-0.30	-2.22
	(-2.76)*	(-3.34)*	(-4.30)*
Unemployment rate, 1981	128.40	20.89	-442.00
	(0.90)	(0.51)	(-1.84)+
Percent urban, 1981	-10.00	3.37	70.82
	(-0.53)	(0.63)	(2.44)*
Percent female householder, 1981	29,344.00	2,350.00	-58,390.00
	(1.56)	(0.43)	(-1.93)+
Percent black, 1981	33,081.00	4,811.00	28,007.00
	(2.43)*	(1.23)	(1.32)
Percent college, 1981	15.49	-7.71	-105.00
	(0.79)	(-0.47)	(-1.14)
Paid lunch price, 1981			-5,266.00
			(-0.94)

* Indicates a t-statistic significant at 5%.
+ Indicates a t-statistic significant at 10%.

Table II. Simulation Results: Average Change in 1981 Daily Participation per County and the Percentage of 1981 Mean Participation.*

Change in 1981 Participation			% of 1981 Mean Participation		
Free	Reduced	Paid	Free	Reduced	Paid
(1) Decrease in Enrollments:					
-422	-80	-407	-10.0	-9.0	-5.4
(2) Legislated Changes in Income Criteria (OBRA):					
+565	-312	+196	+13.0	-35.0	+2.6
(3) Decline in Economic Conditions:					
+376	+59	-469	+9.0	+6.7	-6.2
(4) Increase in Paid Price:					
		-453			-6.0

*Average daily participation per county in 1981 is 4,282, 882, and 7,585 for free, reduced and paid, respectively.

Table III. Results of an Approximation to the Total Differential: Average Differences per County.

	Free	Reduced	Paid
Y(81) - Y(79) [Actual]	-289	-238	-2,327
VARIABLE LEVEL DIFFERENCES:*			
Number eligible	289	-299	-361
Deflated income per capita	28	12	74
Unemployment rate	89	-2	-558
Deflated paid price			-572
SUBTOTAL	406	-289	-1,417
BEHAVIORAL DIFFERENCES [COEFFICIENTS]:			
Intercepts	-5,293	-1,978	-1,110
Number eligible	-1,152	175	-1,471
Deflated income per capita	1,764	1,485	5,260
Percent urban	-311	-310	666
Unemployment rate	588	344	1,723
Percent female householder	3,295	156	-7,759
Percent black	96	-114	-203
Percent college	317	296	669
Deflated paid price			1,366
SUBTOTAL	-696	54	-859
TOTAL	-290	-235	-2,276

* Note that the variable levels do not change for the variables, percent urban, percent female householder, percent black, and percent college; 1980 data is used in both years. As a result, $x^{81} - x^{79} = 0$, and the terms drop out of the differential.

Footnotes

1. Page limitations do not permit a complete discussion of the estimation procedure. Further information may be obtained from the authors.
2. Specifically, enrollments and income criteria are separable components of the variable, number eligible. Economic conditions are reflected in the variables, unemployment rate and income per capita, in addition, economic conditions are also used as explanatory variables in the estimation of the number eligible.

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