AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# What's For Lunch?
# Determinants of the National School Lunch Program Menu

Janet G. Peckham
PhD. Candidate, Clemson University

Selected Poster prepared for presentation at the
Agricultural & Applied Economics Association's
2013 AAEA & CAES Joint Annual Meeting
Washington, DC, August 4-6, 2013

*Copyright 2013 by Janet G. Peckham. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

# What's For Lunch? Determinants of the National School Lunch Program Menu

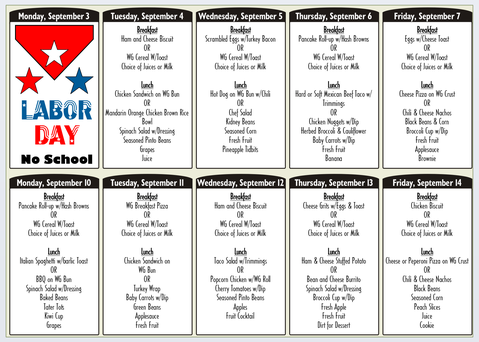

Janet G. Peckham

PhD Candidate, Clemson University

jgemmil@clemson.edu


## Introduction

- Rising rates of childhood overweight and obesity have contributed to increased scrutiny over the content of the National School Lunch Program (NSLP) menu.
- School districts must comply with federal guidelines defining a reimbursable school lunch, but decisions on the quality and quantity of food choices is left to the district and is determined in part by food availability, budgetary restrictions, and student preference.
- Little research has examined what is served as a NSLP lunch among school districts, although differences are well documented (Gordon et al. 2007; Levine 2008; Poppendieck 2010).
- This paper focuses on the relationship between school district income and the variety of entrees, fruit, and vegetables available to participants.
- Using OLS regression, I find evidence that wealthier school districts offer more entrees, fruits, and vegetables than their lower-income counterparts.




## Data

- 816 elementary schools were randomly selected in 3 stages
  1. 1 school from the largest district in each state (51 total)
  2. 62 schools from each income decile (618 total)
  3. 1 school from the 10th, 50th, and 90th income percentile of each state (147 total)
- Menus were compiled by accessing each school's website. The total number of fruits, entrées, and vegetables served each week was calculated. These categories will be used as outcome variables.
- Two measures of income are used
  1. The proportion of households in the school district that fall below 185 percent of the poverty line (*Income_dis*)
  2. The school's county median household income (*Income_cty*)
- Other demographic data are collected from the Common Core Data (Race, Urbanicity, Enrollment) and the American Community Survey (Education Attainment). Relevant state cafeteria policies are collected from School Health Policies and Programs.

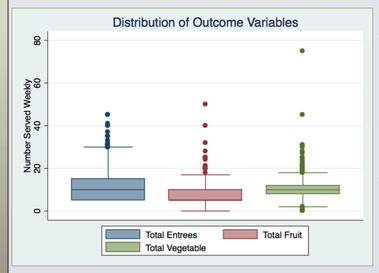
## Methods

- Parent, student, and district characteristics in part determine an individual district's demand for menu components such as entrees, fruits, and vegetables.
- The analysis emphasizes household income because if low-income school districts offer recipients a less nutritious meal then their higher-income counterparts, this may exacerbate rather than alleviate the trend toward low-income childhood obesity.
- Using 5 income specifications, I estimate the effect of income on the total number of entrées, fruits, vegetables served per week. Let $x_i$ be the total number of entrées, fruits, or vegetables served in district *i*.

$$x_i = \alpha + \mathbf{I} + \delta_1 Attained_BA_i + \delta_2 Black_i + \delta_3 Hispanic_i + \delta_4 Other_i + \delta_5 Suburban_i + \delta_6 Rural_i + \delta_7 \ln(Enrollment_i) + \delta_8 Midwest_i + \delta_9 South_i + \delta_{10} West_i + \delta_{11} Month2_i + \delta_{12} Month3_i + \delta_{13} Policy_i + \delta_{14} Coordinator_i + \delta_{15} Vending_i + \varepsilon_i$$

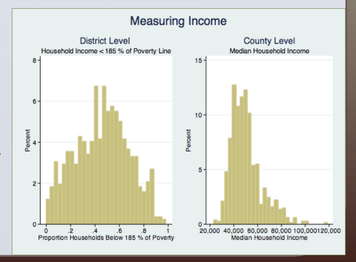
- Covariates are added to all models to control for adult education-level in district *i*, race, urbanicity, district size, region, the month district *i*'s menu was sampled and district food policies.
- Let **I** be one of the following income specifications
  1. $\mathbf{I} = \beta_1 Income_cty_i + \beta_2 Income_cty_i^2 + \beta_3 Income_cty_i^3$
  2. $\mathbf{I} = \beta_1 Ln(Income_cty)_i$
  3. $\mathbf{I} = \beta \mathbf{Income_cty_i}$', a vector of dummy variables
  4. $\mathbf{I} = \beta_1 Income_dis_i$
  5. $\mathbf{I} = \beta \mathbf{Income_dis_i}$', a vector of dummy variables

## Descriptive Statistics



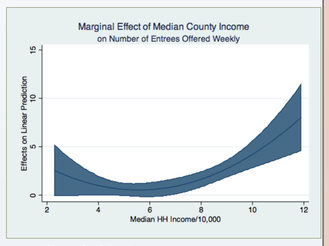

- On average, each elementary school offer 12 entrees, 7 fruits, and 10 vegetables weekly.
- 52% of districts restrict access to vending machines

- Average district enrollment is 18,189 students. 25% of districts are urban, 48% suburban, and 27% rural.
- The average district is composed of 62% white, 17% Hispanic, 13% black, and 8% other students.
- The average county income is $50,665. As expected, the distribution is right-skewed.
- On average, 46% of household incomes fall below 185% of the poverty line.



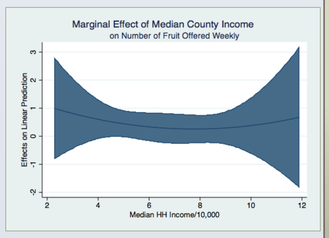

## Results

### Entrée




- Model 1: Across all income levels, a $10,000 increase in the median household income increases the number of entrees offered weekly. This marginal income effect is greatest in the wealthiest school districts.
- Model 2: A 10% increase in the median household income increases the number of entrees offered weekly by 0.5.
- Model 3: School districts with median household income > $65,000 offer 3.6 more entrees per week than districts with income between $55,000 and 65,000.
- Model 4: A 1 percentage point increase in the proportion of students with household income less than 185% of the poverty line decreases weekly entrée offerings by 0.06.
- Model 5: As the proportion of students from households with income less than 185% of the poverty line increases, the number of entrees offered weekly decreases.
- School district enrollment has a positive effect on the number of entrees offered weekly.
- School districts in states requiring a district food coordinator offer more entrees per week.
- School districts in the North offer the most entrée choices, districts in the West the least.

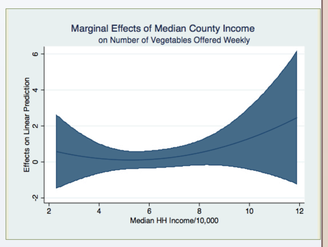
### Fruit




- Model 1: Across all income levels, a $10,000 increase in the median household income increases the number of fruit offered weekly. However, it is never significant.
- Model 2: A 10% increase in the median household income increases the number of fruits offered weekly by 0.2.
- Model 3: As median household income increases, the number of fruits offered weekly increases, but not significantly.
- Model 4: A 1 percentage point increase in the proportion of students with household income less than 185% of the poverty line decreases weekly fruit offerings by 0.03.
- Model 5: As the proportion of students from households with income less than 185% of the poverty line increases, the number of fruits offered per week decreases, but not significantly.
- School district enrollment has a positive effect on the number of fruit offered weekly.
- Suburban school districts offer more fruits per week than urban or rural districts.

## Results

### Vegetable




- Model 1: Across all income levels, a $10,000 increase in the median household income increases the number of vegetables offered weekly. However, it is never statistically significant.
- Model 2: A 10% increase in the median household income increases the number of vegetables offered weekly but is not statistically significant.
- Model 3: As median household income increases, the number of vegetables offered weekly increases but is not statistically significant.
- Model 4: An increase in the proportion of students with household income less than 185% of the poverty line decreases weekly vegetable offerings, but not significantly.
- Model 5: As the proportion of students from households with income less than 185% of the poverty line increases, weekly vegetable offerings decrease, but not significantly.
- School district enrollment has a positive effect on the number of vegetables offered weekly.
- School districts in states requiring 2+ vegetables be served daily offer more vegetables per week.
- School districts in the South offer the most vegetables.

## Conclusion

- School districts in wealthier counties (or with wealthier households) offer more entrees per week than their low-income counterparts.
- There is weak evidence that school districts in wealthier counties (or with wealthier households) offer more fruits and vegetables per week than their low-income counterparts.
- Larger school districts provide more entrees, fruits, and vegetables than smaller districts, suggestive of economies of scale.
- Providing lower-income districts additional subsidies to purchase fruits and vegetables may increase weekly offerings while preserving the education budget.
- Future research regarding the relationship between childhood obesity and NSLP participation should acknowledge the possible differences in nutritional content across NSLP meals.

## References


- Gordon, A., Crepinsek, M.K., Nogales, R., Condon, E., 2007a. School Nutrition Dietary Assessment Study-III: Volume I: School Foodservice, School Food Environment, and Meals Offered and Served. Report No. CN-07-SNDA-III. U.S. Department of Agriculture, Food and Nutrition Service, Office of Research, Nutrition and Analysis.
- Levine, S., 2008. School Lunch Politics: The Surprising History of America's Favorite Welfare Program. Princeton University Press.
- Poppendieck, J., 2010. Free For All: Fixing School Food in America. University of California Press, Berkeley.



RESEARCH POSTER PRESENTATION DESIGN © 2012
www.PosterPresentations.com