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# **Academic Performance and Childhood Misnourishment: A Quantile Approach**

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*Poster prepared for presentation at the Agricultural & Applied Economics Association's 2011 AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011*

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# Academic Performance and Childhood Misnourishment: A Quantile Approach

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## ANALYSIS APPROACH

### Endogeneity

- Simultaneity between health and cognitive production functions
- Example: if poor parenting contributes to child weight and poor academic performance rather than weight causing poor performance
- Need instruments that influence performance only through weight:
  - Child's past weight;
  - Health insurance status;
  - Number of breakfasts and dinners eaten as a family
  - Parental occupation variables (e.g., current employment status)

### Instrumental Variable Quantile Regression (IVQR)

- Quantile regression:
  - get an overall picture of covariate effects
  - allow examination of the tails of the distribution
- IVQR (Chernozhukov and Hansen, 2005)
  - allows and corrects for multiple continuous or dichotomous endogenous variables
  - measures of child weight (endogenous variable):
    - BMI percentile-for-age
    - BMI z-score
    - dichotomous weight classification

## SUMMARY OF FINDINGS

- Overall Findings:
  - Weight has significant negative impacts on performance depending on race and gender with underweight having the smallest impact
  - Heterogeneous relationship between obesity/underweight and academic performance varies across distribution
  - Weight tends to affect math scores more than reading scores
- Detailed Findings:
  - Being obese has an increasingly negative impact on math scores of **Hispanic males** and reading scores of **white males** from 1<sup>st</sup> to 8<sup>th</sup> grade in the lower-middle score percentiles
  - For **Hispanic females**, weight status had the most significant impact on math scores in upper percentiles (75<sup>th</sup> to 95<sup>th</sup>) and had varying impacts for obese, overweight and underweight students
  - For **black males and females**, being underweight has a large negative impact on reading scores (15<sup>th</sup>-25<sup>th</sup>) in 8<sup>th</sup> grade
  - For **white females**, being obese or overweight had negative significant impacts on math scores in lower-middle percentiles (15<sup>th</sup>-65<sup>th</sup>) in 1<sup>st</sup> and 5<sup>th</sup> grades

## INTRODUCTION

- Childhood misnourishment:
  - Caused by insufficient dietary and nutritional quality
  - Includes overweight, obese and underweight
- United States estimates:
  - 190+ million overweight children
  - 2.4 million underweight children
- Childhood misnourishment brings serious health consequences:
  - Chronic diseases
  - Weaken immune system → more frequent and worse infections
- Does weight affect cognitive development?
  - Mixed results are found on correlations between misnourishment and academic performance

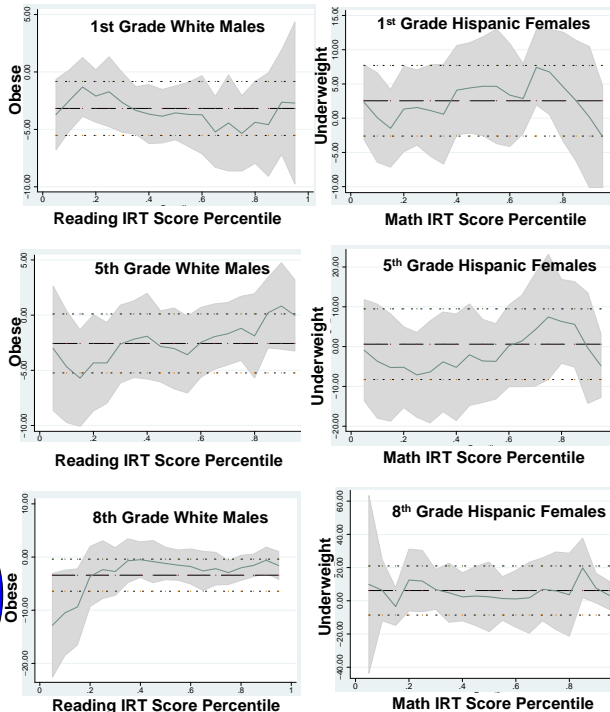
## RESEARCH QUESTIONS

- Does weight status impact academic performance?
- Are impacts of weight larger on lower performing students?
- Do inequalities in academic performance between misnourished students and healthy weight students increase over time?

## DATA

- Early Childhood Longitudinal Study-Kindergarten Class
- Nationally representative sample of 21,260 children followed from kindergarten (1998-1999) to 8<sup>th</sup> grade
- Information on children, parents, teachers and schools
- Standardized math and reading scores which can be compared among children and over time
- Staff measured weight and height of the students

## RESULTS



## POLICY IMPLICATIONS

- Policies targeting childhood weight could have positive spillover effects on academic performance, particularly of lower performing students
- Policies should advocate healthy weight and an active lifestyle as to include underweight children
  - Local Wellness Policies from WIC Reauthorization Act
  - Better balanced school meals
    - National School Lunch Program (NSLP)
    - School Breakfast Program (SBP)
- Policies targeting children's health and performance should begin early

- Students eating meals through NSLP

