Is Public Grading Worth the Costs? An Evaluation of New York City's Restaurant Grades Policy

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APPAM Big Data and Public Policy Workshop
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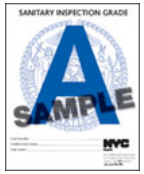
Grading and Public Policy

- Grading policies have become increasingly popular: succinctly and accessibly convey quality of public services
- Examples: schools, food, street cleanliness, NYC Subway

- Restaurant grades:
  - Conspicuously post letter grade for restaurant's food safety compliance
  - Goal: to improve public health/reduce foodborne illness

- Restaurant industry fears negative economics effects
- Impacts are theoretically ambiguous; empirically thin

How should grading change behavior?



- For consumers:
  - Increases information at point of consumption
  - changes where consumers bring business
  - changes spending
  - reduces foodborne illnesses
- For restaurants:
  - increases compliance with food safety regulations
  - increases spending on food safety
  - Increase/decrease food sales for restaurants with better/poorer hygiene

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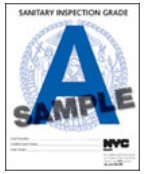

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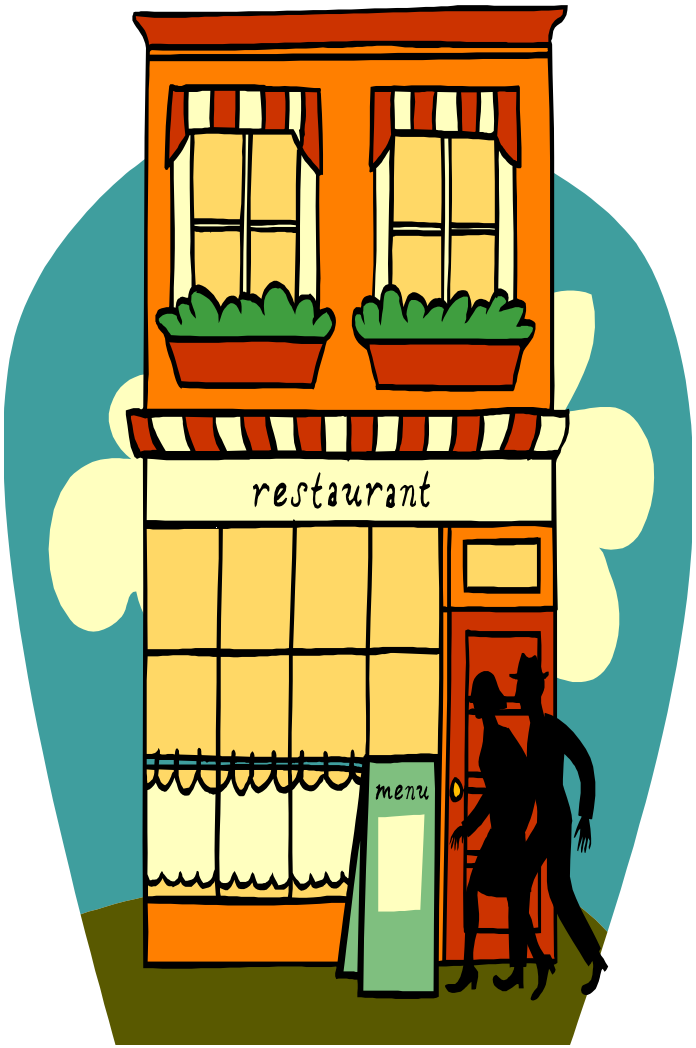
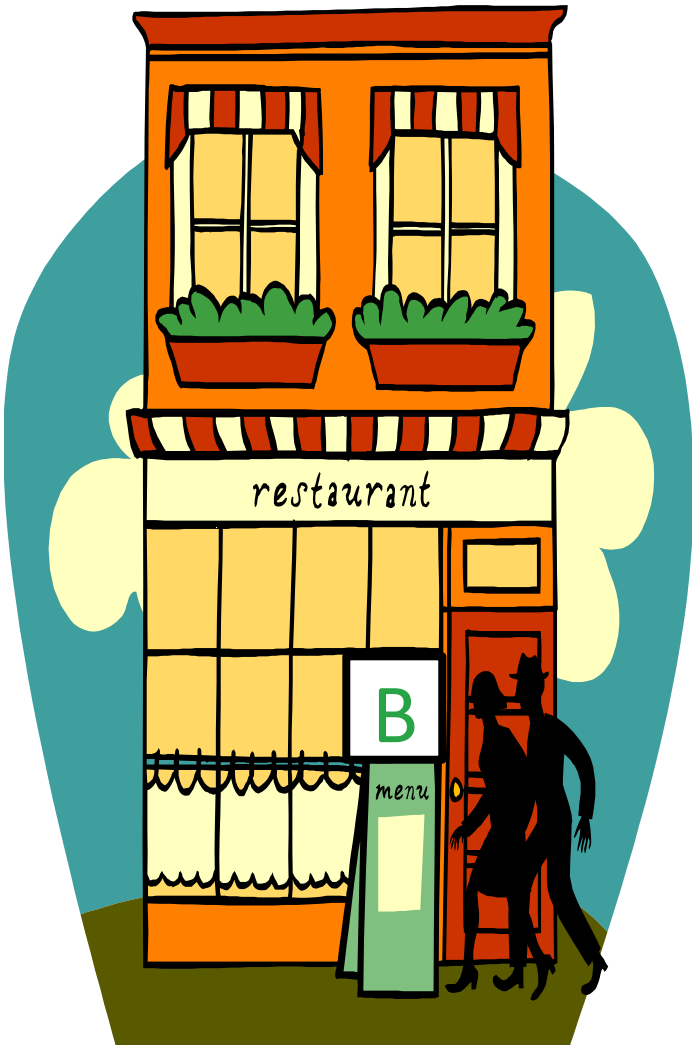
Before NYC restaurant grades began in 2010



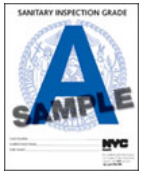
- inspection scores and violations online,
- temporary closures for uncorrected public health hazards,
- fines assessed,
- not publicized,
- no grades

After NYC restaurant grades began in 2010



- scores, violations, and grades online,
- temporary closures for uncorrected public health hazards,
- fines assessed,
- **restaurants conspicuously post the letter grade in their window**
  - **grade based on number and severity of inspection violations**
  - **posted grades: "A", "B", "C", "Grade Pending"**
- inspection frequency depends on previously earned scores

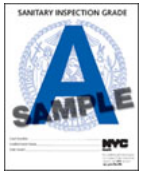
Two Questions



- What is the impact of the restaurant grading policy on food safety compliance, restaurants' economic well-being and municipal finances?

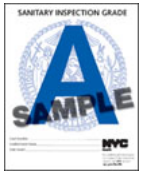
- What is the return from getting a good grade, for restaurants and the City?

Inspection Data



- NYC Department of Health and Mental Hygiene (DOHMH)--Food Safety and Community Sanitation Tracking System (FACTS)
  - Inspection date, type, score, grade, fines assessed, and adjudication information
  - Restaurant address, cuisine, venue and service type, # employees and seats
  - Date restaurant opens and closes (i.e. no longer recorded as open)
  - Temporary closure for public health hazard
  - Includes final inspections, 12/2007 – 2/2013
    - 10 quarters before and 10 after implementation of public grading
    - 159,588 initial and 167,045 final inspections of 41,362 restaurants
    - About 24,000 restaurants operate daily

Sales and Tax Data



- NYC Department of Finance (DOF) Office of Tax Policy
  - Quarterly sales and sales taxes by EIN
  - Building classification by parcel
  - Includes single-filing entities, 12/2007 – 12/2012
  - 10 quarters before and 9 after implementation of public grading
  - 24,464 group-quarter observations; 2,288 groups

Empirical Challenges

- We have *quarterly* sales and tax data, but *date-specific* inspection scores and grades
- Due to privacy concerns individual restaurant sales data not available

- We address these challenges by
  (1) Aggregating date-specific values into quarterly values; and
  (2) Grouping restaurants into bins of 10

Aggregating to quarterly data

- **Ideally**: daily data on grades and sales at restaurant level

(1) $$Sales_{it} = \beta_0 + \beta_1 Grade_{it} + \beta_2 X_{it} + \delta_t + \varepsilon_{it}$$

Aggregating to quarterly data

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(1) $$Sales_{it} = \beta_0 + \beta_1 Grade_{it} + \beta_2 X_{it} + \delta_t + \varepsilon_{it}$$

- **Actually**:
  - aggregate sales, grades, and scores to quarters (the finest common time period)
  - Estimate impact of grades on sales using variable means by quarter

(2) $$\overline{Sales}_{iq} = \beta_0 + \beta_1 \overline{Grade}_{iq} + \beta_2 \overline{X}_{iq} + \overline{\delta}_q + \overline{\varepsilon}_{iq}$$

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  - Control for time-invariant restaurant characteristics with restaurant FE, γ_i

(3) $$\overline{Sales}_{iq} = \beta_0 + \beta_1 \overline{Grade}_{iq} + \beta_2 \overline{X}_{iq} + \overline{\delta}_q + \gamma_i + \overline{\varepsilon}_{iq}$$

Grouping Data

1. Match restaurants and finance data:
   - match using EIN
   - restrict to food and beverage purveyors using NAICS codes

2. Aggregate data into groups of 10 restaurants:
   - stratify restaurants by quarters of operation
   - randomly assign into groups of 10 within strata
   - aggregate sales, grades, and scores for each restaurant, i, to group, g

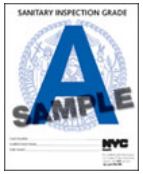
Grouping Data

3. Estimate impact of grades using group data by quarter

(4) $$\overline{Sales}_{gq} = \beta_0 + \beta_1 \overline{Grade}_{gq} + \beta_2 \overline{X}_{gq} + \overline{\delta}_q + \gamma_g + \overline{\varepsilon}_{gq}$$

- Provides unbiased estimates of the impact of grades on restaurant sales and taxes, but with larger standard errors than an individual-level model

Overview Paper 1:

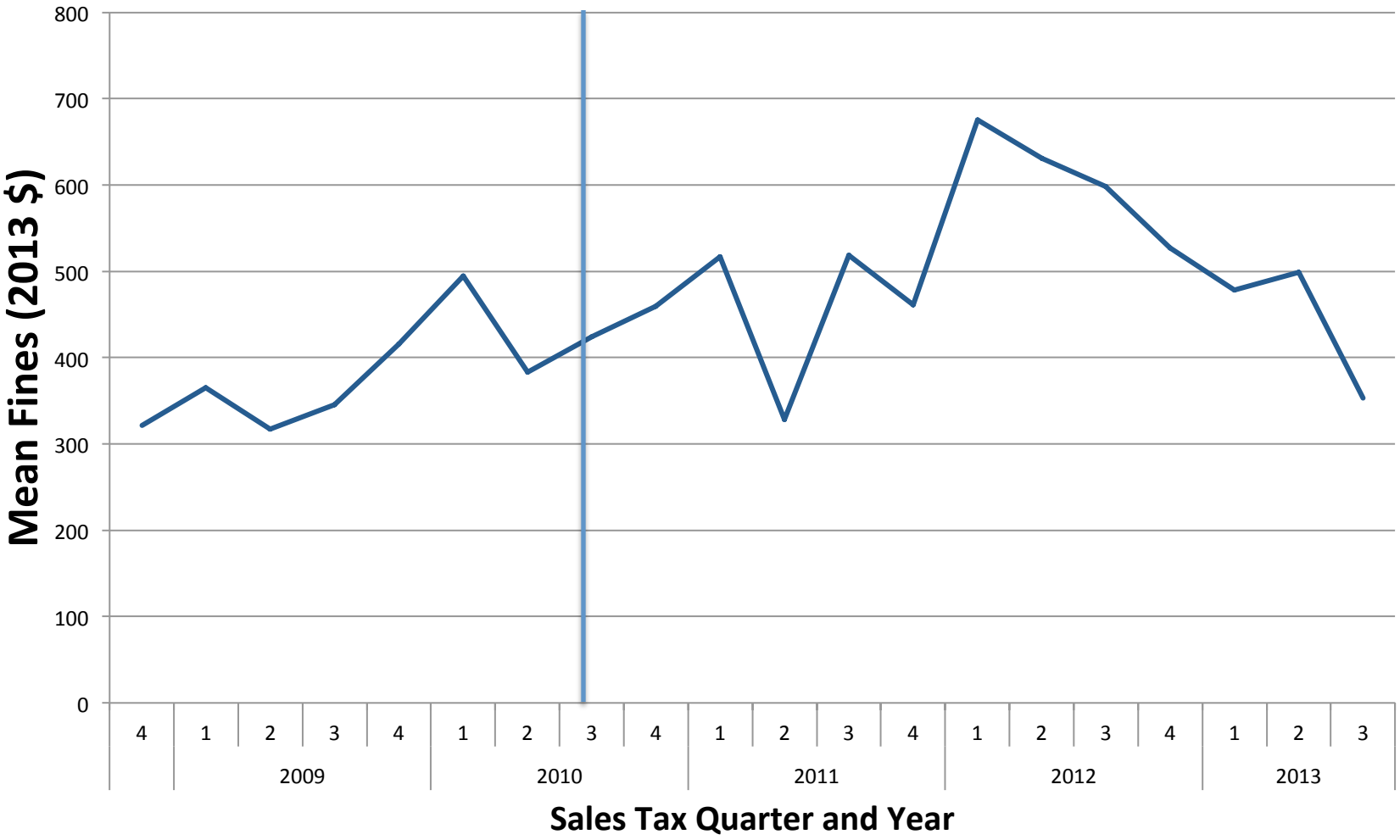


- **What is the impact of the restaurant grading policy on food safety compliance, restaurants' economic well-being and municipal finances?**
- A broad-brush assessment of policy "impacts"
- Methods:
  - Pre-post comparison
  - Exploit roll-out period of grading

Overview Paper 1:

- **What is the impact of the restaurant grading policy on food safety compliance and restaurants' economic well-being?**
- A broad-brush assessment of policy "impacts"
- Methods:
  - Pre-post comparison
  - Exploit roll-out period of grading
- Findings:
  - Inspection scores improve substantially
  - Fines assessed for the mean inspection decline
  - Fines by quarter rise in first year due to increased inspection frequency, but then decline
  - Mixed evidence on sales:
    - Mean sales revenues rise between $8,000-$10,000 per quarter post-grading
    - Little evidence of impact on sales using the treatment roll-out period

Summary Chart: Fines decline



Overview Paper 2:

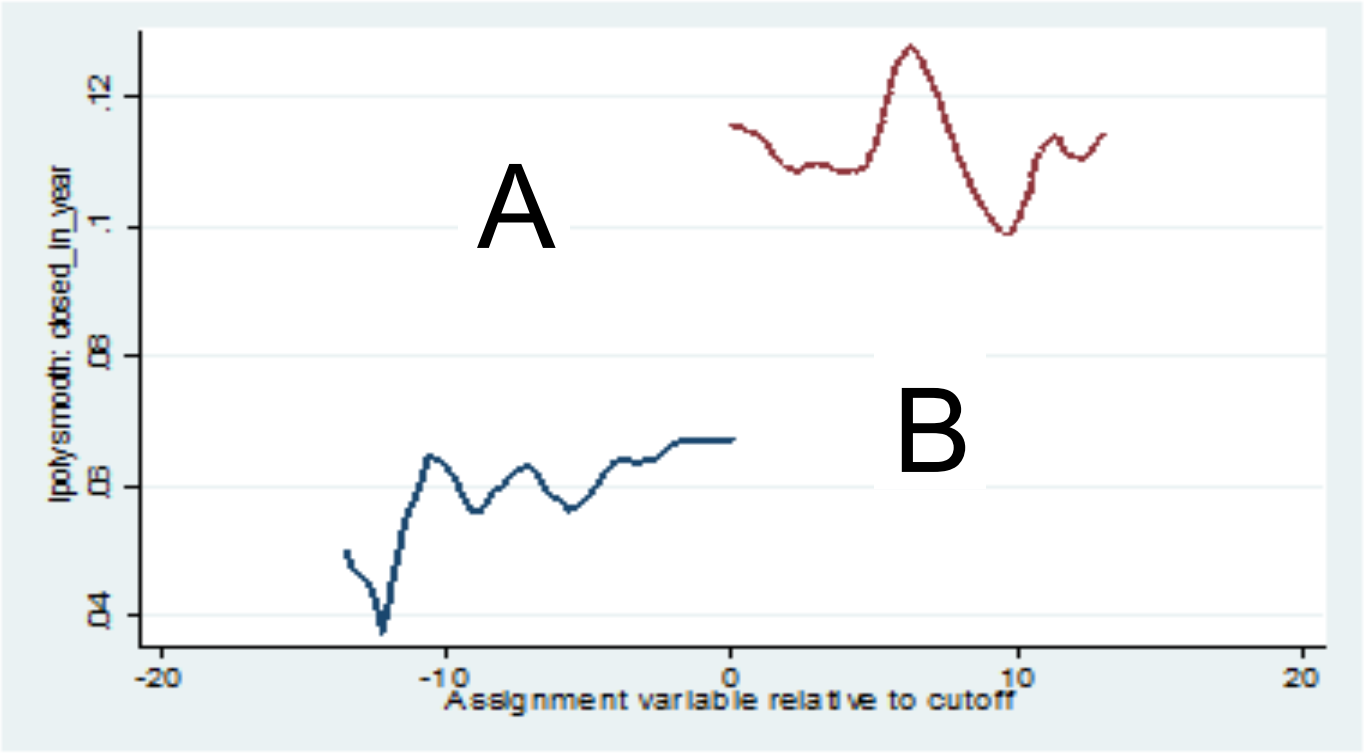
- **What is the return from getting a good grade, for restaurants and the City?**
- Impact of grades themselves on restaurant economic activity and on the City's tax and fine revenues
- Methods
  - Regression discontinuity design
  - Restaurant and group fixed effects models

Overview Paper 2:

- **What is the return from getting a good grade, for restaurants and the City?**
- Impact of grades themselves on restaurant economic activity and on the City's tax and fine revenues
- Methods
  - Regression discontinuity design
  - Restaurant and group fixed effects models
- Findings
  - Receiving an *A* grade – vs. a *B:*
    - increases a restaurant's sales and sales taxes
    - decreases the amount of fines assessed
    - decreases the probability of closing
  - Receiving a *C* grade (vs. a B) has the opposite effect:
    - decreases sales (and taxes)
    - increases probability of closing

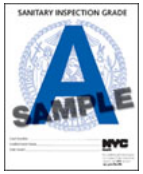
Summary Chart: A's are less likely to close

Estimated Effect of A on Closure, RD Optimum Bandwidth



Bandwidth: 1.293, Wald Estimate: -0.0485

Conclusions



- Grading did induce restaurants to improve food safety compliance.
- But it did not produce significant revenue for businesses (sales) or for the City (fines and sales taxes) overall.
- However, there are marginal effects from posting different grades: restaurants with better grades (A's vs. B's; B's vs. C's) fare better economically (higher revenues, lower fines and smaller likelihood of closure).

Thank You!

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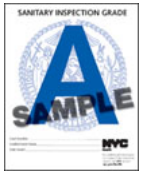
Sparse Evidence on Economic Impacts



- Restaurant grading policies:
  - NYC: improved compliance since the beginning of the public grading programs (Wong et. al. 2015)
  - Los Angeles:
    - improved inspection scores (Jin and Leslie 2003)
    - restaurant revenues sensitive to grades (Jin and Leslie 2003)
    - foodborne illness hospitalizations decrease (Jin and Leslie 2003; Simon et. al. 2005)
    - restaurant revenues sensitive to grades
- Public grading impacts in other areas
  - Figlio and Lucas (2004):
    - school report card grades affect house prices above and beyond estimated effects of test scores
    - effect has gotten smaller over time