# Antitrust Economics and Policy: Some Suggestions for Research Agendas

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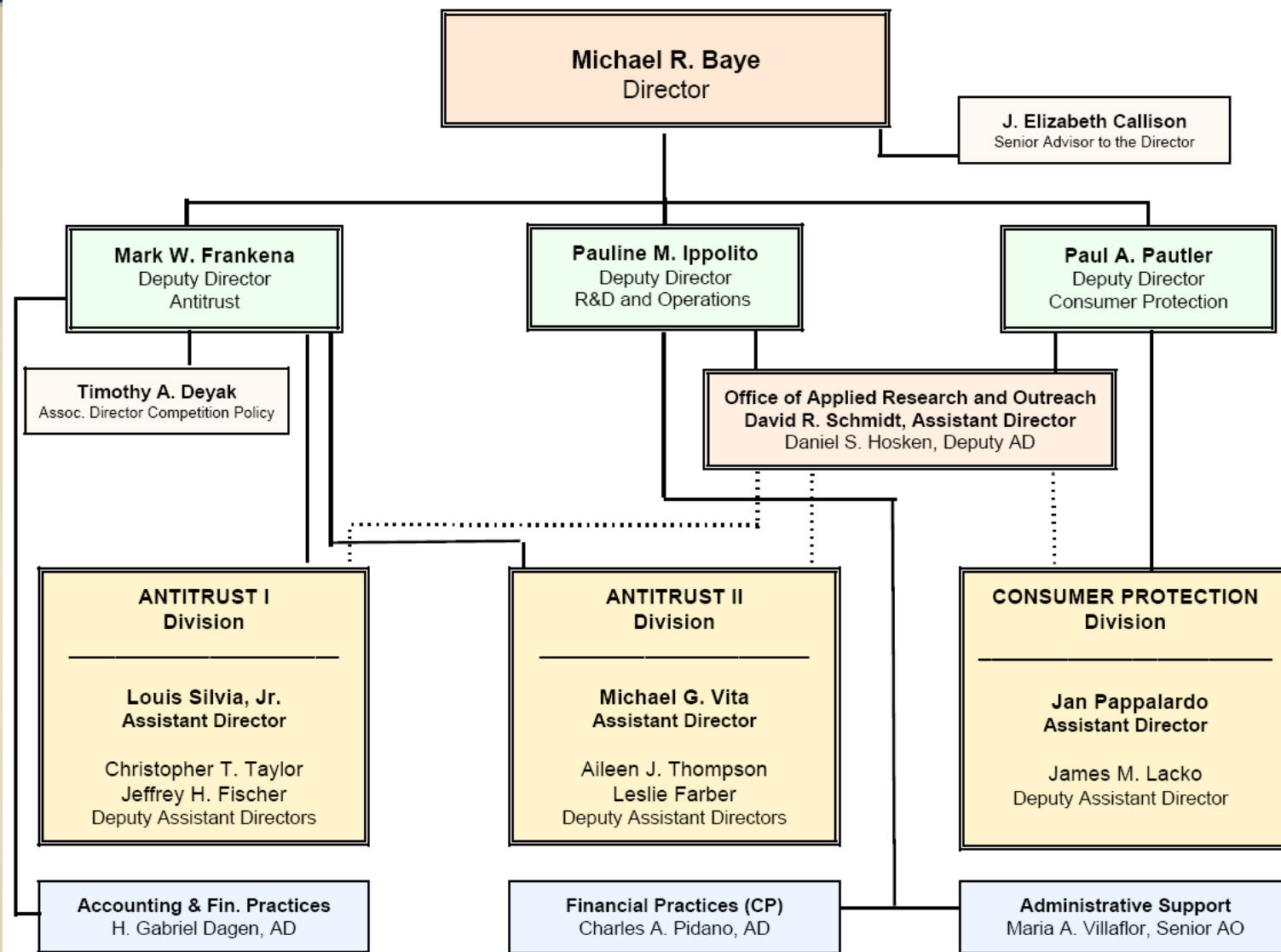Kelley School of Business, Indiana University

These are my views and do not necessarily represent those of the Federal Trade Commission or any of the individual Commissioners

# Overview

- Economic research has played an important role in shaping public policy and the antitrust landscape

- Bureau of Economics at the FTC is a key contributor

- Highlight a few areas where I believe academic researchers could add great social value

- Some caveats regarding the way we, as academics, often choose research agendas

- Share some recent work by FTC economists

# Bureau of Economics Organizational Structure

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**J. Elizabeth Callison**
Senior Advisor to the Director

**Mark W. Frankena**
Deputy Director
Antitrust

**Pauline M. Ippolito**
Deputy Director
R&D and Operations

**Paul A. Pautler**
Deputy Director
Consumer Protection

**Timothy A. Deyak**
Assoc. Director Competition Policy

**Office of Applied Research and Outreach**
David R. Schmidt, Assistant Director
Daniel S. Hosken, Deputy AD

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**Louis Silvia, Jr.**
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Charles A. Pidano, AD

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# 1. Vertical Restraints/Section 2 Issues

- Contentious area

- Absent additional empirical and theoretical research, economists run the risk of becoming irrelevant participants

# Example: Resale Price Maintenance

- Legal History
  - Supreme Court in Dr. Miles (1911) made minimum RPM *per se* illegal
  - Supreme Court in Leegin (2007) overturned Dr. Miles in favor of rule of reason
    - 5-4 majority

- Contentious issue still

# The Economics of RPM

- Theoretical
- Empirical
  - Pauline Ippolito (*JLE* 1991) and other BE economists, cited in the Supreme Court's Leegin decision
- General consensus among economists that RPM should not be *per se* illegal
  - Jeremy Bulow, former Director of the Bureau of Economics, on the Supreme Court's 5-4 Decision in Leegin (Wall Street Journal):

    "As much as I hate to go along with the conservatives on the court, I think they got it right."

# Research Opportunities: Empirical

- In his dissent, Justice Breyer called for research:
  - "I would ask such questions as, how often are harms or benefits likely to occur? How easy is it to separate the beneficial sheep from the antitrust goats?"
  - "How often, for example, will the benefits to which the Court points occur in practice?
  - "The question is how often the "free riding problem" is serious enough to significantly deter dealer investment."
  - "…the ultimate question is not whether, but how much, "free riding" of this sort takes place."

- The change in regime from *per se* illegality to rule of reason provides opportunities for quantitative research on agency/efficiency/free rider vs. anticompetitive effects

# Research Opportunities: Theoretical

- Overcome what skeptics view as the "Achilles heal" of game theory

- Development of theoretically sound, but practical, tests and screens

# Other Areas

- Minimum advertised prices (MAP)
- Bundled discounts
- Threshold/all-unit discounts
- Loyalty discounts
- Exclusion/refusals to deal
- Predation
- Tying

# 2. Online Behavioral Advertising

- Tracking of a consumer's online activities in order to allow businesses to deliver targeted advertising that more closely match the interests of particular consumers
  - Provides benefits to consumers
  - May harm consumer privacy
- Commission recently requested comments on self-regulatory principles for online behavioral advertising
- Some examples of recent comments:

# Consumer Federation of America

- "Because behavioral targeting involves practices that are inherently deceptive they distort consumption. The inherently deceptive practices that pervade the behavioral marketing space include suggestions of relationships that do not exist and use of information about the consumer that the consumer has not willingly divulged to the seller."

# Yahoo!

- "The advertising model has made Internet content and services available to millions of people in the United States and around the world—for free. The business model of relying on advertising revenue to fund websites has meant that vast amounts of information on the Internet has been fully accessible to people of all ages and income levels."

# Consumer Federation of America

- "The existing marketplace creates a race to the bottom where the most invasive companies will succeed and consumers will not have any effective options – assuming that they are even aware of the fact that they are being tracked."

# Research Opportunities

- Issues related to both consumer protection and antitrust

- Empirically examine "ruinous competition"

- Competition, privacy and disclosure

- Quantifying positive and negative externalities associated with behavioral advertising

- Quantifying the costs and benefits of online behavioral advertising

# Broader Points

- Empirical evidence matters in the world of policy

- Academic preferences that can negatively impact public policy:
  - Shunning "obvious" empirical results
  - Favoring "unexpected" theoretical/empirical results
  - Delighting in "perverse" theoretical/empirical results
  - Favoring technique over the question and the robustness of results

# Some Current Research by FTC Economists

- Research by FTC economics is a useful signal for areas of policy-relevant research
  - Revealed preference
  - Considerable interaction with policy-makers
  - Considerable industry and economic expertise
- Highlight papers in five areas today
  - Costs of drug development (Chris Adams)
  - Hospital merger retrospectives (Chris Garmon)
  - Gasoline markets (John Yun, Paul Zimmerman, & Chris Taylor)
  - Impact of education on "health status" (Steve Tenn, Doug Herman, & Brett Wendling)
  - Merger simulation (Matthew Weinberg and Daniel Hosken)

# Cost of New Drug Development

- Christopher P. Adams, "Economics of New Drug Development"
- Issues
  - What does it cost to develop a new drug (the necessary return on investment), and what is the "burn rate?"
  - How do costs vary across drugs and phases of development?
- Data
  - Matched publicly reported R&D expenditure to drugs in development, controls
  - 1682 observations

# Results

- ## Average annual drug development burn rate
    - $25 million per drug per year in clinical trials (all phases)
- ## Average required return on investment depends on
    - $p$ : probability of getting to market
    - $L$ : length of time to get to market
- ## Chris Adam's estimates:
    - $p$ = .26
    - $L$ = 8 years
    - Average required return on investment: $868 million (Compare to DiMasi et al.'s estimate of $802 million).

# But…Estimates Vary by Indication and Firm

- *p* varies by primary indication from .04 to .59

- *L* varies from 4.9 years to 8.9 years by firm

- Required return ranges from about $500 million to $2,000 million, depending on the indication

# Implications

- Can replicate DiMasi et al.'s "average" estimates using publically available data
- Caution in using $802 million figure in policy debates
  - Significant variation by primary indication and firm
  - Not a measure of expenditure, but an investment hurdle
  - Does not determine price

# Hospital Retrospectives

- Christopher Garmon, "The Evanston Northwestern Healthcare and Highland Park Hospital Merger"
- Part of a broader hospital retrospectives project that includes
  - St. Therese Medical Center/Victory Memorial Hospital (Waukegan, IL)
  - Sutter Alta Bates/Summit Hospital (East Bay, CA)
  - Doctors Regional Medical Center/Lucy Lee Hospital (Poplar Bluff, MO)
  - New Hanover Regional Medical Center/Cape Fear Hospital (Wilmington, NC)

# Background Motivation

- ## 1993-2000: Hospital merger wave
  - ### 1,042 hospital mergers
- ## Possible contributing factors:
  - ### Excess capacity
    - Shorter hospital stays; more out-patient procedures
  - ### Rise of managed care
    - Hospital risk pooling
    - Leverage against managed care companies
  - ### Unsuccessful antitrust enforcement?

# Hospital Mergers and Antitrust

- 1981-1992: 397 hospital mergers
    - FTC/DOJ prospectively challenged 15
    - 14 PIs granted
- 1993-2000: 1,042 hospital mergers
    - FTC/DOJ prospectively challenged 6
    - 0 PIs granted
- Impetus for the FTC's hospital merger retrospectives project

# Objectives and Selection

- Two objectives:
    - Research: Examine hospital mergers retrospectively to better understand their effects, particularly regarding price
    - Enforcement: Potentially challenge mergers found to be anticompetitive
- Selection criteria:
    - Data available pre and post-merger
    - Well-defined "event" (i.e., not a series of small mergers)

# Empirical Methodology

- **Difference in Differences:**
  - Post-merger price change relative to a control group, controlling for changes in case-mix (e.g., average severity of patients) and other factors

- **Issues:**
  - *Control group*: Nearby (possible rival effects) or elsewhere (possibly different cost/demand conditions)?
  - *Time of event*: Merger date or effective date of first post-merger contract?
  - *Quality changes*: No single/summary metric available

# Results: Evanston/Highland Park

- Large price increases attributable to the merger
  - 11-19% across all payers, depending on control group and case-mix controls
  - For some payers/products, price increases greater than 70%
- Timetable
  - 2002: FTC issues complaint; starts administrative proceedings
  - 2005: ALJ rules for FTC staff; orders divestiture of HP
  - 2007: FTC affirms ALJ's ruling, but orders separate contracting
  - 2008: ENH decides to drop appeals
- Chairman Kovacic has a strong interest in retrospectives

# Mechanisms Impacting Health Status

- Steve Tenn, Doug Herman, Brett Wendling, "The Role of Education in the Production of Health: An Empirical Analysis of Smoking Behavior"

# Modeling Approach

- Use linear probability model to examine the causal relationship between education and the probability that an individual smokes

- Three different measures of smoking:
  - Ever Smoke
  - Currently Smoke (100 lifetime cigs + smoke in the last month)
  - Smoke Everyday

- Controls for:
  - Student status
  - Age
  - Birth Cohort (i.e. year of the survey)
  - Other observables (e.g. race, gender, year and state fixed effects)

# Identification Strategy

- Must control for the unobserved individual characteristics affecting the decision to smoke that may be correlated with education level

- All previous (smoking) studies control for the "endogeneity" of education using IVs:
  - Problematic if instruments are invalid
  - The instruments used require functional form assumptions for cohort effects

- Smoking outcomes are determined at the same time as educational choices:
  - Identify the relationship by exploiting the fact these decisions are made together
  - Use a "control group" to examine the effect of the "education" treatment on smoking

# Control Group Methodology

- Compare smoking decisions of 16-25 year-old individuals against a "control group" of individuals who are only a year older and who make exactly the same educational decisions as themselves

- Identification strategy is similar to a "Fixed-Effects" analysis:
  – Cannot perform a standard fixed-effects analysis because CPS does not observe smoking status changes

- The method allows for more flexible fixed-effect controls:
  – Standard fixed-effect model imposes that unobserved individual effects must be constant over time
  – Their methodology does not impose that assumption

# Parameter Estimates

**Table 3: Effect of Education on Smoking Status**
**Currently Smoke (N=41,803)**

| | Est | SE | Est | SE | Est | SE | Est | SE |
|---|---|---|---|---|---|---|---|---|
| Education | -0.7 | 1.1 | -0.7 | 1.1 | | | | |
| Student | -3.9* | 1.1 | -3.7* | 1.1 | | | | |
| | | | | | | | | |
| Education, HS | | | | | -0.6 | 2.2 | -0.8 | 2.2 |
| Education, College | | | | | -0.8 | 1.1 | -0.7 | 1.1 |
| Student, HS | | | | | -4.8* | 1.0 | -4.4* | 1.1 |
| Student, College | | | | | -3.6* | 1.2 | -3.5* | -3.5 |
| | | | | | | | | |
| Additional Controls? | N | | Y | | N | | Y | |

# Results

- No causal relationship between education and smoking:
  - Different from literature which finds large effects
  - However, the correlation between smoking and education in the cross-section is similar in magnitude to previous research
    - Results not driven by sample

- But…do find a relationship between **student status** and smoking

# Price Dynamics (in Gasoline Markets)

- John Yun, Paul Zimmerman & Chris Taylor, "Edgeworth Price Cycles in Gasoline: Evidence from the U.S."
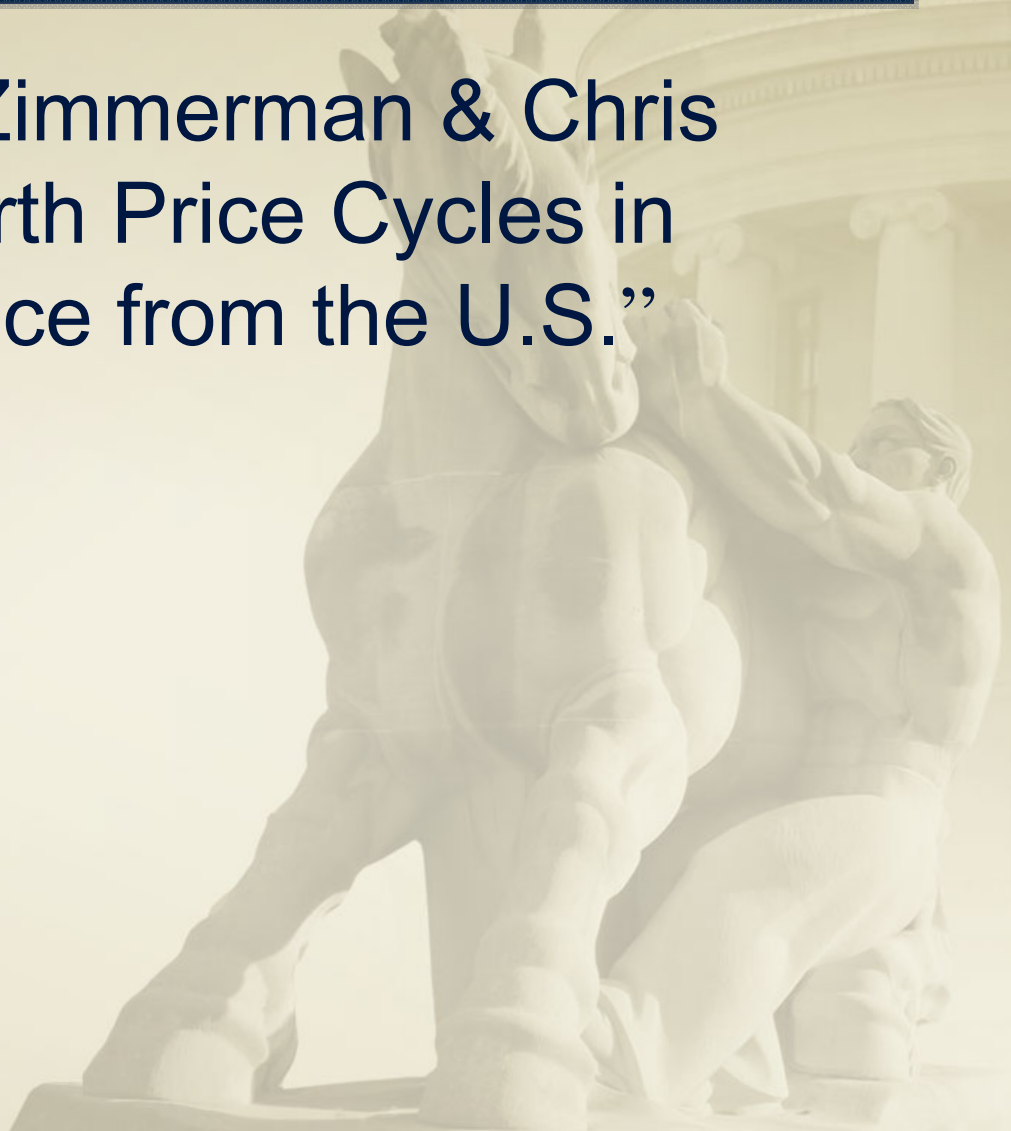
# Edgeworth Cycles: Background

- Theoretical underpinnings: Maskin and Tirole (1988)
- "Sawtooth" pattern of price dynamics
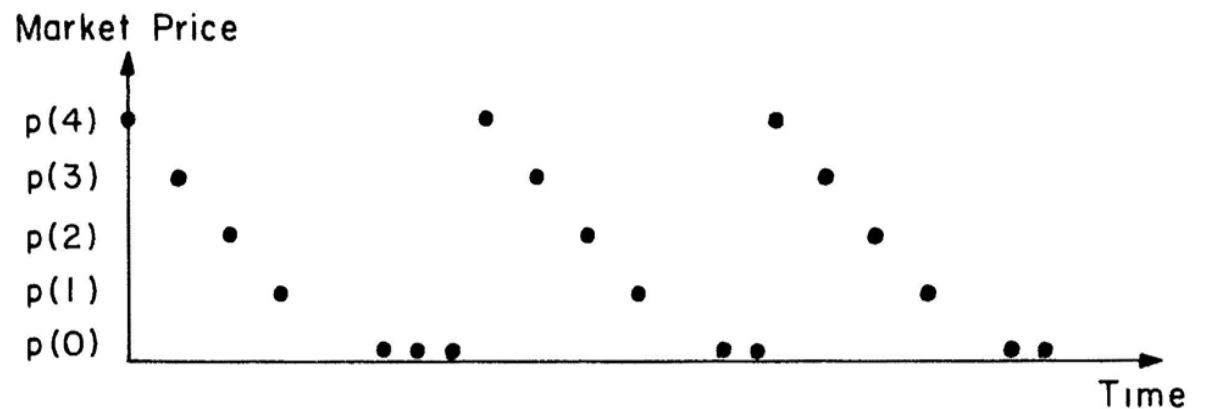


FIGURE 1.—Edgeworth cycles.

# Recent Applications to Gasoline Markets

- ## Canada and Australia
  - Eckert; Eckert & West; Noel; Atkinson; Wang
- ## U.S.
  - Lewis (2008)
    - 85 cities (Midwest, Mid-Atlantic, South), daily, 2004-05
  - Doyel et al. (2007)
    - 115 cities (Midwest, Northeast), daily, 2000-01

# This Study

- Comprehensive look at price cycling patterns in the U.S.
  - 355 cities
  - daily, 1998-2007
- Grades: regular unleaded; premium unleaded; diesel
- Control for wholesale prices (for 20 cities)
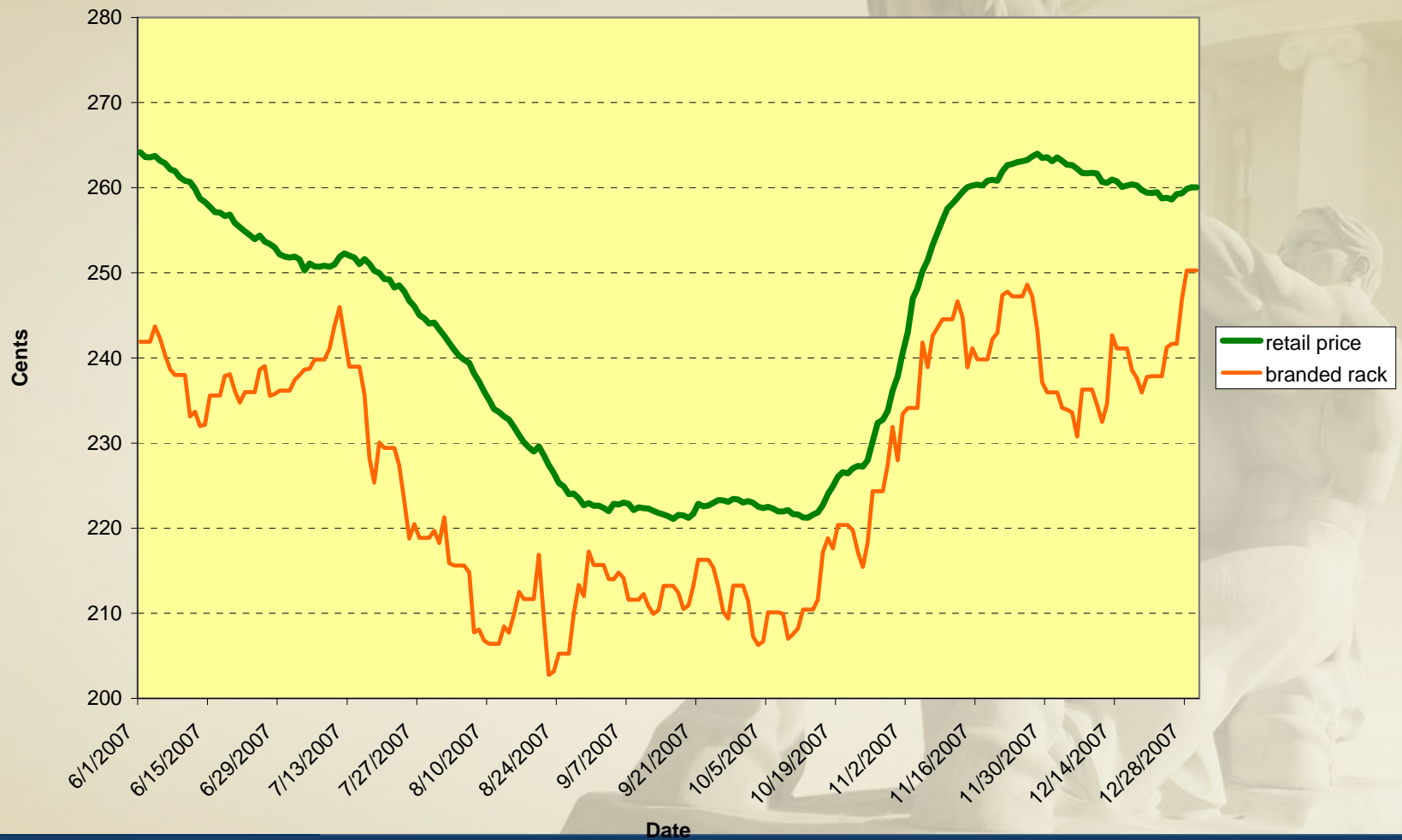  - unbranded rack
  - branded rack
- Data Source: OPIS

# St. Louis Cycles



St. Louis, MO (6/2007 - 12/2007)
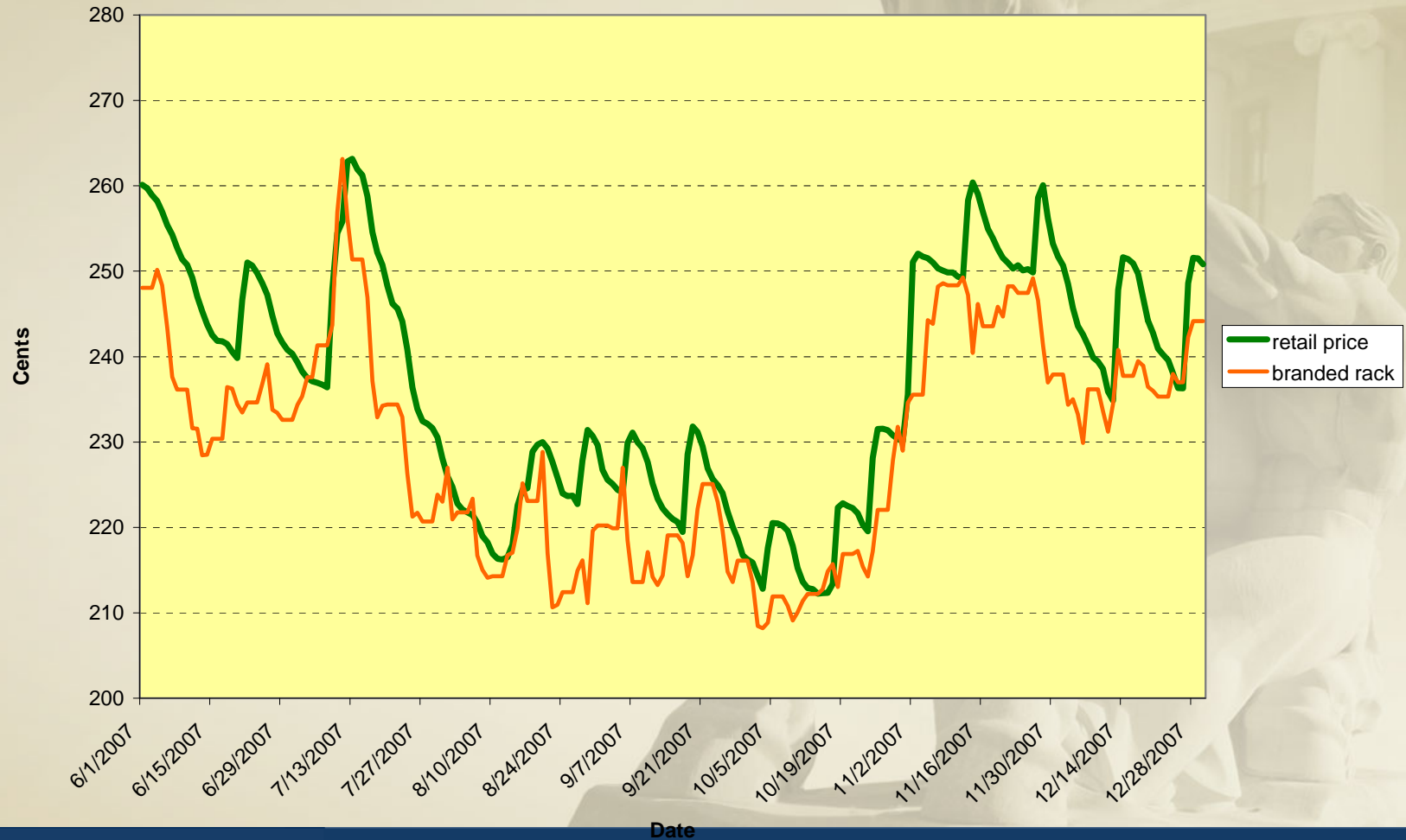
# Newark Price Movements

**Newark, NJ (6/2007 - 12/2007)**



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# Empirical Definition of a "Cycle"

- Define a "cycle" as a period where there is a price increase followed by at least one price decrease.
- Identify Edgeworth price cycling using three approaches:
  - Average ratio of down to up days across all cycles
  - Average ratio of up to down amounts across all cycles
  - Median change in daily price

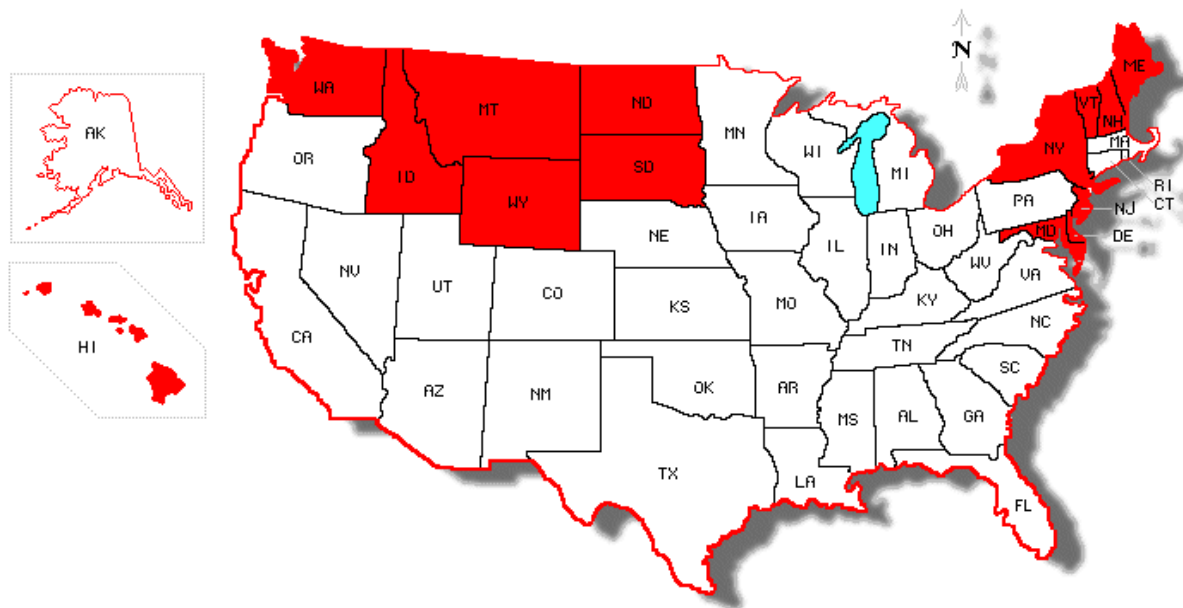# Top 5 States



Edgeworth Price Cycles

● – Top 5
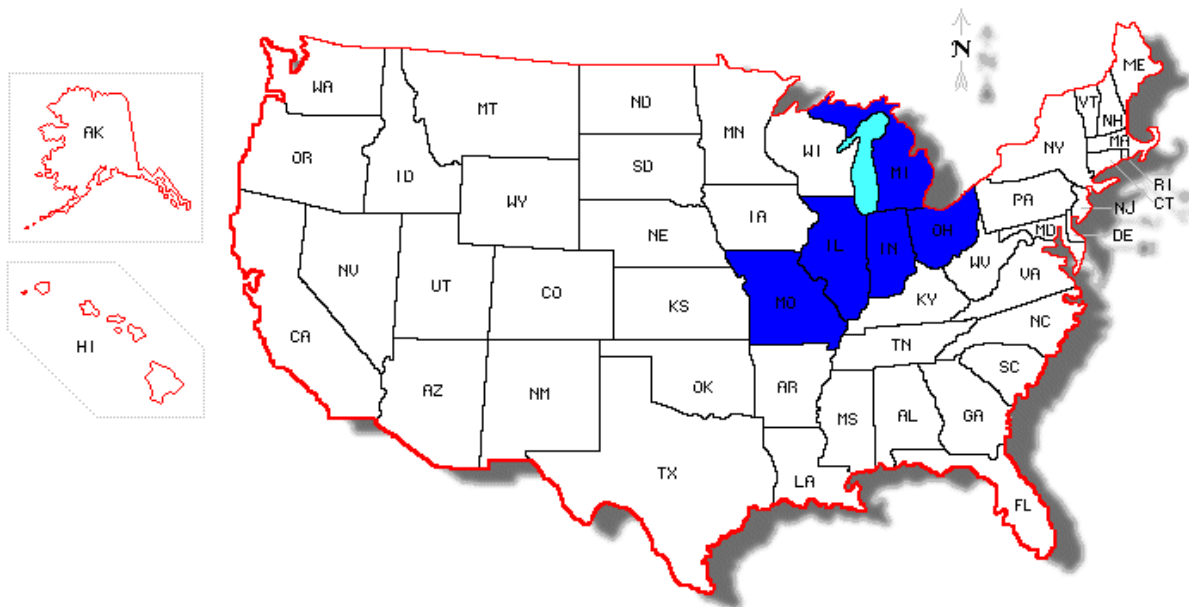
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# Bottom 15 States



Edgeworth Price Cycles

● – Bottom 15

5-14-08

# Findings

- Price cycling is most prevalent and severe in the Midwest—particularly Ohio and Michigan.
- While regular and premium gasoline prices can follow a cycling pattern, diesel prices almost never do.
- Little year-to-year variation in price cycle patterns within a city
- Some (but not all) of retail price cycling can be explained by changes in wholesale prices

# Finale: Evaluation of Merger Simulations

- ## Matthew Weinberg and Daniel Hosken, "An Evaluation of Merger Simulations"
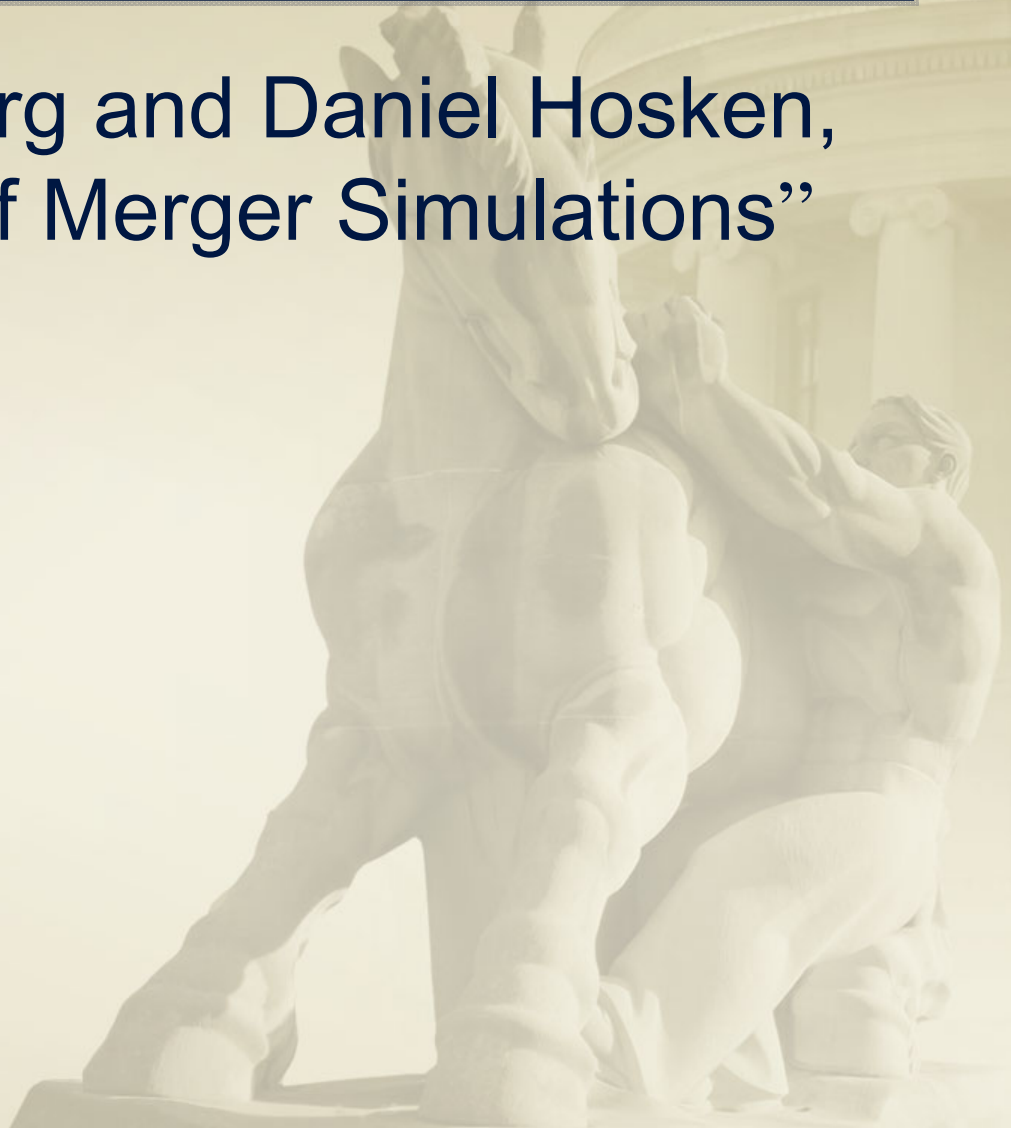
# Motivation

- Antitrust agencies' role is to identify and challenge anticompetitive mergers
- Difficult to forecast price effects of mergers
- Traditional investigative approach largely qualitative
- Demand estimation/merger simulation
  - Principle Advantage: Less subjective than traditional review, clear about assumptions
  - Principle Disadvantage: Assumptions are strong, currently little empirical validation

# Methodology to Evaluation Simulations

- Use pre-merger data to estimate demand and simulate post-merger price effects

- Use actual pre- and post-merger data to estimate actual price effects of merger

- Compare results, and offer some potential explanations for differences

# Mergers Examined

- Pennzoil/Quaker State Motor Oil
- Log Cabin/Mrs. Butterworth Breakfast Syrup
- Represent stable branded consumer product markets

# Models and Assumptions

- Demand estimation based on three alternative demand systems
  - Logit
  - AIDS
  - Linear
- Both OLS and IV
- Firm behavior
  - Static (differentiated product) Bertrand pricing
  - Constant marginal costs
- Simulated price effects for all products in market
  - Used parametric bootstrap to obtain distribution of simulated price changes (non-normal sampling distribution of simulated price changes)

# Results (Percentage Change in Prices)

| Products | Estimated Price Changes | | Simulated Price Changes | | | | Logit |
|---|---|---|---|---|---|---|---|
| | Difference in Difference | Difference | AIDS | | Linear | | |
| | | | OLS | IV | OLS | IV | IV |
| **Pennzoil/Quaker State Merger** | | | | | | | |
| Pennzoil | 3.71 | 1.95 | 2.19 | 76.73 | 1.17 | 1.47 | 0.14 |
| | (1.91) | (1.79) | (0.19, 4.03 ) | (-384.59, 1515.61) | (0.53, 2.55) | (0.32, 5.62 ) | (0.09, 0.34) |
| Quaker State | 7.65 | 5.63 | 2.05 | 36.25 | 1.92 | 6.25 | 0.52 |
| | (1.53) | (1.45) | (1.04, 3.55) | (4.21, 240.41) | (-0.32, 4.77) | (2.19, 14.69) | (0.33, 1.28) |
| **Log Cabin/Mrs Butterworth Merger** | | | | | | | |
| Log Cabin | 1.40 | 2.74 | 12.60 | – | 2.71 | – | 1.59 |
| | (1.40) | (0.74) | (7.21, 19.82) | – | (1.15, 15.03) | – | (1.31,2.03) |
| Mrs Butterworth | -2.08 | -0.74 | 21.30 | – | 6.42 | – | 2.02 |
| | (1.22) | (0.63) | (15.57, 28.25) | – | (0.60, 21.94) | – | (1.66,2.58) |

# Some Remarks

- Results are complementary to a forthcoming paper by Huang, Rojas, and Bass (2007)
  - Monte Carlo approach
  - Examines misspecification

- While demand parameter estimates differ when estimated with pre or post merger data, simulations qualitatively similar when using either time period.

- Large changes in marginal cost (6 to 13%) necessary to reconcile simulations with actual price changes in the syrup merger.