

# Merger Simulation

## Disciplined by *Daubert*, II

Luke M. Froeb

Director  
Bureau of Economics  
Federal Trade Commission  
January 29, 2004

The views expressed herein are not purported to reflect those of the Federal Trade Commission, nor any of its Commissioners

# Outline

- Goal: quantify merger benefits and costs
- Simulation may appear to do this under *apparently weak* assumptions
  - But underlying assumptions are restrictive
- Models are tools that are easily misused
  - Not appropriate for every job
  - *If* used, a *Daubert* discipline is essential
- Each assumption
  - should be supported by evidence, or
  - subject to sensitivity analysis
- Examples
- Conclusion

# Merger Simulation: Definitions

- Back End: Structural Model
  - Consumer behavior
  - Firm behavior
  - Retailer behavior
  - Equilibrium the result of their interaction
- Front End: Parameters “Feed” the Model
  - Estimation
  - Calibration to observed data, like margins
- Equilibrium
  - Pre-merger (observed)
  - Post-merger (predicted)

# Debate on the Benefits and Costs of Estimating Structural Parameters

- PRO: Estimation should always be used
  - Data on actual choices are only source of knowledge
  - Econometrics offers the tools for interpreting these data
  - All problems have satisfactory solutions
- CON: Estimation commonly cannot help much
  - The data often does not speak to the policy questions
  - Many problems have no satisfactory solutions
  - Results stem largely from untested and untestable assumptions
  - Very costly proposition

# Take-Away: Advice to Practitioners

- Merger simulation is never *the* answer
  - A tool that is easily misused.
  - *If* used, must fit with totality of evidence
- Estimation can be expensive yet yield very little
  - Is it likely to convince key decision-makers?
  - Is it likely to reduce uncertainty?
- Is simulation necessary for defensive reasons?
  - Critiquing methodology is hard without replicating it
  - Does some number beat no number?

# The Seductive, Deceptively Simple Intuition of Unilateral Effects

- Pre-merger, profit maximization means  $MR = MC$
- Post-merger, MR for the merging firms falls as substitute products steal share from each other
  - Merged firm responds by increasing both prices
  - Non-merging firms respond to increased demand by raising price
- Makes it seem that the only issue is “how much?”

# Behind Unilateral Effects Story is a Structural Game-Theoretic Model

- Built on assumptions about how consumers, retailers, and firms behave, and how they interact
  - Can compute model equilibrium
  - And how merger changes model equilibrium
- How do we know when model gives reliable forecasts?
  - No good evidence on out-of-sample forecasts
  - What's an antitrust practitioner to do?

# What Does *Daubert* Tell Us About How to Use Models?

- Absent evidence on prediction, model should be judged by how well it comports with the observable data
- Structural merger models have four components:
  - Consumer model
  - Retailer model
  - Firm model
  - Equilibrium
- Each makes predictions or assumptions that can be refuted by data

# Guidelines for Bringing *Daubert* Discipline to Merger Modeling

- Questions to ask:

Does the ...

- demand model accurately characterize consumers?
- firm model accurately characterize firms?
- retail model accurately characterize retailers?
- equilibrium model accurately characterize equilibrium?

# All Models Simplify Reality

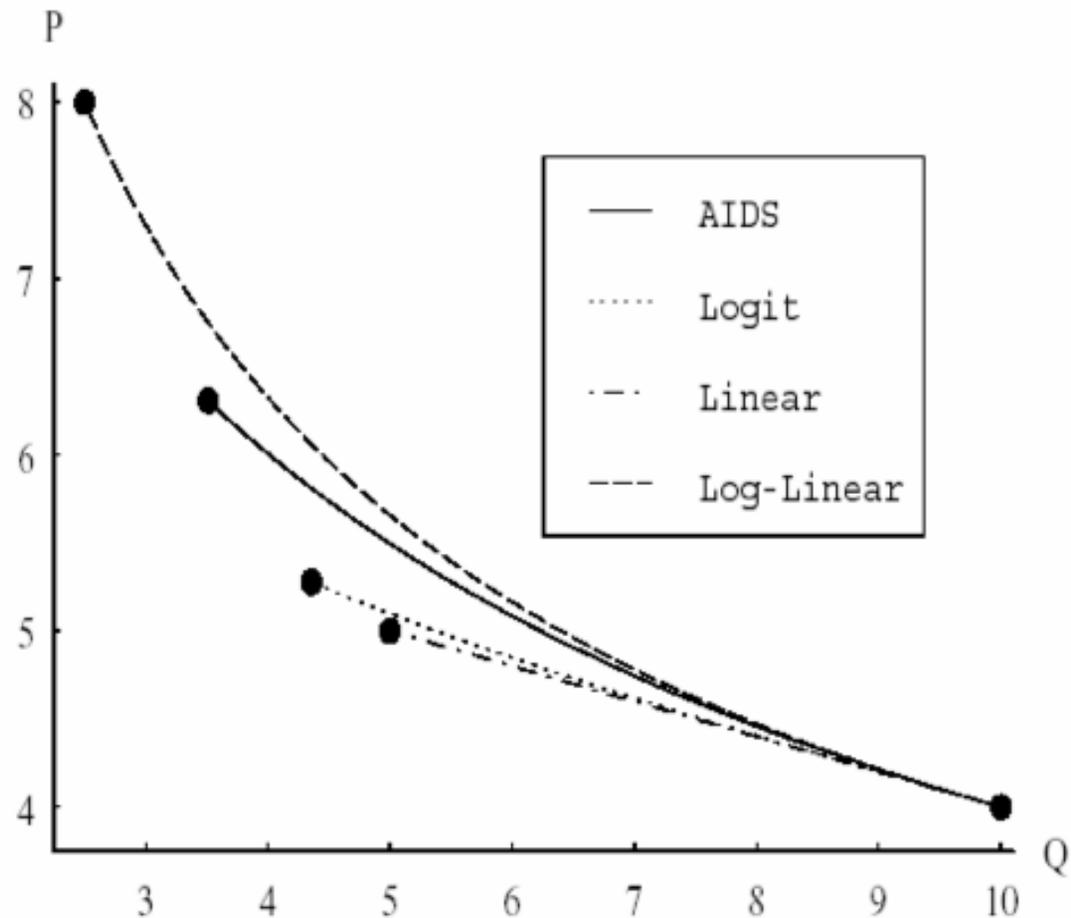
- Question is not whether abstractions are made, but rather, do the abstractions make model's predictions misleading?
- If assumptions matter, then
  - Gather evidence on which assumptions make sense
  - Absent evidence, choose conservative assumptions
- Examples of material assumptions: retail sector, demand curvature, demand elasticities

# Retail Behavior Determines Magnitude of Merger Effects

- *Transparent*: passes on upstream merger effects
  - Retail sector simply “marks up” wholesale prices
- *Opaque*: no downstream effect of upstream merger
  - two-part pricing to maximize joint profit
- *Double Marginalization*: can amplify or attenuate upstream merger effects
- GATHER EVIDENCE ON HOW RETAIL SECTOR BEHAVES!

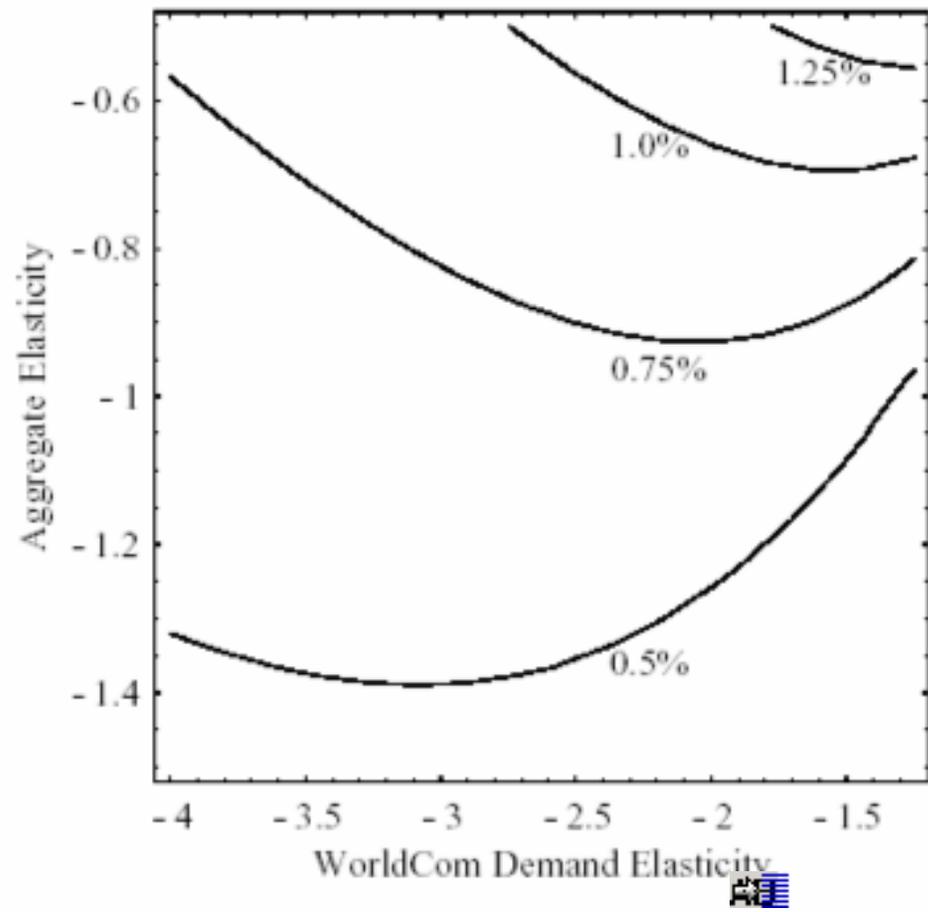
# Demand Curvature Determines Magnitude of Merger Effects

- Cannot estimate, so
- MAKE CONSERVATIVE ASSUMPTIONS!
  - Plaintiff use logit or linear extrapolation
  - Defendant use Log-linear or AIDS
- OR DO SENSITIVITY ANALYSIS



# Demand Elasticities Determine Magnitude of Merger Effects

- Difficult to estimate precisely, so...
- DO SENSITIVITY ANALYSIS!



# Can Academics Help?

	Academics	Practitioners
Concern	Methodological Innovation	How well is methodology applied to case
Outcome	Demonstrate Policy Tradeoffs	Need an Answer
Check and Balance	Peer Review	\$100,000+ Rebuttal Reports

# Who Faces Higher Standard?

- In many ways the legal standard is *higher*
  - Analysis must be practicable; and
  - Fit the facts of a case
- Methodologies chosen not for their beauty but by how well they work

# Policy Dialectic: Pushing Economics Forward

- *Thesis*: Froeb & Werden
- *Antithesis*: Scheffman
- *Synthesis*: Modelers must pay attention to institutional details of the industry
  - Cannot just “assume a can opener”
  - Formal modeling is not always appropriate or useful
- FTC “Enforcement R&D”
  - Merger retrospectives
  - Out-of-sample forecasts
  - More realistic models

# Much that We Need to Know

- How important are omitted competitive dynamics?
  - Product repositioning
  - Entry and investment
  - Repeated interaction
  
- How important are omitted competitive dimensions?, i.e., how well do...
  - Bertrand (price-only) models predict?
  - Cournot (quantity-only) models predict?
  - Auction models (bid-only) predict?
  
- What is role of promotion and advertising?
  - Variation in price helps estimate demand; but
  - We do not know why price varies so much; or how retail relates to wholesale pricing