

The views expressed herein are entirely those of the authors and do not necessarily reflect those of the Board of Governors, Board research staff, or the Federal Trade Commission or any of its Commissioners.

Labor and Product Market Effects of Mergers

Daniel Hosken¹ Miriam Larson-Koester¹ Charles Taragin²

FTC Microeconomics Conference 2024

¹ Federal Trade Commission

² Federal Reserve Board of Governors

Introduction

Research Question

- How and when do downstream horizontal mergers affect workers and consumers?

Research Question

- How and when do downstream horizontal mergers affect workers and consumers?
- We take a two-level vertical supply chain bargaining model, modified from Horn and Wolinsky (1988) and Sheu and Taragin (2021)

Research Question

- How and when do downstream horizontal mergers affect workers and consumers?
- We take a two-level vertical supply chain bargaining model, modified from Horn and Wolinsky (1988) and Sheu and Taragin (2021)
- Allows us to simulate impact of mergers on consumer and worker welfare
 - Upstream workers collectively bargain
 - Downstream differentiated Bertrand

Four key mechanisms of the model:

1. Traditional product market recapture
 - Price \uparrow and Quantity \downarrow

Four key mechanisms of the model:

1. Traditional product market recapture
 - Price \uparrow and Quantity \downarrow
2. Increase bargaining surplus
 - Wage \uparrow

Four key mechanisms of the model:

1. Traditional product market recapture
 - Price \uparrow and Quantity \downarrow
2. Increase bargaining surplus
 - Wage \uparrow
3. Increase firm bargaining leverage
 - Wage \downarrow

Four key mechanisms of the model:

1. Traditional product market recapture
 - Price \uparrow and Quantity \downarrow
2. Increase bargaining surplus
 - Wage \uparrow
3. Increase firm bargaining leverage
 - Wage \downarrow
4. Decrease worker bargaining leverage
 - Employers will not bargain against themselves (Jarosch et al. (2024))
 - Wage \downarrow

Key aspects of the model:

- Labor and product markets may not coincide

Key aspects of the model:

- Labor and product markets may not coincide
 - Unrelated products produced in the same labor market

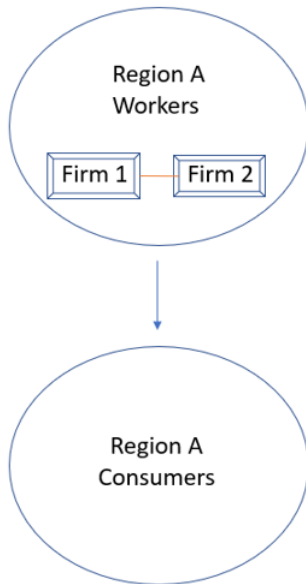
Key aspects of the model:

- Labor and product markets may not coincide
 - Unrelated products produced in the same labor market
 - Competing products produced in different labor markets

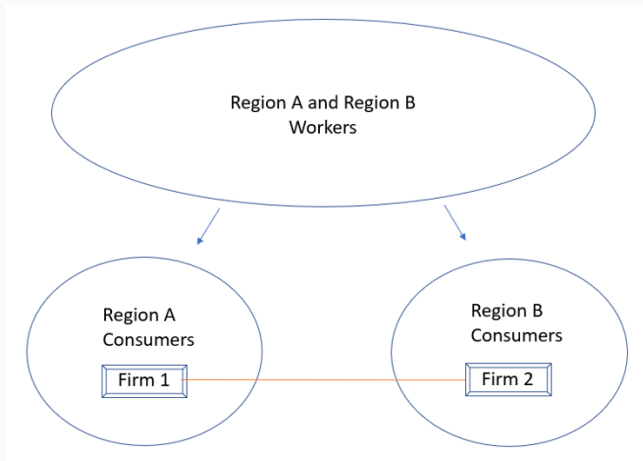
Key aspects of the model:

- Labor and product markets may not coincide
 - Unrelated products produced in the same labor market
 - Competing products produced in different labor markets
- Mergers may occur within or across labor and product markets

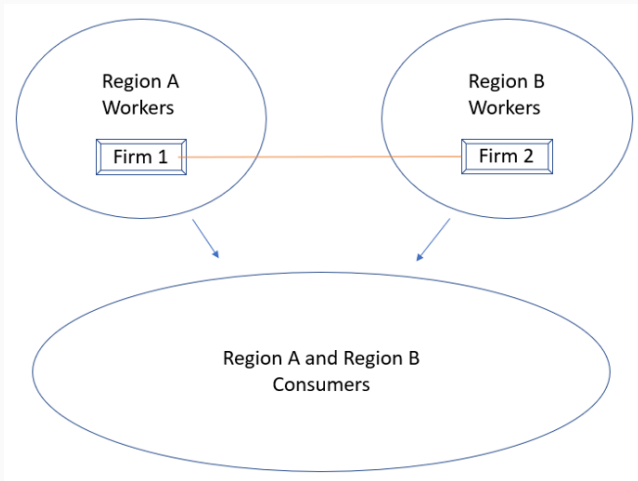
Market Configurations: Product Overlap, Labor Overlap



Market Configurations: No Product Overlap, Labor Overlap



Market Configurations: Product Overlap, No Labor Overlap



Our Approach

- Model is extremely flexible
- Calibrate to real world industries
 - Observed shares, wages, margins, costs, locations
- We use simulation to explore the cases described above

Preview of Results

- Harm to workers depends on the market configuration
 - Most harmed with labor and product market overlap
 - Can benefit from mergers when there is no labor overlap

Preview of Results

- Harm to workers depends on the market configuration
 - Most harmed with labor and product market overlap
 - Can benefit from mergers when there is no labor overlap
- Changes in market structure are predictive of worker outcomes

Preview of Results

- Harm to workers depends on the market configuration
 - Most harmed with labor and product market overlap
 - Can benefit from mergers when there is no labor overlap
- Changes in market structure are predictive of worker outcomes
- Conventional merger simulation screens often identify mergers that harm workers when there is product market overlap

Where We Fit In

- Empirical evidence shows labor markets are not perfectly competitive (Sokolova and Sorensen (2021), Card et al. (2018))
- Impact of mergers (Prager and Schmitt (2021) and Arnold (2021))
- Most models of monopsony do not take into account strategic interaction
 - Classical monopsony (Robinson (1933) and Card et al. (2018))
 - Search (Burdett and Mortensen (1998) and Manning (2003))
- Berger et al. (2023) features local labor market competition and perfectly competitive product markets
- Product market effects of mergers
 - Differentiated Bertrand (Werden and Froeb (1994))
 - Nash Bargaining (Gowrisankaran et al. (2015))

Model

Bargaining Game

- Objective function:

$$\max_{w_n} \left(\underbrace{\text{Worker Payoff} - \text{Worker Disagreement Payoff}}_{\text{Worker Gains From Trade}} \right)^{1-\lambda} \times \left(\underbrace{\text{Firm Payoff} - \text{Firm Disagreement Payoff}}_{\text{Firm Gains from Trade}} \right)^{\lambda}$$

- Gains from trade are weighted by λ , where higher λ indicates more firm power

Firm Gains from Trade

- Firm Agreement Payoff

$$\pi_n = (p_n - w_n - c_n)q_n$$

- Firm Disagreement Payoff

$$\sum_{h \in \{Z_j \setminus n\}} (p_h - w_h - c_h) \frac{s_h}{1 - s_n} q_n$$

Downstream Market

- Logit demand for consumers

$$q_n = \mathcal{S}s_n = \mathcal{S} \frac{\exp(\delta_n - \alpha p_n)}{1 + \sum_{n \in N} \exp(\delta_n - \alpha p_n)}$$

- Product prices satisfy Bertrand Nash equilibrium

$$p_n - w_n - c_n = -\frac{1}{\alpha(1 - \sum_{h \in Z_j} s_h)}$$

- where s_n is the share of product n , \mathcal{S} is the size of the product market, and Z_j is the set of products produced by firm j

Worker Gains from Trade

- Workers produce in L labor markets and for each labor market $m \in L$, let \mathfrak{S}^m denote the size of the labor market
- Under Leontief production technology, labor and product market shares are proportional, scaled by market sizes:

$$q_n = s_n^m \mathfrak{S}^m = s_n \mathcal{S}$$

- Worker Agreement Payoff:

$$w_n q_n = w_n s_n^m \mathfrak{S}^m = w_n s_n \mathcal{S}$$

Worker Gains from Trade

- Let $\mathcal{L}_m \subset N_m \cup o_m$ denote the set of employment opportunities available to workers in a labor market
- Worker Disagreement Payoff

$$\sum_{l \in \{\mathcal{L}_m \setminus Z_j\}} w_l \frac{s_l(\mathbf{p}) \frac{\mathcal{S}}{\mathcal{G}^m}}{1 - s_n(\mathbf{p}) \frac{\mathcal{S}}{\mathcal{G}^m}} s_n(\mathbf{p}) \mathcal{S}$$

Bargaining Game

- Objective function:

$$\max_{w_n} \left(\underbrace{w_n s_n(\mathbf{p}) \mathcal{S}}_{\text{Worker Payoff}} - \underbrace{\sum_{l \in \{\mathcal{L}_m \setminus Z_j\}} w_l \frac{s_l(\mathbf{p}) \frac{\mathcal{S}}{\Theta_m}}{1 - s_n(\mathbf{p}) \frac{\mathcal{S}}{\Theta_m}} s_n(\mathbf{p}) \mathcal{S}}_{\text{Worker Disagreement Payoff}} \right)^{1-\lambda} \times \left(\underbrace{(p_n - w_n - c_n) s_n(\mathbf{p}) \mathcal{S}}_{\text{Firm Payoff}} - \underbrace{\sum_{h \in \{Z_j \setminus n\}} (p_h - w_h - c_h) \frac{s_h(\mathbf{p})}{1 - s_n(\mathbf{p})} s_n(\mathbf{p}) \mathcal{S}}_{\text{Firm Disagreement Payoff}} \right)^{\lambda}$$

- Nash-in-Nash
 - Simultaneous negotiations Horn and Wolinsky (1988)
 - Simultaneous downstream pricing Draganska et al. (2010)
- Wages and prices satisfy all first order conditions

Simulations

Data Needed for Calibration

Downstream FOC

- Margins, costs, and market shares identify downstream demand parameters (α and δ_j)

Bargaining FOC

- Worker wages and outside option identify bargaining power parameter (λ)

Market Configurations: Non-Tradable, US Hospital Industry

- Publicly available data allows us to predict upstream and downstream merger effects for a large number of markets (HCRIS, CMS, AHA, BLS OES)
- Focus on labor market for nurses and pharmacists, where employers likely have power (Prager and Schmitt (2021))
- Stylized “narrow” markets: Hospital Service Areas (HSAs)
 - Zip codes within which residents receive most hospitalizations
- Stylized “broad” markets: Hospital Referral Regions (HRRs)
 - Aggregate of underlying HSAs

Market Configurations: Tradable, Colombian Manufacturing

- 1991 Census of Colombian Manufacturing allows simulation of mergers in 53 industries (4-digit SIC) and 27 regions
- Skilled workers' wages and other costs separately recorded
- Assume local geographic labor markets, and worker outside option wage determined by 2-digit SIC wages in local region
- Assume national product market, exclude exports and imports
- Assume all plants are independent pre-merger

Recall mergers affect workers in 4 ways in our model:

- Traditional product market recapture
- Increase bargaining surplus
- Increase firm bargaining leverage
- Decrease worker bargaining leverage

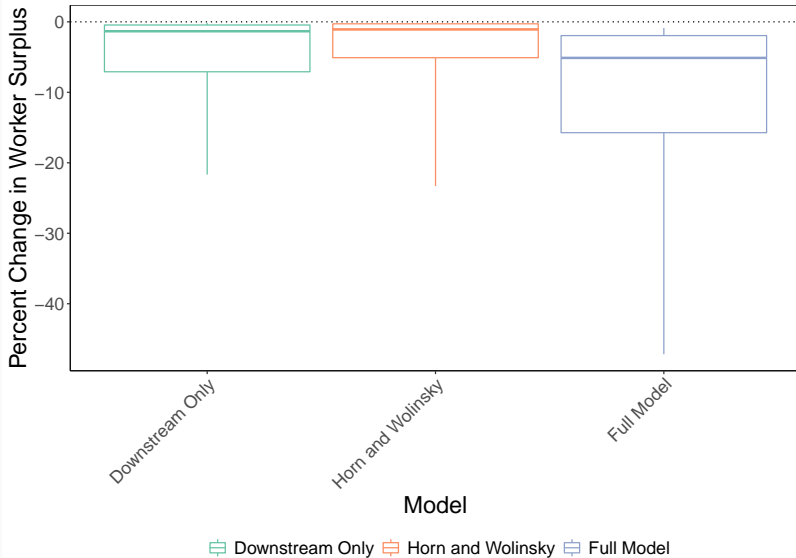
We compare three models:

- “Conventional” downstream only merger simulation
- Bargaining simulation with fixed threat point for workers, Horn and Wolinsky (1988)
- Full model simulation with endogenous threat point for workers

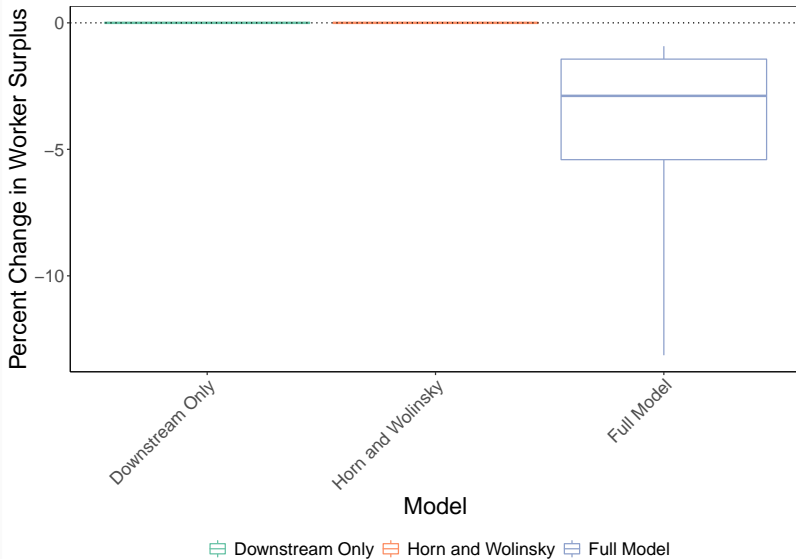
Types of Mergers

- Product and Labor Overlap (Non-Tradable)
 - Hospital systems acquiring hospitals within HSAs
- No Product Overlap and Labor Overlap (Non-Tradable)
 - Hospital systems acquiring hospitals in different HSAs, but with the same HRR labor market
- Product Overlap and No Labor Overlap (Tradable)
 - Manufacturing plants acquiring other plants in different geographic regions, but the same 4-digit SIC industry
- Meaningful mergers: $HHI > 1500$ and $\Delta HHI > 100$

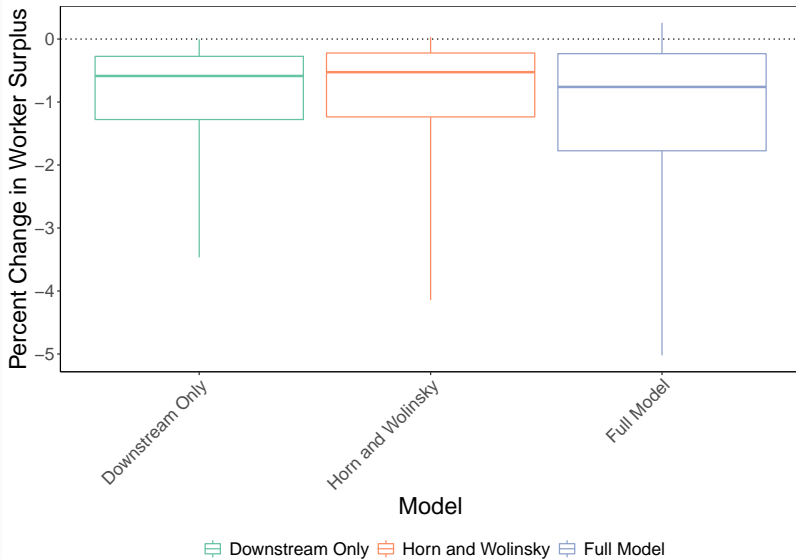
US Hospitals: Product and Labor Overlap (n=855)



US Hospitals: Labor Overlap Only (n=324)



Colombian Manufacturing: Product Overlap Only (n=423)



Relationship to Δ HHI

- How predictive is Δ HHI of worker harm?

Relationship to ΔHHI

- How predictive is ΔHHI of worker harm?
- How does the distribution of “bad” mergers vary by setting?

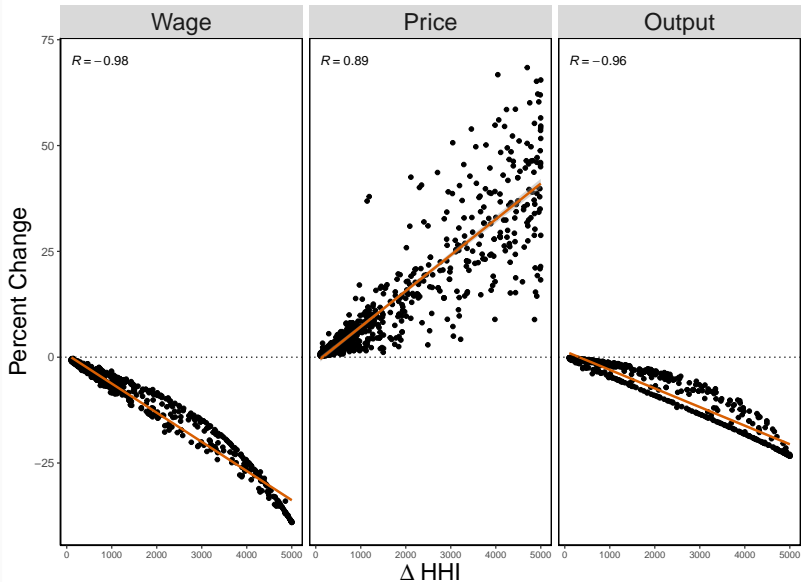
Relationship to Δ HHI

- How predictive is Δ HHI of worker harm?
- How does the distribution of “bad” mergers vary by setting?
- How do model mechanisms vary with Δ HHI?

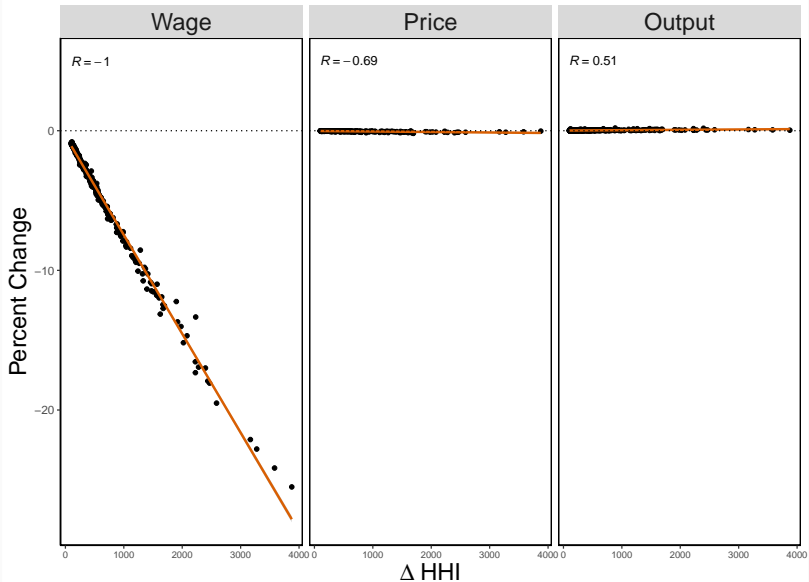
Look common measures of merger impact:

- Wages
- Prices
- Output

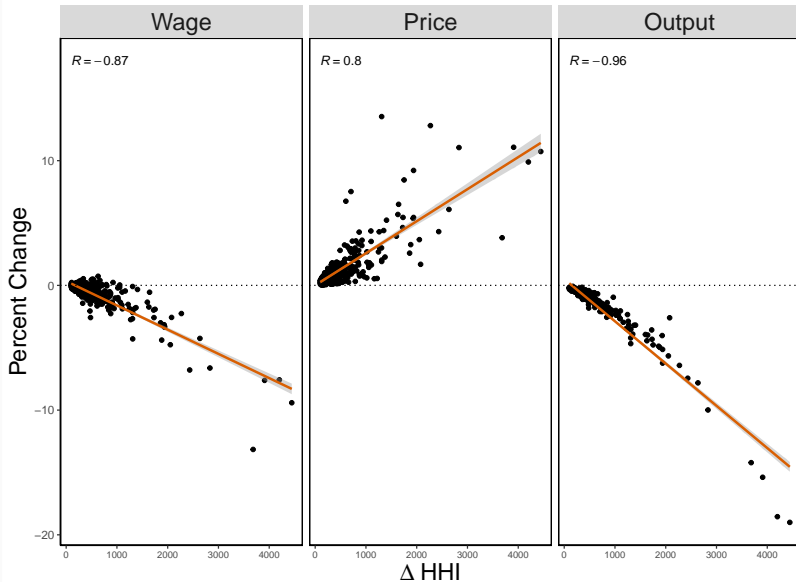
US Hospitals: Product and Labor Overlap



US Hospitals: Only Labor Overlap



Colombian Manufacturing: Product Overlap Only



Enforcement Screens

- What fraction of mergers that harm workers would be caught by a traditional downstream-only product market merger screen?

Enforcement Screens

- What fraction of mergers that harm workers would be caught by a traditional downstream-only product market merger screen?

Setting	Type of Merger	Mergers Caught	
		> 1%	> 5%
Hospitals	Product Overlap, Labor Overlap	0.77	0.99
Hospitals	No Product Overlap, Labor Overlap	0.00	0.00
Manufact.	Product Overlap, No Labor Overlap	0.45	1.00

Conclusion

Conclusion

- Two-level supply chain model simulations calibrated to the hospital and manufacturing industries predict:

Conclusion

- Two-level supply chain model simulations calibrated to the hospital and manufacturing industries predict:
 - Workers most harmed with labor and product overlap.

Conclusion

- Two-level supply chain model simulations calibrated to the hospital and manufacturing industries predict:
 - Workers most harmed with labor and product overlap.
 - Workers can benefit when there is no labor overlap

Conclusion

- Two-level supply chain model simulations calibrated to the hospital and manufacturing industries predict:
 - Workers most harmed with labor and product overlap.
 - Workers can benefit when there is no labor overlap
- Change in concentration is predictive of worker outcomes

Conclusion

- Two-level supply chain model simulations calibrated to the hospital and manufacturing industries predict:
 - Workers most harmed with labor and product overlap.
 - Workers can benefit when there is no labor overlap
- Change in concentration is predictive of worker outcomes
- Conventional product market screening tools capture some but not all mergers that harm workers
 - Labor markets without product overlap most at risk for error

Thank You

References

Arnold, D. (2021). Mergers and acquisitions, local labor market concentration, and worker outcomes. *Working Paper*.

Berger, D. W., T. Hasenzagl, K. F. Herkenhoff, S. Mongey, and E. A. Posner (2023). Merger guidelines for the labor market. Technical report, National Bureau of Economic Research.

Burdett, K. and D. T. Mortensen (1998). Wage differentials, employer size, and unemployment. *International Economic Review*, 257–273.

Card, D., A. R. Cardoso, J. Heining, and P. Kline (2018). Firms and labor market inequality: Evidence and some theory. *Journal of Labor Economics* 36(S1), S13–S70.

Draganska, M., D. Klapper, and S. B. Villas-Boas (2010). A larger slice or a larger pie? an empirical investigation of bargaining power in the distribution channel. *Marketing Science* 29(1), 57–74.

Gowrisankaran, G., A. Nevo, and R. Town (2015). Mergers when prices are negotiated: Evidence from the hospital industry. *American Economic Review* 105(1), 172–203.

Horn, H. and A. Wolinsky (1988). Bilateral monopolies and incentives for merger. *The RAND Journal of Economics*, 408–419.

Jarosch, G., J. S. Nimczik, and I. Sorkin (2024). Granular search, market structure, and wages. *Review of Economic Studies*, rdae004.

Manning, A. (2003). *Monopsony in motion: Imperfect competition in labor markets*. Princeton University Press.

Prager, E. and M. Schmitt (2021). Employer consolidation and wages: Evidence from hospitals. *American Economic Review* 111(2), 397–427.

Robinson, J. (1933). *The economics of imperfect competition*. Springer.

Sheu, G. and C. Taragin (2021). Simulating mergers in a vertical supply chain with bargaining. *The RAND Journal of Economics* 52(3), 596–632.

Sokolova, A. and T. Sorensen (2021). Monopsony in labor markets: A meta-analysis. *ILR Review* 74(1), 27–55.

Werden, G. J. and L. M. Froeb (1994). The effects of mergers in differentiated products industries: Logit demand and merger policy. *JL Econ. & Org.* 10, 407.