

# Mergers and Coordinated Effects

Robert Porter  
Northwestern University

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# Merger Review Empirics

Common empirical practice in merger evaluation:

1. Estimate differentiated products demand system
2. (i) Infer marginal cost from Nash equilibrium pricing equations, or  
(ii) Estimate supply side assuming Nash equilibrium.
3. Simulate effect of merger on prices given new ownership patterns, maintaining assumption of Nash equilibrium pricing

This type of analysis restricts attention to unilateral effects, i.e., assume that pre- and post-merger outcomes are a Nash equilibrium.

What about coordinated effects (collective dominance), whereby the merger results in less competitive conduct?

(And is pre-merger conduct a Nash equilibrium?)

Nash equilibrium assumption also matters in evaluating incentives to alter product characteristics or the set of available products.

# Coordinated Effects

“A merger may diminish competition by enabling or encouraging post-merger coordinated interaction among firms in the relevant market that harms customers. Coordinated interaction involves conduct by multiple firms that is profitable for each of them only as a result of the accommodating reactions of the others. ...

“Coordinated interaction includes a range of conduct. [It] can involve the explicit negotiation of a common understanding of how firms will compete or refrain from competing. Such conduct typically would itself violate the antitrust laws. Coordinated interaction also can involve a similar common understanding that is not explicitly negotiated but would be enforced by the detection and punishment of deviations that would undermine the coordinated interaction. ... Coordinated interaction includes conduct not otherwise condemned by the antitrust laws.”

(US Merger Guidelines, 2010)

# Introduction

My purpose today is to:

- Review the theory of tacit collusion and mergers.  
Effect of mergers on enforcement and participation constraints (incentive compatibility vs. individual rationality), and on outcomes (equilibrium selection).
- Describe some empirical studies and underlying measurement issues.
- Discuss some recent cases.  
Merger reviews and *ex post* investigations.

Ignore effects of mergers on explicit collusion, a *per se* violation.

# Tacit Collusion

A collusive scheme must:

1. Enlist conspirators
  - problematic if potential participants are asymmetric
2. Come to an agreement
  - prices
  - market shares or market division
  - product features
3. Enforce agreement
  - detection of and response to deviations
4. Protect gains from entry or expansion by non-participants
5. Respond to new circumstances

# Theories of Tacit Collusion

Standard approach considers a repeated game.

Agreement enforced by the threat of retaliation, such as collapse of the agreement.

See Ivaldi, Jullien, Rey, Seabright & Tirole (2007) review.

Industry characteristics that may facilitate collusion:

- Number or concentration of sellers
- Symmetry among sellers (in costs, capacity, etc.)
- Pricing transparency
- Frequency of interaction
- Degree of product differentiation
- Excess capacity
- Entry barriers
- Demand stability

Can examine how a merger affects these factors, and therefore the likelihood of tacit collusion, given industry circumstances.

Less analysis of how firms select outcome from equilibrium set.

# The Role of Communication

Explicit communication is often *per se* illegal.

But what is the role of communication?

In an explicit cartel with side payments and communication, allocations and payments are functions of internal messages (mechanism design perspective on collusion).

E.g., Asker (AER 2010) study of stamp dealer bidding ring,  
Clark & Houde (AEJ: Micro 2013) study of Quebec gas.

But communication also plays a role in dispute mediation, and more general design of rules, contracts and institutions.

E.g., Genesove & Mullin (AER 2001) study of Sugar Institute.

Communication is much more limited under tacit collusion.

Role for “parallel accommodating conduct,” or a price leader.

# Permissible Communication?

A recurring issue is what constitutes illegal communication.

Airline Tariff Publishing Company (ATPCO) (Borenstein 2004):

Airlines communicated with advance price announcements, without having to sell tickets at those prices.

Settlement placed constraints on feasible messages.

US DEF block spectrum auction (Cramton & Schwartz, JRE 2000)

Market division facilitated via messages in trailing digits of bids.

FCC addressed by requiring fixed bid increments.

Broiler chicken price fixing?

Ongoing civil litigation; DoJ requested halt of discovery process, while it pursues criminal investigation.

Sharing of detailed price and inventory information via AgriStats.

Allegations of coordinated production cuts.

Wholesale prices rose 50% in 2008-16, despite falling costs.

As above, solution may be behavioral remedy, weighing costs and benefits of sharing different kinds of information.

# Inferring Conduct

Bresnahan (EL 1982): Can distinguish between competitive and collusive pricing, or identify the degree of collusion, even absent marginal cost data, by exploiting rotations in a firm's demand curve.

See also Bresnahan (HIO 1989), Berry & Haile (ARE 2014).

In order to identify marginal cost, require exogenous firm-specific rival cost shifters, or exogenous rival demand shifters, which affect a firm's residual demand function.

Corts (JEm 1999) caution: Not innocuous to assume that conduct is stable over time (or over firms).

Bresnahan (JIE 1987): Distinguish between Nash pricing and collusion by exploiting ownership patterns of multiproduct firms.

Porter (BJE 1983) and Ellison (RJE 1994) measure changes in conduct associated with transition to temporary price wars.

Bajari & Ye (REStat 2003) discuss how to identify participants in a collusive scheme in an auction context.

# MillerCoors

Miller & Weinberg (Ecma 2017) examine the effects of the 2008 MillerCoors joint venture.

Effectively a merger of the second and third largest brewers.

Market shares in 2007:

ABI:	35%	Modelo:	10%
Miller:	18%	Heineken:	6%
Coors:	11%		

HHI increased from 1,853 in 2007 to 2,350 in 2009.

Efficiencies associated with synergies and decreased transportation costs (some brands could be brewed in plants closer to market).

But some brands of combined firm are relatively close substitutes, with high diversion ratios.

Overall effect was price increase for MillerCoors, also for ABI.

Miller & Weinberg ask if the price changes are consistent with Nash equilibrium outcomes (i.e., solely unilateral effects), or whether there is evidence of coordinated effects.

# Average Retail Prices: 2000-2011

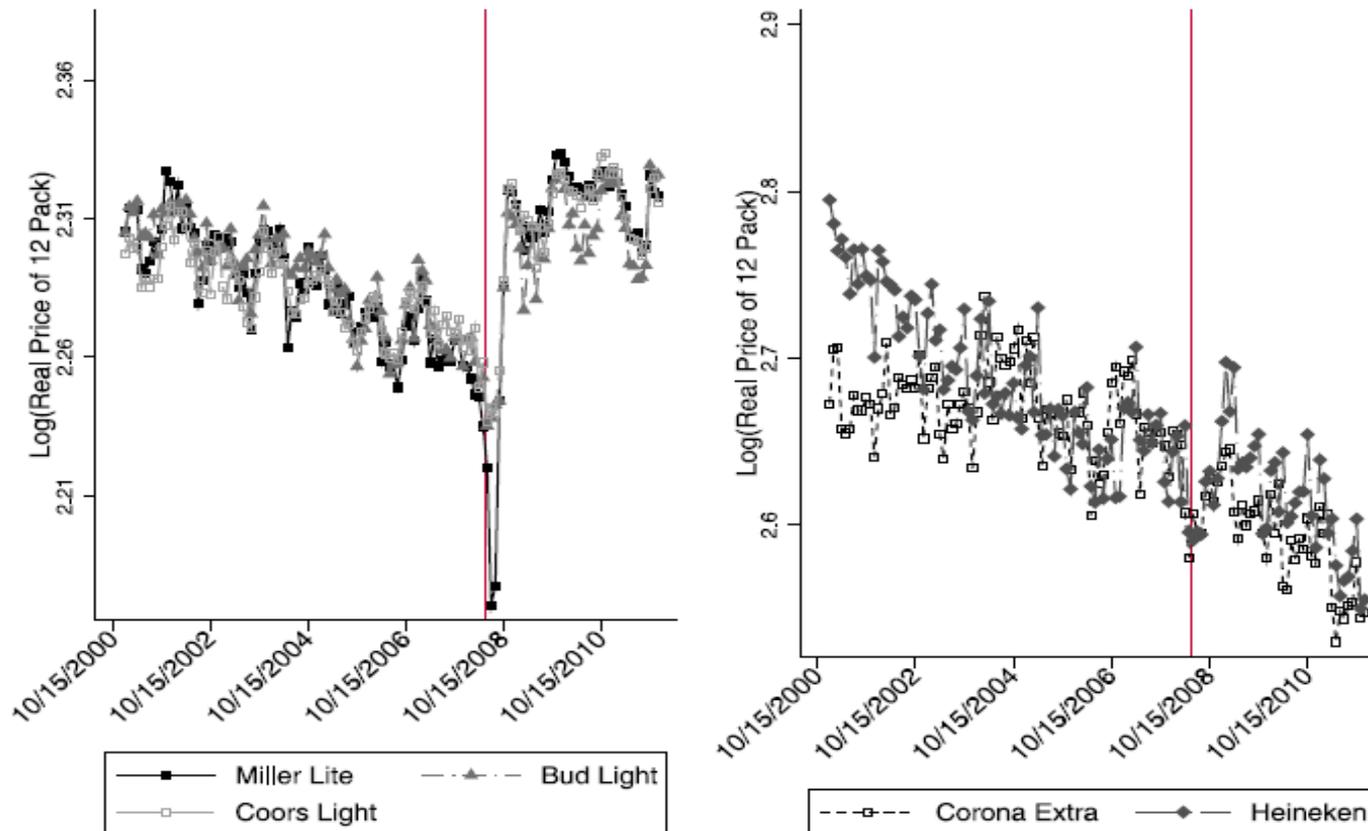


FIGURE 1.—Average retail prices of flagship brand 12 packs. *Notes:* This figure plots the average prices of a 12 pack over 2001–2011, separately for Bud Light, Miller Lite, Coors Light, Corona Extra, and Heineken. The vertical axis is the natural log of the price in real 2010 dollars. The vertical bar drawn at June 2008 signifies the consummation of the Miller–Coors merger.

# Miller & Weinberg Structural Model

First estimate a differentiated products (RCNL) demand system.

Unit of observation: product (brand, size) / city / month

Then estimate supply side model of pricing:

Pre-merger Nash equilibrium in pricing, where multiproduct firms internalize effects on own products.

Marginal cost depends on distance to nearest plant ( $\times$  fuel price).

Post-merger pricing accounts for change in brand ownership patterns, as well as post-merger synergies for MillerCoors (M-C).

Assume post-merger M-C maximizes  $\pi_{M-C} + \kappa \pi_{ABI}$ ; similarly for ABI.

Here  $\kappa$  captures partial internalization, or coordinated effects.

Estimated value of  $\kappa$  is approx. 0.3; M-C marginal cost falls 14%.

Price changes cannot be accounted for by reasonable changes in marginal costs.

ABI marginal costs would have had to increase by 14% under Nash pricing.

# ABI & Modelo

ABI and Modelo merged in 2013.

Under the terms of a settlement with the DoJ, the merged entity divested all of Modelo's business in the US to Constellation Brands (a wine and spirit distributor).

The DoJ complaint raised concerns about both unilateral and coordinated effects.

Miller, Sheu & Weinberg (2019) adapt the Miller & Weinberg structural model to simulate the effects of the proposed ABI-Modelo merger (i.e., without divestiture).

They consider a price leadership model, whereby the leader (ABI) chooses the most profitable collusive price markup that satisfies the IC constraints for ABI and M-C of the repeated pricing game, under a threat of reversion to Nash pricing.

They find that the merger relaxes the IC constraints and so increases the equilibrium markup.

Moreover, merger efficiencies may amplify the coordinated effect, by making the firms more symmetric.

# American Airlines & US Airways

Disclaimer: I advised the DoJ on this matter. My views do not necessarily reflect those of the DoJ.

Merger consummated in 2014, after some divestiture of landing slots and gates in markets where unilateral effects were a concern.

In addition to unilateral market power concerns, DoJ complaint also raised concerns over coordinated effects.

Unusual features of airlines:

1. Firms can monitor rival prices almost continuously, and seat availability quickly.
2. Multi-market contact, with well defined spheres of influence associated with hub operations.

Tacit coordination enforced by “cross-market initiatives.”

Merger resulted in three relatively symmetric legacy carriers (Delta, United, AA); American and US Air had differed from others.

# Implications of Transparency

Rivals have opportunity to match any price change quickly.

Published fare changes monitored via ATPCO.

Repeatedly see dynamics of firms trying price (and ancillary fee) changes, many of them withdrawn if not matched.

Equilibrium of “parallel pricing” game in isolated market is lowest of carriers’ preferred prices.

A merger that results in more symmetric carriers also results in higher prices, absent cost synergies.

DoJ complaint discusses implications for baggage fees, change fees, etc., but main focus was on “Advantage Fares.”

# Advantage Fares

Offered in markets with US Air connect service (through a US Air hub; typically, Charlotte or Phoenix).

Walk-up connect fares (within 14 days of departure) priced at approximately 40% of rival non-stop fare.

Not offered when there is US Air non-stop service, nor if US connect service is too circuitous.

Other legacy carriers offered reciprocal connect discounts in US non-stop markets, and Southwest markets, but not on their own non-stop markets, nor when other legacies had non-stop service (they “respected” each others’ territories).

# Examples of Advantage Fares

Miami/Cincinnati round trip, 13-14 August 2013, fares on 12 August

All flights	US Airways, Inc.	Multiple Airlines	American Airlines Inc.	United Airlines, Inc.	Delta Air Lines Inc.
Nonstop	--	--	From \$740	--	--
1 stop	From <b>\$471</b>	From \$686	From \$751	From \$762	From \$762

New York/Houston round trip, 13-14 August 2013, fares on 12 August

All flights	US Airways, Inc.	Jetblue Airways Corporation	AirTran Airways, Inc.	Multiple Airlines	United Airlines, Inc.	Delta Air Lines Inc.	American Airlines Inc.
Nonstop	--	From \$907	--	--	From \$1,445	From \$1,457	From \$1,477
1 stop	From <b>\$575</b>	From \$1,618	From \$909	From \$1,006	From \$1,331	From \$1,467	From \$1,467

# Reciprocity

Charlotte/Syracuse round trip, 13-14 August 2013, fares on 12 August

All flights	Delta Air Lines Inc. 	United Airlines, Inc. 	Multiple Airlines 	US Airways, Inc. 	Jetblue Airways Corporation 	American Airlines Inc. 
Nonstop	--	--	--	From \$685	--	--
1 stop	From <b>\$375</b>	From \$395	From \$458	From \$696	From \$691	From \$1,258

# Effect of Merger on Advantage Fares

DoJ argued that merged carrier would discontinue the Advantage Fare program on Delta and United non-stops.

Benefits of program (relative to standalone US Airways):

Undercut only on Delta and United non-stops:

- Lose revenues from under-cutting American non-stops, as don't undercut self.

- Gain if American connect service is better than US connect.

Lose on American non-stop passengers from reciprocal rival connect fare discounts.

Traffic originating from American hubs is much larger (esp. DFW, ORD) than that from US Air hubs (CLT, PHL, PHX).

# Coordinated Effects and the Merger

Pre-merger, American and US Air were distinctive.

American reorganized under bankruptcy with lower costs and debt, had fleet expansion plans.

US Air, with its relatively small hub cities, competed aggressively with connect service.

US Air also had lower labor costs, but the merged carrier would not (US Air employees to be paid on higher American scale).

Merged carrier more closely resembles United and Delta, with more points of contact, and is more vulnerable to cross-market initiatives.

It competes on an “equal footing,” with well-defined spheres of influence.

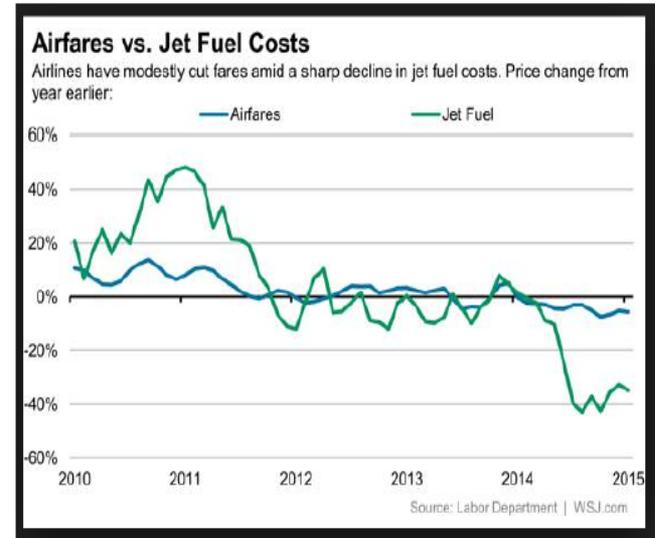
# Merger Aftermath

DCA and LGA slots divested to LCCs. Remedies did not address coordinated effects concerns.

In year after merger, fuel costs fell sharply, but average fares only fell slightly.

Ancillary fees have increased.

Allegations of capacity discipline, whereby public statements facilitate coordination to limit fleet expansion. See also Aryal, Ciliberto & Leyden (2019).



# Tronox & Cristal

Proposed merger in titanium dioxide ( $\text{TiO}_2$ , industrial chemical used as pigment), reviewed by FTC and by European Commission.

Both considered potential coordinated effects.

FTC blocked acquisition, in large part on these grounds.

North American market more concentrated; merger would result in chloride  $\text{TiO}_2$  HHI exceeding 3,000, increase of more than 700.

Tronox and Chemours would be similar size, with combined market share of nearly 75%.

In prior civil price fixing suit, firms paid “a significant settlement.”

In European market, merger of 3<sup>rd</sup> and 5<sup>th</sup> largest firms.

Four remaining large firms asymmetric, e.g., in costs and capacity.

Commission concluded there was not evidence of a “clear focal point.”

# ***Ex Post Review***

DoJ has sought divestiture in several recent cases following a merger. E.g., *US v. Bazaarvoice* (2014), *US v. Parker Hannifin* (2018).

In both these cases, claim that merged entity was a dominant firm.

*Ex post* divestiture requested in *Steves & Sons v. Jeld-Wen* (ongoing).

Market for doorskins, primary input of molded interior doors.

2001 DoJ review of Premdor acquisition of Masonite business of IPC considered potential for coordinated effects in this market, forced divestiture in attempt to maintain competition.

Subsequent acquisition of divested business by J-W in 2012.

Private litigation requesting divestiture, DoJ filed supporting statement.

But see *FTC v. Evanston Northwestern Healthcare* (2008).

*Ex post* divestiture proposed, but rejected on appeal as “too costly and potentially risky,” instead imposed a conduct remedy.

# Summary

Coordinated effects remain an important concern in merger review.

Coordinated effects do not lend themselves to a standardized merger review procedure, unlike unilateral effects, and they can be distinct.

Individual circumstances suggest lines of inquiry, however.

Concern if merger expands set of feasible equilibria, and/or increases participants' likelihood of coming to a more profitable agreement.

In many of the cases mentioned above, tacit collusion involved a subset of the firms, often (but not always) the larger ones.

Participation (IR) constraints matter, and mergers affect them as well. See, e.g., Loertcher & Marx (2019).

In contrast to explicit cartels, tacit conspiracies are less bound by leniency concerns, and so participation can be more fluid.