Unit 9. H&R Block/TaxACT

Part 2. Anticompetitive Effect in Horizontal Mergers

a. *PNB* presumption
b. Coordinated effects
c. Elimination of a “maverick”
d. Unilateral effects
e. Dominant firms with a competitive fringe

Professor Dale Collins
Merger Antitrust Law
Georgetown University Law Center

October 20, 2022

Refresher:
Anticompetitive Effect under Section 7

Section 7 of the Clayton Act

- Section 7 supplies the antitrust standard to test acquisitions:

> No person engaged in commerce or in any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no person subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another person engaged also in commerce or in any activity affecting commerce, where in any line of commerce or in any activity affecting commerce in any section of the country, *the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.*[1]

- Test of anticompetitive effect under Section 7
  - Whether "the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly" in any relevant market
  - *Incipiency standard*: The Supreme Court has interpreted the "may be" and "tend to" language in the anticompetitive effects test to:
    - Require proof only of a reasonable probability that the proscribed anticompetitive effect will occur as a result of the challenged acquisition
    - Does *not* require proof that an actual anticompetitive effect will occur

[1] 15 U.S.C. § 18.

"May be to substantially lessen competition"

- No operational content in the statutory language itself
  - What does it mean to "substantially lessen competition"?
  - Judicial interpretation has varied enormously over the years
- *Modern view*:[1] Transaction threatens—with a reasonable probability—to hurt some identifiable set of customers through:
  - Increased prices
  - Reduced market output
  - Reduced product or service quality
  - Reduced rate of technological innovation or product improvement
  - (Maybe) reduced product diversity[2]

These are called *anticompetitive effects*

A firm that has the power to produce or strengthen an anticompetitive effect is said to have *market power*

- Forward-looking analysis
  - Compare the postmerger outcomes with and without the deal
  - Can view potential competitors today as future competitors tomorrow

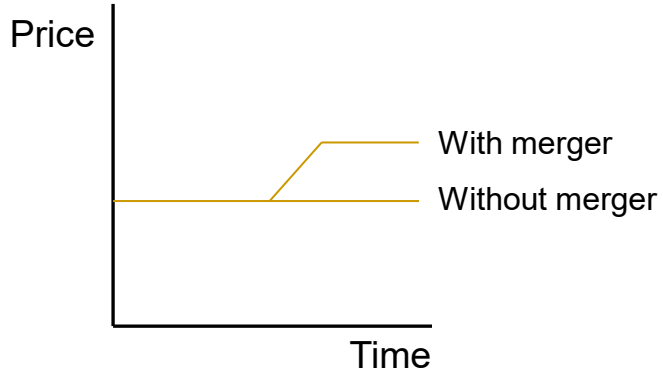
[1] The modern view dates from the late 1980s or early 1990s, after the agencies and the courts had assimilated the 1982 DOJ Merger Guidelines.

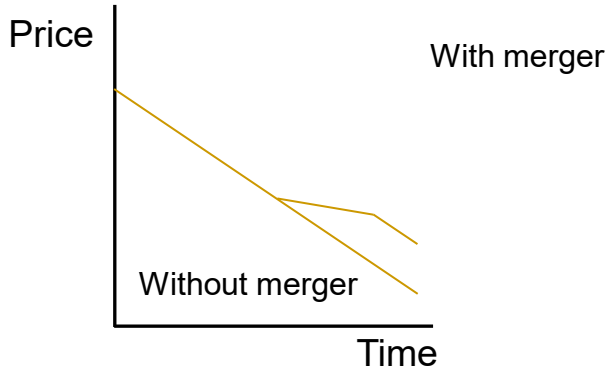
[2] The idea that reduced product diversity may be a cognizable customer harm was formally introduced in the 2010 DOJ/FTC Horizontal Merger Guidelines.

"May be to substantially lessen competition"

- *Key focus*: Price increases
  - Anticompetitive effect occurs whenever prices, *going forward*, likely would be higher with the transaction than without it[1]
    - A decrease in the rate of a price decline is regarded as a price increase, even if price levels continue to decline

Price Increases Resulting from a Merger



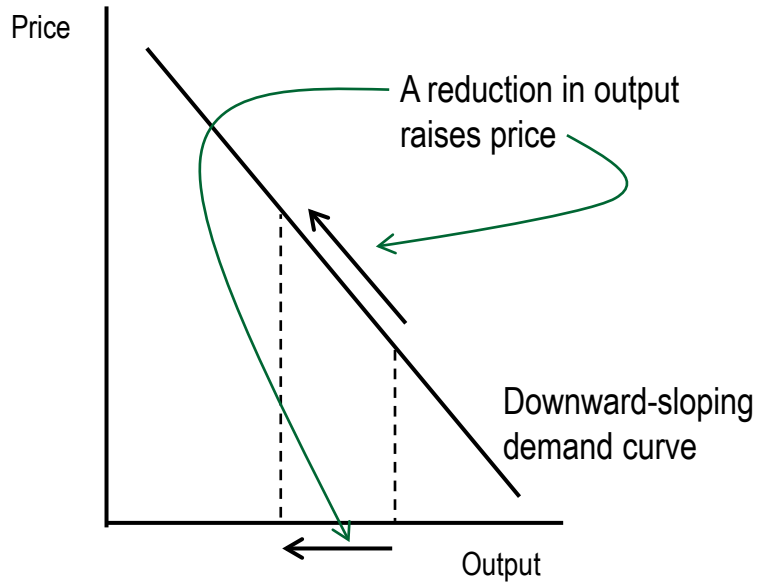


[1] "Likely" in the Section 7 context means "reasonably probable." *See* United States v. E.I. duPont de Nemours & Co., 353 U.S. 586, 589 (1957).

"May be to substantially lessen competition"

- Output reductions
  - The agencies consider a reduction in market output to be effectively a price increase

A Reduction in Output Implies a Price Increase



  - The idea is that when supply becomes limited, the customers who value the product the most bid up the prices

"May be to substantially lessen competition"

- Other dimensions of possible anticompetitive effect
  - Historically, there have not been challenges on other dimensions (quality, rate of technological innovation, or product diversity) when there is no alleged price effect
    - Economic theory is not well-developed in predicting—
      - Consequences of transaction for nonprice market variables
      - Consequences of changes in nonprice market variables for consumer welfare
    - But adverse effect on other dimensions is sometimes mentioned in complaints that also allege an anticompetitive price effect
      - The agencies do this to strengthened the emotive appeal of the complaint and to establish some agency "precedent" for recognizing nonprice anticompetitive harms
  - *Implication*: Agencies will require strong direct evidence to proceed on a theory other than a price increase—Most likely will require:

Direct evidence will be documents or testimony

1. An "admission against interest" by the acquiring company that—
   - The merging companies compete significantly in product quality or innovation,
   - This competition is costly and is materially reducing profits, *and*
   - A benefit of the transaction will be to eliminate this competition and increase profits by saving costs;
2. Evidence that the merging companies vigorously compete in the nonprice dimension and that other companies will not replace the nonprice competition lost due to the merger; *and*
3. Evidence that customers will be significantly harmed by the loss of this nonprice competition
   - Customer harm could be reflected in future increased prices (e.g., as a consequence of reduced competition of reduced cost-reducing innovation)

Theories of anticompetitive harm

- Horizontal transactions
  1. Coordinated effects
     - Merger of significant competitors where customers have few realistic alternatives
     - Anticompetitive effect occurs when the merger facilitates pricing or other harmful tacit coordination ("accommodating conduct") among some or all of the firms in the market
  2. Unilateral effects
     - Merger of uniquely close competitors
       - The 1992 DOJ/FTC Horizontal Merger Guidelines were widely interpreted to require the merging parties to be each other's closest competitors
       - This requirement was dropped in the 2010 revision
     - Anticompetitive effect depends only on the elimination of "local" competition between the merging firms
     - Anticompetitive effect does not depend on changes in the behavior of other firms in the market (i.e., assumes no accommodating conduct)
  3. Elimination of a "maverick" firm
     - A maverick is a firm that is disruptive in the marketplace and tends to drive market prices down, even though it may have a small market share
     - This is a very ill-defined concept and may be entirely dependent on the business strategy of the current management
       - As has a "know it when you see it" quality

The *PNB* Presumption

REVIEW 2010 DOJ/FTC HORIZONTAL MERGER GUIDELINES § 5

The *PNB* presumption

- *Philadelphia National Bank*:

> Specifically, we think that a merger which produces a firm controlling an **undue percentage of the relevant market**, and results in a **significant increase in the concentration** of firms in that market, is so inherently likely to lessen competition substantially that it is must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects.[1]

  - Created in 1963 as the Court was becoming increasingly restrictive on business
    - Next merger antitrust case after *Brown Shoe*
  - Originally created as a *rebuttable* presumption of the requisite anticompetitive effect where the combined firm passed some (undefined) thresholds of—
    1. Combined market share, *and*
    2. Increasing market concentration
  - But quickly became a *conclusive* presumption in the lower courts
    - Essentially eliminated any defense once the prima facie case was proven
  - Returned to a rebuttable presumption by the Supreme Court in *General Dynamics*[2] in 1974

[1] United States v. Philadelphia National Bank, 374 U.S. 321, 363 (1963).
[2] United States v. General Dynamics Corp., 415 U.S. 486 (1974).

The *PNB* presumption

- Two ways to think about the *PNB* presumption
  1. *The historical view*: A presumption grounded in industrial organization economics
     - The citations to the economic literature in *PNB* itself indicate that the majority thought the presumption was grounded in modern industrial organization economics
     - *The idea*: As firms become larger and the market becomes more concentrated, there is an increasing likelihood that the market will exhibit more successful oligopolistic interdependence and higher resulting prices
       - This is sometimes called the *price-concentration hypothesis* or the *profit-concentration hypothesis*
       - This hypothesis was popular among the structure-conduct-performance adherents in the 1950s and 1960s
     - Queries:
       - Is there meaningful support for the price/profit-concentration hypothesis?
       - If so, at what levels of combined share and increased market concentration does oligopolistic interdependence become significantly more successful?
  2. *The modern view*: A burden-shifting device in litigation
     - If the presumption is triggered, the burden of production shifts to the defendants to show that the presumption is not reliable in the circumstances of the case
     - Presumably, the likelihood that the defendants will fail to discharge their burden increases as the case becomes a closer call
     - NB: Since under *Baker Hughes* the plaintiff always bears the burden of persuasion, even with the presumption underinclusive enforcement errors are favored over overinclusive enforcement errors in close cases

The *PNB* presumption

- Bottom line
  - However viewed, the *PNB* presumption remains the point of departure in the litigation of horizontal mergers in the analysis of competitive effects
  - Al courts expect the plaintiffs to use the *PNB* presumption
    - Whether the use of the presumption is legally required has never been litigated
  - Curiously, the thresholds for triggering the *PNB* presumption have not been litigated
    - Since the early 1980s, the DOJ and FTC—regardless of administration—have only brought actions where the alleged combined market shares and market concentration have been very high by any standard
    - However, conventional wisdom holds that the market shares and market concentration shown in *Rome (Alcoa)/Von's/Pabst* are much too low today to trigger the *PNB* presumption even though these cases have never been overruled
    - Of course, the market shares and market concentration depend on the definition of the relevant market, and the agencies have not always been successful in proving their alleged markets to the satisfaction of the courts
      - When the government loses a horizontal merger case, it is almost always on market definition

The 2010 Merger Guidelines

- "HHI thresholds"[1]
  - Not really *PNB* thresholds, but courts tend to use them that way[1]

Postmerger HHI	ΔHHI	Guidelines
--	< 100	"unlikely to have adverse competitive consequences and ordinarily require no further analysis"
< 1500	--	"unlikely to have adverse competitive consequences and ordinarily require no further analysis"
Between 1500 and 2500	≥ 100	"potentially raise significant competitive concerns and often warrant scrutiny"
> 2500	100-200	"potentially raise significant competitive concerns and often warrant scrutiny"
	≥ 200	"will be presumed to be likely to enhance market power. The presumption may be rebutted by persuasive evidence showing that the merger is unlikely to enhance market power."

[1] The "HHI" is a market concentration statistic. To calculate it, take the square of the market share of each firm in the relevant market and square it, and then add up all of the squared market shares. The "ΔHHI" (or just "delta" or "Δ") is the difference between the HHI after the merger and the HHI before the merger.

[2] "The purpose of these thresholds is not to provide a rigid screen to separate competitively benign mergers from anticompetitive ones, although high levels of concentration do raise concerns. Rather, they provide one way to identify some mergers unlikely to raise competitive concerns and some others for which it is particularly important to examine whether other competitive factors confirm, reinforce, or counteract the potentially harmful effects of increased concentration." 2010 Merger Guidelines § 5.3.

The *PNB* presumption

- The *H&R Block* court used the Merger Guidelines thresholds as triggers for the *PNB* presumption

	Premerger Shares	HHI Contribution	
Intuit	62.2%	3869	The square of the firm's market share
HRB	15.6%	243	
TaxACT	12.8%	164	
Others (6)	9.4%	15	Residual share (9.4%) divided by 6 firms and added six times
	100.0%	4291	The sum of the squared shares of all of the firms in the market
Combined share	28.4%		
Premerger HHI		4291	
Delta (Δ)		400	2 × HRB share × TaxACT share
Postmerger HHI		4691	Sum of the premerger HHI + Δ

"Violates" the 2010 Guidelines:
Postmerger HHI exceeds 2500 and delta exceeds 200

Note: The court appears to have assumed that six equal-sized firms are in the "other" category.

The *PNB* presumption

- Measures of market share
  - Differentiated product markets
    - Where products are differentiated in price, the convention is to use *revenue shares*
    - The 2010 Merger Guidelines explain:

> In most contexts, the Agencies measure each firm's market share based on its actual or projected revenues in the relevant market. Revenues in the relevant market tend to be the best measure of attractiveness to customers, since they reflect the real-world ability of firms to surmount all of the obstacles necessary to offer products on terms and conditions that are attractive to customers.[1]

  - Homogenous product markets
    - Unit shares and revenue shares will be the same since all products will have the same price
    - The convention, however, is to use *unit shares*
    - The 2010 Merger Guidelines explain:

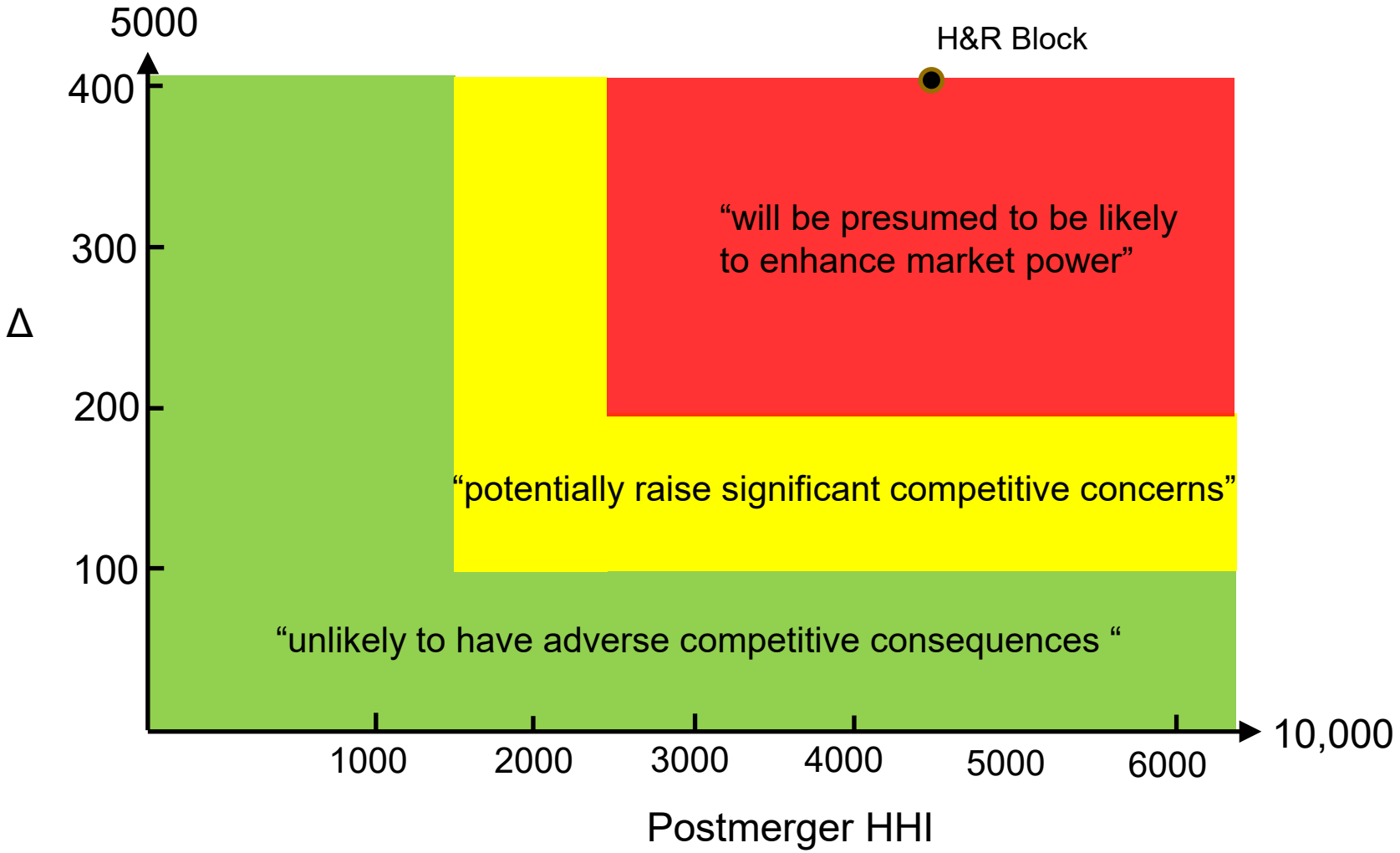
> In markets for homogeneous products, a firm's competitive significance may derive principally from its ability and incentive to rapidly expand production in the relevant market in response to a price increase or output reduction by others in that market. As a result, a firm's competitive significance may depend upon its level of readily available capacity to serve the relevant market if that capacity is efficient enough to make such expansion profitable. In such markets, capacities or reserves may better reflect the future competitive significance of suppliers than revenues, and the Agencies may calculate market shares using those measures.[2]

[1] 2010 Merger Guidelines § 5.2.

[2] *Id*.

The *PNB* presumption

- The current thresholds: 2010 Merger Guidelines



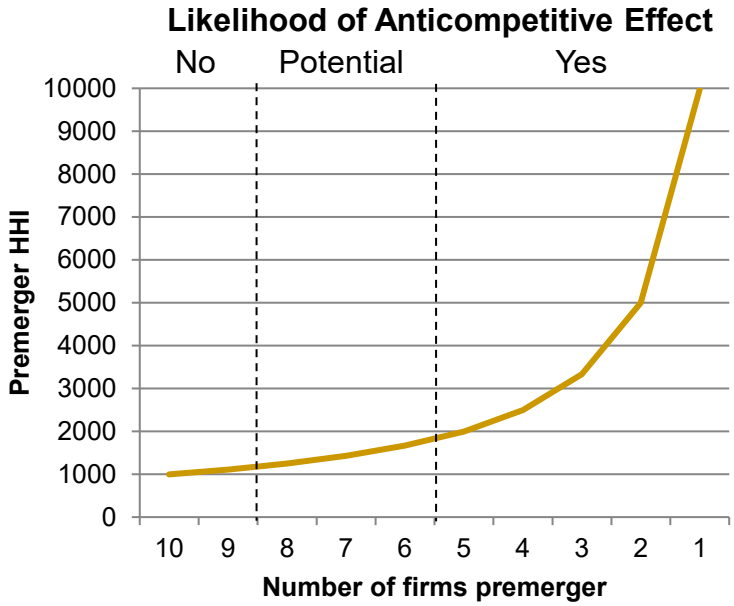
The 2010 Merger Guidelines

- Math notes
  - Calculation of the HHI with *n* firms in the market, with firm *i* having a market share of s_i:

$$HHI = \sum_{i=1}^{n} s_i^2$$

  - Shares and HHIs in symmetrical markets with *n* identical firms

	Premerger			Postmerger	Exceeds
n	***S*** $_i$	**HHI**	**Delta**	**HHI**	**2010 Guidelines**
10	10.0	1000	200	1200	No
9	11.1	1111	247	1358	No
8	12.5	1250	313	1563	Potential
7	14.3	1429	408	1837	Potential
6	16.7	1667	556	2222	Potential
5	20.0	2000	800	2800	Yes
4	25.0	2500	1250	3750	Yes
3	33.3	3333	2222	5556	Yes
2	50.0	5000	5000	10000	Yes
1	100.0	10000			



The 2010 Merger Guidelines

- Observations
  - *Calculating the delta*: Let *a* and *b* be the market shares of the merging companies.

    Premerger contribution to the HHI: $a^2 + b^2$

    Postmerger contribution to the HHI: $(a+b)^2 = a^2 + 2ab + b^2$

    Difference (= HHI delta): $2ab$

  - *Dealing with the "other firms" category*: Market share lists often contain an "other firms" category with an aggregate share for these firms. In TaxACT, for example, "others" had an aggregate share of 9.4%. If the number of other firms is two or greater, simply squaring this number in the HHI calculation will overstate the HHI. To get a better estimate of the contribution of the other firms to the HHI, analysts typically assume that there *n* equally sized firms that account collectively for a share *s*. The contribution of the other firms to the HHI is then:

    Share of each "other" firm: $\frac{s}{n}$ Each "other" firm's HHI contribution: $\left(\frac{s}{n}\right)^2$

    Total HHI contribution of all *n* firms: $n\left(\frac{s}{n}\right)^2 = \frac{s^2}{n}$

    In *H&R Block*, the court appeared to assume six equally sized firms. So the contribution to the HHI from the other firms was $\frac{9.4^2}{6} = 14.7.$

HHIs in Successful DOJ/FTC Challenges

- The DOJ and FTC have not brought "close" cases in alleged markets

Agency	Complaint	Defendant	Combined share[1]	PreHHI	PostHHI	Delta	Deal Status
FTC	2020	Hackensack	≈50	1994	2835	841	Preclosing
FTC	2020	Peabody Energy	68	2707	4965	2258	Preclosing
FTC	2018	Wilhelmsen	84.7	3651	7214	3563	Preclosing
FTC	2017	Sanford Health	98.6[2]	5333	9726	4393	Preclosing
DOJ	2017	Energy Solutions	100	6040	10000	3960	Preclosing
DOJ	2016	Anthem	47	2463	3000	537	Preclosing
DOJ	2016	Aetna			>5000[3]		Preclosing
FTC	2016	Penn State Hershey	64	3402	5984	2582	Preclosing
FTC	2015	Advocate Heath	55	2094	3517	1423	Preclosing
FTC	2015	Staples	75[4]	3036	5836	2800	Preclosing
FTC	2015	Sysco	71[5]	3153	5519	1966	Preclosing

[1] When the complaint alleged multiple markets, the market with the most problematic highest HHIs is reported.
[2] Pediatricians market. The FTC alleged three other physician markets. The lowest problematic delta was in OB/GYN with a premerger HHI of 6211, a postmerger HHI of 7363, and a delta of 1152.
[3] The DOJ challenged Aetna's proposed acquisition of Humana in 17 geographic markets. The complaint did not provide HHI statistics for each market, although it noted that in 75% of the markets, the post-HHI would be greater than 5000.
[4] The FTC also challenged the transaction in 32 alleged relevant local geographic markets, with the smallest combined share being 51% and the largest being 100%.
[4] The complaint alleged multiple markets in food distribution. The numbers given are for national broadline distribution.

HHIs in Successful DOJ/FTC Challenges

- The DOJ and FTC have not brought "close" cases in alleged markets

Agency	Complaint	Defendant	Combined Share[1]	PreHHI	PostHHI	Delta	Deal Status
DOJ	2015	Electrolux		3350[2]	5100	1750	Preclosing
DOJ	2013	Bazaarvoice	68	2674	3915	1241	Consummated
FTC	2013	Saint Alphonsus	57	4612	6129	1607	Consummated
DOJ	2013	US Airways	100[3]	5258	10000	4752	Preclosing
DOJ	2013	ABInbev	100	5114	10000	4886	Preclosing
FTC	2011	OSF Healthcare	59	3422	5179	1767	Preclosing
FTC	2011	ProMedica	58	3313	4391	1078	Preclosing
DOJ	2011	H&R Block	28	4291	4691	400	Preclosing
FTC	2009	CCC	65	4900	5460	545	Preclosing
FTC	2008	Polypore	100	8367	10000	1633	Consummated
FTC	2007	Whole Foods	100[4]		10000		Preclosing
FTC	2004	Evanston	35	2355	2739	384	Consummated
DOJ	2003	UPM-Kemmene	20	2800	2990	190	Preclosing

[1] When the complaint alleged multiple markets, the market with the most problematic highest HHIs is reported.
[2] The complaint alleged three markets. The numbers given are for ranges. Cooktops and wall ovens were similar
[3] The complaint alleged 1043 markets.
[4] In some local geographic markets, this was a merger to monopoly in the FTC's alleged product market of premium, natural, and organic supermarkets.

HHIs in Successful DOJ/FTC Challenges

- The DOJ and FTC have not brought "close" cases in alleged markets

Agency	Complaint	Defendant	Combined Share[1]	PreHHI	PostHHI	Delta	Deal Status
FTC	2002	Libbey	79	5251	6241	990	Preclosing
FTC	2001	Chicago Bridge	73	3210	5845	2635	Consummated
FTC	2000	Heinz	33	4775	5285	510	Preclosing
FTC	2000	Swedish Match	60	3219	4733	1514	Preclosing
DOJ	2000	Franklin Electric	100	5200	10000	4800	Preclosing

[1] When the complaint alleged multiple markets, the market with the most problematic highest HHIs is reported.

Example: Albertsons/Safeway

- Challenged markets with the highest Δs (130 markets)

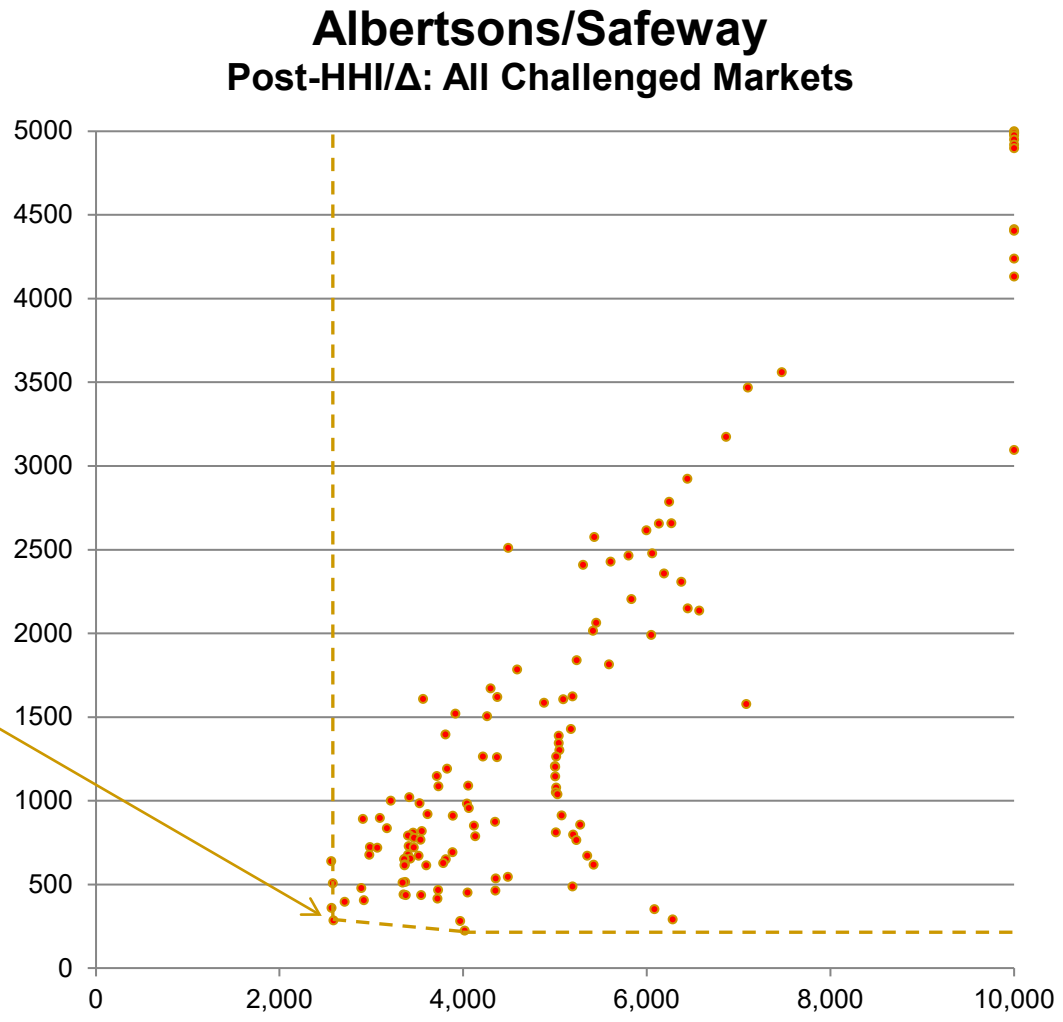
Area Number (See Para. 16 of Complaint)	City	State	Merger Result	HHI (pre)	HHI (post)	Delta
72	Deer Lodge	MT	2 to 1	5000	10,000	5000
83	Happy Valley/ Clackamas	OR	2 to 1	5006	10,000	4994
19	Carpinteria	CA	2 to 1	5012	10,000	4988
78	Ashland	OR	2 to 1	5013	10,000	4987
22	Coronado Island	CA	2 to 1	5025	10,000	4975
74	Boulder City	NV	2 to 1	5051	10,000	4949
29	Ladera Ranch	CA	2 to 1	5081	10,000	4919
79	Baker County	OR	2 to 1	5102	10,000	4898
53	San Diego, CA (Tierrasanta)	CA	2 to 1	5586	10,000	4414
122	Snohomish	WA	2 to 1	5595	10,000	4405
119	Sammamish	WA	2 to 1	5761	10,000	4239
26	Imperial Beach	CA	2 to 1	5869	10,000	4131
58	Santa Barbara/ Goleta	CA	3 to 2	3909	7469	3560
62	Simi Valley	CA	5 to 4	3633	7101	3468
11	Arroyo Grande/ Grover Beach	CA	3 to 2	3690	6864	3174

Example: Albertsons/Safeway

- Challenged markets with the lowest Δs (130 markets)

Area Number (See Para. 16 of Complaint)	City	State	Merger Result	HHI (pre)	HHI (post)	Delta
32	Lakewood	CA	6 to 5	2073	2581	508
71	Butte	MT	3 to 2	4701	5189	488
93	Dallas (Far North)	TX	5 to 4	2413	2891	478
123	Tacoma (Eastside)	WA	4 to 3	3260	3727	467
106	Lake Forest Park	WA	5 to 4	3889	4352	463
21	Chino Hills	CA	4 to 3	3596	4047	451
111	Monroe	WA	4 to 3	2911	3352	441
44	Oxnard	CA	4 to 3	2939	3375	436
98	Plano	TX	4 to 3	3105	3541	436
117	Renton (East Hill- Meridian)	WA	4 to 3	3304	3719	415
85	Klamath Falls	OR	5 to 4	2511	2917	406
104	Federal Way	WA	5 to 4	2312	2709	397
113	Olympia (East)	WA	6 to 5	2205	2566	361
87	Milwaukie	OR	3 to 2	5729	6082	353
55	San Marcos	CA	3 to 2	5991	6282	291
103	Everett	WA	5 to 4	2301	2586	285
65	Tujunga	CA	3 to 2	3688	3969	281
120	Shoreline	WA	4 to 3	3792	4017	225

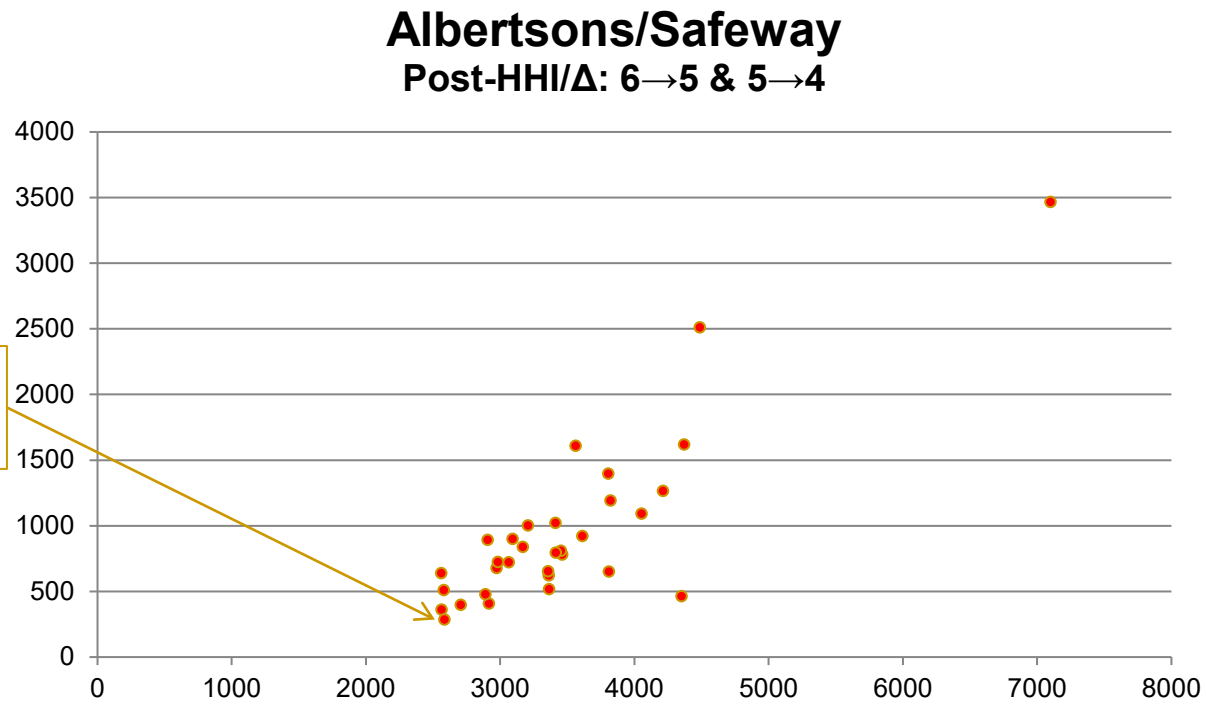
Example: Albertsons/Safeway



Post-HHI: 2586
Δ: 285

6 to 5	5
5 to 4	27
4 to 3	43
3 to 2	42
2 to 1	13
	130

Example: Albertsons/Safeway



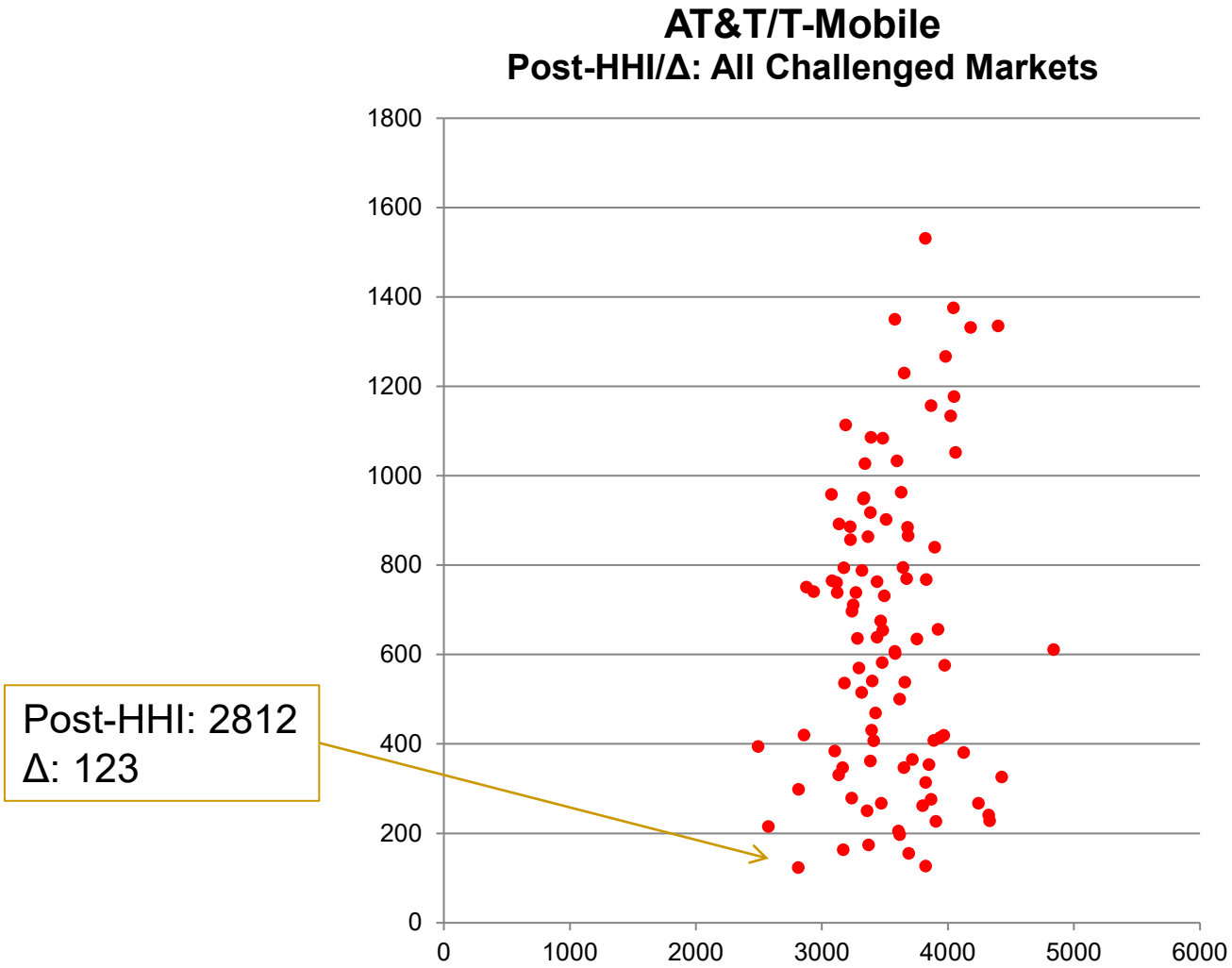
Post-HHI: 2586
Δ: 285

Example: AT&T/T-Mobile

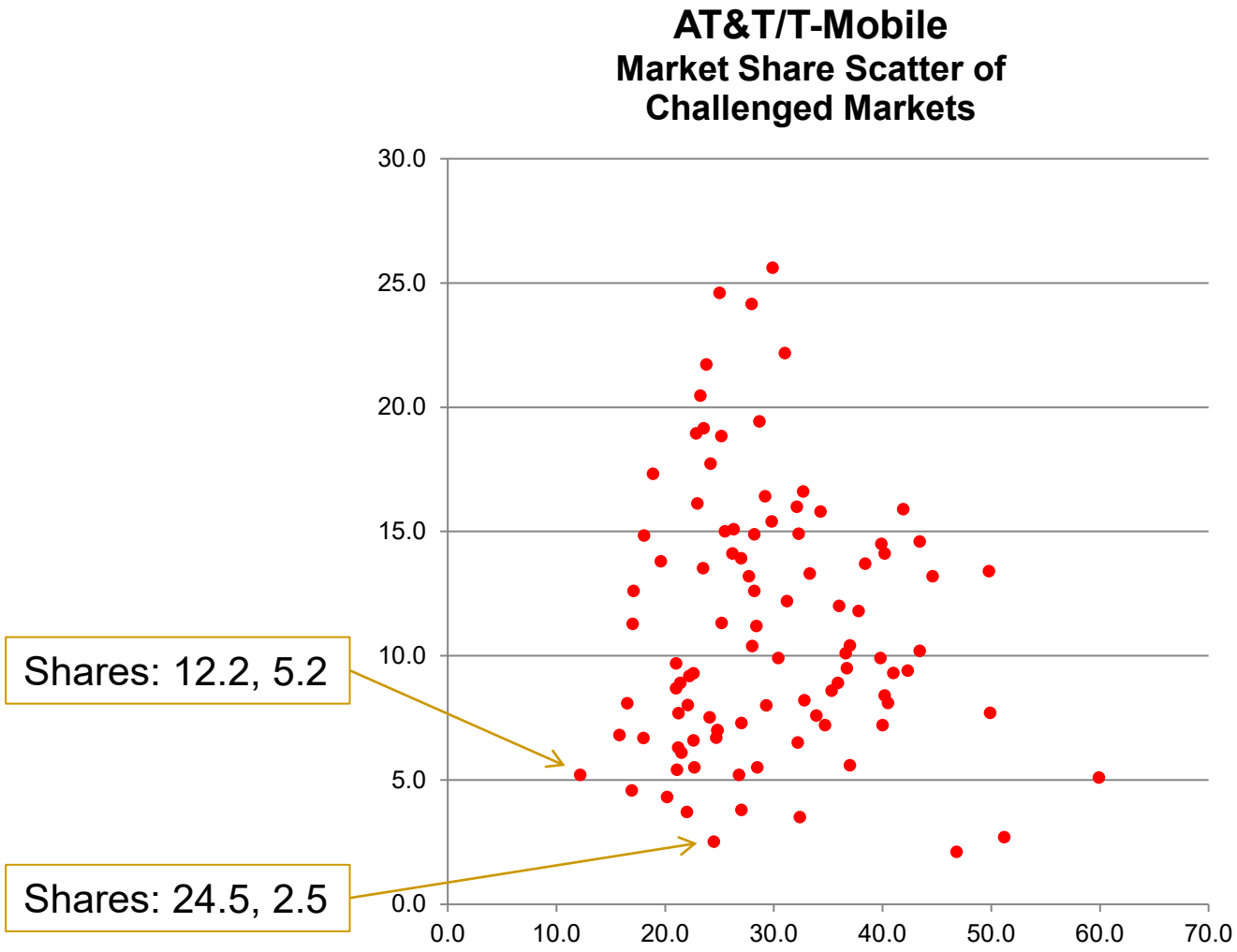
- Challenged markets with the lowest Δs (100 markets)

CMA Number and Name	Post-merger share	Post-HHI	Increase in HHI	Share 1	Share 2
079-Knoxville, TN	27.0%	2812	123	24.5	2.5
048-Toledo, OH-MI	17.4%	3822	127	12.2	5.2
078-Lansing-East Lansing, MI	21.5%	3689	155	16.9	4.6
068-Flint, MI	25.7%	3168	163	22.0	3.7
064-Grand Rapids, MI	24.5%	3370	174	20.2	4.3
100-Shreveport, LA	48.9%	3618	197	46.8	2.1
044-Albany-Schenectady-Troy, NY	30.8%	3607	205	27.0	3.8
023-Cincinnati, OH-KY-IN	22.6%	2575	215	15.8	6.8
053-Syracuse, NY	35.9%	3905	227	32.4	3.5
034-Rochester, NY	26.5%	4330	228	21.1	5.4
085-Johnson City-Kingsport-Bristol, TN-VA	24.7%	4323	241	18.0	6.7
047-Greensboro-Winston-Salem-High Point, NC	28.2%	3358	250	22.7	5.5
088-Chattanooga, TN-GA	27.6%	3799	262	21.5	6.1
087-Canton, OH	27.5%	4242	267	21.2	6.3
059-Richmond, VA	24.6%	3472	267	16.5	8.1
092-Little Rock-North Little Rock, AR	53.9%	3867	276	51.2	2.7
071-Raleigh-Durham, NC	32.0%	3236	279	26.8	5.2
040-Dayton, OH	29.2%	2814	298	22.6	6.6

Example: AT&T/T-Mobile



Example: AT&T/T-Mobile



Market participants[1]

- The general idea
  - Under the Merger Guidelines, only demand-side substitutability counts in market definition
  - BUT who participates in the market—and their associated market shares—does take supply-side substitutability into account

Note: Historical precedent allows courts to take supply-side substitutability into account when defining markets

[1] *See* 2010 Merger Guidelines § 5.1.

Identifying market participants

- Two types of market participants under the Merger Guidelines
  1. Current sellers: All firms that currently earn revenues in the relevant market
  2. Nonsellers ("rapid entrants"):
     a. Vertically integrated firms to the extent that they would divert production from captive use to merchant sales in response to a SSNIP
     b. Firms not currently earning revenues in the relevant market but will enter the market with near certainty in the very near future
     c. Firms that are not current producers in a relevant market but would very likely provide a rapid supply response to a SSNIP

Identifying market participants

- Nonseller "rapid entrants"
  - The 2010 Merger Guidelines limit "rapid entrants" to those firms whose entry do not require significant sunk costs
    - The 1992 Guidelines called these firms "uncommitted entrants"[1]
  - *Example*:

> Farm A grows tomatoes halfway between Cities X and Y. Currently, it ships its tomatoes to City X because prices there are two percent higher. Previously it has varied the destination of its shipments in response to small price variations. Farm A would likely be a rapid entrant participant in a market for tomatoes in City Y.[2]

  - NB: Entry that would take place more slowly in response to adverse competitive effects, or that requires firms to incur significant sunk costs, is considered in the entry defense analysis, not as market participation

[1] *See* 1992 Merger Guidelines § 1.32.

[2] 2010 Merger Guidelines § 5.1 (example 16).

Market share attribution[1]

1. Current sellers
   - Normally based on recent historical level of sales
     - Homogeneous products are usually measured in units
       - Reflects Cournot competition, where production levels are the firm's control variable
       - In a homogeneous market with a single price for all products, market share is the same whether measured in production units or revenues
       - Where production can be increased quickly, capacity is often the better measure of market share
         - BUT do not include capacity that is committed or so profitably employed outside the relevant market, or so high-cost, that it would not likely be used to respond to a SSNIP in the relevant market
     - Differentiated products are usually measured in revenues
       - Reflects Bertrand competition, where price is the firm's control variable
   - Adjustments
     - The Merger Guidelines envision adjustments to historical measures based on changed conditions when these adjustments can be reliably made
       - *Example*: Firm A, which operates close to full capacity, has just developed a new technology, which will enable it to increase production by 20%.
         - For the HHI analysis, increase Firm A's production by 20% and recalculate the market shares of all firms in the relevant market
       - *Example*: One of Firm B's plants was recently destroyed by a fire, which will reduce the firm's production levels in the future
         - For the HHI analysis, reduce Firm B's production by the amount produced by the destroyed plant (and not shifted to another of B's plants with excess capacity) and recalculate the market shares of all firms in the relevant market

[1] *See* 2010 Merger Guidelines § 5.2.

Market share attribution

2. Nonsellers ("rapid entrants")
   - The Merger Guidelines
     - 2010 Merger Guidelines
       - Do not state how market shares are to be quantified for prospective sellers, whether committed or rapid entrants, other than to note that they will be assigned shares "only if a measure of their competitive significance properly comparable to that of current producers is available"[1]
     - 1992 Merger Guidelines
       - Assign market share to the extent of their potential supply response to the hypothetical price increase (SSNIP)
   - The practice
     - The burden of showing that a firm is a "rapid entrant" and establishing its market share is on the merging parties
     - In an investigation, the parties will have to identify *by name* any putative rapid entrants
       - These companies will be vigorously questioned by the investigating staff on their ability and incentive to enter the relevant market and the levels and timing of any entry
       - Third-party companies are frequently hesitant to speculate on what strategies they might pursue
       - In other situations, the firm's managers may not wish to answer hypothetical questions and therefore may say that they do not know what the firm would do
     - Reliability of market share estimates
       - In almost all cases, the lack of data would make these share estimates wildly speculative
       - Moreover, with the modern deemphasis in agency investigations on quantitative market share measures in assessing competitive effects and new emphasis on the number of meaningful competitors, the lack of a reliable means of estimating shares for prospective sellers does not really matter

[1] *See* 2010 Merger Guidelines § 5.2.

Coordinated Effects

REVIEW 2010 DOJ/FTC HORIZONTAL MERGER GUIDELINES § 7

Introduction

- Definition
  - Coordinated effects (or coordinated interaction) is a theory of anticompetitive harm that depends on the merger making oligopolistic interdependence more effective:

> Merger law "rests upon the theory that, where rivals are few, firms will be able to coordinate their behavior, either by overt collusion or implicit understanding in order to restrict output and achieve profits above competitive levels."[1]

    - The idea is that oligopolistic behavior becomes stronger and more effective the more firms in the market *accommodate* each other
      - That is, the more the firms are willing to pull their short-term competitive punches against each other, say by not undercutting a competitor's price in order to win market share or not invading a competitor's territory to win its customers
      - The better way to think about this is that firms, recognizing their interdependence in a multi-period game and their ability to earn higher profits in the long run, elect unilaterally to forego increasing their short-run profits by simply not competing as aggressively with one another as they might otherwise

[1] FTC v. CCC Holdings Inc., 605 F. Supp. 2d 26, 60 (D.D.C. 2009); *accord* United States v. H&R Block, Inc., 833 F. Supp. 2d 36, 77 (D.D.C. 2011).

Introduction

- What can firms do if the merged firm seeks to increase price?
  1. "Do nothing"—Just continue doing what they were doing
  2. Compete more aggressively/expand production/maybe even lower price to gain market share
  3. "Accommodate" the price increase
     - Need not match it
  - Key question:

    Will the merger increase the probability of effective coordinated interaction/ accommodating conduct among some or all of the firms in the market, thereby facilitating the exercise of market power to the harm of consumers?

    - Must find a causal relationship between the merger and the increased probability of coordination

[1] FTC v. CCC Holdings Inc., 605 F. Supp. 2d 26, 60 (D.D.C. 2009); *accord* United States v. H&R Block, Inc., 833 F. Supp. 2d 36, 77 (D.D.C. 2011).

Introduction

- Application in horizontal merger analysis
  - Three stages of development: Overview
    1. The *PNB* presumption and the structure-conduct-performance paradigm
       - Relied on the structure-conduct-performance paradigm in industrial organization economics for support
         - Foundation proposition: Increasing firm size and market concentration results in more effective oligopolistic interdependence and poorer market performance (i.e., more market power being exercised)
         - This is sometimes called the *price-concentration hypothesis* or *the profit-concentration hypothesis*
       - Assumed that the price-concentration relationship was invariant across industries ("one size fits all")
       - *Principal question*: What are the right thresholds to trigger the presumption?
       - Adopted implicitly in the 1968 and 1982 DOJ Merger Guidelines

Introduction

- Application in horizontal merger analysis
  - Three stages of development: Overview
    2. The 1992 Guidelines refinements
       - Recognized that the relationship between market performance and structure varies widely across industries
         - There exist highly competitive markets with only a few firms (e.g., Coke and Pepsi)
       - Sought to reduce overinclusiveness errors by requiring a showing that—
         - Certain market share and concentration thresholds were passed (i.e., creating "safe harbors" for transactions that did not pass these thresholds), *and*
         - Certain conditions in the market are present that result in the merger making the market more conducive to oligopolistic interdependence
         - The "Stigler conditions" for (tacit) coordination were satisfied in the relevant market: Market conditions must be—
           a. Conducive to firms (tacitly) reaching terms of coordination that are individually profitable to the firms involved
           b. Conducive to detecting deviations from the tacit terms of coordination
           c. Conducive to firms punishing deviations from the tacit terms of coordination[1]

[1] Slides later in this deck will develop the Stigler conditions in greater detail.

Introduction

- Application in horizontal merger analysis
  - Three stages of development: Overview
    3. The 2010 Guidelines refinements
       - The "punishment" part of the Stigler conditions was difficult for agencies to explain
         - Courts were looking for some sort of punitive enforcement mechanism
         - But all that is required is the firms return to competition upon the detection of deviations, and so "punish" defectors by eliminating their future gains if other firms in the market continue to cooperate
           - The general idea of punishment is for the nondefecting firms to engage in below-cooperative pricing for a period long enough after the defection to deprive the defector of the gains of defection
           - *Fun fact*: In game theory, the extreme version of this is called the *grim reaper strategy*: Once a firm defects from the cartel strategy, all other firms return permanently to competitive pricing
       - *Solution*: Eliminate the Stigler conditions as a strict requirement, but still consider factors that make oligopolistic coordination more or less likely:
         1. The market must be susceptible to tacit coordination
         2. The merger must increase the probability of effective coordinated interaction (accommodating conduct) among some or all of the firms in the market, thereby facilitating the exercise of market power to the harm of consumers
            - Must find a causal relationship between the merger and the increased probability or effectiveness of coordination

Structure-conduct-performance hypothesis

- The idea
  - Posits a stable causal relationship between the structure of an industry, firm conduct, and market performance
  - Fundamental proposition: Increasing firm size and market concentration results in more effective oligopolistic interdependence and poorer market performance (i.e., more market power being exercised)
    - In homogeneous markets, the exercise of market power in the market can be measured by the Lerner index L:

$$L = \frac{p - c}{p}$$

    - When firms face downward-sloping residual demand curves, the Lerner index will be positive even in the absence of any meaningful exercise of market power
    - But the difference in the Lerner index pre- and postmerger still can give an indication of whether the merger is likely to raise prices and hence be anticompetitive
    - That said, there are serious practical difficulties in measuring economic marginal cost (as opposed to accounting incremental costs) that make use of the Lerner index impractical in empirical analysis
    - Instead, courts and enforcement agencies turned instead to looking at changes in market concentration under the structure-conduct-performance hypothesis as an indirect means of assessing the effect of a merger on the likely exercise of market power

Structure-conduct-performance hypothesis

- Three sources of apparent support for the structure-conduct-performance hypothesis
  1. Consistent with intuition
  2. Theoretical models
  3. Empirical studies

Structure-conduct-performance hypothesis

- Theoretical support: A simple Cournot model
  - Notation: Define the firm *i*'s Lerner index to be:

$$L_i = \frac{p - c_i}{p}$$

  - and s_i to be the market share of firm i, ε the own-elasticity of demand of the aggregate demand curve, and p is the market equilibrium price
  - Define the market Lerner index (L) to be the sum of the share-weighted individual firm Lerner indices:

$$L \equiv \sum_{i=1}^{n} L_i s_i .$$

  - In a Cournot model with homogeneous products and where each firm has a constant marginal cost (although the marginal costs may differ among firms), we can show that the market Lerner index is the market HHI divided by the absolute value of market elasticity ε:

$$L \equiv \sum_{i=1}^{n} L_i s_i = \sum_{i=1}^{N} \left(\frac{s_i}{|\varepsilon|} \right) s_i = \sum_{i=1}^{N} \frac{s_i^2}{|\varepsilon|} = \frac{HHI}{|\varepsilon|}$$

Key result*: In a Cournot model, the degree of market power exercised in the market is an increasing function of market concentration as measured by the HHI*

Structure-conduct-performance hypothesis

- Theoretical support: A simple Cournot model
  - Proposition (from prior side):

OPTIONAL PROOF

$$L = \frac{HHI}{|\varepsilon|}$$

    - Proof:
      - Assume that there are n firms producing a homogeneous product. Each firm i maximizes its profit πi by choosing an output level qi:

$$\underset{q_i}{\text{Max}} \ \pi_i = p(Q)q_i - t_i(q_i)$$

      - where p = p(Q) and Q = q1 + q2 +. . . + qn (that is, p is a function of the total quantity Q produced in the market by all n firms), and ti is the total cost function for firm i. The profit-maximizing condition for each firm is marginal revenue equals marginal cost (or equivalently, marginal revenue minus marginal cost equals zero):

$$mr - mc = \overbrace{p + q_i \frac{\partial p}{\partial Q}\frac{\partial Q}{\partial q_i}}^{mr} - \overbrace{\frac{\partial t_i}{\partial q_i}}^{mc} = 0$$

Note: this equals 1

      - Rearranging:

$$p - c_i = -q_i \frac{\partial p}{\partial Q}\frac{\partial Q}{\partial q_i} \text{ where } c_i \equiv \frac{dt_i}{dq} \text{ (marginal cost)}$$

Structure-conduct-performance hypothesis

- Theoretical support: A simple Cournot model
  - Proof (con't)

OPTIONAL PROOF

- Dividing by each term by p and multiplying by Q/Q yields:

$$\frac{p-c_i}{p} = -\frac{q_i}{p}\frac{\partial p}{\partial Q}\frac{\partial Q}{\partial q_i}\frac{Q}{Q} = -\left[\frac{Q}{p}\frac{\partial p}{\partial q_i}\right]\frac{q_i}{Q} = -\left[\frac{Q}{p}\frac{dp}{dQ}\right]\frac{q_i}{Q} \text{ since } \frac{\partial p}{\partial q_i} = \frac{dp}{dQ} \text{ under Cournot}$$

- Recall that market elasticity ε is equal to:

Just rearranging terms

$$\varepsilon \equiv \frac{\frac{dQ}{Q}}{\frac{dp}{p}} = \frac{dQ}{dp}\frac{p}{Q}$$

- So the term in brackets on the previous slide is just 1/ε. Moreover, qi/Q is the market share sj of firm i. So the equation at the top reduces to:

$$\frac{p-c_i}{p} = -\left[\frac{Q}{p}\frac{dp}{dQ}\right]\frac{q_i}{Q} = \frac{1}{-\varepsilon}s_i$$

- The left-hand side of this equation is the firm Lerner index Li. Multiplying all sides by si and adding across all firms yields:

$$L = \sum_{i=1}^{n} L_i s_i = \sum_{i=1}^{n} \frac{p-c_i}{p} s_i = \sum_{i=1}^{N} \left(\frac{s_i}{-\varepsilon}\right) s_i = \frac{1}{-\varepsilon}\sum_{i=1}^{N} s_i^2 = \frac{HHI}{-\varepsilon} = \frac{HHI}{|\varepsilon|}$$

Q.E.D.

Structure-conduct-performance hypothesis

- Theory: A simple Cournot model (con't)—Criticisms
  - This simple model contains some very restrictive assumptions (e.g., homogeneous products, Cournot behavior with a Nash-Cournot equilibrium, constant marginal costs across firms)
  - This model reflects the realities of few, if any, industries
  - Other models produce quite different results
    - For example, a two-firm market of homogeneous products with a Bertrand equilibrium would yield a perfectly competitive equilibrium

Bottom line: Very little support in theoretical models for the structure-conduct performance-hypothesis

Structure-conduct-performance hypothesis

- Empirical studies
  - Typical study
    - Obtain data across many industries and regress a measure of performance (e.g., prices, profits, margins, ROI) against various measures of industry structure (e.g., concentration, barriers to entry)
      - Typical regression equation:

$$m_i = c + \alpha HHI_i + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_N x_N + e_i$$

      where for each industry i, m_i is the industry gross margin, HHI_i is the industry concentration, the x_i's are other variables that may affect industry gross margin (such as some proxy for barriers to entry), and the c, α, and βs are parameters to be estimated, the e_is are error terms.
    - The *profit-concentration hypothesis* says that α is a meaningful positive number
  - Assumptions
    - Industry structure is exogenous (i.e., although structure affects performance. but structure is determined independently of performance)
    - Changes in the structural variables have the same average effect on performance measures in all markets
  - Many studies purported to find a consistent relationship between increasing concentration and higher prices and/or profits

Structure-conduct-performance hypothesis

- Empirical studies—Some criticisms
  - Data problems
    - Interindustry econometric comparisons are unable to capture many of the important differences between industries
    - Performance measures (profit, margins, ROI) may be artifacts of accounting techniques and not reflective of true economic measures
    - Good proxies for barriers to entry and other important variables are hard to find
  - Weak results
    - Weiss' 1974 review of the literature prior to 1970s: Most studies found a positive relationship, but the effect is small (10% increase in 4-FCR resulted in 1.21% increase in price-cost margins)[1]
    - Schmalensee's 1989 review of the literature after Weiss: Cast doubt on the sign and whether the effect is statistically significant[2]
  - Demsetz critique[3]
    - Studies assume that market structure (concentration) is exogenous
    - But largest producers are likely to be superior in producing and marketing their products, which enables these firms to earn above-normal profits

[1] Leonard Weiss, *The Concentration-Profits Relationship and Antitrust*, *in* Industrial Concentration: The New Learning (H. Goldschmid, H.M. Mann & J.F. Weston eds. 1974).
[2] Richard Schmalensee, *Inter-Industry Studies of Structure and Performance*, *in* 2 Handbook of Industrial Organization ch. 16 (Richard Schmalensee & Robert D. Willig eds. 1989).
[3] *See* Harold Demsetz, *Industry Structure, Market Rivalry, and Public Policy*, 16 J.L. & Econ. 1 (1974).

Structure-conduct-performance hypothesis

- Bottom line:
  - Most antitrust economists do not believe that there is a simple, consistent relationship between the level of concentration in a market and its performance
  - Too many other factors to consider

Seriously undermines the PNB *presumption as an economic proposition*

  - *Query*: Are there additional showings that can be added to high combined share and high market concentration that can better tailor the *PNB* presumption to reduce overinclusiveness errors?
    - This is what the 1992 Guidelines attempted to do by requiring both that—
      - The HHI thresholds must be crossed, *and*
      - There must be an *explicit theory* of anticompetitive harm supported by evidence apart from mere reliance on increased concentration in the market

The 1992 refinements

- 1992 DOJ/FTC Merger Guidelines
  - Changed surpassing the market share and HHI thresholds to a *necessary* but not *sufficient* condition for concluding that a horizontal merger is anticompetitive (in the Section 7 sense)
  - Required an explanation (supported with evidence) that the relevant market was conducive to the exercise of market power through oligopolistic interdependence

> Other things being equal, market concentration affects the likelihood that one firm, or a small group of firms, could successfully exercise market power. The smaller the percentage of total supply that a firm controls, the more severely it must restrict its own output in order to produce a given price increase, and the less likely it is that an output restriction will be profitable. If collective action is necessary for the exercise of market power, as the number of firms necessary to control a given percentage of total supply decreases, the difficulties and costs of reaching and enforcing an understanding with respect to the control of that supply might be reduced. However, market share and concentration data provide only the starting point for analyzing the competitive impact of a merger. Before determining whether to challenge a merger, the Agency also will assess the other market factors that pertain to competitive effects, as well as entry, efficiencies and failure.[1]

    - The idea for imposing this requirement is to distinguish between high market share/ high concentration markets that are conducive to coordination interaction and those that are not

[1] U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 2.0 (rev. 1992) (superseded by the 2010 Merger Guidelines).

The 1992 refinements

- The Stigler conditions[1]
  - The 1992 Guidelines required three showings in addition to surpassing the market share and concentration thresholds to make out a case of coordinated interaction: Market conditions must be—
    1. Conducive to firms (tacitly) reaching terms of coordination that are individually profitable to the firms involved
    2. Conducive to firms detecting deviations from the tacit terms of coordination
    3. Conducive to firms punishing deviations from the tacit terms of coordination

> Successful coordinated interaction entails reaching terms of coordination that are profitable to the firms involved and an ability to detect and punish deviations that would undermine the coordinated interaction. Detection and punishment of deviations ensure that coordinating firms will find it more profitable to adhere to the terms of coordination than to pursue short-term profits from deviating, given the costs of reprisal. In this phase of the analysis, the Agency will examine the extent to which post-merger market conditions are conducive to reaching terms of coordination, detecting deviations from those terms, and punishing such deviations. Depending upon the circumstances, the following market factors, among others, may be relevant: the availability of key information concerning market conditions, transactions and individual competitors; the extent of firm and product heterogeneity; pricing or marketing practices typically employed by firms in the market; the characteristics of buyers and sellers; and the characteristics of typical transactions.[2]

[1] George J. Stigler, *A Theory of Oligopoly*, 72 J. Pol. Econ. 44 (1964).
[2] 1992 Merger Guidelines § 2.1.

The 1992 refinements

- The Stigler conditions
  1. Market conditions must be conducive to firms (tacitly) reaching terms of coordination that are individually profitable to the firms involved

> Market conditions may be conducive to or hinder reaching terms of coordination. For example, reaching terms of coordination may be facilitated by product or firm homogeneity and by existing practices among firms, practices not necessarily themselves antitrust violations, such as standardization of pricing or product variables on which firms could compete. Key information about rival firms and the market may also facilitate reaching terms of coordination. Conversely, reaching terms of coordination may be limited or impeded by product heterogeneity or by firms having substantially incomplete information about the conditions and prospects of their rivals' businesses, perhaps because of important differences among their current business operations. In addition, reaching terms of coordination may be limited or impeded by firm heterogeneity, for example, differences in vertical integration or the production of another product that tends to be used together with the relevant product.[1]

[1] 1992 Merger Guidelines at § 2.11.

The 1992 refinements

- The Stigler conditions
  2. Market conditions are conducive to detecting deviations
  3. Market conditions are conducive to punishing deviations

> Where detection and punishment likely would be rapid, incentives to deviate are diminished and coordination is likely to be successful. The detection and punishment of deviations may be facilitated by existing practices among firms, themselves not necessarily antitrust violations, and by the characteristics of typical transactions. For example, if key information about specific transactions or individual price or output levels is available routinely to competitors, it may be difficult for a firm to deviate secretly. If orders for the relevant product are frequent, regular and small relative to the total output of firm in a market, it may be difficult for the firm to deviate in a substantial way without the knowledge of rivals and without the opportunity for rivals to react. If demand or cost fluctuations are relatively infrequent and small, deviations may be relatively easy to deter.
>
> By contrast, where detection or punishment is likely to be slow, incentives to deviate are enhanced and coordinated interaction is unlikely to be successful. If demand or cost fluctuations are relatively frequent and large, deviations may be relatively difficult to distinguish from these other sources of market price fluctuations, and, in consequence, deviations may be relatively difficult to deter.[1]

[1] 1992 Merger Guidelines at § 2.12.

The 1992 refinements

- Reception of the coordinated effects theory under the 1992 Guidelines
  - Courts (and agency staff) found the requirements of the Stigler conditions very demanding and difficult to prove
    - Part of the problem was that the Stigler conditions were created more to explain explicit coordination (price fixing) than tacit coordination in an oligopoly setting
  - In particular, the "punishment" requirement of the Stigler conditions was difficult for agencies to explain or prove
    3. Courts tended to see "punishment" as something more than depriving the defector of financial rewards
       - Economists, but not courts, saw "punishment" as simply depriving the defector of the financial rewards of defection in the short-run and coordinated interaction in the long-run
       - A classic "punishment" mechanism in economics is the "grim reaper" strategy: Once a firm defects from the cartel strategy, all other firms in the collusive group return permanently to competitive pricing
         - The defector receives little short-term benefit if the defection is detected quickly
         - Even if there is a significant lag in detection, the defector is deprived in the long-term of the benefits of a supracompetitive price umbrella even if it decided to return to cooperation in the future
    4. Moreover, it was difficult for plaintiffs to demonstrate instances of the premerger existence or deployment of a punishment mechanism in an allegedly susceptible markets
       - Almost impossible to adduce documents or testimony that suggested firms in the allegedly collusive group thought about, much less deployed, any type of punishment mechanism
    5. Finally, courts, even assuming there was a punishment mechanism, found punishment ineffective when apparent deviations continued—indicating that coordination was not effective

The 1992 refinements

- *Bottom line*: Coordinated effects fell out of favor as a theory of anticompetitive harm
  - In agency prosecutorial decision making under the 1992 guidelines, coordinated interaction quickly ceased to be a meaningful theory in prosecutorial decision-making
    - Rarely addressed in any detail by staff or parties in merger investigations
  - Unilateral effects was an easier theory to explain and prove
    - Since the agencies were challenging only high market share transactions in their alleged markets, a unilateral effects theory would almost always be available in any transaction to which a coordinated effects theory might apply
    - Agencies prefer to tell a unilateral effects story in litigation as long as they can also rely on the *PNB* presumption to satisfy their initial burden under *Baker Hughes*
  - Coordinated effects as a formal theory became central to the litigation only when—
    - the defense is successful in undermining a unilateral effects theory by expanding the market and increasing the number and/or significance of non-merging parties as close competitors to the merging firms (e.g., *Arch Coal*[1] or *Oracle/PeopleSoft*[2]); *or*
    - The court rejected the unilateral effects theory on some other grounds but still wants a story told beyond the *PNB* presumption (e.g., *CCC/Mitchell*[3])

[1] FTC v. Arch Coal, Inc., 329 F. Supp. 2d 109 (D.D.C. 2004), *appeal voluntarily dismissed*, Nos. 04-5291, 04-7120, 2004 WL 2066879 (D.C. Cir. Sept. 15, 2004).
[2] United States v. Oracle Corp., 331 F. Supp. 2d 1098 (N.D. Ca. 2004).
[3] FTC v. CCC Holdings Inc., 605 F. Supp. 2d 26 (D.D.C. 2009).

The 2010 refinements

- Revitalization of coordinated effects
  - The 2010 Merger Guidelines sought to revitalize the coordinated effects theory
  - To do this, the 2010 guidelines softened the language to eliminate the language of the Stigler conditions on detection and punishment and focused more on market characteristics:

> A market typically is more vulnerable to coordinated conduct if each competitively important firm's significant competitive initiatives can be promptly and confidently observed by that firm's rivals. This is more likely to be the case if the terms offered to customers are relatively transparent. Price transparency can be greater for relatively homogeneous products. Even if terms of dealing are not transparent, transparency regarding the identities of the firms serving particular customers can give rise to coordination, e.g., through customer or territorial allocation. Regular monitoring by suppliers of one another's prices or customers can indicate that the terms offered to customers are relatively transparent.
>
> A market typically is more vulnerable to coordinated conduct if a firm's prospective competitive reward from attracting customers away from its rivals will be significantly diminished by likely responses of those rivals. This is more likely to be the case, the stronger and faster are the responses the firm anticipates from its rivals. The firm is more likely to anticipate strong responses if there are few significant competitors, if products in the relevant market are relatively homogeneous, if customers find it relatively easy to switch between suppliers, or if suppliers use meeting-competition clauses.
>
> (continued on next slide)

The 2010 refinements

- 2010 changes

A firm is more likely to be deterred from making competitive initiatives by whatever responses occur if sales are small and frequent rather than via occasional large and long-term contracts or if relatively few customers will switch to it before rivals are able to respond. A firm is less likely to be deterred by whatever responses occur if the firm has little stake in the status quo. For example, a firm with a small market share that can quickly and dramatically expand, constrained neither by limits on production nor by customer reluctance to switch providers or to entrust business to a historically small provider, is unlikely to be deterred. Firms are also less likely to be deterred by whatever responses occur if competition in the relevant market is marked by leapfrogging technological innovation, so that responses by competitors leave the gains from successful innovation largely intact.

A market is more apt to be vulnerable to coordinated conduct if the firm initiating a price increase will lose relatively few customers after rivals respond to the increase. Similarly, a market is more apt to be vulnerable to coordinated conduct if a firm that first offers a lower price or improved product to customers will retain relatively few customers thus attracted away from its rivals after those rivals respond.

The Agencies regard coordinated interaction as more likely, the more the participants stand to gain from successful coordination. Coordination generally is more profitable, the lower is the market elasticity of demand.[1]

[1] 2010 Merger Guidelines at § 7.2.

The 2010 refinements

- Requirements under the 2010 Merger Guidelines
  - The requirements
    1. The premerger *susceptibility* of coordinated interaction, and
    2. The *effectiveness* of the merger in increasing the probability or success of coordinated interaction among some or all of the firms in the market
       - Requires a causal relationship between the merger and the increased probability or effectiveness of coordination
  - Relation to the Stigler conditions
    - The 2010 susceptibility requirement subsumed the structural market, information, and incentive compatibility considerations inherent in the first two Stigler conditions
    - The Stigler punishment element disappeared altogether as a factor in the analysis and was replaced by the effectiveness condition
    - The effectiveness only required a showing of an increased likelihood of successful coordination interaction, not proof that coordination interaction would in fact occur postmerger

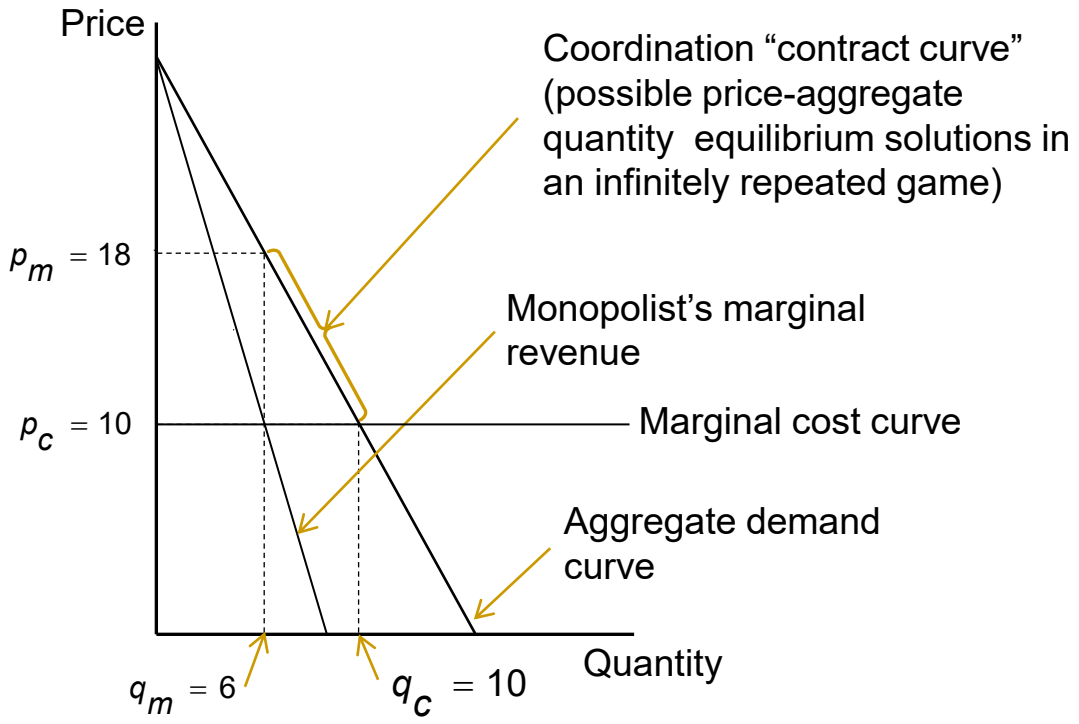
Let's look at the susceptibility and effectiveness requirements under the 2010 Merger Guidelines

1. Susceptibility

- Oligopolistic coordination—and hence susceptibility—is impeded by three problems:
  1. Selection problem
     - Will the firms be able to "agree' to the price or other terms on which they will tacitly coordinate?
  2. Internal stability/Incentive compatibility problem
     - Will the (short-run) incentive to pursue a more competitively aggressive strategy, which all profit-maximizing firms have, undermine any tacit coordination?
  3. External interference problem
     - Apart from the firms in the market, will other entities disrupt any tacit coordination?
       - Firms outside of the market that enter or threaten to enter the market
       - Buyers with the negotiating power to induce defections and disrupt the terms of coordination

1. Susceptibility: Selection problem

- The idea
  - There are an infinite number of possible price-quantity points on the demand curve on which the firms could tacitly "select" to achieve
  - Ineffectiveness or instability occurs if they cannot coordinate on the same point

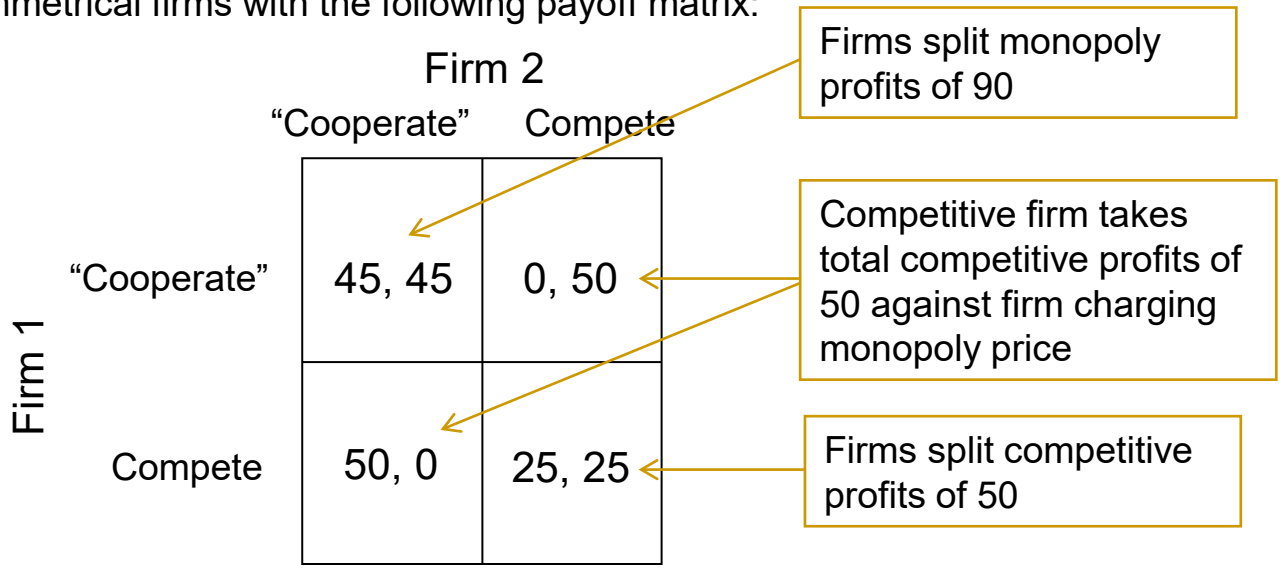


1. Susceptibility: Selection problem

- Factors to consider (not exhaustive)
  a. The ability of the firms to signal one another about their individually preferred outcomes
  b. The degree of firm and product heterogeneity
     - Goes to alignment of incentives
     - Significant heterogeneity may make reaching terms of coordination difficult due to different desired outcomes dictated by the individual conditions of each firm
     - Look for differences in product attributes, location, costs, or vertical integration
  c. Prior actual or attempted collusion or coordination/willingness to coordinate
     - Indicates that firms in the market believe that coordination is possible

1. Susceptibility: Internal stability

- Incentive compatibility problem
  - Inherent in oligopolistic coordination since each profit-maximizing firm has an incentive to compete more aggressively and steal market share rather than to cooperate
  - *Illustration*: Duopoly "prisoner's dilemma" in single-period game
    - Two symmetrical firms with the following payoff matrix:



Key result: Charging the competitive price is the *dominant strategy* for each firms, regardless of what strategy the other firm chooses. But mutual monopoly strategies earn each firm higher profits.

1. Susceptibility: Internal stability

- Two questions on internal stability—
  a. What is the probability that at least one firm in the market will defect?
  b. For any given firm, what factors influence its individual probability of defection?

1. Susceptibility: Internal stability

a. Probability of at least one defection

- *Key factor*: The number of competitors
  - The more competitors, the more likely one or more firms will defect
- Heuristic illustration
  - Say (quite unrealistically) that the probability of defection is *p* for each firm and independent of what the others do. Then the probability of at least one defection—
    - Increases with *p*
    - Increases with the number of firms *n*
- More generally
  - The probability that at least *m* firms defect increases with—
    - Increases with *p*
    - Increases with the number of firms *n*

This factor underpins the emphasis on the number of realistic suppliers remaining in the market postmerger

Probability of at Least One Defection

Number of firms *n* \ Defection probability *p*	10.0%	20.0%	30.0%
2	19.0%	36.0%	51.0%
3	27.1%	48.8%	65.7%
4	34.4%	59.0%	76.0%
5	41.0%	67.2%	83.2%
6	46.9%	73.8%	88.2%
7	52.2%	79.0%	91.8%
8	57.0%	83.2%	94.2%
9	61.3%	86.6%	96.0%
10	65.1%	89.3%	97.2%

1. Susceptibility: Internal stability

b. Factors affecting an individual firm's incentive to defect (not exhaustive)

1. The expected rewards of defection
   - The larger the expected reward relative to cooperation, the higher the probability of defection
   - The expected reward is a function of the size of the reward and the probability of obtaining it
2. The size of the reward relative to the market (for a given probability of detection)
   - The larger the size of the reward relative to the size of the market, the larger the probability of defection
     - *Example*: As the number of sales opportunities become smaller, the probability of defection increases
       - Large, "lumpy" sales or long-term contracts can make defection more profitable
     - *Example*: As individual sales become smaller relative to the market, the probability of defection decreases
   - Differences among firms in the market may affect the size of their expected reward
     - *Example*: Firms with large excess capacity can increase their production to service more demand at more competitive (defection) prices
     - *Example*: Firms operating at capacity have no incentive to defect

1. Susceptibility: Internal stability

b. Factors affecting an individual firm's incentive to defect (not exhaustive)

3. The probability of detection (for a given size of reward)
   - The greater the probability of detection, the lower the probability of defection
     - That is, the defecting firm will not be able to make as many sales before other companies respond
   - Factors
     - The availability of key market information necessary to detect defections
       - E.g., market conditions, market prices, market volumes, transactions (seller, buyer, prices)
       - Lack of information may make defections from coordination harder to detect and therefore punish
     - Volatility of the market/predictability of demand
       - Volatility/unpredictability makes defections harder to detect
4. Lags in detection
   - Significant lags make cheating more profitable (can successfully cheat for a longer period of time)
   - Factors
     - Same as for probability of detection
5. Prior actual or attempted collusion or coordination/willingness to coordinate
   - Indicates that firms in the market believe that coordination is possible

1. Susceptibility: External interference

c. Threat of "external" interference that may undermine coordinated interaction within a relevant market

1. Mechanisms of external interference
   i. Producers outside of the market that enter the market
   ii. Customers that switch to products outside of the market
   iii. Customers with sufficient bargaining power to disrupt coordinated interaction
2. External factors to consider
   - That is, factors external to the collusive group that may undermine the collusive group's stability
   - These factors affect the elasticity of demand for the collusive group

   i. Willingness of customers to switch to suppliers outside of the collusive group
   ii. Ease with which new competitors may enter
   iii. Ease with which incumbent competitors outside the collusive group may efficiently expand production
   iv. Capacity utilization outside the collusive group
      - Low capacity utilization allows outside firms to significantly increase their production levels to service demand diverting from the collusive group

   - Existence of disruptive "power buyers"

1. Susceptibility: The practice

d. In practice

- Although this might change in the Biden administration, historically the agencies typically have not challenged 5-to-4 mergers absent bad documents, customer complaints, or special situations such as unilateral effects or the elimination of a maverick (see Unit 2)
- This indicates that market with five firms premerger and four firms postmerger does not by itself predicate a coordinated effects theory
  - This implies that a five-firm market ordinarily is not ordinarily susceptible to tacit collusion and that a decrease in the number of firm postmerger to four does not materially increase the probability or effectiveness of tacit collusion

2. Merger effectiveness

- Rule
  - It is not enough that premerger the market is conducive to coordinated interaction—the merger *must reasonably increase the probability* that the market will be materially *more* conducive to coordinated interaction postmerger
- Implications
  - This means that the merger must materially improve the incentives or ability of a group of firms sufficient to affect market price (the "collusive group") to—
    1. Solve the section problem
    2. Solve the incentive incompatibility problem, *or*
    3. Resist external interference
  - The "collusive group" of firms means a subset of firms that, if coordinating, would create, enhance or facilitate the exercise of market power in the relevant market
    - The set of all firms in the market is a sufficient group (by the hypothetical monopolist test)
    - But a smaller subset may also be sufficient depending on the characteristics of the market
      - Think about a market that can be modeled as a "dominant firm" with a competitive fringe
      - But where the "dominant firm" is the tacitly coordinating sufficient group
    - Recognizes the potential for coordinated effects even if all firms in the market are not tacitly coordinating

2. Merger effectiveness

- Some factors to consider when thinking about merger effectiveness
  1. Mitigating the selection problem
     - \+ The merger reduces firm or product heterogeneity in the market and better aligns the incentives of the various firms tacitly to achieve coordinated interaction
  2. Mitigating the incentive incompatibility problem
     - \+ The merger reduces the number of independent competitors in a way that materially reduces the probability of defection, thereby increasing the probability of effective coordination
       - The magnitude of the HHI delta may be probative of significance here
     - \+ The acquisition of a disruptive "maverick" (considered as a separate theory below)
     - – The merger decreases excess capacity inside the collusive group
     - – The merger results in significant efficiencies in the combined firm that increase the rewards of defection, thereby decreasing the probability of effective coordination
     - – The merger results in vertical integration that could improve the merged firm's ability to cheat without detection, thereby increasing the probability of defection
  3. Mitigating the external interference problem
     - \+ The merger eliminates a likely potential entrant, thereby increasing the probability of effective coordination
     - \+ The merger increases the barriers to entry/expansion/repositioning

Key:
\+ The merger increases the probability of effective coordinated interaction postmerger
– The merger decreases the probability of effective coordinated interaction postmerger

The practice today

- Last choice as a theory
  - Even after the 2010 revisions to the Merger Guidelines, coordinated effects is the last choice as an independent theory of competitive harm in horizontal merger investigations
  - Given the narrow market definitions usually found under the hypothetical monopolist test:
    - In problematic mergers, the merging firms tend to have high market shares and be close competitors with one another
    - Typically yields an easily understood unilateral effects theory
  - *Result*: Coordinated effects is rarely used in investigations or litigations as the primary theory of anticompetitive harm
    - Usually more of an add-on
    - Or when the agency is forced into it (*CCC/Mitchell*)
  - *BUT* DOJ and FTC still consider the theory in investigations, and so it must be addressed

The practice today

- When coordinated effects is used in litigation
  - A common approach is for the plaintiffs to invoke the *PNB* presumption and then make the argument that—
    - The high concentration and other characteristics of the relevant market make it susceptible to coordinated interaction, *and*
    - the reduction in the number of competitors and increase in concentration resulting from the merger is sufficient to increase the probability of coordinated interaction
      - This is essentially a return to the structure-conduct-performance argument
  - In some cases, however, the evidence may be more substantial
    - The agencies, for example, are looking more closely at significant reductions in excess capacity, especially in heavy industries where capacity expansions are costly and time-consuming, as making the market more conducive to coordinated interaction
      - NB: Consolidations of plants to reduce excess capacity is usually one of the common efficiencies cited by the parties in support of a deal

Application: Tronox/Cristal

- The FTC complaint[1]
  - *Central allegation*:
    - "Tronox's proposed acquisition of Cristal (the "Acquisition") would combine two of the three largest producers of titanium dioxide ("TiO_2") manufactured through the chloride process ("chloride TiO_2") in the United States and Canada ("North America")."
    - Five major players in the North American market
  - Coordinated effects theory[2]
    1. Market susceptible to coordinated effects:
       a. Commodity-like product
       b. Highly concentrated market with limited competitors (5 majors plus several small regional fringe firms)
       c. Significant transparency into the competitive and strategic decision of rival firms
       d. Customers with long-term, stable supplier relationships allowing for easy detections of deviations from past practices
       e. Low elasticity of demand
       f. History of strong interdependent behavior (with a history of price-fixing allegations and settlements)
    2. Merger increases likelihood and effectiveness of coordinated effects
       a. It removes one of the three largest competitors in a five-competitor market;
       b. Consolidates the overwhelming majority of North American chloride TiO2 sales and production capacity (80%) in the hands of two large and disciplined TiO2 companies, Tronox and Chemours; and
       c. Enhances market transparency among the competitors that remain.

[1] Complaint, *In re* Tronox Ltd., No. 9377 (F.T.C. issued Dec. 5, 2017).
[2] The complaint also alleged a unilateral effects theory (discussed below).

Application: Tronox/Cristal

- The initial decision[1]
  - Forum
    - FTC administrative hearing
    - Before Chief Administrative Law Judge D. Michael Chappell
      - Appointed January 26, 1999 by the Commission pursuant to 5 U.S.C. § 3105
      - Today, the FTC's only administrative law judge

[1] Slip op. at 33-43, *In re* Tronox Ltd., No. 9377 (F.T.C. Dec. 14, 2018) (initial decision)

Application: Tronox/Cristal

- The initial decision
  - Findings on coordinated effects
    - A. Market susceptibility to coordinated effects
      1. Market structure
         - Markets with only a small number of firms are generally conducive to coordinated interaction
         - There are only five major producers for over 99% of chloride TiO_2 sales in North America
           - Chemours is the largest firm[1]
           - Merging firms (Tronox and Cristal) were number 2 and 3, respectively
         - Five competitors is a small enough number for competitors to engage in accommodating conduct
      2. Product homogeneity
         - Markets for homogenous products are more susceptible to coordination
           - Reactions by rivals to attempts to steal their business are likely to be strong, given that each firm's product is largely interchangeable with its rivals' products
         - Documents and testimony show that TiO_2 is a commodity product
         - Customers can switch between the chloride TiO_2 produced by the five North American chloride TiO2 producers

[1] All market shares were redacted from the public version of the complaint and initial decision.

Application: Tronox/Cristal

- The initial decision
  - Findings on coordinated effects
    - A. Market susceptibility to coordinated effects (con't)
      3. Firms recognize mutual interdependence
         - Mutually recognized interdependence is indicative of a market that is vulnerable to coordination since each competitor knows that expanding his sales or lowering price will reduce the sales of rivals, who will notice that fact, identify the cause, and probably respond with a matching price reduction
         - Evidence shows mutual accommodating conduct by chloride TiO_2 producers in order to support market discipline and avoid triggering adverse competitor responses
         - Earnings calls and industry conference remarks of Tronox's and Cristal's competitors refer to the need for "discipline" in their competitive behavior and in their responses to the behavior of others
         - North American chloride TiO_2 producers over the years have increased TiO_2 prices typically in close proximity to each other in time
      4. Ability to learn competitors' actions
         - A market typically is more vulnerable to coordinated conduct if each competitively important firm's significant competitive initiatives can be promptly and confidently observed by that firm's rivals
         - Four of the five major North American TiO_2 producers are publicly traded companies
           - Publicly disclosing information in a market characterized by interdependence can serve as a signal to the market, enhancing predictability and the potential for tacit coordination.
           - TiO_2 producers monitor the releases and statements of their competitors for market intelligence
           - Cristal is a privately held company that historically has not disclosed as much information
         - Documents and testimony show that TiO_2 producers obtain pricing data and other market intelligence about their competitors from customers

Application: Tronox/Cristal

- The initial decision
  - Findings on coordinated effects
    - A. Market susceptibility to coordinated effects (con't)
      5. Ability to learn competitors' actions
         - A market typically is more vulnerable to coordinated conduct if each competitively important firm's significant competitive initiatives can be promptly and confidently observed by that firm's rivals
         - Four of the five major North American TiO_2 producers are publicly traded companies
           - Publicly disclosing information in a market characterized by interdependence can serve as a signal to the market, enhancing predictability and the potential for tacit coordination.
           - TiO_2 producers monitor the releases and statements of their competitors for market intelligence
           - Cristal is a privately held company that historically has not disclosed as much information
         - Documents and testimony show that TiO_2 producers obtain pricing data and other market intelligence about their competitors from customers
      6. Low price elasticity
         - Inelastic demand makes the market more susceptible to coordinated interaction because if prices for all firms were to rise, few sales would be lost, making the reward for successful coordination greater
         - The elasticity of demand for chloride TiO_2 is relatively low at -0.45

[1] All market shares were redacted from the public version of the complaint and initial decision.

Application: Tronox/Cristal

- The initial decision
  - Findings on coordinated effects
    - b. Merger increases likelihood and success of coordinated interaction
      1. Merger eliminates Cristal as an independent competitive decision-making force in the market, reducing the number of independent firms from five to four
      2. Postmerger, two firms—Chemours and Tronox—will account for around 75% of all TiO_2 sales in North America
         - Postmerger HHI > 3000; delta = 700
      3. Postmerger, after Cristal becomes part of Tronox, a publicly traded company, more information is likely to be disclosed about the pricing, output and strategy of former Cristal plants than was released premerger

[1] All market shares were redacted from the public version of the complaint and initial decision.

Elimination of a “Maverick”

REVIEW 2010 DOJ/FTC HORIZONTAL MERGER GUIDELINES § 2.1.5

Mavericks

- General idea
  - A “maverick” is a competitor that disrupts coordinated interaction among the other, more accommodating competitors that would occur in the absence of the maverick
  - When an accommodating competitor acquires a maverick, the maverick’s disruptive conduct is suppressed and the market performs less competitively to the harm of consumers:

> The Agencies consider whether a merger may lessen competition by eliminating a “maverick” firm, i.e., a firm that plays a disruptive role in the market to the benefit of customers. For example, if one of the merging firms has a strong incumbency position and the other merging firm threatens to disrupt market conditions with a new technology or business model, their merger can involve the loss of actual or potential competition. Likewise, one of the merging firms may have the incentive to take the lead in price cutting or other competitive conduct or to resist increases in industry prices. A firm that may discipline prices based on its ability and incentive to expand production rapidly using available capacity also can be a maverick, as can a firm that has often resisted otherwise prevailing industry norms to cooperate on price setting or other terms of competition.[1]

  - As a result, the acquisition of a maverick by an accommodating competitor is a special case of coordination interaction
    - Typically used to challenge deals where the target has a sufficiently small market share that the transaction would not otherwise raise major concern

[1] 2010 Merger Guidelines at § 2.1.5.

Mavericks

- Example: DOJ challenge to ABI/Grupo Modelo
  - Background
    - ABInbev (ABI)
      - #1 firm in the U.S. beer market with a 39% share
      - Budweiser, Busch, Michelob, Natural Light, Stella Artois, Goose Island, and Beck's
    - MillerCoors (joint venture between SAB Miller and MolsonCoors)
      - #2 firm with a 26% share
      - Coors, Coors Light, Miller Genuine Draft, Miller High Life, Miller Lite, Extra Gold Lager, Hamm's
    - Grupo Modelo
      - #3 firm with a 7% share
      - Corona Extra, Corona Light, Modelo Especial, Pacifico, Negra Modelo and Victoria
    - Other 28%
      - Heineken, Sam Adams, Yuengling, craft beers, others—all relatively small
  - DOJ allegations
      - ABI and MillerCoors, the mass beer producers, are accommodating firms, with MillerCoors and the other brewers willing to follow ABI's price leadership
      - Grupo Modelo is a maverick
        - Unwilling to follow ABI's price leadership
        - Has caused ABI to price lower that it would have otherwise
      - ABI's acquisition of Grupo Modelo would violate Section 7
        - Settled by consent decree requiring divestiture of Modelo operations in the United States

Mavericks

- Policy question
  - Mavericks have that Potter Stewart "I know it when I see it" quality[1]
    - In *H&R Block/TaxACT*, the district court observed:

> The parties have spilled substantial ink debating TaxACT's maverick status. The arguments over whether TaxACT is or is not a "maverick"—or whether perhaps it once was a maverick but has not been a maverick recently—have not been particularly helpful to the Court's analysis. . . . Here, the record is clear that while TaxACT has been an aggressive and innovative competitor in the market, as defendants admit, TaxACT is not unique in this role. Other competitors, including HRB and Intuit, have also been aggressive and innovative in forcing companies in the DDIY market to respond to new product offerings to the benefit of consumers.
>
> The government has not set out a clear standard, based on functional or economic considerations, to distinguish a maverick from any other aggressive competitor. At times, the government has emphasized TaxACT's low pricing as evidence of its maverick status, while, at other times, the government seems to suggest that almost any competitive activity on TaxACT's part is a "disruptive" indicator of a maverick. For example, the government claims that "[m]ost recently, TaxACT continued to disrupt the Digital DIY market by entering the boxed retail software segment of the market, which had belonged solely to HRB and [Intuit]." . . . .[2]

[1] *See* Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (describe his threshold test for obscenity).
[2] United States v. H & R Block, Inc., 833 F. Supp. 2d 36, 79-80 (D.D.C. 2011).

Mavericks

- Why are “mavericks” mavericks, and should it matter in antitrust law?
  1. The most likely reason is idiosyncratic: The particular management of the firm simply believes in being disruptive
     - This may be the case when the management—
       - Refuses to pursue a more industry price-accommodating strategy[1]
       - Pursues a long-run strategy of disruptive new product development or new marketing innovations[2]
     - *Query*: Should a merger be prohibited simply because the current management—perhaps even just the current CEO—believes in being disruptive?

[1] *See, e.g.*, Complaint, United States v. Anheuser-Busch InBev SA/NV, No. 1:13-cv-00127 (D.D.C. filed Jan. 31, 2013) (settled by consent decree).
[2] *See, e.g.*, Complaint, United States v. AT&T Inc., No. 1:11-cv-1560 (D.D.C. filed Aug. 31, 2011) (challenging AT&T’s pending acquisition of T-Mobile; complaint voluntarily dismissed when transaction was terminated).

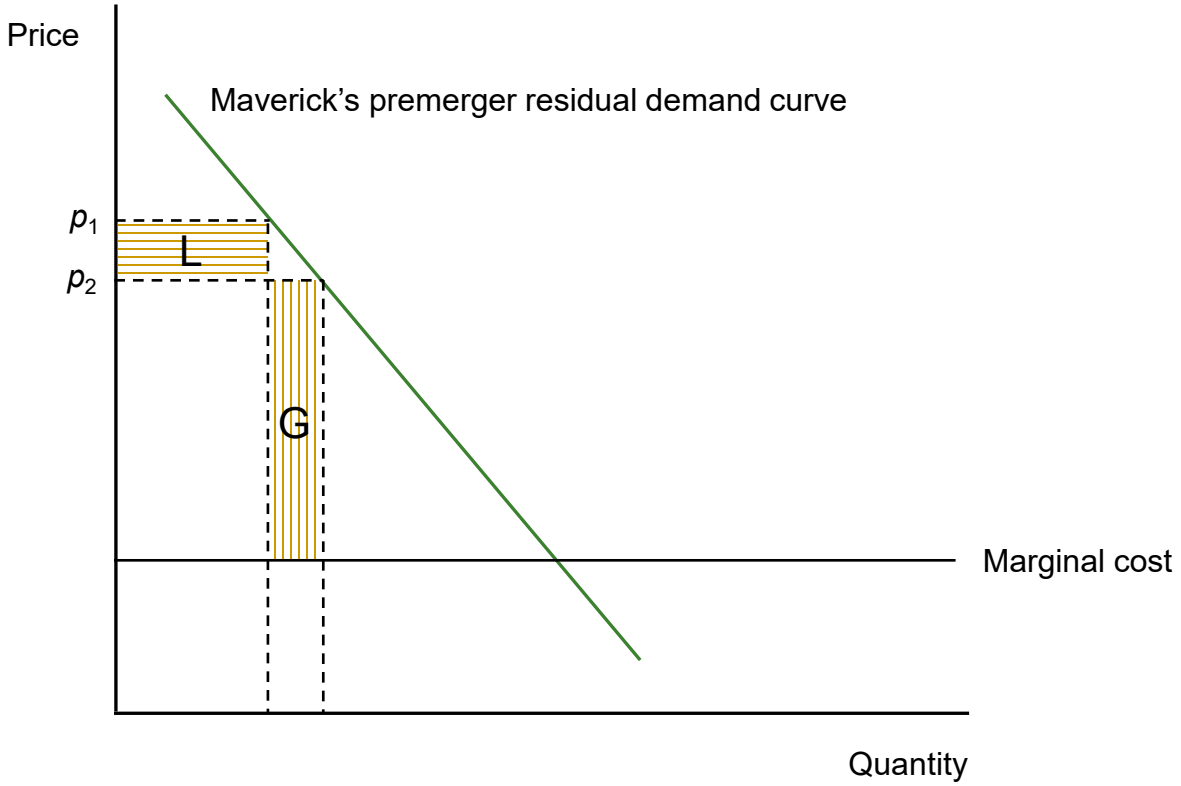
Mavericks

- Why are "mavericks" mavericks, and should it matter in antitrust law? (con't)
  2. Another possible reason is that something inherent in the firm's structure that makes it in the profit-maximizing interest of the firm to be disruptive regardless of the predilections of its management
     - This may be the case if the firm is a small but materially lower-cost producer than the larger, more established firms. In this case, the firm may wish to take advantage of its lower-cost structure to discount prices and gain market share.[1]
     - More generally, smaller firms may have more of an incentive to be a maverick than larger firms since they have—
       - proportionally less incumbent business at stake in the event that a maverick strategy does not work, *and*
       - proportionally more to gain in market share in the event that the strategy works

[1] *See, e.g.*, United States v. H&R Block, Inc., 833 F. Supp. 2d 36 (D.D.C. 2011) (noting government argument that TaxACT was a "maverick" because, among other things, it was a low-cost competitor that pursued an aggressive pricing policy).

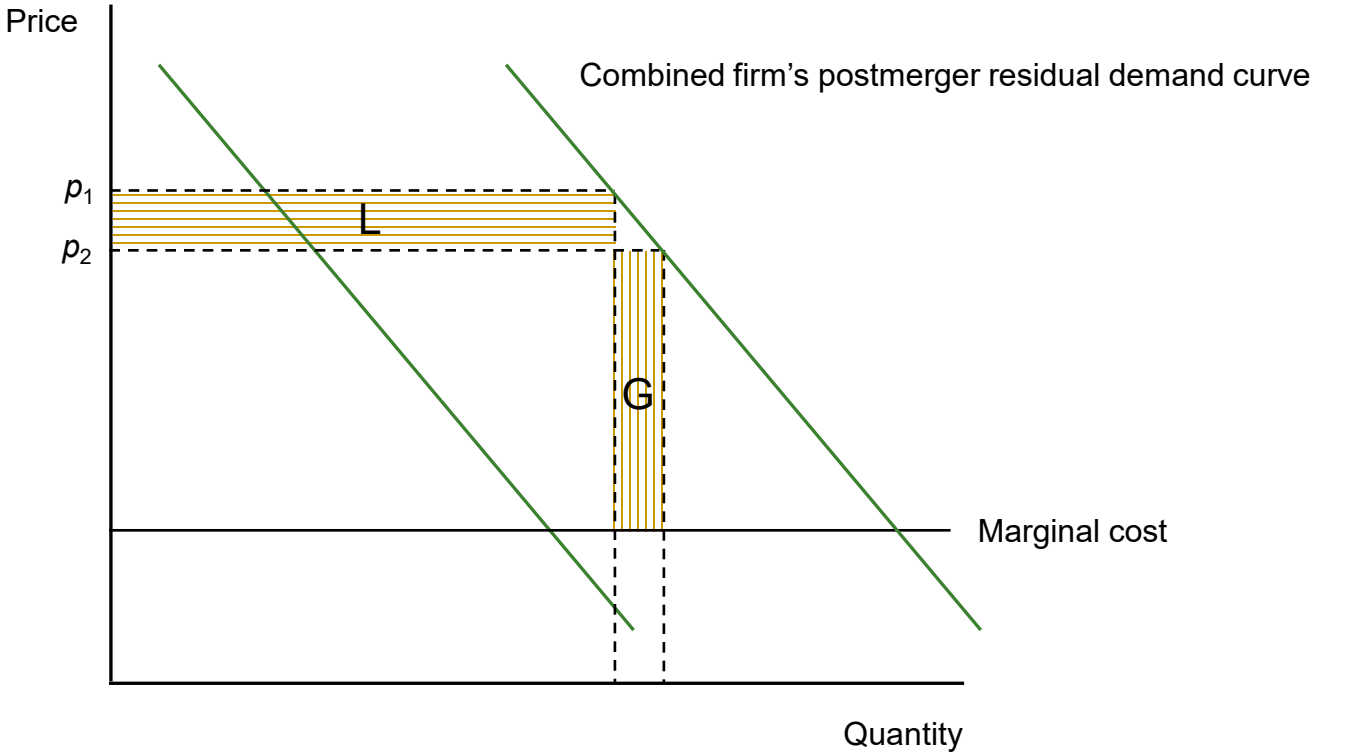
Mavericks

- Premerger incentives to act aggressively
  - As illustrated in the diagram below, the “maverick” standing alone has an incentive to lower price because the profit gains outweigh the losses



Mavericks

- Postmerger disincentives to act aggressively
  - Postmerger, the combined firm has a greater sales volume and hence incurs greater losses than the maverick for a price decrease
  - As illustrated in the diagram below, the combined firm does not have an incentive to lower price



Mavericks

- Why are “mavericks” mavericks, and should it matter in antitrust law? (con’t)
  3. *Query*: While it makes sense to pay special attention to the acquisition of a “structural” maverick—that is, a firm that has been and is likely to continue to be disruptive of coordinated interaction in the absence of the acquisition—does it also make sense to give the same attention to an “idiosyncratic” maverick, whose behavior is likely to change with a change in management?

Mavericks

- Policy question: What is a "maverick"?
  - Mavericks have that Potter Stewart "I know it when I see it" quality[1]
  - In *H&R Block/TaxACT*, the district court observed:

> The government has not set out a clear standard, based on functional or economic considerations, to distinguish a maverick from any other aggressive competitor [2]

  - But maybe that is the point:
    - Perhaps a maverick is best defined as a firm that aggressively pursues a competitive strategy rather than an accommodating one and thereby disrupts coordination
    - Under this definition, the plaintiffs would have to show that—whatever the source of its "maverickness"—the firm would remain a maverick for some material period of time if the merger did not occur

[1] *See* Jacobellis v. Ohio, 378 U.S. 184, 197 (1964) (Stewart, J., concurring) (describe his threshold test for obscenity).
[2] United States v. H & R Block, Inc., 833 F. Supp. 2d 36, 79-80 (D.D.C. 2011).

Mavericks

- Essential elements of the "maverick" theory
  - In any event—
    - As *H&R Block/TaxACT* suggests, the following requirements should be imposed on a theory of anticompetitive harm based on eliminating a maverick:
      1. The market is conducive to a materially higher degree of coordinated interaction than it exhibits premerger;
      2. The disruptive conduct of the merger target is a material contributor to the inability of the market to achieve this higher degree of coordinated interaction;
      3. The acquisition of the merger target is likely to result in the discontinuance of the disruptive conduct; *and*

         NB: Sometimes the target management will become the combined company's management, which raises the question of whether the disruptive activity will be discontinued
      4. The discontinuance of the merger target's disruptive activity is likely to result in a materially higher degree of coordinated interaction in the market to the harm of consumers
         - This requires that the target be unique or especially effective in its disruptive conduct

Mavericks

- One final note
  - Although in most applications of the theory the target is the maverick, in some cases the buyer may be the maverick
  - The incentives argument is harder for the plaintiff in this situation, since the disruptive buyer's management will run the combined company
    - But they still face an incentive to be less of a maverick because of the effect on a larger number of inframarginal sales.

Unilateral Effects

REVIEW 2010 DOJ/FTC HORIZONTAL MERGER GUIDELINES § 6

Unilateral effects

- Definition
  - Unilateral effects is a theory of anticompetitive harm that goes to the elimination of significant "local" competition between the merging firms so that the merged firm can raise prices independently of how other incumbent firms react

> A merger is likely to have unilateral anticompetitive effect if the acquiring firm will have the incentive to raise prices or reduce quality after the acquisition, independent of competitive responses from other firms.[1]

[1] United States v. H&R Block, Inc., 833 F. Supp. 2d 36, 81 (D.D.C. 2011).

Unilateral effects

- Definition
  - The idea is that the merged firm can increase prices to an identifiable subset of customers in the market even *without* any accommodating conduct from the nonmerging firms in the market and that this price increase is a cognizable anticompetitive effect under Section 7
    - In other words, an anticompetitive effect results if the merging firm increases the price of one of its products as a result of the merger even if no other firm in the market increases its price
    - The concept of unilateral effects as a theory of merger anticompetitive harm was introduced in the 1992 DOJ/FTC Horizontal Merger Guidelines
    - The theory has been accepted as actionable under Section 7 by the courts, although many have rejected the application of the theory for failure of proof [1]

[1] *See, e.g.*, ProMedica Health Sys., Inc. v. FTC, 749 F.3d 559, 568-70 (6th Cir. 2014); New York v. Deutsche Telekom AG, 439 F. Supp. 3d 179, 237 (S.D.N.Y. 2020); FTC v. RAG-Stiftung, 436 F. Supp. 3d 278, 318-21 (D.D.C. 2020); United States v. Anthem, Inc., 236 F. Supp. 3d 171, 215-20 (D.D.C.), *aff'd*, 855 F.3d 345 (D.C. Cir. 2017); FTC v. Sysco Corp., 113 F. Supp. 3d 1, 61-65, 67-70 (D.D.C. 2015); United States v. Bazaarvoice, Inc., No. 13-CV-00133-WHO, 2014 WL 203966, at *54 (N.D. Cal. Jan. 8, 2014); *H&R Block*, 833 F. Supp. at 81-88; FTC v. CCC Holdings Inc., 605 F. Supp. 2d 26, 67-72 (D.D.C. 2009); FTC v. Foster, No. CIV 07-352 JBACT. 2007 WL 1793441, at *27-*31 (D.N.M. May 29, 2007); United States v. Oracle Corp., 331 F. Supp. 2d 1098,1113-23, 1166-73 (N.D. Ca. 2004).

Unilateral effects

As a matter of conventional, denote the combined firm's product subject to the price increase as "product A"

- Relation to the one-product SSNIP test
  - The underlying economics of unilateral effect is similar to that of the one-SSNIP recapture test:

    Is a price increase for merging product A profitable postmerger because of the recapture of some lost sales by merging product B?

    - The profitability of a price increase in one of the merged firm's product is the incremental profits are profitable, taking into account—
      1. The gain in incremental profits from the increased price of product A's inframarginal sales
      2. The loss in margin from the loss of marginal customers of product A, *and*
      3. The gain in incremental profits from the recapture of lost marginal sales by product B
  - *A critical difference*: In unilateral effects, ANY (material) price increase is actionable
    - There is no "safe harbor" for anticompetitive price increases under Section 7
      - Under Section 7's terms, the only requirement is that the merger is reasonably likely to "substantially" lessen competition
    - Hence, unilateral effects does not employ a SSNIP to test the profitability of a price increase of one of the products of the merging firm
  - *Another difference*: In unilateral effects, the profit-maximization test is the right implementation in order to investigate substantiality
    - But the probability test is still probative of an anticompetitive price increase

Unilateral effects

- Example 1
  - Say firm A faces a residual inverse demand curve $p = 10 - 0.5q$ and has no fixed cost and constant marginal cost of 4
    - The demand curve is then $q = 20 - 2p$
  - Premerger, firm A maximizes its profits by choosing a quantity q^* such that its marginal revenue equals its marginal cost.
    - Solving—
      - $q^* = 6$
      - $p^* = \$7$
    - Also, suppose that if firm A increases its price, 50% of its marginal customers to firm B (that is, $D_{AB} = 0.50$).

We solved this problem on Slide 51 of the Unit 8 notes

Premerger, firm A is indifferent to where its marginal customers go when firm A changes its price.

That is, the profit gains or losses of other firms do not change firm A's profit-maximizing choices

Unilateral effects

- The profit-maximizing economics
  - Premerger:

A's marginal revenue = Marginal cost

Gain in revenues on the higher margin on the inframarginal sales + Loss in revenues from the loss on the marginal unit = Reduction in the marginal cost of production

At the margin, B's marginal sales divert to A if A lowers its price

  - Postmerger:

A's marginal revenue − Loss on B's diverted sales = Marginal cost

Gain in revenues on the higher margin on the inframarginal sales + Loss in revenues from the loss on the marginal unit − $D_{BA}m_B$ = Reduction in the marginal cost of production

Holding B's price and booking all of B's losses to A

  - Holding the price of B constant, the combined firm's marginal revenue equals A's marginal revenue minus the loss on B's diverted sales
  - Since *mr* = *mc* premerger, *mr* – loss on B's diverted sales < *mc* at A's premerger price and quantity
    - When combined firm's marginal revenue postmerger is less than its marginal cost, the combined firm must reduce quantity and increase price to maximize profits

Unilateral effects

- Example 1 (con't)
  - Firm A now acquires firm B as a subsidiary
    - Should the combined firm increase the price of product A to improve joint profits?
    - Parameters:
      - Units divert between A and B one-to-one (from problem)
      - So if A loses 2 units when it increases its price, B gains one unit in sales (since $D_{AB} = 0.50$)
      - Say B has a dollar gross margin of $2
    - Suppose A increases its price from 7 (the premerger profit-maximizing price) to 7.5
      - Firm A loses 1 unit
        - $q = 20 - 2p$
        - At $p_1 = 7$, $q_1 = 20 - 2*7 = 6$ and $\$m_1 = p_1 - c = 7 - 4 = 3$
        - At $p_2 = 7$, $q_2 = 20 - 2*7.5 = 5$
        - $\Delta q = -1$
      - Firm A has a gross profit loss of $3 (= the original $3 margin at p = 7 times 1 unit)
      - Firm A sells 5 units at the higher price for a profit gain of $2.50 (= 5 units times an incremental price of $0.50)
      - Firm B gains 0.5 units from diversion for a profit gain of $1 (= 0.5 units at a dollar margin of $2)
      - Combine profits increase by $0.50, so the combined firm should increase the price of A
        - NB: This is purely directional—the example say nothing about what is the profit-maximizing Δp

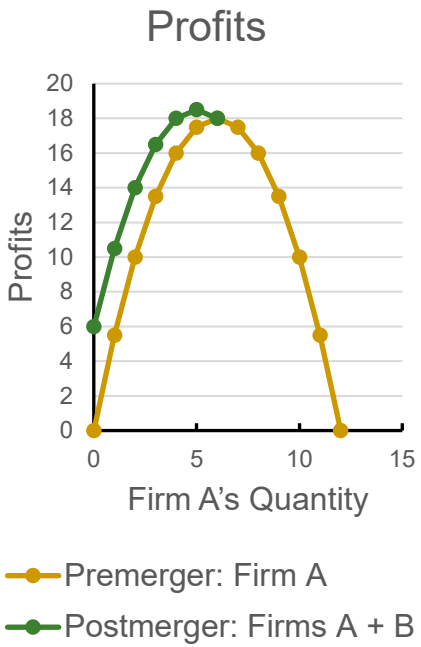
Postmerger, the combined firm must take into account the profit changes of firm B as well as firm A

Unilateral effects

- Example 1 (con't)

Premerger: Firm A

p	q	$m	Profits
0.0	20.0	-4.0	-80.0
0.5	19.0	-3.5	-66.5
1.0	18.0	-3.0	-54.0
1.5	17.0	-2.5	-42.5
2.0	16.0	-2.0	-32.0
2.5	15.0	-1.5	-22.5
3.0	14.0	-1.0	-14.0
3.5	13.0	-0.5	-6.5
4.0	12.0	0.0	0.0
4.5	11.0	0.5	5.5
5.0	10.0	1.0	10.0
5.5	9.0	1.5	13.5
6.0	8.0	2.0	16.0
6.5	7.0	2.5	17.5
7.0	6.0	3.0	18.0
7.5	5.0	3.5	17.5
8.0	4.0	4.0	16.0
8.5	3.0	4.5	13.5
9.0	2.0	5.0	10.0
9.5	1.0	5.5	5.5
10.0	0.0	6.0	0.0



Postmerger: Firms A + B

(holding the price of B constant and looking at incremental changes in B from diversion)

Firm A: Postmerger					Firm B: Postmerger			Combined
Δp	p	q	$m1	Profits	Δq2	m	Δπ2	Profits
0.0	7.0	6.0	3.0	18.0	0.0	2	0.0000	18.0000
0.5	7.5	5.0	3.5	17.5	0.5	2	1.0000	18.5000
1.0	8.0	4.0	4.0	16.0	1.0	2	2.0000	18.0000
1.5	8.5	3.0	4.5	13.5	1.5	2	3.0000	16.5000
2.0	9.0	2.0	5.0	10.0	2.0	2	4.0000	14.0000
2.5	9.5	1.0	5.5	5.5	2.5	2	5.0000	10.5000
3.0	10.0	0.0	6.0	0.0	3.0	2	6.0000	6.0000

The acquisition of competitor firm B puts upward pricing pressure *on the price of firm A*

Unilateral effects

- What is going on here?
  - Firm A increase in production requires it to decrease its price for all its sales since A cannot price discriminate—charge different prices—among its customers
  - Firm A's price reduction causes some of firm B's customers to divert to A
    - This is called a *negative externality* on B of A's price reduction
      - Alternatively, if A had increased its price, some of A's customers would divert to B, creating a *positive externality* on B
    - An *externality* is a cost or benefit caused by an economic actor that is not suffered or enjoyed by that actor
      - *Example (negative externality)*: A firm's pollution diminishes the property values or health of people in the surrounding area
      - *Example (positive externality)*: A firm's restoration of historic buildings encourages more people to visit the area and patronize nearby businesses
        - Networks effects often result from positive externalities
          - *Example*: The more people who are connected to a telephone network makes the network more valuable to all users
    - When an externality exists, the acting firm does not take into account all of the costs and benefits of its actions when making decisions
    - This results in decisions that are individually optimal but socially suboptimal

When A acquires B, A internalizes the externalities A's decisions impose on B

Unilateral effects

- Example 2: Firm A *increases* production (and *decreases* price)
  - Say for firm A:
    - Inverse demand: $p = 300 - q$
    - Fixed costs: $f = 0$
    - Marginal costs: $mc = 20$
    - Marginal revenue: $mr = 300 - 2q$

FOC: $mr = mc$
$300 - 2q = 20$
So: $q^* = 140$
$p^* = 160$
$\$m_A = 140$

  - Say when firm A increases its production by 1 unit (and lowers its price by \$1), 0.3 units that firm B would have sold now divert to Firm A ($D_{BA} = 0.3$)
  - If firm B's margin is also 140 at its initial price level, then firm A's one-unit increase in production causes firm B to lose \$42 ($\Delta\pi_B = D_{BA} \times \$m_B = = (0.3)(140) = \$42$).
    - That is, Firm A's conduct creates a *negative externality* for Firm B
  - When A and B are independent firms, firm A does not care about firm B's loss
  - But when firm A acquires firm B, firm A must take into account firm B's losses in firm A's marginal revenue:

$$mr_A^{postmerger} = mr_A^{premerger} - D_{BA}\$m_B$$
$$= 300 - 2q - 42$$

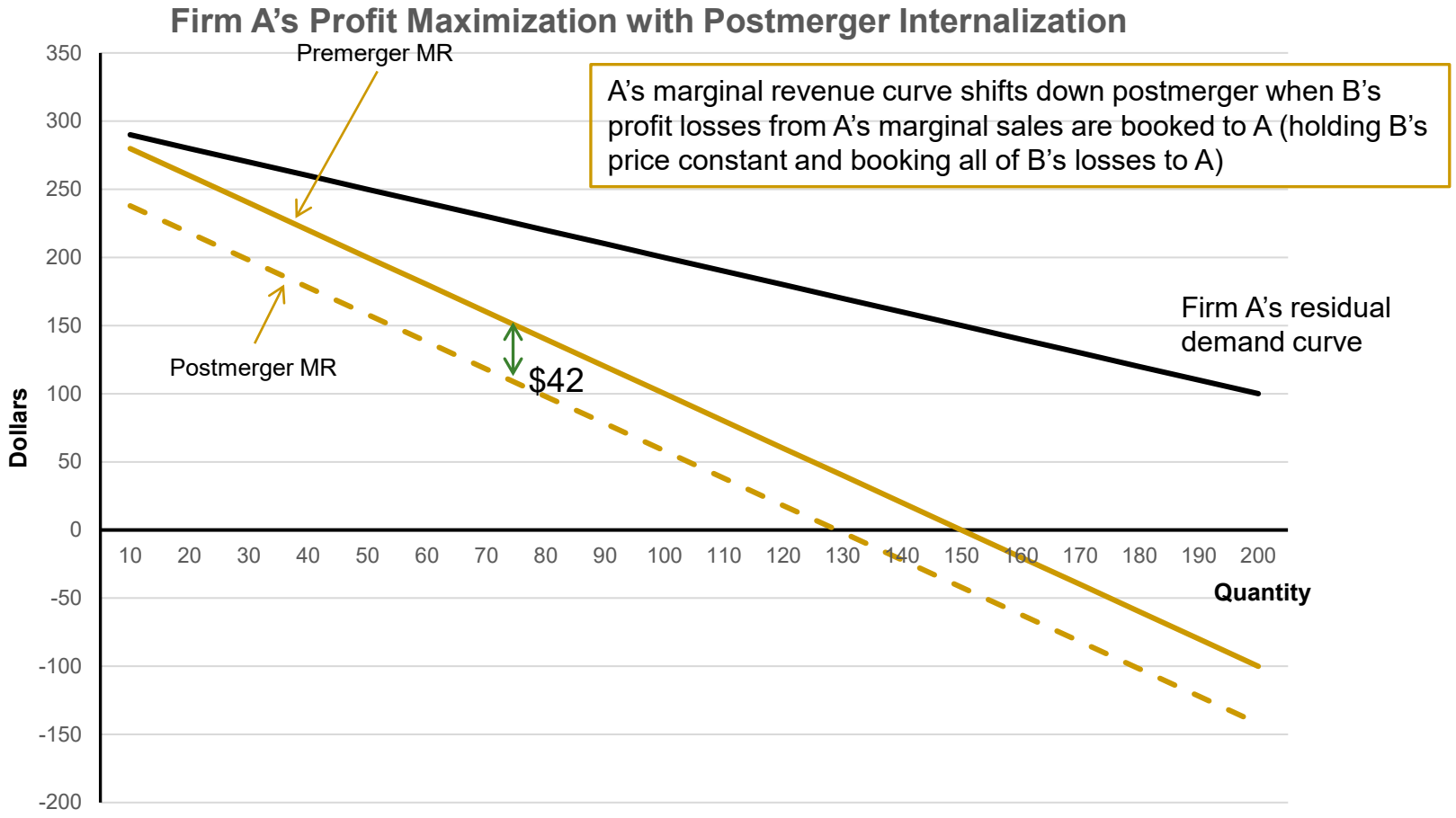
A's marginal negative externality imposed on B

This shifts firm A's marginal revenue curve down and makes firm A's marginal revenue less than its marginal cost at premerger prices. *Firm A must decrease output and increase price to reequilibrate marginal revenue and marginal cost:* $q_{postmerger} = 119$; $p_{postmerger} = 181$

Unilateral effects

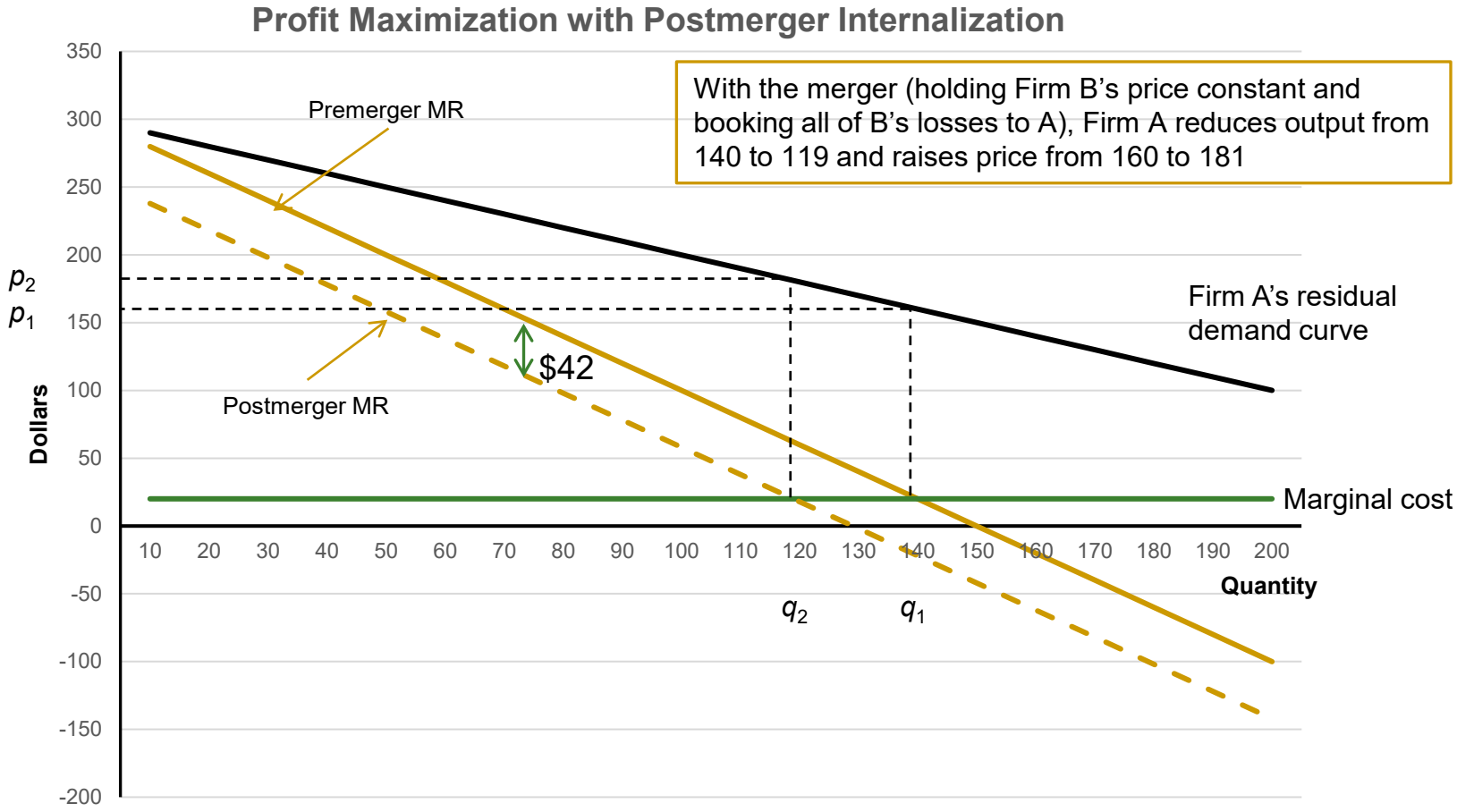
An easy way to visualize unilateral effects is to hold firm B's profits constant postmerger and book all of B's gains and losses from A's price changes to A.

- Example 2 (con't)



Unilateral effects

- Example 2 (con't)



Another example

- Example 2 (another take)

Firm 1
(producing Product 1)

Assume linear demand (p = price intercept minus quantity)

Price intercept	300	
Marginal cost	20	(constant)
Margin	140	

(price minus marginal cost at premerger profit-maximizing price)

Recapture of Products from Diverted Sales to Firm 2

Diversion ratio	0.3	
Firm 2 margin	140	(assume the same as Firm 1 at premerger price)

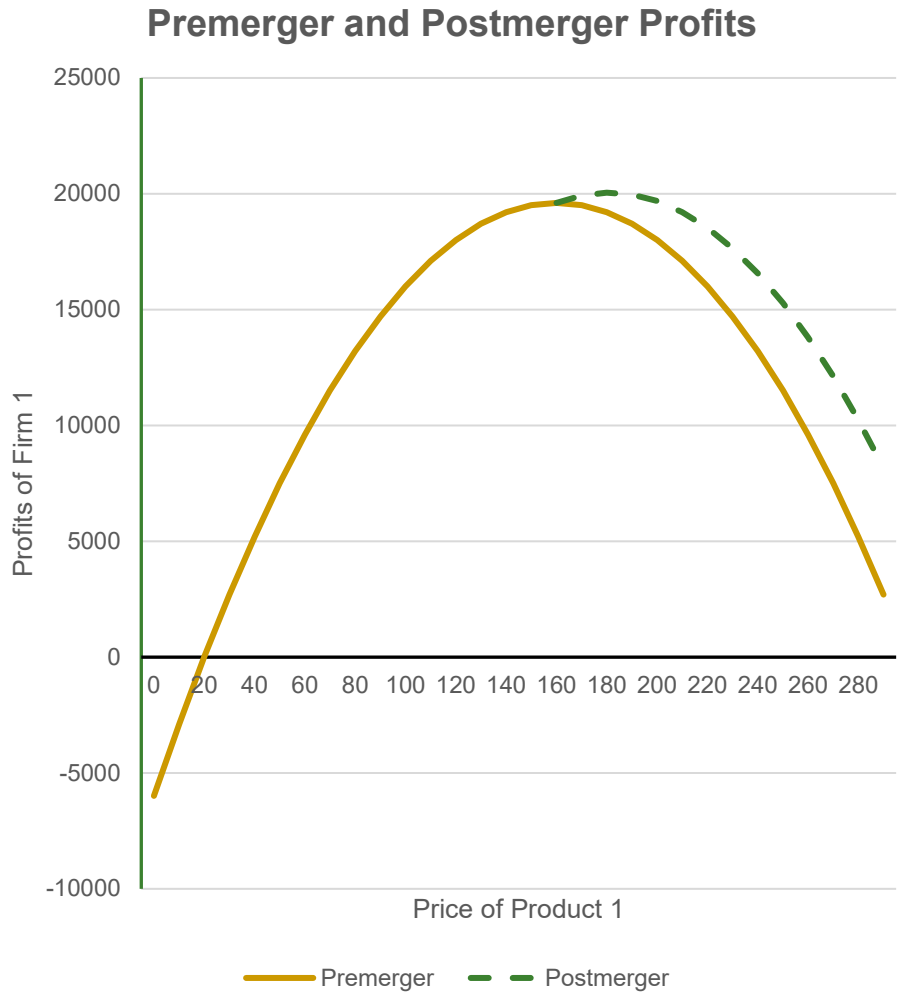
PREMERGER

POSTMERGER RECAPTURE
(holding Firm 2's price constant at the premerger level)

Price	Quantity	Revenue	MR	Cost	MC	Profit	Margin (p - mc)	Firm 1 Lost units	Firm 1 Lost profits	Diversion to Firm 2	Profit Recapture	Post-merger Profit	Post-merger Difference
0	300	0	-300	6000	20	-6000	-20						
10	290	2900	-280	5800	20	-2900	-10						
20	280	5600	-260	5600	20	0	0						
30	270	8100	-240	5400	20	2700	10						
40	260	10400	-220	5200	20	5200	20						
50	250	12500	-200	5000	20	7500	30						
60	240	14400	-180	4800	20	9600	40						
70	230	16100	-160	4600	20	11500	50						
80	220	17600	-140	4400	20	13200	60						
90	210	18900	-120	4200	20	14700	70						
100	200	20000	-100	4000	20	16000	80						
110	190	20900	-80	3800	20	17100	90						
120	180	21600	-60	3600	20	18000	100						
130	170	22100	-40	3400	20	18700	110						
140	160	22400	-20	3200	20	19200	120						
150	150	22500	0	3000	20	19500	130						
160	140	22400	20	2800	20	19600	140	0	0	0	0	19600	0
170	130	22100	40	2600	20	19500	150	10	100	3	420	19920	320
180	120	21600	60	2400	20	19200	160	20	400	6	840	20040	440
190	110	20900	80	2200	20	18700	170	30	900	9	1260	19960	360
200	100	20000	100	2000	20	18000	180	40	1600	12	1680	19680	80
210	90	18900	120	1800	20	17100	190	50	2500	15	2100	19200	-400
220	80	17600	140	1600	20	16000	200	60	3600	18	2520	18520	-1080
230	70	16100	160	1400	20	14700	210	70	4900	21	2940	17640	-1960
240	60	14400	180	1200	20	13200	220	80	6400	24	3360	16560	-3040
250	50	12500	200	1000	20	11500	230	90	8100	27	3780	15280	-4320
260	40	10400	220	800	20	9600	240	100	10000	30	4200	13800	-5800
270	30	8100	240	600	20	7500	250	110	12100	33	4620	12120	-7480
280	20	5600	260	400	20	5200	260	120	14400	36	5040	10240	-9360
290	10	2900	280	200	20	2700	270	130	16900	39	5460	8160	-11440

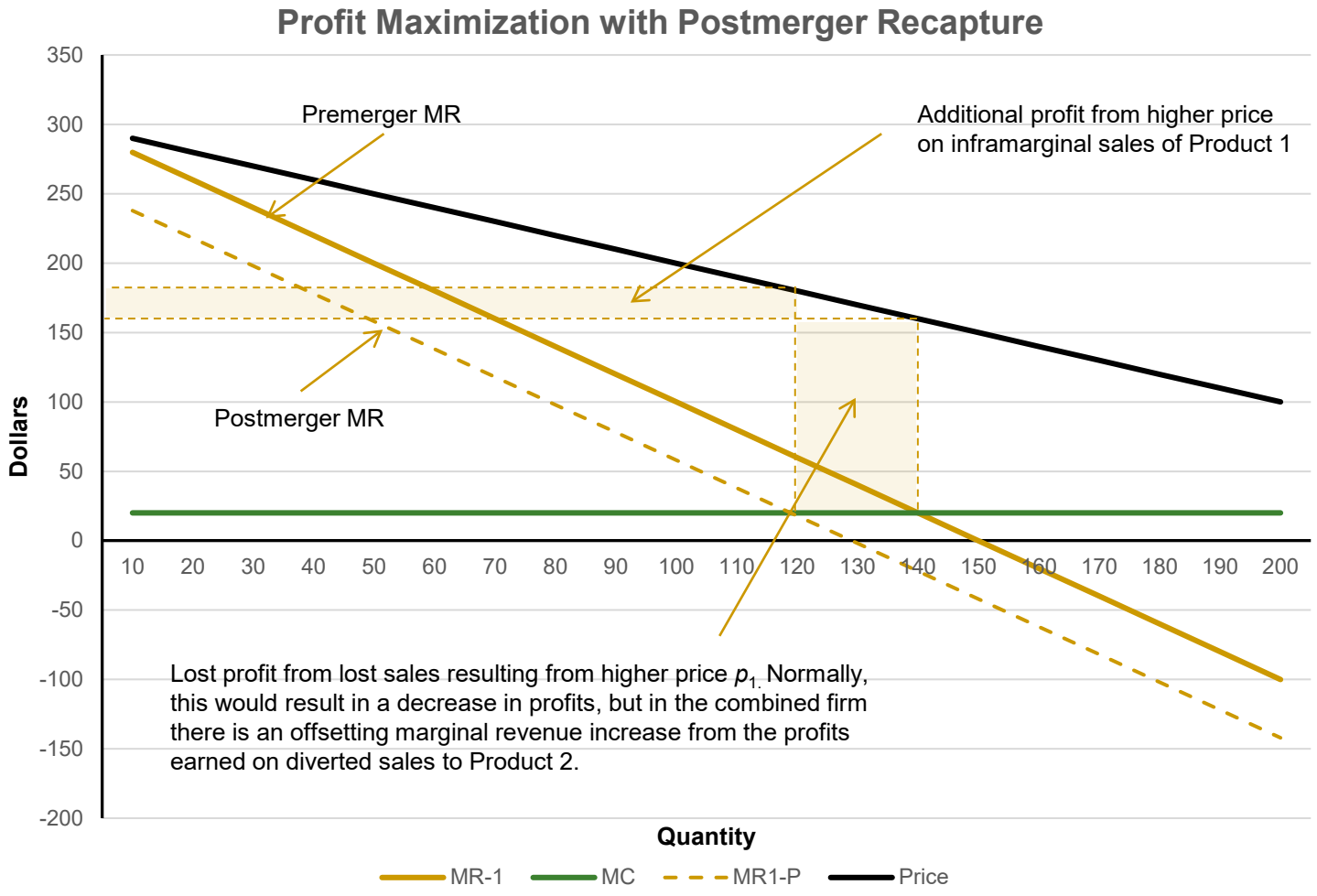
Another example

- Example 2 (another take—con')



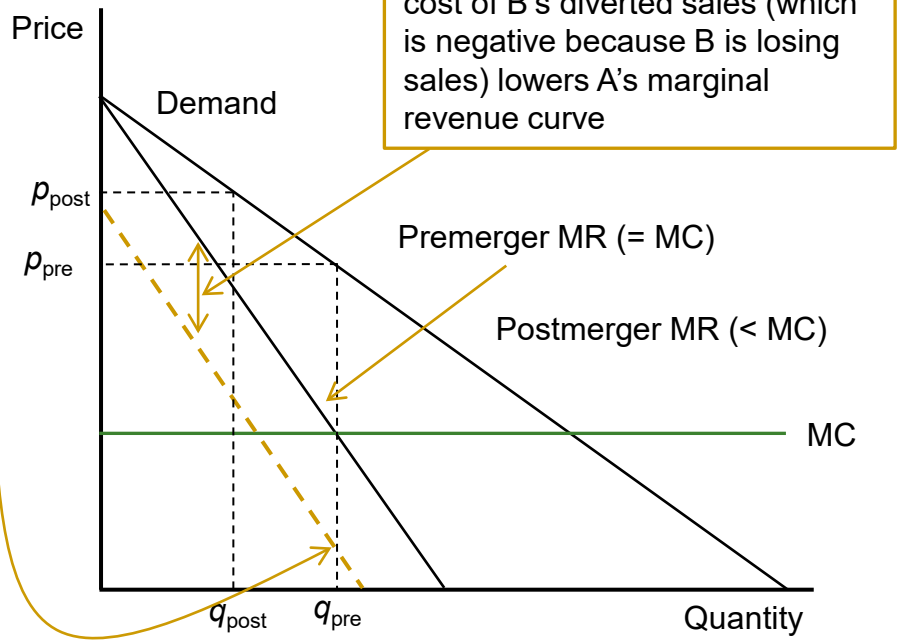
Another example

- Example 2 (con't)



Unilateral effects

- The basic idea
  - The diagrammatic approach (when thinking about expanding Firm A's output)[1]
    - Premerger: $MR_A = MC_A$
    - Postmerger: MR_A + opportunity cost from B's lost profits < MC_A *at* A's premerger output and price because the opportunity cost is negative
    - *Rule*: When *MR* < *MC*, contract output to increase profits



Accounting for the opportunity cost of B's diverted sales (which is negative because B is losing sales) lowers A's marginal revenue curve

$$= \Delta q_{B \to A}\left(p_B - c_B\right)$$

At premerger price and output, $MR_A < MC_A$, so A needs to contract its output

[1] This allows us to use our usual profits-quality diagram rather than a profits-price diagram.

Unilateral effects

OPTIONAL

- The math
  - Look at the merged firm's breakeven condition when we increase A's output by one unit and so decrease A's price (holding B's price constant and allocating all incremental profits and losses to A):

Sign of the term → + - + - +

$$p_A + \frac{\Delta p_A}{\Delta q_A}\left(q_A + \Delta q_A\right) + \Delta q_{B\to A}\left(p_B - c_B\right) = c_A$$

A's marginal opportunity cost postmerger (i.e., B's lost sales diverted to A times their dollar gross margin when A increases production by one unit)

  - Note that the opportunity cost for firm B is *negative* (because B is losing sales to A)
    - This means that at A's premerger levels of output and price, A's postmerger marginal revenue is *less* than its marginal cost
    - Consequently, to achieve marginal revenue = marginal cost, firm A must *decrease* output and increase price
    - This will also increase the merged firm's profits
      - Firm B's profit stays the same as premerger (due to firm A's payment of the "tax")
      - Firm A's profits increase even after it has paid the "tax" to Firm B
  - Note also that the magnitude of the opportunity cost—and hence the amount that A must decrease output and increase price is directly related to:
    - The magnitude of the diversion of products from B to A ($\Delta q_{B\to A}$)
    - The magnitude of firm B's margin ($p_B - c_B$)

Unilateral effects

OPTIONAL

- The math: Increasing firm A's price
  - On the prior slide, we looked at the merged firm's breakeven condition when we increased firm A's output. Now look at the merged firm's breakeven condition when we increase A's price by an amount that decreases A's output by one unit (again holding B's price constant and allocating all profits and losses to A):

$$\underset{-}{-p_A} - \frac{\Delta p_A}{\underset{-}{\Delta q_A}}\left(\underset{-}{q_A} + \underset{-}{\Delta q_A}\right) + \underset{+}{\Delta q_{A\to B}}\left(\underset{+}{p_B} - \underset{+}{c_B}\right) = \underset{-}{-c_A}$$

Recapture of profits from Firm A's sales that are diverted to Firm B

    - Note that:
      - The first term ($-p_A$) is the loss of revenue on the one lost marginal unit
      - The second term is the increase in profits from the margin increase on the inframarginal sales
      - The third term is the additional revenue recaptured by firm B from the diverted sales
      - The last term on the right is the marginal cost savings from the reduction in production by one unit
  - Now multiply both sides by -1 (this preserves the breakeven condition):

$$p_A + \frac{\Delta p_A}{\Delta q_A}\left(q_A + \Delta q_A\right) - \Delta q_{A\to B}\left(p_B - c_B\right) = c_A$$

Multiplying by -1 in effect shifts the direction of the quantity change from negative to positive, and so this equation is similar to the one on the previous slide

    - This means that at firm A's premerger levels of output and price, A's postmerger marginal revenue is *less* than its marginal cost
    - Consequently, to achieve marginal revenue = marginal cost, firm A must decrease output and increase price

Unilateral effects

- Example 4: Nestlé-Dreyer's[1]
  - Nestlé to acquire Dreyer's for $2.8 billion
  - Both companies make regular and super-premium ice cream
    - Nestlé makes Häagen Dazs
    - Dreyer's makes Dreamery, Godiva, and Starbucks
    - Unilever distributes Ben & Jerry's

[1] *In re* Nestlé Holdings, Inc., 136 F.T.C. 791 (2003) (settled by consent decree).

Unilateral effects

- Example 4: Nestlé-Dreyer's[1]
  - Two approaches
    - *Unilateral effects as originally conceived*: Allege an all-ice cream market and apply unilateral effects theory to Nestlé and Dreyer's in their super-premium products
      - PNB presumption not triggered in this market
    - *PNB approach*: Narrow relevant to a three-firm super-premium ice cream relevant market in order to invoke *PNB* presumption

> The consistent agency approach has been to narrow the markets for increase the market shares of the merging firms in order to take advantage of the *PNB* presumption

      - The agency approach is consistent with the Merger Guidelines as long as the combined firm maximizes its prices by raising the price of at least one of the products by at least a SSNIP. If so, then the products of the two firms constitute a relevant market.
        - This market approach often can be expanded to include all of the firms making close substitutes.
        - The only situation where the plaintiff needs to use the unilateral effects theory as originally conceived is when the profit-maximizing price increase of the merged firm for any or all of its products is less than a SSNIP—and those situations are unlikely to attract the investigating agency's interest in the first instance

[1] *In re* Nestlé Holdings, Inc., 136 F.T.C. 791 (2003) (settled by consent decree).

Unilateral effects

- Example 4
  - Nestlé-Dreyer's in the super-premium segment of an all ice cream market

Super-Premium Ice Cream (1)
(all channels)

	Sales	Share	HHI
Ben & Jerry's	$254.40	42.4%	1797.76
Nestlé	$219.00	36.5%	1332.25
Dreyer's	$114.60	19.1%	364.81
Others	$12.00	2.0%	4
	$600.00	100.0%	3498.82
Combined share		55.6%	
Premerger HHI			3,501
Delta			1,396
Postmerger HHI			4,897

All Ice Cream (2)
(supermarket sales in 2002)

	Sales	Share	HHI
Store brands (10)	$997.2	23.0%	53
Dreyer's	$795.4	18.4%	339
Breyer's	$686.8	15.9%	253
Blue Bell	$253.4	5.8%	34
Ben & Jerry's	$199.8	4.6%	21
Nestle	$192.7	4.4%	19
Wells Diary	$136.9	3.2%	10
Armour Swift	$106.7	2.5%	6
Turkey Hill	$105.2	2.4%	6
Marigold Foods	$88.2	2.0%	4
Others (10)	$769.1	17.8%	32
	$4,331.4	100.0%	776
Combined share		22.8%	
Premerger HHI			776
Delta			162
Post-merger			938

Note: If premium ice cream is a relevant product market, then the Nestlé-Dreyer's merger violates Merger Guidelines. But if premium ice cream is not a relevant market, then in the absence of a unilateral effects theory the transaction does not violate the market share thresholds of the Merger Guidelines.

[1] Complaint, *In re* Nestlé Holdings, Inc., 136 F.T.C. 791 (2003) (settled by consent decree).
[2] Sherri Day, *Nestlé and Dreyer's to Merge in $2.4 Billion Deal, Creating Top U.S. Ice Cream Seller*, N.Y. Times, June 18, 2002.

Unilateral effects: Requirements

- General requirements of the theory
  1. There must be two products differentiated in prices (premerger or postmerger)
  2. The products of the merging parties must be close substitutes for one another
  3. The products of (most) other firms must be sufficiently more distant substitutes to permit the merged firm to profitably increase price for at least one of its products
  4. Entry, expansion or repositioning into the products of the merging firms must be sufficiently difficult so as not to defeat the profitability of the merging firm increasing its prices postmerger

- Specific Guidelines requirements
  - 1992: Merging companies—
    1. had to be each other's closest competitors, *and*
    2. the combined firm had to have a market share of at least 35%

    Problem: Some cabining was necessary, since otherwise the unilateral effects theory would apply too broadly to any merger where the combining firms have positive cross-elasticity with one another and a positive margin and the market exhibits barriers to entry and repositioning
  - 2010: Eliminated both the closest substitute and 35% share requirements

Common evidence

1. Shared unique product attributes
   - Must be such as to create a high cross-elasticity of demand/diversion ratios between the products of the merging firms and significantly lower cross-elasticity of demand/diversion ratios with other products in the broader market
     - *Example*: Super-premium ice cream[1]
   - "Product attributes" should be broadly defined to include ancillary services
     - *Example*: Sales of office supplies to very large volume customers (including customized IT services and special commitments for rapid delivery)[2]
2. Uniquely observed head-to-head competition
   - Merging firms disproportionally compete head-to-head for customers compared to other firms in the broader market, with little prospect for replacement competition postmerger
     - *Example*: Staples and Office Depot consistently competed with each other—but few other office supply firms—in the sale of office supplies to large B2B customers, and customers testified (with supporting reasons) that no other supplier could replace this competition after the merger[3]

[1] *In re* Nestlé Holdings, Inc., 136 F.T.C. 791 (2003).
[2] FTC v. Staples, Inc., No. CV 15-2115 (EGS), 2016 WL 2899222 (D.D.C. May 17, 2016)
[3] *Id*.

Unilateral effects and market definition

- If there is a significant unilateral effect price effect from a merger, the hypothetical monopolist test will—
  - define narrow markets around the merging parties, *and thereby*
  - create corresponding high market shares and HHIs
- *Consequence*: When unilateral effects are present—
  1. The relevant markets will be smaller, and
  2. The *PNB* presumption will be stronger (higher HHIs)

Unilateral effects and cost efficiencies

- Offsetting marginal cost efficiencies
  - *Query*: What marginal cost reduction would be necessary to offset a one-product unilateral effect?
    - No marginal cost efficiencies:

$$mr_A^{postmerger} = mr_A^{premerger} - D_{BA}\$m_B = mc_A$$

    - Say the marginal cost efficiencies reduce marginal costs by *e* percent. Then:

$$mr_A^{postmerger} = mr_A^{premerger} - D_{BA}\$m_B = (1-e)mc_A$$

      - Rearranging and cancelling equal terms:

$$mr_A^{postmerger} = mr_A^{premerger} - D_{BA}\$m_B = mc_A - e \times mc_A$$

Remember: $mr_A^{premerger} = mc_A$

    - So to restore the first order condition at original prices and output:

$$D_{BA}\$m_B = e \times mc_A$$

that is, the downward pricing pressure from the marginal cost reduction must offset the upward pricing pressure

Merger Simulation

Unilateral effects and diversion ratios

- Predicting price increases
  - As noted earlier, the loss of units $\Delta q_{B \to A}$ from Firm B to Firm A when Firm A increases its output (and lowers its price) is a critical component of the merged firm's opportunity cost
  - Likewise, the recapture of units $\Delta q_{A \to B}$ (and profits) by Firm B when Firm A increases its price (and contracts its output) is a critical component of the merged firm's recapture of profits
  - Diversion ratios can be used in some models to predict ("simulate") the profit-maximizing price increase in the wake of a merger of two firms producing substitutes
    - This can permit a quantification of the upward pricing pressure under a theory of unilateral effects
- Refresher: Diversion ratios
  - Definition (when firm A raises in price):

$$D_{A \to B} \equiv D_{AB} \equiv \frac{\frac{\Delta q_B}{\Delta p_A}}{\frac{\Delta q_A}{\Delta p_A}} = \frac{\Delta q_B}{\Delta q_A},$$

This is the *diversion ratio* from A to B. It is the percentage of the total units that Firm A loses when it raises price that go to Firm B.

where firm A loses total units of Δq_A, of which Δq_B go to Firm B

"Merger simulation"

- The basic idea
  - *Merger simulation* attempts to directly predict price changes as a result of a merger
  - The usual structure of merger simulation models
    1. A theoretical model that derives market equilibrium from demand and cost characteristics
    2. The estimation of the demand characteristics (own- and cross elasticities, diversion ratios)
       - Ideally, estimated econometrically using a rich set of data (e.g., Nielsen scanner data in retail deals)
    3. The estimation of the premerger cost characteristics (marginal costs, margins)
       - For example, one approach is to assume a model of pricing (often Bertrand) and to use it jointly with the estimated demand parameters to recover implied marginal costs
       - Marginal cost can be approximated from accounting data, but these estimates tend to be unreliable
    4. The estimated demand parameters and costs are used jointly to simulate the new equilibria that would result from a merger
  - Models and data requirements
    - More structure (restrictions) on the model can significantly reduce the data requirements
      - *Examples of model restrictions*: Linear demand curves, identical firms, identical diversion ratios, identical margins
      - Of course, the more structure on the model, the less the model is likely to accurately predict actual market responses

"Merger simulation"

- The basic idea
  - Use by courts
    - Courts have accepted merger simulation models advanced by economic experts as potentially probative (although not dispositive) of the price implications of mergers
      - FTC v. Advocate Health Care, No. 15 C 11473, 2017 WL 1022015, at *11 (N.D. Ill. Mar. 16, 2017)
      - United States v. Aetna Inc., 240 F. Supp. 3d 1, 46-47 (D.D.C. 2017)
      - United States v. Anthem, Inc., 236 F. Supp. 3d 171, 212 (D.D.C. 2017)
      - FTC v. Sysco Corp., 113 F. Supp. 3d 1, 66 (D.D.C. 2015)
      - United States v. H & R Block, Inc., 833 F. Supp. 2d 36, 64 (D.D.C. 2011)
      - FTC v. Foster, No. CIV 07-352 JBACT, 2007 WL 1793441, at *42 (D.N.M. May 29, 2007)
      - United States v. Oracle Corp., 331 F. Supp. 2d 1098, 1122 (N.D. Cal. 2004)
    - Because these models go directly to the potential anticompetitive effect of a merger, they are usually highly contested in court
      - Also typically subject to *Daubert* challenges for faulty application (and not unreliability of the method generally)

Merger simulation

- Problems with merger simulation
  - Only as good as the model, the data, and the parameter estimates that go into the simulation
  - Often predict “hard to believe” price increases
    - Example: H&R Block/TaxACT
      - TaxACT 83%
      - HRB 37%
      - TurboTax 11%
  - Small changes in the model specification or the parameter estimation methods can result in big changes to the predicted postmerger price increases
  - Very few studies testing the accuracy of postmerger simulation with the use of actual postmerger data
    - That is, few studies examine how close or how far the simulated results are from what actually happened

Overall, courts have been very reluctant to give much weight to merger simulations

GUPPIs

- Definition
  - Antitrust economists define a measure called the *gross upward pricing pressure index* (GUPPI) to assess the merged firm's incentive to raise prices under a unilateral effects theory in the absence of entry, repositioning, and efficiencies:

$$GUPPI_1 = \frac{\text{value of profits from sales diverted to product 2}}{\text{value of all sales lost by product 1}} = \frac{\Delta q_2 (p_2 - c_2)}{\Delta q_1 p_1},$$

    where the merging firms produce products 1 and 2, respectively, and $GUPPI_1$ is the measure for product 1
    - Section 6.1 of the 2010 DOJ/FTC Horizontal Merger Guidelines implicitly creates of measure of this type
    - GUPPIs can be used in a simple, highly structured model to predict price increases resulting from a merger (usually used for screening to find stores of interest in retail deals)
  - Let $m_2 = \frac{p_2 - c_2}{p_2}$, the percentage gross margin of product 2 and D_{12} be the diversion ratio between product 1 and product 2. Then multiplying by p_2/p_2 yields:

$$GUPPI_1 = \frac{\Delta q_2}{\Delta q_1} \frac{(p_2 - c_2)}{p_2} \frac{p_2}{p_1} = D_{12} m_2 \frac{p_2}{p_1},$$

    These are all premerger prices and quantities

    which is the usual form of the expression for a GUPPI

GUPPIs

- GUPPIs and various measures of diversion
  - Recall the formula: $GUPPI_1 = D_{12} m_2 \frac{p_2}{p_1}$,

    where D_{12} is the diversion ratio from firm 1 to firm 2
  - We can also define a diversion ratio in sales:

$$D_{12}^{sales} = \frac{\text{Change in the value of firm 2's sales}}{\text{Change in the value of firm 1's sales}} = \frac{p_2 \Delta q_2}{p_1 \Delta q_1} = D_{12} \frac{p_2}{p_1}.$$

  - Using the sales diversion ratio, we have:

$$GUPPI_1 = D_{12}^{sales} m_2,$$

  - It is important to understand the measure of diversion in order to use the proper GUPPI formula
  - One more useful formula:

$$GUPPI_1 = \frac{p_2 \Delta q_2}{p_2 q_2} \times \frac{p_2 q_2}{p_1 q_1} \times m_2 = \frac{\Delta sales_2}{sales_2} \times \frac{sales_2}{sales_1} \times m_2,$$

    which is the percentage change in the sales (not units) of firm 2 times the ratio of firm 2's sales to firm 1's sales times the margin of firm 2. This formula can be useful when the firms sell multiple products and sales data is more readily available.

GUPPIs

- "Merger simulation" with GUPPIs
  - The unilateral profit-maximizing price increase
    - In the very special case of linear residual demand curves and equal diversion ratios ($D_{AB} = D_{BA} = D$), equal marginal costs, equal prices, equal margins, equal market shares, Bertrand competition, no changes in the prices of any nonmerging firm, and no entry/expansion/repositioning or efficiencies. The GUPPI gives the profit-maximizing price increase postmerger under the unilateral effects theory
    - The profit-maximizing price increase for product A leaving the price of product B at its premerger level:

$$\frac{\Delta p_A^*}{p_A} = \frac{GUPPI}{(1-D)} = \frac{Dm}{(1-D)}$$

since $p_A = p_B$ and so $p_A/p_B = 1$

    - The profit-maximizing price increase for both product A and product B when raising the price of both products:

$$\frac{\Delta p_A^*}{p_A} = \frac{\Delta p_B^*}{p_B} = \frac{GUPPI}{2(1-D)} = \frac{Dm}{2(1-D)}$$

    - In other words, the profit-maximizing price increase when the merged firm raises the price of both products is half of the profit-maximizing price increase when the merged firm raises the price of only one of the two products
      - This makes sense given the linearity of demand and the symmetry assumptions in the model

For proofs and an expanded treatment, see Carl Shapiro, Unilateral Effects Calculations (Oct. 2010), *available at* http://faculty.haas.berkeley.edu/shapiro/unilateral.pdf.

GUPPIs

Why look at so special a case?
Because the Merger Guidelines uses this model in Example 5!

GUPPIs

- "Merger simulation" with GUPPIs
  - Example 5 of the 2010 DOJ/FTC Horizontal Merger Guidelines

> Products A and B are being tested as a candidate market. Each sells for $100, has an incremental cost of $60, and sells 1200 units. For every dollar increase in the price of Product A, for any given price of Product B, Product A loses twenty units of sales to products outside the candidate market and ten units of sales to Product B, and likewise for Product B. Under these conditions, economic analysis shows that a hypothetical profit-maximizing monopolist controlling Products A and B would raise both of their prices by ten percent, to $110.

- How do the Guidelines predict that the profit-maximizing price will increase by $10?
  - Summary of parameters

$$p = \$100 \qquad c = \$60$$

$$D = 1/3 \qquad m = \frac{p - c}{p} = 0.4$$

  - The market exhibits linear demand and complete symmetry, so

$$\frac{\Delta p_1^*}{p_1} = \frac{\Delta p_2^*}{p_2} = \frac{Dm}{2(1-D)} = \frac{(1/3)(0.4)}{2(1-1/3)} = 0.10 \quad \text{or } 10\%$$

So price will increase from $100 to $110

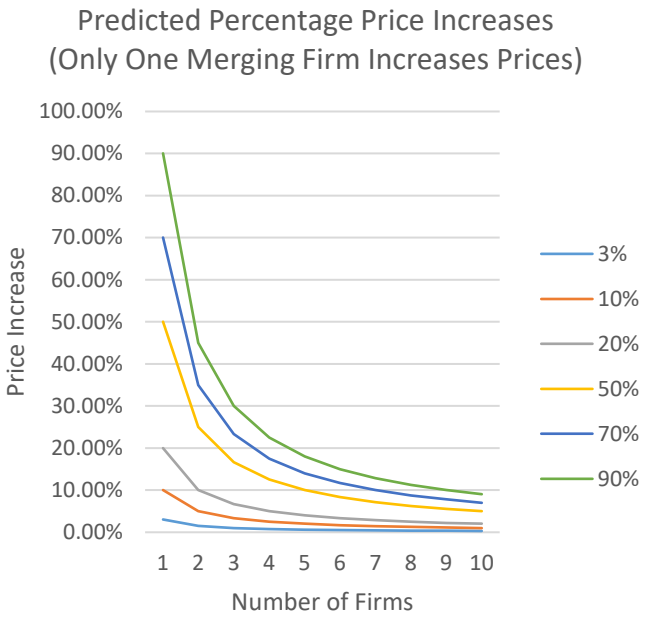
  - This implies that the hypothetical monopolist would raise its price to $110, as in the MG example

GUPPIs

- "Merger simulation" with GUPPIs
  - Illustration: The unilateral profit-maximizing price increase for only one merging firm
    - Assume linear residual demand curves and equal diversion ratios, equal marginal costs, equal prices, equal market shares, Bertrand competition, all other firms continue to price at premerger levels, and no entry/expansion/repositioning or efficiencies. Then:

$$\frac{\Delta p_1^*}{p_1} = \frac{GUPPI}{1-D} = \frac{Dm}{1-D}$$

Firms	Share	Margin: DR	3%	10%	30%	50%	70%	90%
			Predicted Percentage Price Increase for Only One Merging Firm					
3	33.33%	50.00%	3.00%	10.00%	30.00%	50.00%	70.00%	90.00%
4	25.00%	33.33%	1.50%	5.00%	15.00%	25.00%	35.00%	45.00%
5	20.00%	25.00%	1.00%	3.33%	10.00%	16.67%	23.33%	30.00%
6	16.67%	20.00%	0.75%	2.50%	7.50%	12.50%	17.50%	22.50%
7	14.29%	16.67%	0.60%	2.00%	6.00%	10.00%	14.00%	18.00%
8	12.50%	14.29%	0.50%	1.67%	5.00%	8.33%	11.67%	15.00%
9	11.11%	12.50%	0.43%	1.43%	4.29%	7.14%	10.00%	12.86%
10	10.00%	11.11%	0.38%	1.25%	3.75%	6.25%	8.75%	11.25%
11	9.09%	10.00%	0.33%	1.11%	3.33%	5.56%	7.78%	10.00%
12	8.33%	9.09%	0.30%	1.00%	3.00%	5.00%	7.00%	9.00%



NB: Given the highly restrictive conditions on the model, these estimates are likely to be wildly inaccurate but the agencies have used them for screening. *See, e.g.*, Statement of the Federal Trade Commission, In the Matter of Dollar Tree, Inc. and Family Dollar Stores, Inc. FTC File No. 141-0207 (July 13, 2015)..

GUPPIs

- Merger screening with GUPPIs
  - The idea
    - The GUPPI models that predict price increases have very restrictive conditions and usually will not provide a good estimate of any actual price increase that would occur as a result of a merger.
    - However, the agencies have used GUPPIs as a “screen” in some merger investigations (that is, as a method of eliminating some facilities from the investigation without the need for a detailed individualized analysis)
  - Example: Dollar General/Dollar Tree/Family Dollar
    - The situation
      - Contested takeover of Family Dollar between Dollar Tree and Dollar General in 1994-1995
        - Family Dollar: 8,200 stores (multi-price point stores generally < $10)
        - Dollar Tree: 5,000 stores (fixed-price point stores, selling everything for $1 or less)
        - Dollar General: 11,300-store (multi-price point stores)
      - The outcome
        - Dollar Tree won (at $9.2 billion)
        - Had to divest 330 Family Dollar stores
  - FTC problem: How to perform a merger antitrust analysis on so many stores in two separate investigations?
    - Number of stores made an individual analysis impossible as a practical matter

GUPPIs

- Merger screening with GUPPIs
  - Example: Dollar General/Dollar Tree/Family Dollar (con't)
    - The method
      1. Determine a GUPPI threshold that presumptively should indicate that a given store would not have an incentive under a unilateral effects theory to raise its prices significantly after the merger
      2. Estimate the GUPPI for each store in the investigation
      3. Compare the estimated GUPPI against the screening threshold

GUPPIs

- Merger screening with GUPPIs
  - Example: Dollar General/Dollar Tree/Family Dollar (con't)
    1. Determine a GUPPI screening threshold
       - Suppose that the agency decided that a 5→4 merger in a market with equally sized firms charging the same price presumptively would not give rise to a competitive concern
       - If we know the margin of the stores, then we can determine the GUPPI for each store (which will be the same for all stores in this hypothetical market)
         - Estimate the diversion ratio according to the proportional share method: D = 25%
         - Say the agency determined that the proper margin to use is 30%
         - Then GUPPI = $Dm = 25\% \times 30\% = 7.5\%$
         - Use 7.5% as the screening threshold (that is, if a 5→4 merger in a market of equally sized firms was acceptable to the agency and the GUPPI for each store in the merger was 7.5%, then any store in the transaction with a GUPPI less than or equal to 7.5% should be presumptively acceptable)
       - In the *Family Dollar* investigation, the FTC used different GUPPI thresholds for the stores of the two firms:
         - 7.5% for Family Dollar (→ 6 equivalent firms premerger with a 30% margin)
         - 10.0% for Dollar Tree (→ 5 equivalent firms premerger with a 30% margin)
           - The explanation for the higher GUPPI threshold for Dollar Tree is that DT's format is not to sell items for more than a dollar, so given the disincentives associated with a fundamental change to the store's format the merged, firm will be more likely to resist changing DT prices even if there is pricing pressure to do so.

GUPPIs

- Merger screening with GUPPIs
  - Example: Dollar General/Dollar Tree/Family Dollar (con't)
    2. Estimate the GUPPI for each store in the investigation
       - Retail stores that use electronic registers and bar code scanners collect data on each item sold and its price. This point-of-sale (POS) data is collected by services such as Nielsen and IRI and made available for purchase
       - Retail sales data was available for Dollar General, Dollar Tree, and Family Dollar
       - Using econometrics, the FTC estimated the diversion ratio for each store in both a Dollar General/Family Dollar and a Dollar Tree/Family Dollar transaction
         - To illustrate, say an area had only one Dollar Tree and one Family Dollar store. Then from the data, the agency could observe weekly changes in sales from both stores. If, as sales volume in one store changes, some customers were diverting to the other store, this can be detected econometrically. Moreover, econometrics can estimate the diversion ratio for each store compared to the other store.
         - NB: Using this method, diversion ratios will be estimated using the changes in dollar sales, not unit sales, but this is still consistent with the GUPPI formula:

$$GUPPI_1 = D_{12} m_2 \frac{p_2}{p_1} = \left(\frac{p_2}{p_1} \frac{\Delta q_2}{\Delta q_2} \right) m_2 = D_{12}^{sales} m_2,$$

         where D_{12}^{sales} is the diversion ratio measured in sales (i.e., the term in the parenthesis)
         - In principle, a GUPPI can be calculated for each pair Dollar Tree and Family Dollar stores (of course, stores very distant from one another should have zero diversion ratios). When, say, several Dollar Tree stores have positive diversion ratios with a single Family Dollar store, the total GUPPI for that Family Dollar store is the sum of the pairwise GUPPIs with each DT store

GUPPIs

- Merger screening with GUPPIs
  - Example: Dollar General/Dollar Tree/Family Dollar (con't)
    3. Compare the estimated GUPPI against the screening threshold
       - Dollar Tree determined to divest only Family Dollar stores
       - Stores with GUPPIs above the screening GUPPI thresholds (7.5% for Family Dollar Stores and 10.0% for Dollar Tree Stores) required further individualized investigation
       - However, the FTC and the states also reviewed some of the stores with GUPPIs below the screening thresholds based on other information the agencies developed (e.g., through casual inspection of maps)
       - Ultimately, the FTC and the states settled with a consent decree that required 330 Family Dollar stores to be divested
         - Including 100 stores that were below the threshold

GUPPIs

- "Merger simulation" with GUPPIs
  - The model so far is very restrictive with all of its symmetry conditions
  - Loosening these conditions makes things complicated very quickly
    - For example, when residual demand for both firms is linear but diversion ratios and margins differ, the optimal price increase formula becomes:

$$\frac{\Delta p_A^*}{p_A} = \frac{\left(D_{B\to A}\left(D_{B\to A} + D_{A\to B}\right)\right)m_A + 2D_{A\to B}m_B}{4 - \left(D_{B\to A} + D_{A\to B}\right)^2}$$

You should just see this to understand how quickly the formula becomes with a relaxation of the restrictions. You will *not* be required to know or use the formula.

GUPPIs

- GUPPIs in court
  - FTC v. Wilh. Wilhelmsen Holding ASA, 341 F. Supp. 3d 27, 64-65 (D.D.C. 2018)
    - Finding FTC's GUPPI analysis confirmatory of other, more reliable analysis of anticompetitive effect
  - FTC v. RAG-Stiftung, 436 F. Supp. 3d 278, 319 & n.33 (D.D.C. 2020)
    - Rejecting FTC's GUPPI analysis since it was based on putative relevant markets that the court had already rejected
    - But also noting:

> Even setting aside the GUPPI's market-share input, the model is unreliable here because: (1) the Merger Guidelines only recommend using the GUPPI to predict upward pricing pressure for "differentiated products," § 6.1, and the products here are homogenous within each relevant product market (hydrogen peroxide formulated for a specific end use); (2) the GUPPI "assumes that customers have little or no bargaining power," which is not the case with hydrogen peroxide customers; and (3) accurate GUPPI results "require[ ] precise information on pass-through behavior," and Dr. Rothman provides no evidence to support his .8 pass-through rate of cost to price.[1]

  - Entrata, Inc. v. Yardi Sys., No. 2:15-CV-00102, 2019 WL 13076536, at *2-*4 (D. Utah Aug. 23, 2019) (*Daubert* motion in monopolization and attempted monopolization case)

[1] *RAG-Stiftung*, 436 F. Supp. 3d at 319 n.33.

Dominant firm with a competitive fringe

- Recall the setup
  - Consider a homogeneous product market with—
    - A dominant firm, which sees its output decisions as affecting price and so sets output so that *mr* =*mc*, *and*
    - A fringe of firms that are small and act as price takers, that is, they do not see their individual choices of output levels as affecting price and therefore price as competitive firms (i.e., *p* = *mc*)
  - Choice question for the dominant firm: Pick the profit-maximizing level for its output given the competitive fringe
    - The model requires some constraint on the ability of the competitive fringe to expand its output. Otherwise, the competitive fringe will take over the market.
    - The constraint usually is either limited production capacity or increasing marginal costs

Dominant firm with a competitive fringe

- The model
  - At market price p, let $Q(p)$ be the industry demand function and $q_f(p)$ be the output of the competitive fringe. Then the residual demand $q_d(p)$ for the dominant firm is $Q(p) - q_f(p)$.
  - The dominant firm's profit maximization problem:

$$\max_p \pi_D = p \times \left[Q(p) - q_f(p) \right] - C\left(q(p)\right)$$

Although the dominant firm does not control market price directly, in this model it can— determine the market price that would maximize its profits and then back out the quantity it should produce using the aggregate demand function and the expected production level of the competitive fringe

1. determine the market price that would maximize its profits *and*
2. then back out the quantity it should produce using the aggregate demand function and subtracting the expected production level of the competitive fringe at that price

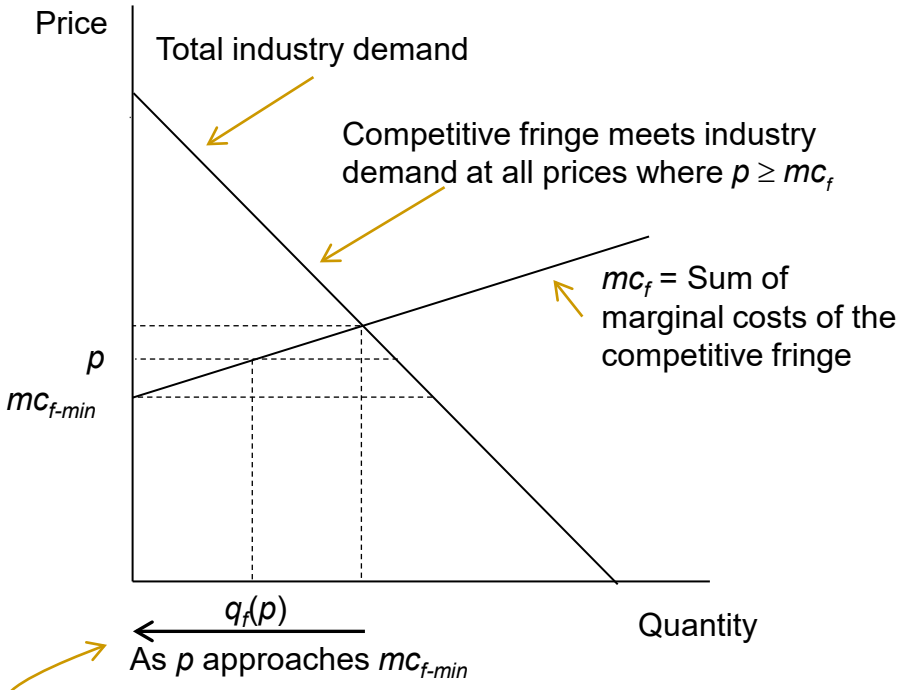
Dominant firm with a competitive fringe

- Dominant oligopolies
  - The model can be extended to the case where the dominant firm is replaced by a dominant oligopoly
    - The key is to specify the solution concept for the choice of output by the firms in the oligopoly (e.g., Cournot). You then create a residual demand curve for the oligopoly and apply the solution concept to that demand curve.
- The antitrust implications
  - As we saw in Unit 2, the DOJ and the FTC typically ignore fringe firms. The dominant firm (or dominant oligopoly) model with a competitive fringe provides a theoretical justification.
  - The idea is that the residual demand curve for the dominant firm can be created by subtracting the output supplied by the competitive fringe aggregate demand curve for the market as a whole.[1]
  - The usual tools for analyzing mergers can be applied to the subset of the market participants that do not include the competitive fringe firms

[1] The idea is conceptually easy to understand but the diagraming makes it look very complicated. See the next slide.

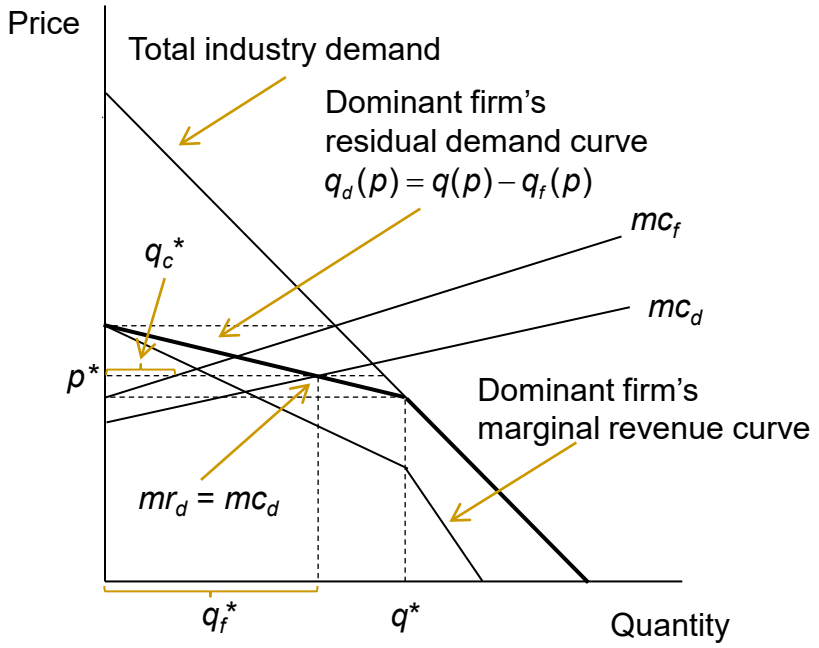
Unilateral effects with a competitive fringe

Output of the Competitive Fringe



Competitive fringe reduces output until price equals mc_f-min, its minimum marginal cost. Below this price the competitive fringe does not produce.

Output of the Dominant Firm



Dominant firm maximizes profit at q_f^*, where $mr_f = mc_f$. Total industry output $q^* = q_f^* + q_c^*$ at price p^*.