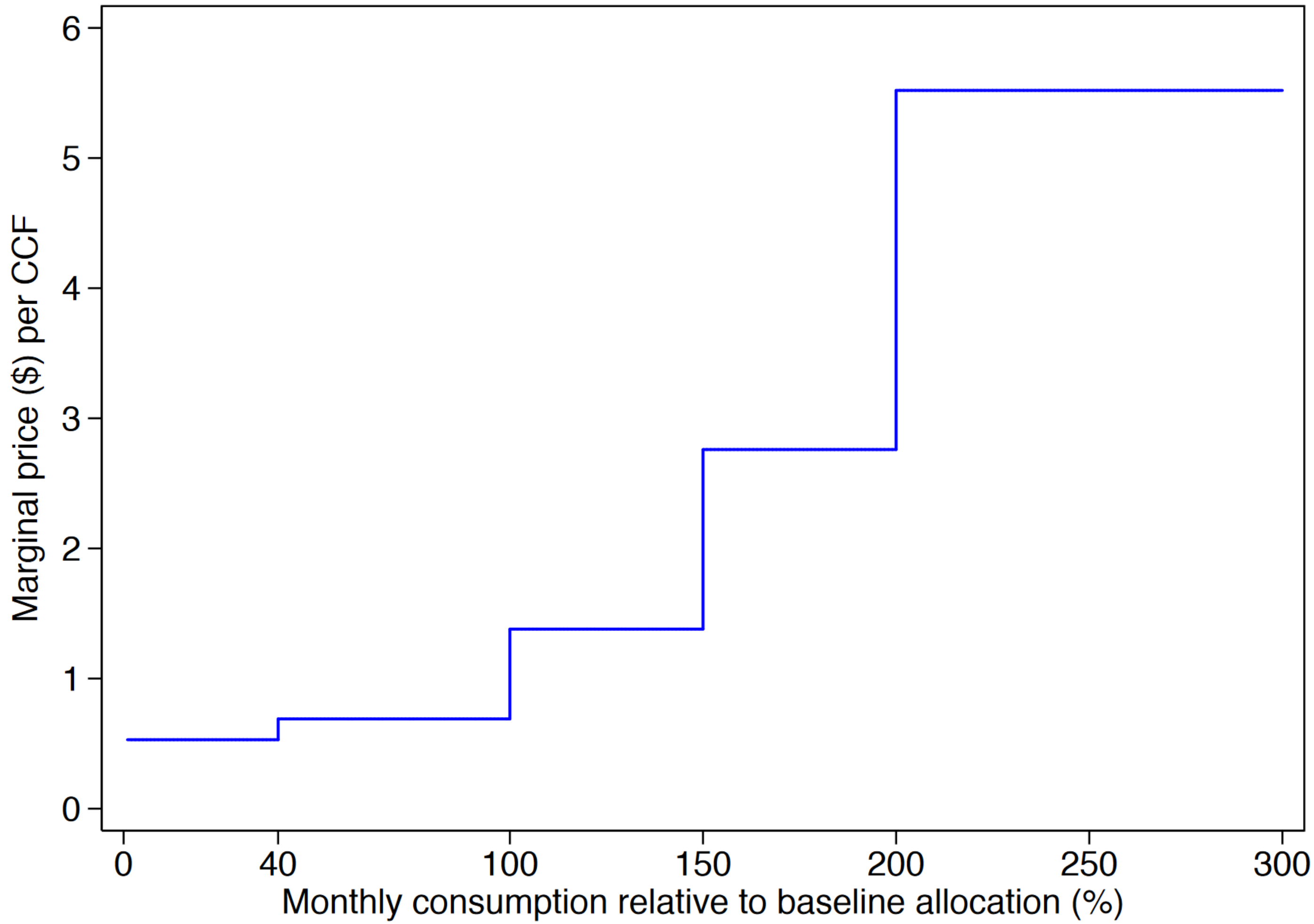
- 0. Nonlinear Pricing (two-part tariff)
- 1. Market power and policy
- 2. Hart-Scott-Rodino Act
- 3. Killer Acquisitions
- 4. Common Ownership

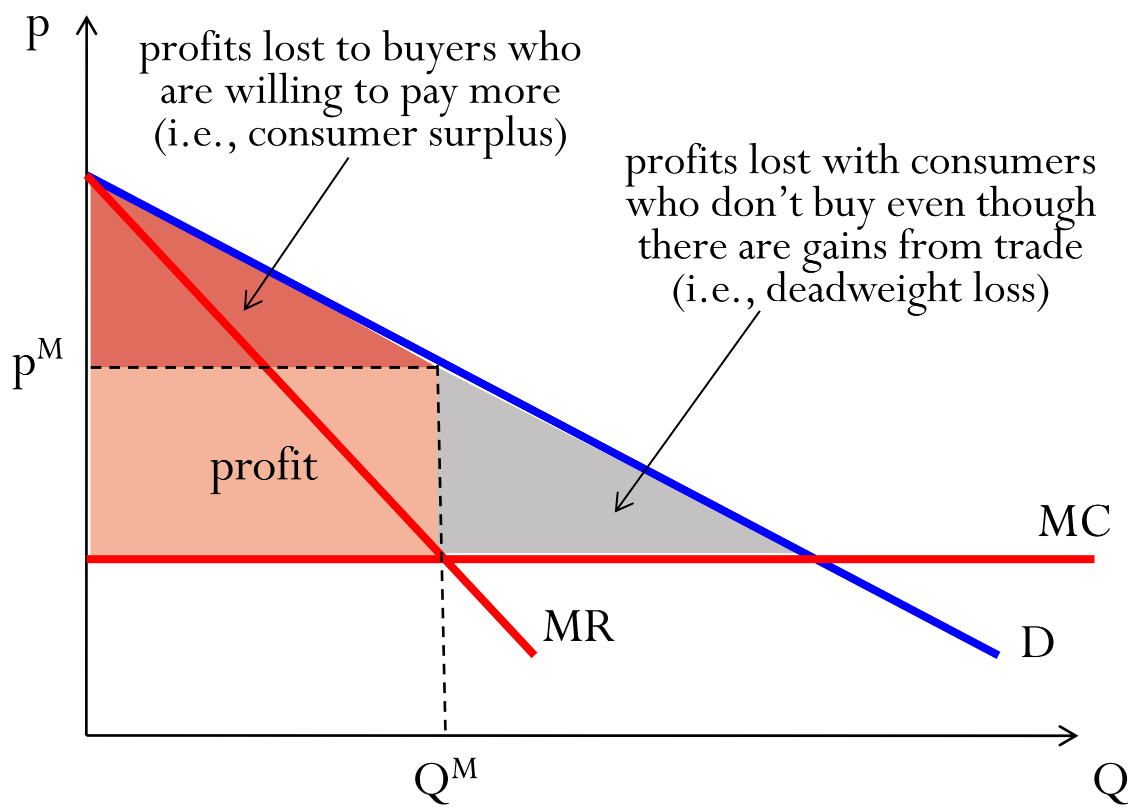
Marginal price/CCF for Irvine Water District



Two-part tariffs

- Special type of nonlinear pricing consisting of
  - Fixed upfront fee
  - Per-unit price
- Examples include
  - Admission fee + per-ride fee
  - Golf membership + per-use fee
  - Monthly internet/phone fee + per GB fee

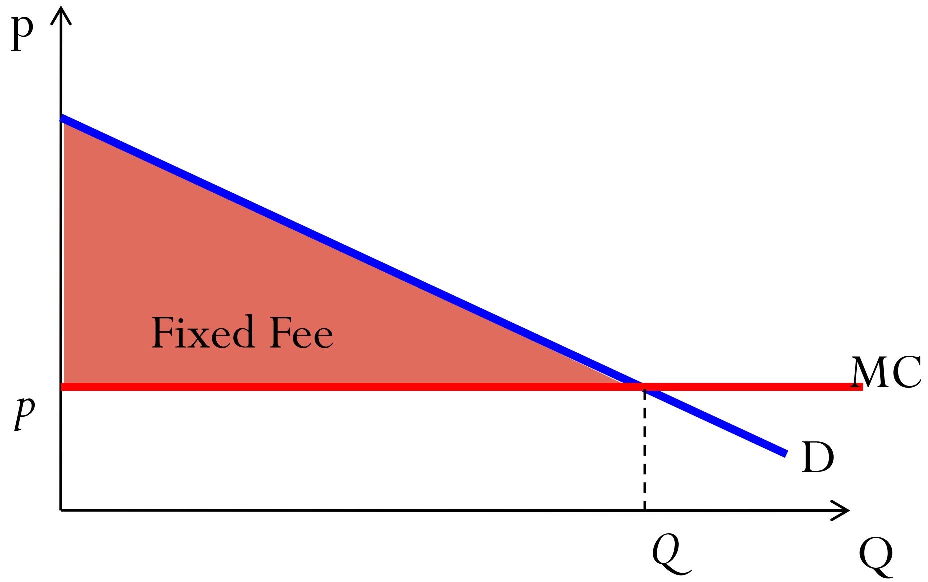
Motivation for Two-part tariff (remember this?)



Simple pricing leaves money on the table!

Two-part tariff:

- In order to maximize total surplus, want to set $p = MC$
- This maximizes total surplus, but surplus is all consumer surplus.
- Idea: charge a fixed fee to extract CS.
  - Set Fee = CS



Other Pricing Schemes

- Coupons
  - Idea: buyers with low valuations (e.g., the unemployed) may also value their time less, and will put more effort in clipping coupons
  - Outcome: rich and busy people pay more than poor people
  - Similar idea applies to some sales

Other Pricing Schemes …

- Intertemporal price discrimination
  - Price declines over time (e.g., movies and books)
  - Idea: high valuation users are often less patient
  - Outcome: less patient (or high-valuation) consumers pay more
- Complementary product pricing
  - Idea: reducing one product's price increases the demand for *both* products (e.g., razor blades and razors; printers and inks)
  - Outcome: lower prices than when each product is sold by separate monopolies

Summary

- When firms have market power, price discrimination is an important way to increase revenue
- Key issues for price discrimination:
  - Identifying market segments
  - Avoiding "arbitrage"
- If direct market segmentation is feasible, apply elasticity rule to each segment separately
- Otherwise, you may want/need to provide self-selection schemes (i.e., a menu of price-quantity/quality combinations) to induce consumers to distinguish themselves

Market Power and Policy

Introduction

- Types of Anti-trust/competition policy
  - Cartels and collusive behavior (e.g., price fixing)
  - Monopolization or exclusionary practices (e.g., exclusive contracts, predatory pricing)
  - Acquisition and mergers

- Policy institutions:
  - Department of Justice (DoJ), Federal Trade Commission (FTC), and sectoral regulators (e.g., FCC)

Anti-Trust/Competition Policy

- When and how should the government intervene?
- Main anti-trust laws in the US: the *Sherman Act* (1890) and the *Clayton Act* (1914), *Hart-Scott-Rodino Act* (1976, 2000)
- Section 1 of the Sherman Act deals with conspiracy to restrain trade (i.e., price fixing, bid rigging, market division etc.)
- Section 2 of the Sherman Act deals with monopolization (more on this)
- Clayton Act deals with Mergers, HSR deals with merger notification

Clayton Act (1914)

- Clayton Act: Section 7

  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….

- Paraphrase: No person shall acquire stock, capital, or assets of another that lessen competition or tend to create a monopoly

DOJ and FTC's interpretation of the Clayton Act

From the DOJ and FTC's Merger Guidelines

The unifying theme of these Guidelines is that mergers should not be permitted to create, enhance, or entrench market power or to facilitate its exercise. For simplicity of exposition, these Guidelines generally refer to all of these effects as enhancing market power. A merger enhances market power if it is likely to encourage one or more firms to raise price, reduce output, diminish innovation, or otherwise harm customers as a result of diminished competitive constraints or incentives. In evaluating how a merger will likely change a firm's behavior, the Agencies focus primarily on how the merger affects conduct that would be most profitable for the firm.

A merger can enhance market power simply by eliminating competition between the merging parties. This effect can arise even if the merger causes no changes in the way other firms behave. Adverse competitive effects arising in this manner are referred to as "unilateral effects." A merger also can enhance market power by increasing the risk of coordinated, accommodating, or interdependent behavior among rivals. Adverse competitive effects arising in this manner are referred to as "coordinated effects." In any given case, either or both types of effects may be present, and the distinction between them may be blurred.

Hart-Scott-Rodino Antitrust Act

TITLE II—PREMERGER NOTIFICATION

NOTIFICATION AND WAITING PERIOD

SEC. 201. The Clayton Act (15 U.S.C. 12 et seq.) is amended by inserting immediately after section 7 of such Act the following new section:

"SEC. 7A. (a) Except as exempted pursuant to subsection (c), no person shall acquire, directly or indirectly, any voting securities or assets of any other person, unless both persons (or in the case of a tender offer, the acquiring person) file notification pursuant to rules under subsection (d)(1) and the waiting period described in subsection (b)(1) has expired, if—

"(1) the acquiring person, or the person whose voting securities or assets are being acquired, is engaged in commerce or in any activity affecting commerce;

"(2)(A) any voting securities or assets of a person engaged in manufacturing which has annual net sales or total assets of $10,000,000 or more are being acquired by any person which has total assets or annual net sales of $100,000,000 or more;

"(B) any voting securities or assets of a person not engaged in manufacturing which has total assets of $10,000,000 or more are being acquired by any person which has total assets or annual net sales of $100,000,000 or more; or

"(C) any voting securities or assets of a person with annual net sales or total assets of $100,000,000 or more are being acquired by any person with total assets or annual net sales of $10,000,000 or more; and

"(3) as a result of such acquisition, the acquiring person would hold—

Hart-Scott-Rodino Antitrust Act

- Requires merging parties or acquirer to notify the antitrust agency before consummation
  - To give agencies time to review for potential harm to competition.
  - Exempt for mergers worth less than $10 million initially, then less than $50 million between 2000-2016. In 2017, it was changed to $80.8 million , then $84.4 million.

- HSR reflect the difficulty of "unscrambling the scrambled egg"
  - Before HSR, there were many "midnight mergers"
  - Almost no challenges to consummated mergers.

Horizontal Merger

COMPLAINT

The United States of America, acting under the direction of the Attorney General of the United States, brings this civil action to enjoin the merger of two of the nation's four largest mobile wireless telecommunications services providers, AT&T Inc. ("AT&T") and T-Mobile USA, Inc. ("T-Mobile"), and to obtain equitable and other relief as appropriate. Plaintiff alleges as follows:

I. NATURE OF THE ACTION

1. Mobile wireless telecommunications services are vital to the everyday lives of hundreds of millions of Americans. From their modest beginnings in the 1980s, when handsets were the size of a brick and coverage areas were limited, mobile wireless telecommunications devices have evolved into a profusion of smartphones, feature phones, tablets, data cards, e-readers, and other devices that use the nationwide mobile wireless telecommunications networks. Mobile wireless telecommunications services have become indispensible both to the way we live and to the way companies do business throughout the United States. Innovation in wireless technology drives innovation throughout our 21st-century information economy, helping to increase productivity, create jobs, and improve our daily lives. Vigorous competition is essential to ensuring continued innovation and maintaining low prices.

2. On March 20, 2011, AT&T entered into a stock purchase agreement to acquire T-Mobile from its parent, Deutsche Telekom AG ("DT"), and to combine the two companies' mobile wireless telecommunications services businesses ("Transaction Agreement"). AT&T, with approximately 98.6 million connections to mobile wireless devices, and T-Mobile, with approximately 33.6 million connections, serve customers throughout the United States, with networks that each reach the homes of at least 90 percent of the U.S. population. AT&T and T-Mobile are two of only four mobile wireless providers with nationwide networks and a variety of competitive attributes associated with that national scale and presence. The other two nationwide networks are operated by Verizon Wireless ("Verizon") and Sprint Nextel Corp. ("Sprint"). Although smaller providers exist, they are significantly different from these four. For instance, none of the smaller carriers' voice networks cover even one-third of the U.S. population, and the largest of these smaller carriers has less than one-third the number of wireless connections as T-Mobile. Similarly, regional competitors often lack a nationwide data network, nationally recognized brands, significant nationwide spectrum holdings, and timely access to the most popular handsets. Collectively, the "Big Four" – AT&T, T-Mobile, Verizon, and Sprint – provide more than 90 percent of service connections to U.S. mobile wireless devices.

U.S. V. AT&T. INC. T-MOBILE USA, INC. AND DEUTSCHE TELEKOM AG (2011)

Horizontal Merger

C. Concentration

22. Concentration in relevant markets is typically measured by the Herfindahl-Hirschman Index ("HHI"), which is defined and explained in Appendix A to this Complaint. Preliminary market share estimates demonstrate that in 96 of the nation's largest 100 CMAs – all identified in Appendix B as representing relevant geographic markets for mobile wireless telecommunications services – the post-merger HHI exceeds 2,500. Such markets are considered to be highly concentrated. In one additional CMA identified in Appendix B, the post-merger HHI falls just below 2,500 and the market would be considered moderately concentrated

23. In 91 of the 97 CMAs identified in Appendix B as representing relevant geographic markets for mobile wireless telecommunications services – including all of the nation's 40 largest markets – preliminary market share estimates demonstrate that AT&T's acquisition of T-Mobile would increase the HHI by more than 200 points. Such an increase is presumed to be likely to enhance market power. In an additional 6 CMAs, the increase would be at least 100, an increase that often raises significant competitive concerns.

24. In more than half of the CMAs identified in Appendix B as representing relevant geographic markets for mobile wireless telecommunications services, the combined AT&T/T-Mobile would have a greater than 40 percent share. In at least 15 of the CMAs, including major metropolitan markets such as Dallas, Houston, Oklahoma City, Birmingham, Honolulu, and Seattle, the combined firm would have a greater than 50 percent share – i.e., more customers than all the other firms combined.

25. Nationally, the proposed merger would result in an HHI of more than 3,100 for mobile wireless telecommunications services, an increase of nearly 700 points. These numbers substantially exceed the thresholds at which mergers are presumed to be likely to enhance market power.

U.S. V. AT&T. INC. T-MOBILE USA, INC. AND DEUTSCHE TELEKOM AG (2011)

Measuring Market Concentration

- The **C_4 concentration index**: the sum of the market shares of the largest 4 firms

$$C_4 = (s_1 + s_2 + s_3 + s_4) \times 100$$

  - E.g., if s_1=30%, s_2=25%, s_3=15% and s_4=10%, then C_4=80
- The **Hirschman-Herfindahl concentration index (HHI)**: the sum of the squared market shares of all firms in the industry

$$HHI = (s_1^2 + s_2^2 + \cdots + s_n^2) \times 10{,}000$$

  - E.g., if s_1=40%, s_2=35%, and s_3=25%, then $HHI = 40^2 + 35^2 + 25^2 = 3450$
- Higher C_4 or HHI implies greater market concentration

Concentration in Some US Industries

Industry	SIC Code	C_4	HHI
Pharmaceuticals	3254	32.2	446
Computers	3341	37.0	465
Semiconductors	334413	52.5	1080
Motor vehicles	3361	82.4	2506
Aircraft	3364	84.8	1637

Source: DoC.

(SIC: Standard Industrial Classification)

Acquisitions and Mergers

- If there are economies of scale, then merger leads to lower costs. Various synergies may create additional value.
- But: greater concentration leads to greater market power
- Merger policy is an attempt at measuring the pros and cons of each merger
  - Benefits and costs for firms
  - Benefits and costs for consumers

DOJ/FTC Merger Guidelines

Among many factors, look at post-merger HHI:

- Mergers involving an increase in HHI of less than 100 points not likely a concern
- *Unconcentrated markets*: HHI < 1500
  - Mergers leading to unconcentrated markets not likely a concern
- *Moderately concentrated markets*: HHI b/w 1500 and 2500
  - Mergers resulting in moderately concentrated markets that involve an increase in HHI of more than 100 points raise significant competitive concern and often warrant scrutiny
- *Highly concentrated markets*: HHI above 2500
  - Mergers resulting in highly concentrated markets that involve an increase in HHI of between 100 and 200 points raise significant competitive concern and often warrant scrutiny
  - Mergers resulting in highly concentrated markets that involve an increase in HHI of more than 200 presumed to enhance market power (subject to mitigating factors)

Source: http://www.justice.gov/atr/public/guidelines/hmg-2010.html#5c

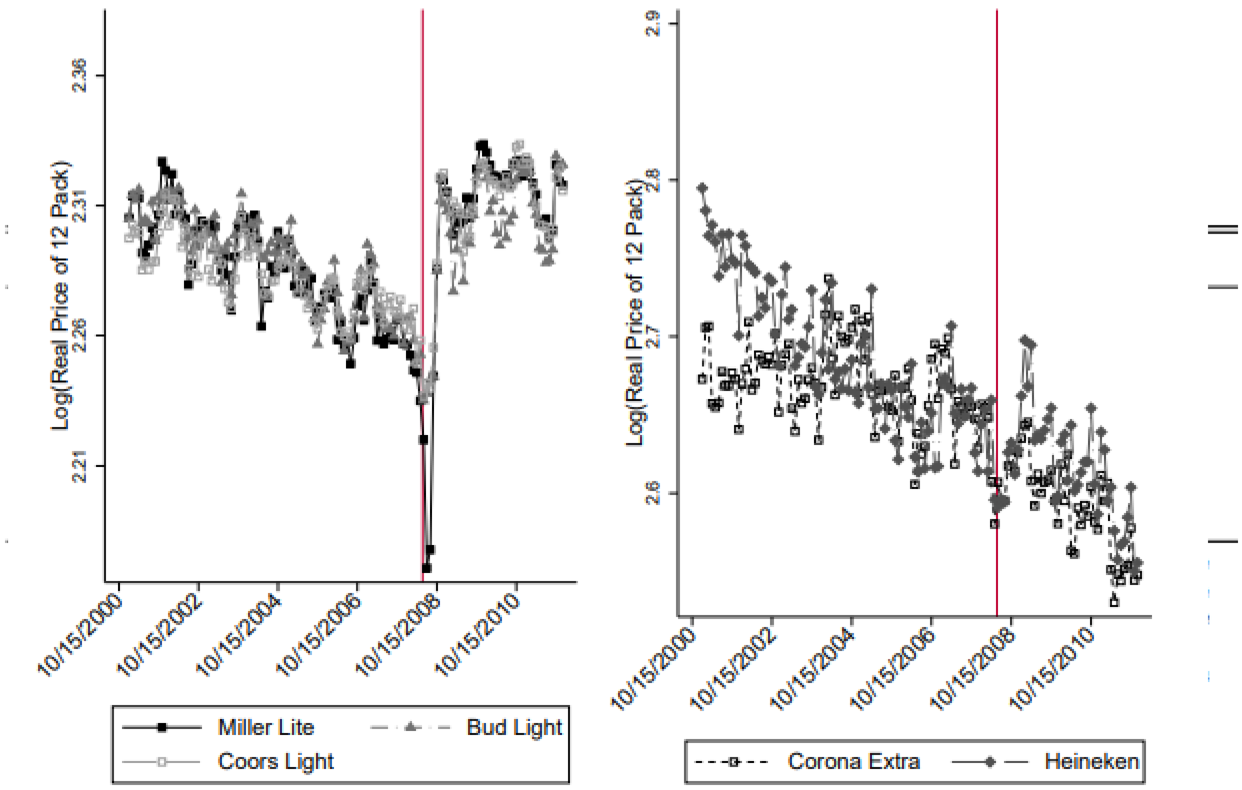
Study of Miller-Coors Merger of 2008 Miller and Weinberg (2017)

Table I: Revenue Shares and HHI

Year	ABI	MillerCoors	Miller	Coors	Modelo	Heineken	Total	HHI
2001	0.37	.	0.20	0.12	0.08	0.04	0.81	2,043
2003	0.39	.	0.19	0.11	0.08	0.05	0.82	2,092
2005	0.36	.	0.19	0.11	0.09	0.05	0.79	1,907
2007	0.35	.	0.18	0.11	0.10	0.06	0.80	1,853
2009	0.37	0.29	.	.	0.09	0.05	0.80	2,350
2011	0.35	0.28	.	.	0.09	0.07	0.79	2,162

Notes: This table provides revenue shares and the HHI over 2001–2011. Firm-specific revenue shares are provided for ABI, Miller, Coors, Modelo, and Heineken. The total across these firms is also provided. The HHI is scaled from 0 to 10,000. The revenue shares incorporate changes in brand ownership during the sample period, including the merger of Anheuser-Busch (AB) and InBev to form ABI, which closed in November 2008, and Heineken's acquisition of the FEMSA brands in April 2010. All statistics are based on supermarket sales recorded in IRI scanner data.

Study of Miller-Coors Merger of 2008



US budget airline Frontier to buy rival Spirit for $6.6bn

Carriers say the deal would allow them to better compete with America's 'Big Four'

Frontier and Spirit say the combined company would lower costs and expand services to underserved markets © REUTERS

US low-cost carrier Frontier has agreed to acquire rival Spirit for $6.6bn, including net debt, in what would be the first large airline merger since the industry was rocked in 2020 by travel bans and lockdowns introduced to stem the spread of Covid-19.

Under the terms of the agreement on Monday, Spirit shareholders will receive 1.9126 shares of Frontier plus $2.13 in cash per Spirit share. At a $25.83 per share valuation, Spirit shareholders will be paid a 19 per cent premium over the stock's closing price on February 4.

If the deal is approved, the new company will be 51.5 per cent owned by Frontier, while the remainder will be held by Spirit.

Frontier and Spirit said that the combination would allow them to better compete with the "Big Four" airlines — American, Delta, Southwest and United — claiming they would lower costs further for consumers and also expand services to underserved, and usually more expensive, routes.

"This transaction is centred around creating an aggressive ultra-low fare competitor . . . and increase competitive pressure, resulting in more consumer-friendly fares for the flying public," said Ted Christie, president and chief executive of Spirit. "We look forward to uniting our talented teams to shake up the airline industry."

The combination, which the two companies said they hoped to close in the second half of 2022, is likely to be thoroughly scrutinised by antitrust regulators, who have in recent years been sceptical about airline mergers.

Lina Khan, chair of Federal Trade Commission, and Jonathan Kanter, head of the justice department's antitrust division, have both recently said that they would take an aggressive stance on blocking deals.

Khan has been particularly critical about consolidation in the airline industry. Her attacks, however, have been predominantly targeted at the Big Four, which according to her calculations control about 80 per cent of air travel in the US.

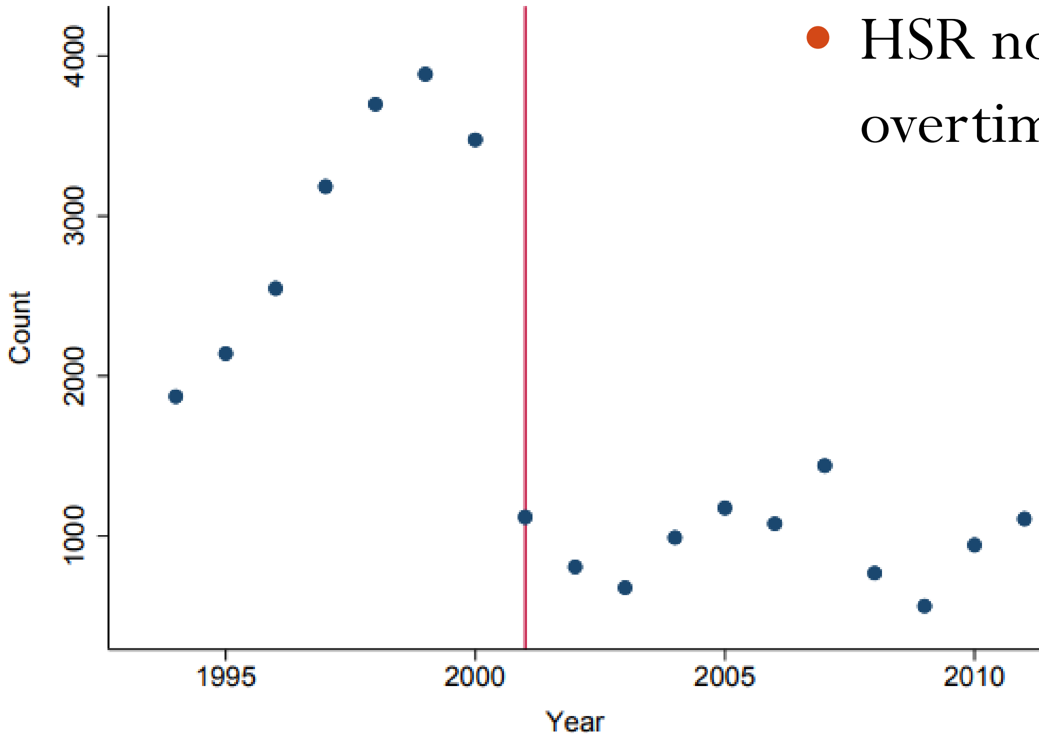
"The high level of concentration has handed the four companies enormous market power, equipping them to keep fares high even as oil prices have plummeted," Khan wrote in the Washington Post in 2015.

She added: "The quality of their service, meanwhile, continues to deteriorate, with less seat space, fewer flight options and a litany of fees for basics that used to be free, such as checked bags and in-flight snacks. The situation, in other words, bears classic signs of oligopoly."

Frontier and Spirit are likely to use Khan's previous arguments to make a case in favour of the creation of a larger budget carrier that can compete against the existing top players. The last large airline merger to be cleared by the DoJ was in 2016 when Alaska Airlines bought Virgin America for $4bn.

Study on Change in HSR and the Rise of Concentration

Figures

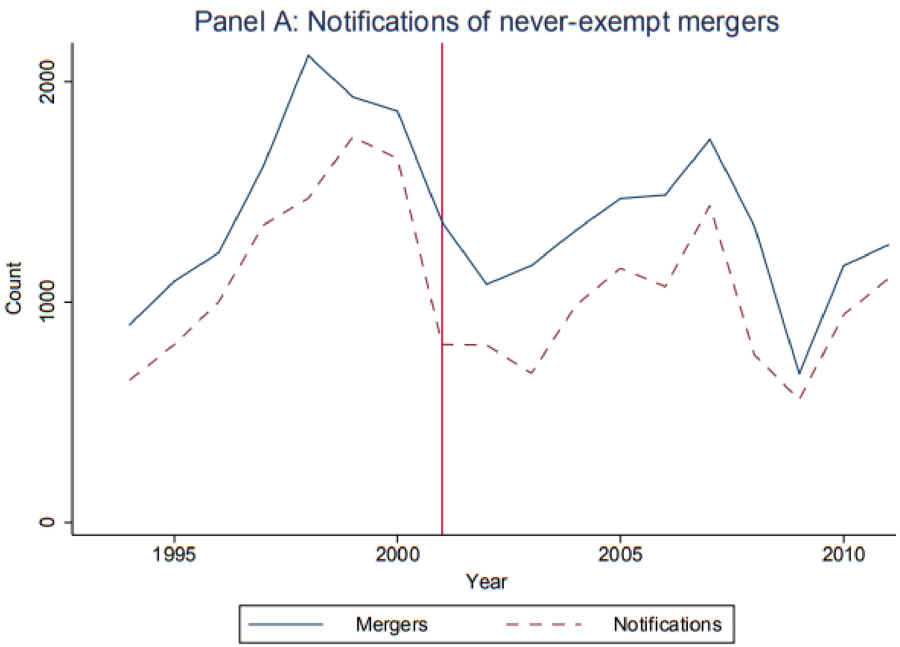


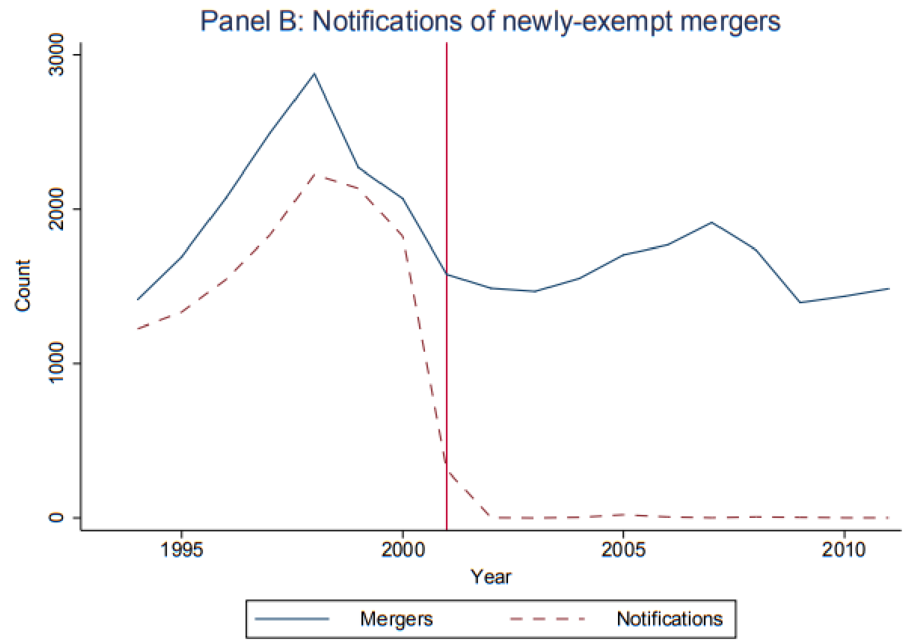
- HSR notifications overtime

Figure I: *Notifications drop sharply when the Amendment takes effect.*

This graph plots the number of transactions for which premerger notifications were filed in the US over time. Filings are required pursuant to the Hart-Scott-Rodino Antitrust Improvements Act and reviewed by the Department of Justice and Federal Trade Commission. A vertical line marks 2001, the year the Act was amended to exempt deals valued at less than $50 million.

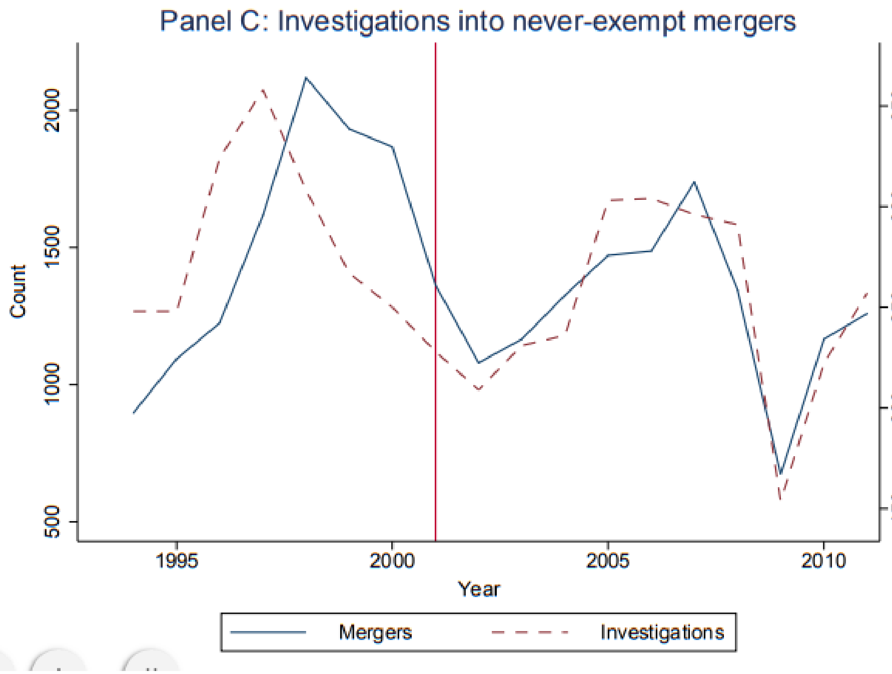
HSR Notifications by Firm Size

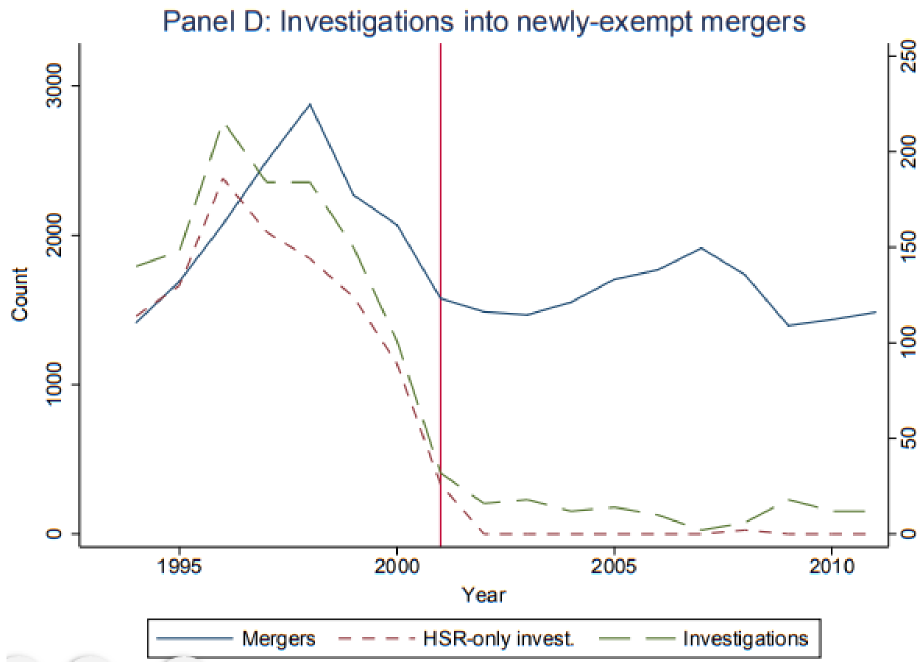




- HSR notifications for >50 million
- HSR notifications between 10 million 50 million

Investigations by Firm Size

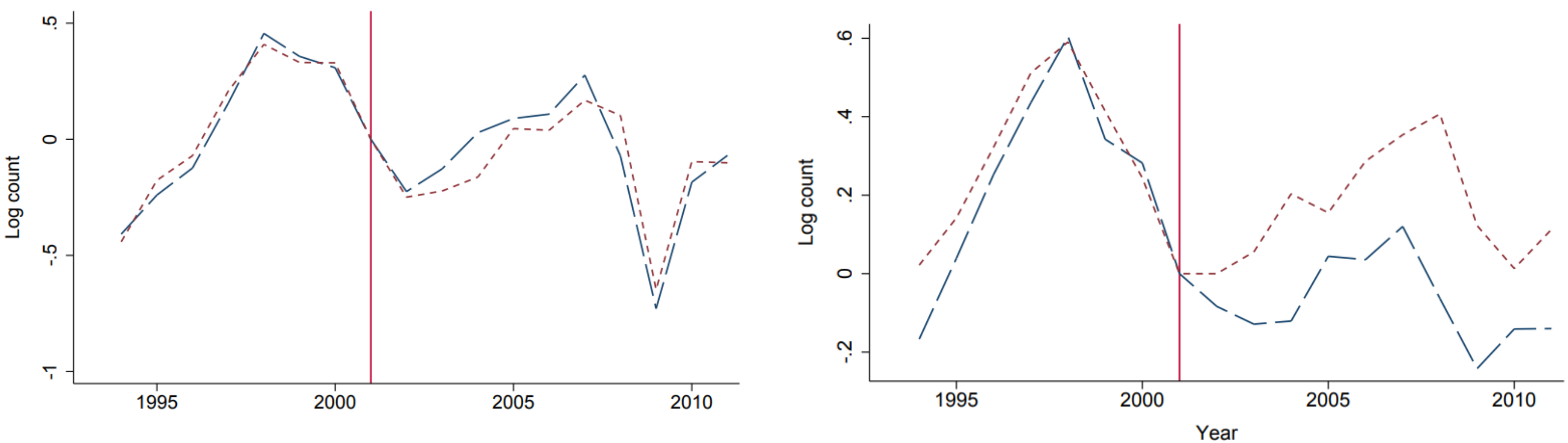




- Investigations for >50 million mergers
- Investigations for mergers between 10 and 50 million mergers

Horizontal and Vertical Mergers by Firm Size

- One panel is never-exempt and the other is newly exempt. Which panel is which? One line corresponds to horizontal mergers and the other corresponds to vertical mergers. Which is which?



- What conclusions can we draw from this study?

Why do we have mergers/acquisitions?

- In ATT-T-mobile merger case, merging parties claimed that the proposed transaction "provides by far the surest, fastest, and most efficient solution" to the spectrum and capacity "challenges" it faced
  - In particular, (1) the merger would permit it to relieve alleged capacity constraints on its GSM and UMTS networks.
  - (2) the merger would permit it to deploy the next generation 4G LTE service to 97 percent of the U.S. population by some unspecified date, as compared to only 80 percent in 2013 absent the merger.
- Why do firms want to do M&A?

Killer Acquisitions?

- A study that looks at acquisitions in pharmaceuticals.
  - Studies 35,000+ drug projects from 6700 companies.
  - Data on development milestones of each drug project
  - Mergers and acquisitions

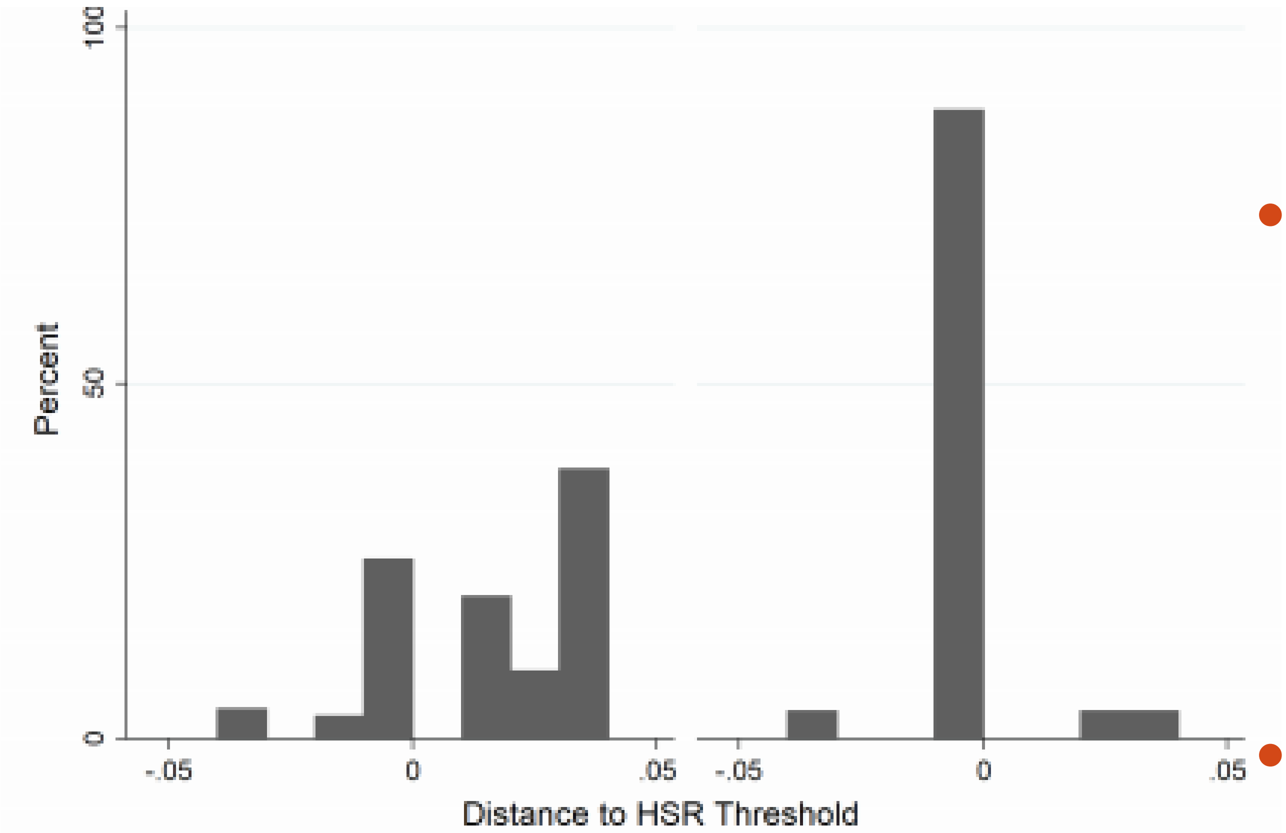
- What happens to drug projects of acquired firms
  - Depending on whether or not the acquirer has an "overlapping drug"
    - Overlapping drug defined as same therapeutic market (antihypertensives)
    - And same mechanism of action (calcium channel antagonists)
  - If a drug is developed less when acquirer has an "overlapping drug", it would be consistent with "killer acquisition"

Killer Acquisitions?

$$Development_{i,t} = \beta \cdot I(Acquired)_i \times I(Post)_{i,t} \times I(Overlap)_i + \gamma_1 \cdot I(Acquired)_i \times I(Post)_{i,t} + \gamma_2 \cdot I(Acquired)_i \times I(Overlap)_i + \gamma_3 \cdot I(Acquired)_i + \alpha_{age} + \alpha_{vintage} + \varepsilon_{i,t},$$

	Development Event = 1					
	(1)	(2)	(3)	(4)	(5)	(6)
	Originated before 2011		Originated before 2000		Single-Project Companies	
I(Acquired) × I(Post) × Overlap	-0.019***	-0.013*	-0.030***	-0.017*	-0.128**	-0.177***
	(-2.894)	(-1.747)	(-3.508)	(-1.791)	(-2.392)	(-2.688)
I(Acquired) × I(Post)	-0.017***	-0.013***	-0.013***	-0.016***	-0.041*	-0.036
	(-5.239)	(-3.684)	(-3.050)	(-3.471)	(-1.747)	(-1.376)
I(Acquired) × Overlap	-0.001		-0.000		0.040	
	(-0.178)		(-0.061)		(0.931)	
I(Acquired)	-0.002		-0.003		0.008	
	(-0.720)		(-0.955)		(0.501)	
Observations	311,501	311,501	127,910	127,910	17,780	17,780
R-squared	0.018	0.243	0.009	0.237	0.028	0.166
Project FE	No	Yes	No	Yes	No	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes
Vintage FE	Yes	No	Yes	No	Yes	No

Killer Acquisitions?



- Distribution of Acquisition size near HSR Threshold.
- One corresponds to acquisitions with overlap, another corresponds to acquisitions with no overlap.
- Which one is which?

Common Ownership and Antitrust Concerns

DealBook / Business & Policy

DEAL PROFESSOR

Rise of Institutional Investors Raises Questions of Collusion

BlackRock, Vanguard and other big institutional investors own roughly 70 percent of the public stock market, according to some reports. People are starting to ask whether this allows companies — now having the same owners — to compete less and raise prices.

Take, for example, the airline industry. Across all of its funds, BlackRock held 8.3 percent of United, 6.6 percent of JetBlue, 4.7 percent of Delta and 4.5 percent of Southwest, as of March 31, 2013. Mr. Baer said the Justice Department was exploring whether such cross-ownership either explicitly or implicitly pushed companies to compete less.

After all, if there is less competition in the airline industry and higher fares result, it will arguably benefit BlackRock over all, because it holds shares in not just one company but several in the industry. Less competition may mean higher costs for consumers but more profits for the airlines and BlackRock's investors.

Common Ownership and Antitrust Concerns

The Justice Department's investigation was spurred by a draft study published by José Azar and Isabel Tecu of the consulting firm Charles River Associates, along with Martin C. Schmalz of the University of Michigan business school. In that study, which looked at the airline industry from 2001 to 2013, the authors found that the higher the concentration of cross-ownership by institutional shareholders, the less competition and the higher fares that rose. The authors estimate that airfares rose by 3 to 5 percent on average because of this cross-shareholding.

Let's just stop here and note why this is interesting.

These are not the typical antitrust violations where one company buys a rival and is able to squeeze out competition and raise prices. Instead, these institutional shareholder positions are minority holdings that are pervasive throughout the public stock market. If these holdings diminish competition and result in higher prices, it is an attack on the way shares are held. And it also means that the public is suffering under our capital markets arrangement.

Azer, Schmalz, Tecu (2017)

- Common Ownership Patterns

Apple	*[%]*
Vanguard	6.05
BlackRock	5.72
State Street	3.82
Fidelity	2.34
Northern Trust Corporation	1.26

Microsoft	*[%]*
Vanguard	6.41
BlackRock	5.80
Capital Research	4.76
- Steve Ballmer -	4.24
State Street	3.80
- Bill Gates -	2.54
T. Rowe Price	2.27

CVS	*[%]*	*Walgreens Boots Alliance*	*[%]*	*Rite Aid*	*[%]*
Vanguard	6.66	-Stefano Pessina-	13.06	Vanguard	7.24
BlackRock	6.02	Vanguard	5.58	BlackRock	4.20
State Street	4.00	BlackRock	4.55	Arrowgrass Capital	3.55
Fidelity	3.67	KKR	3.38	Franklin Resources	2.87
Wellington	2.37	State Street	3.34	Pentwater Capital	1.89
		T. Rowe Price	2.70		

JP Morgan Chase	*[%]*	*Bank of America*	*[%]*	*Citigroup*	*[%]*
Vanguard	6.28	Berkshire Hathaway*	6.90	BlackRock	6.43
BlackRock	6.28	Vanguard	5.94	Vanguard	5.96
State Street	4.12	BlackRock	5.94	State Street	4.04
Capital Research	3.68	State Street	4.01	Fidelity	3.00
Fidelity	2.10	Fidelity	2.37	Invesco	1.67
Wells Fargo	*[%]*	*PNC Financial*	*[%]*	*U.S. Bancorp*	*[%]*
Berkshire Hathaway	10.46	Wellington	8.34	BlackRock	6.51
Vanguard	5.67	Vanguard	6.30	Berkshire Hathaway	5.94
BlackRock	5.42	BlackRock	5.03	Vanguard	5.59
State Street	3.68	State Street	4.33	Fidelity	4.12
Wellington	2.55	Barrow Hanley	3.71	State Street	3.84

Table 1: Illustrative Cases of Within-industry Common Ownership Links (continued)

The data source is Capital IQ and reflects holdings as of 2016Q4.

Delta Air Lines	*[%]*	*Southwest Airlines Co.*	*[%]*	*American Airlines*	*[%]*
Berkshire Hathaway	8.25	PRIMECAP	11.78	T. Rowe Price	13.99
BlackRock	6.84	Berkshire Hathaway	7.02	PRIMECAP	8.97
Vanguard	6.31	Vanguard	6.21	Berkshire Hathaway	7.75
State Street Global Advisors	4.28	BlackRock	5.96	Vanguard	6.02
J.P. Morgan Asset Mgt.	3.79	Fidelity	5.53	BlackRock	5.82
Lansdowne Partners Limited	3.60	State Street Global Advisors	3.76	State Street Global Advisors	3.71
PRIMECAP	2.85	J.P. Morgan Asset Mgt.	1.31	Fidelity	3.30
AllianceBernstein L.P.	1.67	T. Rowe Price	1.26	Putnam	1.18
Fidelity	1.54	BNY Mellon Asset Mgt.	1.22	Morgan Stanley	1.17
PAR Capital Mgt.	1.52	Egerton Capital (UK) LLP	1.10	Northern Trust Global Inv	1.02

United Continental Holdings	*[%]*	*Alaska Air*	*[%]*	*JetBlue Airways*	*[%]*
Berkshire Hathaway	9.20	T. Rowe Price	10.14	Vanguard	7.96
BlackRock	7.11	Vanguard	9.73	Fidelity	7.58
Vanguard	6.88	BlackRock	5.60	BlackRock	7.33
PRIMECAP	6.27	PRIMECAP	4.95	PRIMECAP	5.91
PAR Capital Mgt.	5.18	PAR Capital Mgt.	3.65	Goldman Sachs Asset Mgt.	2.94
State Street Global Advisors	3.45	State Street Global Advisors	3.52	Dimensional Fund Advisors	2.42
J.P. Morgan Asset Mgt.	3.35	Franklin Resources	2.59	State Street Global Advisors	2.40
Altimeter Capital Mgt.	3.26	BNY Mellon Asset Mgt.	2.34	Wellington	2.07
T. Rowe Price	2.25	Citadel	1.98	Donald Smith Co.	1.80
AQR Capital Management	2.15	Renaissance Techn.	1.93	BarrowHanley	1.52

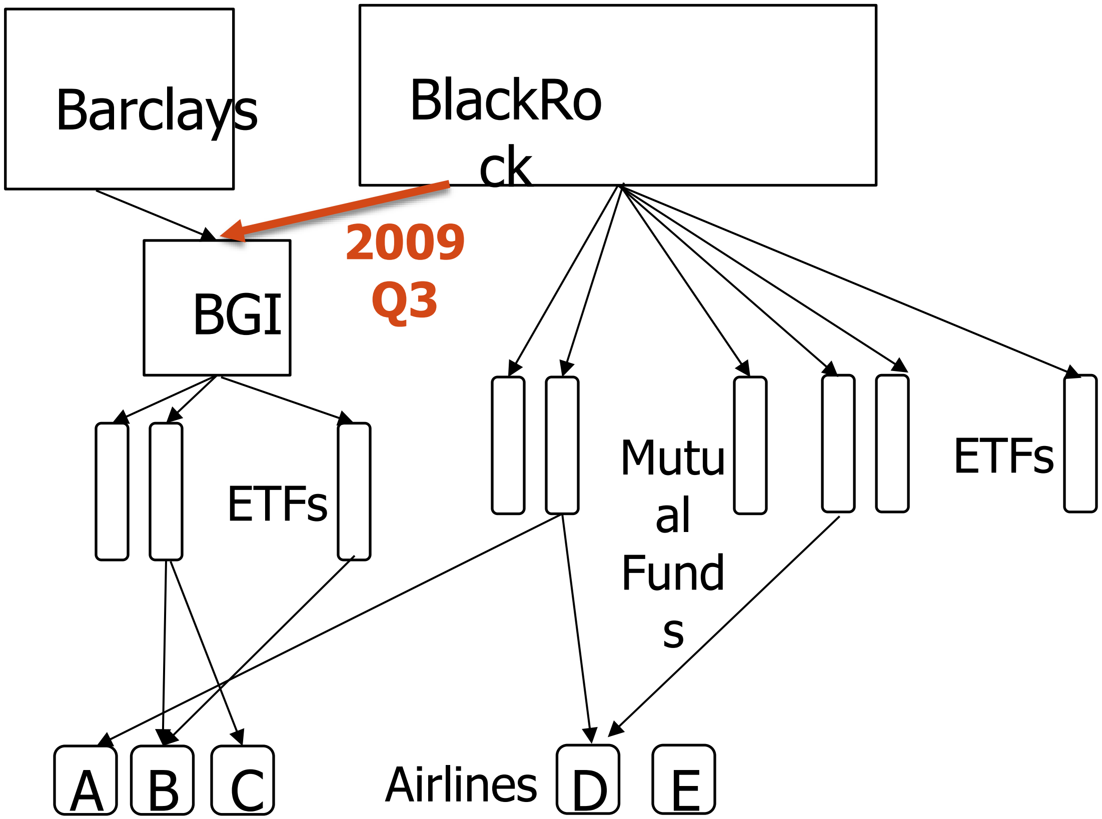
Spirit Airlines	*[%]*	*Allegiant Travel Company*	*[%]*	*Hawaiian*	*[%]*
Fidelity	10.70	Gallagher Jr., M. J. (Chairman, CEO)	20.30	BlackRock	11.20
Vanguard	7.41	BlackRock	8.61	Vanguard	10.97
Wellington	5.44	Renaissance Techn.	7.28	Aronson, Johnson, Ortiz, LP	5.99
Wasatch Advisors Inc.	4.33	Vanguard	6.65	Renaissance Techn.	4.67
BlackRock	3.77	Fidelity	5.25	Dimensional Fund Advisors	3.17
Jennison Associates	3.49	Franklin Resources	4.52	State Street Global Advisors	2.43
Wells Capital Mgt.	3.33	Wasatch Advisors Inc.	4.39	PanAgora Asset Mgt.	2.22
Franklin Resources	2.79	T. Rowe Price	4.23	LSV Asset Management	2.22
OppenheimerFunds.	2.67	TimesSquare Capital Mgt.	3.91	BNY Mellon Asset Mgt.	1.84
Capital Research and Mgt.	2.64	Neuberger Berman	3.07	Numeric Investors	1.79

Empirical Design

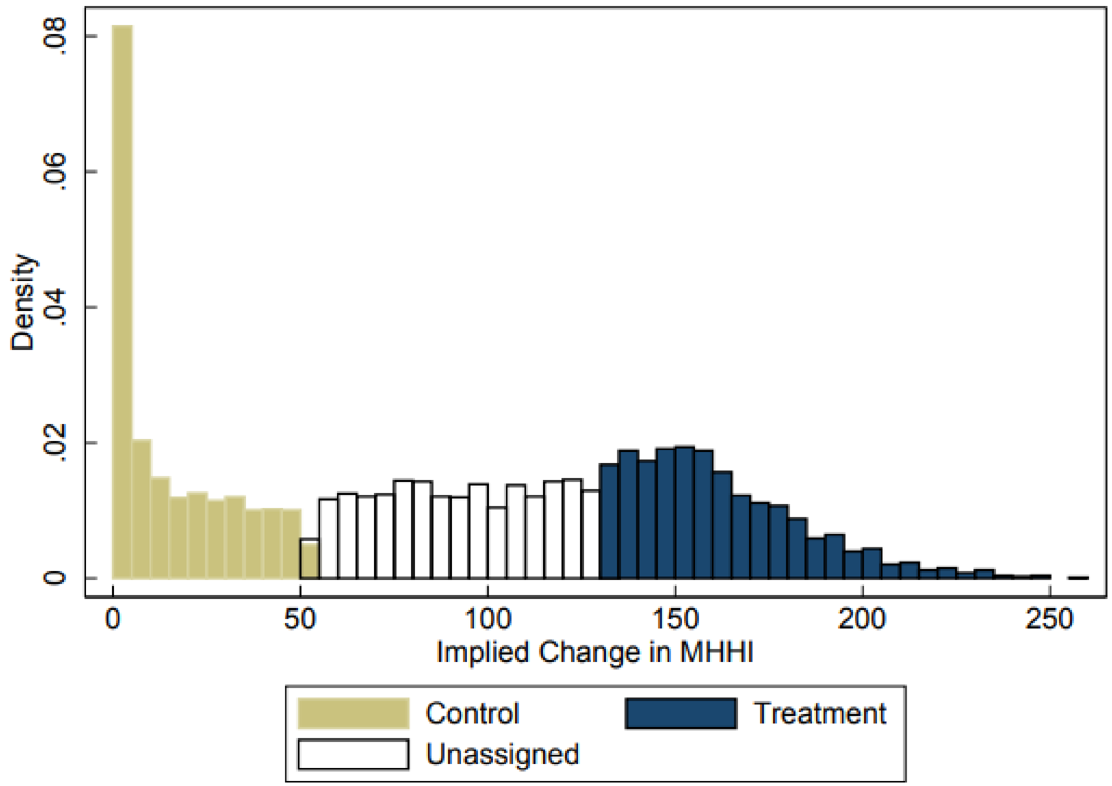
Route 1: Served by Airlines A, D, E

Route 2: Served by Airlines B, C, D

Route 3: Served by Airlines C, D, E

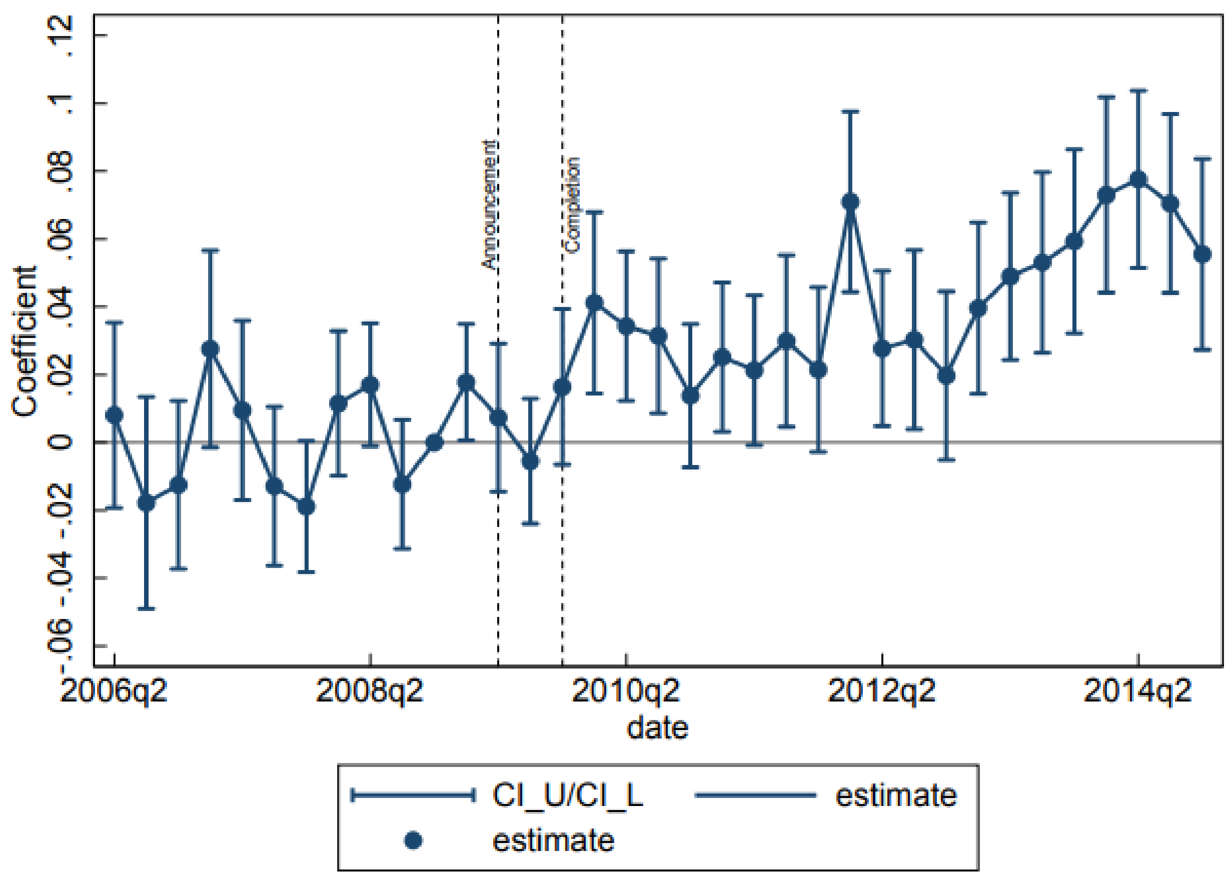


Histogram of Change in Measures of Common Ownership (“deltaMHII”)



- Main Specification

$$\log\left(p_{rjt}\right) = \sum_{k=-n_{pre}}^{n_{post}} \delta_{DiD}^{k} \cdot Treat_{r}^{k} + \sum_{k=-n_{pre}}^{n_{post}} \gamma_{DiD}^{k} \cdot X_{rj}^{k} + \alpha_{t} + \nu_{rj} + \varepsilon_{rjt},$$



.12
.1
.08
.06
.04
.02
0
-.02
-.04
-.06
Coefficient
Announcement
Completion
2006q2
2008q2
2010q2
2012q2
2014q2
date
CI_U/CI_L
estimate
estimate