The Empirical Measurement of Foreclosure Incentives in U.S. Pay Television Markets

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Background: A Research Program in US Pay TV Markets

- Today's paper is part of an ongoing research program in US Pay Television Markets:
  - Evaluating the effects of regulation
    - Crawford (2000), Crawford and Shum (2006), Crawford (2006)
  - Measuring the welfare effects of "discriminatory" (retail) bundling
    - Crawford and Cullen (2007), Crawford (2008), Crawford and Yurukoglu (2009)

Crawford and Yurukoglu (2009)

- This last paper is most relevant to what I'll present today.
- It does two things:
  1. Builds a estimable structural model of the US Pay TV industry:
     - ★ Demand, Pricing, Bundling, Bargaining
  2. Evaluates a specific policy question:
     - ★ "What are the welfare effects of offering TV channels on an à la carte basis?"
     - ★ Preliminary results: could increase consumer welfare by $8 billion/year.
- While important, there are other policy questions also being asked in pay-television markets, both in the US and around the world.

Foreclosure in Pay Television Markets

These questions center on foreclosure possibilities:

1. Does Vertical Integration between programming networks (channels) and distributors...
   1. Disadvantage (downstream) distributors in video markets?
      - Example: the UK Pay Television Inquiry (June 2009)
   2. Disadvantage (upstream) channels in video markets?
      - Example: US wholesale market
2. Does tying/bundling by firms owning multiple channels disadvantage rival channels?
   - Example: US FCC Wholesale Bundling (Tying) Proceeding

Aside: Is (retail) bundling *itself* an antitrust violation?

An aside:

- An ongoing class-action lawsuit in the US has claimed that retail bundling is *itself* an antitrust violation
  - Rob Brantley et. al. v. NBC Universal, Inc. et. al.
- Why?
- Contracts between content providers and distributors regularly specify tiering requirements:
  - "on the most widely available tier", or
  - "to X% of all Basic subscribers" (with X large)
- These contracts require all distributors to bundle, even if they would rather not.
  - (Some have claimed they *would* rather not...)

Is (retail) bundling *itself* an antitrust violation?

Aside, cont.:

- Plaintiffs claim these contract terms:
  - Have impeded competition in distribution
  - Have harmed consumer welfare through "deprivation of choice"
- Defendants counter-claim:
  - There is no foreclosure in distribution, thus no harm to competition.
  - Without harm to competition, there can be no antitrust injury
    - ★ Regardless of whether consumers are in fact harmed by the contracts
- Case recently dismissed; currently on appeal.

The Current Research Program

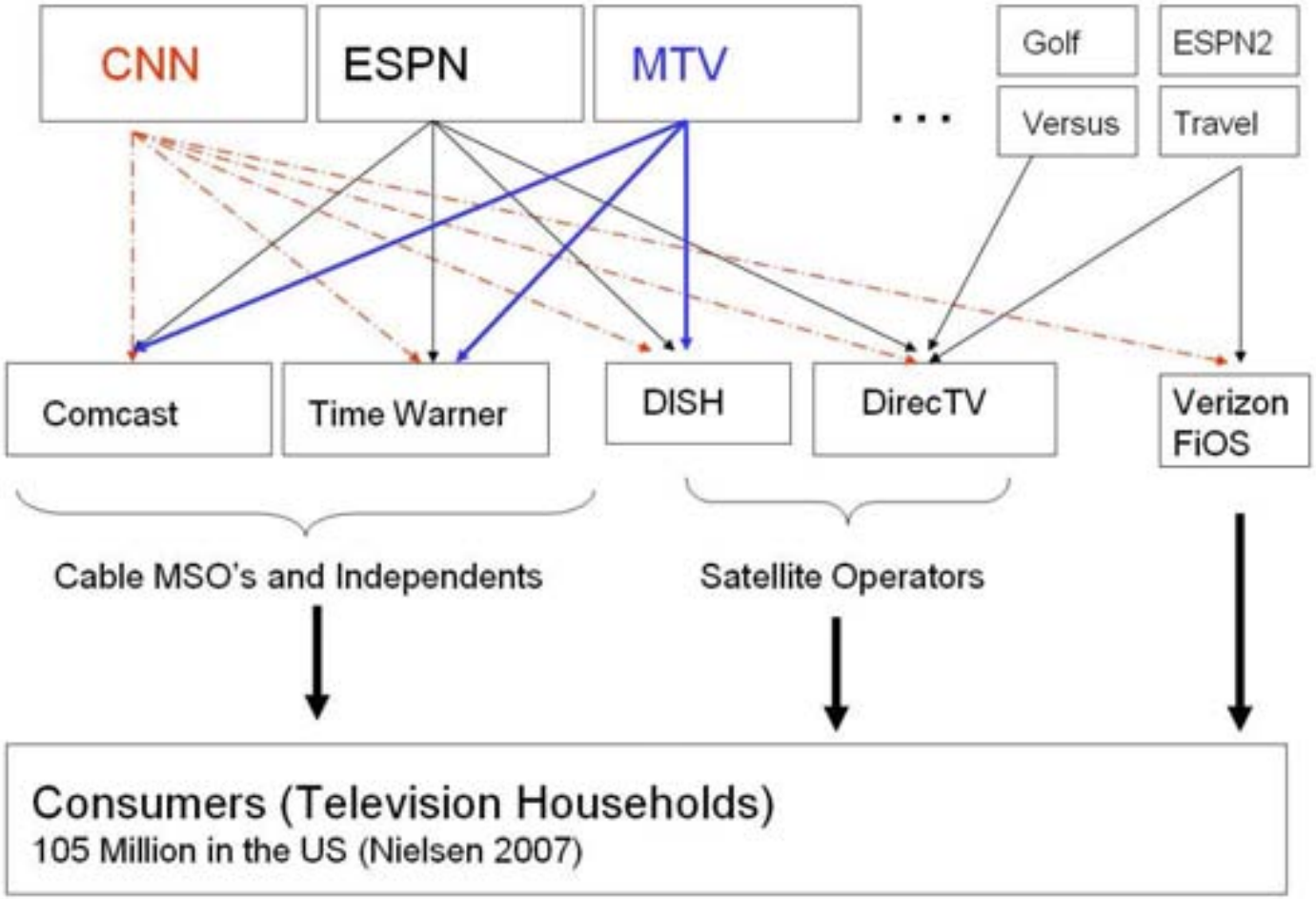
Our goal is to measure these foreclosure incentives in US Pay Television Markets:

- Vertical Foreclosure
  - By vertical integration
- Horizontal Foreclosure
  - By wholesale bundling/tying
- In the rest of the talk today, I'll focus on Vertical Integration
  - I'm happy to discuss horizontal foreclosure after the talk.

Outline

- Some institutional facts
- Channel ownership
- Motivations to integrate
  - Efficiency incentives
  - Foreclosure incentives
- Effects in the data
- An empirical framework to measure foreclosure incentives
- Results - Yet to come

The Pay Television Industry



Vertical Contracts in the Pay TV Market

- Contracts between channels and distributors specify a number of elements.
- In (rough) order of importance, these include
  - The per-subscriber *affiliate fee* the distributor will pay to the channel for the right to carry the channel.
    - These are the primary marginal costs for distributors
    - Note the use of *linear contracts*
  - Tiering obligations
  - Most-Favored Nation (MFN) clauses
  - The term of the agreement (usually 5-8 years)
  - Bundle discounts within channel family (if any)

Non-Discrimination Regulations

- Since 1992, the FCC has regulated the terms of contracts between vertically affiliated channel-distributors and
  - Unaffiliated channels
  - Unaffiliated distributors
- These are called the "Program Access" and "Program Carriage" rules

Program Access Rules

The *Program Access Rules*

- In principle:
  - "The rules ... prohibit vertically integrated [channels] from discriminating in the prices or terms and conditions of sale of satellite-delivered programming to cable operators and competing MVPDs."
    - **Bottom Line:** Channels can't discriminate against unaffiliated distributors.
- In practice, they generally don't:
  - Contracts may allow for volume discounts (and do)...
  - But otherwise,
    - Comcast, an unintegrated distributor
    - Pays CNN, an integrated channel (owned by Time Warner)
    - The same fee that Time Warner does.
- If a dispute?
  - A FCC complaint process (though rarely used)

Program Carriage Rules

The *Program Carriage Rules*

- In principle:
  - "The Commission prohibits a cable operator ... from requiring a financial interest in any [channel] as a condition for carriage of [that channel] or engaging in conduct that unreasonably restrains the ability of an unaffiliated [channel] to compete fairly by discriminating against [it] on the basis of its nonaffiliation."
    - **Bottom Line:** Distributors can't discriminate against unaffiliated channels.
- In practice, this is much harder to enforce:
  - Carriage decisions more subjective than terms in a contract
  - We will provide evidence on this later
- If a dispute?
  - A FCC complaint process (more commonly used).
    - e.g. NFL Network v. Comcast; WealthTV v. Time Warner

No Exclusives between Affiliated Parties

There is one last element in the Program Access Rules:

- "Cable operators generally are prohibited from entering into exclusive distribution arrangements with vertically integrated [channels]."
- **Except...**
- The rule only applies to *satellite-delivered* programming
  - This is the so-called **"terrestrial exception"**
- In a few markets (Philadelphia, San Diego, Charlotte), regional sports programming was/is delivered via terrestrial methods (microwave, fiber).
  - In these markets, the incumbent cable system owns an important regional sports network and has an exclusive agreement with them.
  - We will use this fact in our empirical analysis.

Top Distributors

	1997		2000		2004		2006	
Rank	Company	Market Share	Company	Market Share	Company	Market Share	Company	Market Share
1	TCI	25.54	AT&T	19.07	Comcast	23.37	Comcast	22.44
2	TimeWarner	15.97	TimeWarner	14.92	DirecTV*	12.10	DirecTV*	16.20
3	MediaOne	6.95	DirecTV*	10.28	TimeWarner	11.87	Echostar*	13.01
4	Comcast	5.84	Comcast	8.43	Echostar*	10.63	Time Warner	11.52
5	Cox	4.44	Charter	7.36	Cox	6.92	Charter	6.17
6	Cablevision	3.92	Cox	7.27	Charter	6.73	Cox	5.64
7	DirecTV*	3.58	Adelphia	5.94	Adelphia	5.88	Adelphia	5.09
8	Primestar	2.40	Echostar*	5.11	Cablevision	3.19	Cablevision	3.20
9	Jones	2.00	Cablevision	4.29	Bright House	2.37	Bright House	2.38
10	Century	1.62	Insight	1.23	Mediacom	1.66	Mediacom	1.48
	Top 4	54.30	Top 4	52.70	Top 4	57.97	Top 4	63.17
	Top 8	68.64	Top 8	78.38	Top 8	80.69	Top 8	83.27
	Top 25	84.94	Top 25	89.75	Top 25	90.41	Top 25	93.46
	HHI	1166	HHI	954	HHI	1097	HHI	1187

* = Satellite Operator

Top Channels, 2006

Network	Subs (million)	Fee Rev ($ million)	Ad Rev ($ million)	Fee Rev Share	Prog Expn ($ million)
ESPN	91.2	3,184.2	1,029.7	0.734	3,444.7
Discovery	91.4	318.0	313.8	0.499	158.2
TBS	90.6	467.8	604.8	0.436	375.4
TNT	91.0	966.0	669.5	0.576	720.4
USA	90.9	528.9	696.7	0.426	551.0
Nickelodeon	90.7	449.8	1,000.7	0.256	252.9
CNN	91.1	484.1	399.0	0.504	273.7
Lifetime	90.8	253.0	536.5	0.319	336.9
Spike	90.6	203.6	314.0	0.392	259.0
Weather	90.7	108.8	149.2	0.391	128.6
HGTV	90.1	92.1	415.3	0.180	171.0
VH-1	89.7	137.2	392.2	0.258	198.1
TLC	90.4	235.3	194.8	0.541	128.3
ESPN2	90.6	434.0	182.6	0.677	332.8
Cartoon	89.8	165.2	335.1	0.315	118.6
History	89.8	203.6	286.0	0.397	185.0
ABC Family	90.0	215.3	199.5	0.517	214.8
Animal Plan	88.8	91.3	84.0	0.510	54.5
Food	89.6	79.3	343.3	0.186	146.5
Fox News	89.3	284.0	388.8	0.413	265.5
AMC	88.6	234.4	131.3	0.638	123.5
A&E	90.2	237.0	321.4	0.410	280.5
Comedy	89.1	119.1	433.1	0.180	211.7
Disney	88.4	858.8	—	—	211.8
TV Land	87.8	99.1	168.4	0.363	82.2
F/X	89.2	374.5	313.5	0.539	332.0
MTV	90.1	313.0	854.4	0.257	402.0
E! TV	88.3	205.3	153.1	0.560	98.5
Sci-Fi	86.5	171.3	335.3	0.335	195.8

Top Channels, 2006, p.2

Network	Subs (million)	Fee Rev ($ million)	Ad Rev ($ million)	Fee Rev Share	Prog Expn ($ million)
Court TV	86.1	84.0	164.0	0.332	179.0
MSNBC	86.6	151.1	116.6	0.559	138.4
Bravo	81.7	145.1	175.9	0.450	141.9
BET	82.4	147.4	343.1	0.298	103.6
Travel	85.0	83.9	89.9	0.481	77.1
CMT	81.4	58.6	111.8	0.340	55.7
TV Guide	78.8	23.4	103.6	0.184	29.5
TCM	73.6	203.1	—	—	46.4
Speed	66.9	147.9	78.8	0.639	134.3
Hallmark	73.0	24.1	173.4	0.122	156.9
Versus	67.4	123.8	47.5	0.717	158.5
Game Show	60.1	64.5	68.7	0.477	46.6
MTV2	61.5	23.9	45.9	0.343	18.8
Oxygen	63.8	80.0	93.5	0.456	85.1
WE	59.0	68.2	67.7	0.488	57.1
Nat Geo	59.6	132.9	89.0	0.596	73.7
SoapNet	58.1	94.1	44.4	0.671	49.5
Toon Disney	55.1	68.8	60.2	0.522	44.2
Noggin	49.8	85.2	24.0	0.773	31.9
LifeMovie	51.3	57.1	54.1	0.512	54.6
Science	42.4	35.7	21.6	0.617	32.3
NickToo	22.0	0.4	4.0	0.085	3.6
Total (Among These)	—	13,417.2	13,223.7	0.504	11,972.6
Total (All Channels)	—	17,693.0	14,692.7	0.527	15,552.4
Agg Share among All	—	0.758	0.900		0.770

Channel Ownership

- The FCC collects information about channel ownership and vertical affiliation
- In their most recent survey covering 2006, they conclude:
  - For nationally-delivered channels:
    - Of the 565 satellite-delivered national channels,
    - 107 (18.9%) were affiliated with at least one cable or satellite operator.
    - 138 (24.4%) were affiliated with another media entity
  - For regionally-delivered (mostly sports) channels:
    - 76 of 101 (75.2%) were affiliated with at least one cable or satellite operator.
- Looking at the most "popular" (widely available) channels gives a different view, however:

Channel Ownership, 2006

Network	Total Rev ($ million)	Majority Owner Name	Share	Minority Owner Name	Share	Cable or Sat	Big Media
ESPN	4,335.6	Disney	0.80	Other	0.20	0	1
Discovery	637.6	Liberty Media	0.50	Bright House	0.25	1	0
TBS	1,072.6	Time Warner	1.00			1	0
TNT	1,677.1	Time Warner	1.00			1	0
USA	1,242.6	NBC Universal	1.00			0	1
Nickelodeon	1,756.5	Viacom	1.00			0	1
CNN	961.1	Time Warner	1.00			1	0
Lifetime	794.2	Other	0.50	Disney	0.50	0	1
Spike	519.9	Viacom	1.00			0	1
Weather	278.1	Other	1.00			0	0
HGTV	511.0	Other	1.00			0	0
VH-1	532.6	Viacom	1.00			0	1
TLC	435.1	Liberty Media	0.50	Bright House	0.25	1	0
ESPN2	640.9	Disney	0.80	Other	0.20	0	1
Cartoon	524.3	Time Warner	1.00			1	0
History	512.9	Other	0.38	Disney	0.38	0	1
ABC Family	416.5	Disney	1.00			0	1
Animal Plan	179.1	Liberty Media	0.40	Other	0.20	1	0
Food	427.4	Other	0.56	Other	0.29	0	0
Fox News	688.0	News Corp	1.00			1	0
AMC	367.6	Cablevision	1.00			1	0
A&E	577.4	Other	0.38	Disney	0.38	0	1
Comedy	661.9	Viacom	1.00			0	1
Disney	931.2	Disney	1.00			0	1
TV Land	273.3	Viacom	1.00			0	1
F/X	695.4	News Corp	1.00			1	0
MTV	1,215.7	Viacom	1.00			0	1
E! TV	366.7	Comcast	0.61	Disney	0.40	1	1
Sci-Fi	510.9	NBC Universal	1.00			0	1

Channel Ownership, 2006, p.2

Network	Total Rev ($ million)	Majority Owner Name	Share	Minority Owner Name	Share	Cable or Sat	Big Media
Court TV	253.0	Time Warner	1.00			1	0
MSNBC	270.3	NBC Universal	0.82	Other	0.18	0	1
Bravo	322.7	NBC Universal	1.00			0	1
BET	494.9	Viacom	1.00			0	1
Travel	174.6	Liberty Media	0.50	Bright House	0.25	1	0
CMT	172.6	Viacom	1.00			0	1
TV Guide	127.0	News Corp	0.43	Liberty Media	0.04	1	0
TCM	203.1	Time Warner	1.00			1	0
Speed	231.6	News Corp	1.00			1	0
Hallmark	197.6	Other	1.00			0	0
Versus	172.7	Comcast	1.00			1	0
Game Show	135.3	Liberty Media	0.50	Other	0.50	1	0
MTV2	69.7	Viacom	1.00			0	1
Oxygen	175.4	Other	1.00			0	0
WE	139.8	Cablevision	1.00			1	0
Nat Geo	223.1	News Corp	0.50	Other	0.50	1	0
SoapNet	140.2	Disney	1.00			0	1
Toon Disney	131.9	Disney	1.00			0	1
Noggin	110.2	Viacom	1.00			0	1
LifeMovie	111.5	Other	0.50	Disney	0.50	0	1
Science	57.9	Liberty Media	0.50	Bright House	0.25	1	0
NickToo	4.7	Viacom	1.00			0	1
ABC	6,210.0	Disney	1.00			0	1
CBS	7,120.0	Viacom	1.00			0	1
NBC	4,980.0	NBC Universal	1.00			0	1
FOX	4,350.0	News Corp	1.00			1	0
CW	909.0	Viacom	0.50	Time Warner	0.50	1	1

Channel Ownership, 2006, Summary

- Among the most widely available networks, vertical integration and/or ownership by large media companies is commonplace:
  - Cable/Sat = Comcast, News Corp, Time Warner, Cablevision, Cox, Bright House, Liberty Media*
    - 23 Networks (41.1%)
    - 28.5% of Total Net Revenue
  - Big Media = Disney, Viacom, NBC Universal
    - 30 Networks (53.6%)
    - 70.9% of Total Net Revenue
  - Other = Hearst, Scripps, Crown Media, Landmark, Independent Investors, BBC, Sony, NatGeo, Microsoft, Tribune Corp
    - 5 Networks (8.9%)
    - 3.1% of Total Net Revenue
- In total:
  - 51 of 56 channels (94.7%)
  - 98+% of total net revenue

The Last of the Big Independents

- The 5 Independents in 2006 (and who owns them now):
  - The Weather Channel
    - Formerly owned by: Landmark
    - Now owned by: NBC Universal
  - HGTV
    - Now and formerly owned by: Scripps (Newspapers)
  - Food Network
    - Now and formerly owned by: Scripps (Newspapers)
  - Hallmark Channel
    - Now and formerly owned by: Crown Media (Hallmark Cards, Discovery Channel)
  - Oxygen
    - Formerly owned by: Independent Investors
    - Now owned by: NBC Universal

Motivations to Integrate

- As typical, there are two classes of reasons to integrate in pay television markets:
  1. Efficiency Motivations
     - i.e. Reasons that increase both profit and total welfare
  2. Foreclosure Motivations
     - i.e. Reasons that may increase profit, but may also reduce total welfare
- I will briefly introduce the reasons for each previously identified in the literature...
  - ...and assess their likely relevance in the US pay television market.

An Aside on Linear Contracts

Before we do, however, it is worth asking about a more widespread puzzle:

Why do we see linear contracts in pay-television markets?

- Here are my three preferred explanations:
  1. They may Soften downstream competition
     - ★ Bonanno and Vickers (1988), Gal-Or (1991)
  2. They may Solve problems of upstream moral hazard
  3. They may, with MFNs, help Resolve commitment problems
     - ★ Hart and Tirole (1990), McAfee and Schwartz (1994)

Efficiency Motivations: Double Marginalization

There are many possible efficiency motivations for vertical integration:

1. Eliminate Double Marginalization
   - The *"Textbook"* reason
     - Allows the integrated entity to transfer programming at its true (zero) marginal cost.
   - Just not relevant in pay-television markets (at least superficially)
     - Program Access Rules forbid discrimination. Thus...
     - Contracts between integrated channels/distributors often charge identical affiliate fees...
     - To those between unintegrated channels/distributors.

Efficiency Motivations: Moral Hazard

Efficiency motivations for integration, cont:

2. Eliminate upstream or downstream moral hazard
   - Upstream moral hazard already discussed in the context of linear contracts.
   - Possible, however, those still provide insufficient incentives
     - The programmer captures some but not all of the returns from his promotional investments
   - Downstream moral hazard?
     - Possible, but unlikely. Biggest effect might be channel positioning.
   - It's not clear vertical integration would solve:
     - Cable systems are geographically segmented
     - VI would resolve this issue within that area, but not for the market as a whole.
     - Call this *Incomplete Market Coverage*

Efficiency Motivations: Industry-Specific Investment

Efficiency motivations for integration, cont:

3. Promote relationship-specific investments
   - Consider a large media company that did *not* own another strong programming network
     - Suppose it contracted with distributors to develop a new programming network
     - Price terms necessarily unspecified due to uncertainty about demand
     - Once developed, each distributor has an incentive to renege/under-report its value to their subscribers.
     - Lessens investment incentives ex ante
   - Would vertical integration resolve?
     - At least partially, yes (subject to similar concerns about incomplete market coverage)
   - Perhaps better to call this promoting industry-specific investments

Efficiency Motivations: Option Value

Efficiency motivations for integration, cont:

4. Option Value
   - A final possibility that may be relevant in pay-television markets
     - Theoretical support?
   - An example:
     - The success of a channel is uncertain.
     - Suppose a cable operator grants carriage at a given fee.
     - If the channel fails, so be it.
     - If the channel succeeds, however, it will demand a higher fee in future negotiations.
     - Granting carriage now provides a channel both current revenue *and* an option on future revenue.
     - The latter is hard to contract on, but is something that vertical integration may solve.

Efficiency Motivations: Summary

In sum, there several possible efficiency motivations for integration in the US pay television market:

- Resolve double-marginalization: No
- Resolve moral hazard problems: Probably not
- Encourage industry-specific investment: Possibly
- Resolve issues of option value: Possibly

Foreclosure Motivations

- We turn next to "foreclosure motivations" for vertical integration
- I follow Rey and Tirole (2007)'s definition of foreclosure:
  1. A firm dominates (has market power in) one market
  2. It uses its market power to restrict output in another market
- (As I define them here:) "Foreclosure motivations" measure the benefit of the output restriction in the other market.

Vertical Foreclosure in Pay TV Markets

Vertical foreclosure in pay-TV markets could mean one of two things:

1. Market power in the channel market influences outcomes in the distribution market.
   - This is the crux of the UK Pay-television inquiry...
   - But less of an issue in the US due to the combination of
     - The Program Access rules (which forbids exclusivity and discourages discrimination) and
     - The comparability of contracts (which facilitates its implementation and enforcement)
   - Still, possibly relevant for channels not covered by the Program Access Rules
2. Market power in the distribution market influencing outcomes in the channel market.
   - This covered by the Program Carriage rules, but still possibly an issue
   - Due to difficulties enforcing them at all/in a timely manner.

Do Distributors have Market Power?

- Do distributors have market power in distribution?
  - Won't address that immediately. Hard to measure without price data.
  - What we can (try to) measure is what I call foreclosure motivations:
    - ★ What are the effects of a distributor's choices (carriage/tiering decision, channel positioning, etc.) in the programming market?

Foreclosure Motivations: Dynamic Commitment

There are many several foreclosure motivations for vertical integration:

1. Dynamic Commitment (Rey and Tirole (2007))
   - Already discussed above in the context of linear contracts
   - Unlikely to be relevant here:
     - Linear contracts plus MFNs probably (?) resolve this issue
     - Or that plus repeat play/reputation?

Foreclosure Motivations: Raising Rivals Costs / Reducing Rivals Revenues

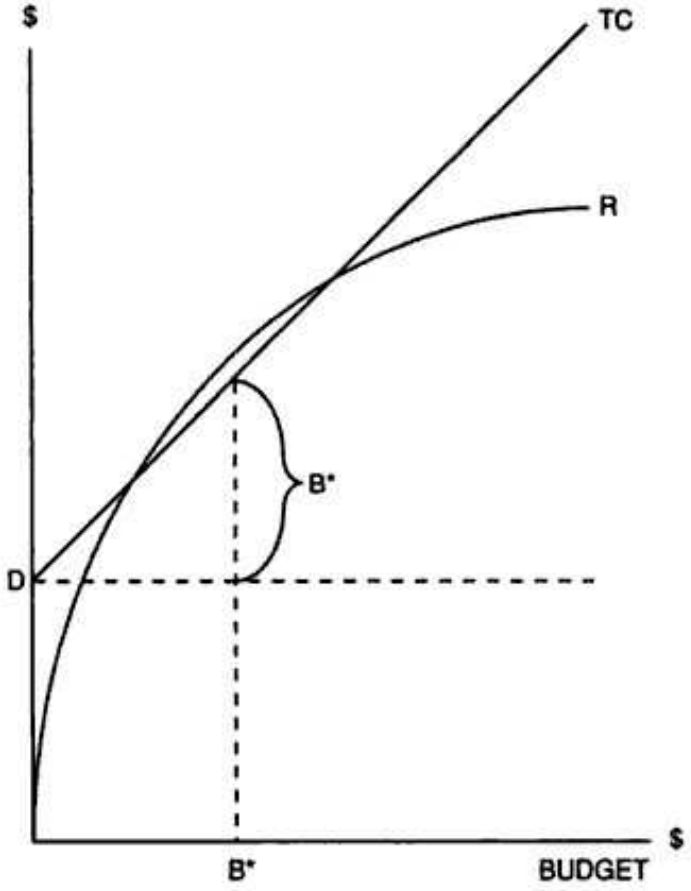
Foreclosure motivations for integration, cont:

2. Raising Rivals Costs (Salop and Scheffman (1983), Ordover, Saloner, and Salop (1990))
   - Suppose two channels, American Movie Classics (AMC) and Turner Classic Movies (TCM), compete for similar viewers and/or advertisers
     - AMC is owned by Cablevision
   - An unintegrated operator (e.g. Comcast), determines its carriage decisions based on the attractiveness of each channel to its subscribers
   - An integrated operator (e.g. Cablevision), has the same logic, but also
     - Considers the effects of its decision on AMC's profits.
     - In particular, the effect of its decisions on the competition between AMC and TCM
   - In channel markets, the effect is more "Reducing Rivals Revenues" than Raising Rivals Costs.

Reducing Rivals Revenues in Channel Markets

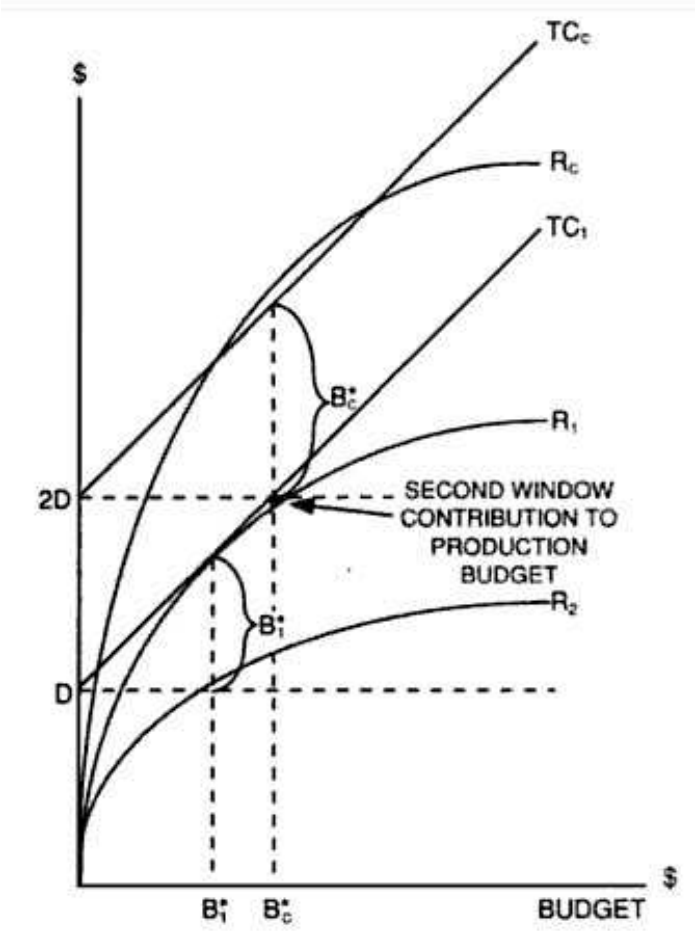
- This story is plausible because:
  - A rival's revenues depend on the quality of his programming
  - Program quality, in turn, depends on the size of the potential market that can see the programming.
- Graphical example from Owen and Wildman (1992):
  - Consider a channel deciding on its programming budget in a market with two distributors
  - In one scenario, it has been excluded from one of the distributor's channel lineups
  - In the other, it can sell to both.
  - (For simplicity, abstract away from the terms of these contracts)

Owen and Wildman, Fig 2.1: Selling to one market



- D (TC) = Distribution (Total) cost; B = Budget, R = Expected Revenue
- The channel sets its budget such that an additional dollar in programming costs returns a dollar in expected revenue.

Owen and Wildman, Fig 2.2: Selling to two markets



- Having access to a second market increases the returns to investing in quality (budget)

Implications

- Endogenous program budgets provide the mechanism for "Reducing Rivals Revenues":
  - Excluding a rival channel reduces its potential audience,
  - Reducing its expected revenue in that market *and*
  - Reducing its incentives to invest in programming...
  - Reducing its expected revenue in all its markets.
- The effects here analogous to those involved in "Naked Exclusion"
  - Rasmusen, Ramseyer, and J. Wiley (1991), Segal and Whinston (2000)

Effects in the Data

- We're finally in a position to examine the effects of integration in the data.
- We look at a number of different outcomes
- As well as a number of different ways of measuring the effects of integration

Outcomes of Interest

- Our preliminary results focus on the channel carriage and positioning decisions of distributors
  - Carriage decisions
    - i.e. Does a cable system carry a particular channel?
  - Tiering decisions
    - i.e. On what tier of service (Basic/Expanded Basic/Digital Basic) is a channel carried, conditional on carriage?
  - Channel position

Measuring Integration's Impact

- We measure the effect of vertical integration in a number of ways
  - How outcomes vary between integrated and unintegrated distributors
  - How they vary after ownership changes in distribution
  - How they vary for channels excepted from the Program Access rules:
    - High-definition programming
    - Programming that takes advantage of the "terrestrial exception"

Industry Data and Sources

In what I'll present today, we use two sources of data:

- Bundle Purchase Data (Obs: System-Bundle-Year)
  - Price, Market Share, and Channels Included in Cable Bundles.
    - Warren's TV & Cable Factbook, 1997-2007
  - Similar information for Satellite (Obs: DMA-Year)
- Channel Lineup Data (Obs: System-Headend-Bundle)
  - From Tribune Media Services (TMS), February 2007

Carriage Tables

	Channels Targeting Black Audiences			Cartoon Networks			
System	TV One	Black Family Channel	BET	Boomerang	Cartoon Network	Disney Channel	NickToons
Comcast	1.34	0.94	0.51	-1.54	0.42	0.60	0.20
	(0.07)	(0.05)	(0.03)	(0.07)	(0.03)	(0.03)	(0.03)
Time Warner	0.96	0.86	0.55	0.60	0.25	0.63	-0.21
	(0.07)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Cox	1.35	0.20	0.46	-0.42	0.08	-0.11	-0.63
	(0.10)	(0.11)	(0.04)	(0.06)	(0.04)	(0.04)	(0.06)
Charter	0.52	-0.39	0.04	0.20	-0.14	0.28	0.13
	(0.09)	(0.09)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)
Cablevision	—	—	0.32	—	0.26	0.78	1.69
			(0.10)		(0.10)	(0.10)	(0.17)

- Reported above are the coefficients on system dummies in Probit carriage regressions (including market demographics)
  - Excluded dummy: Other cable systems

Carriage Tables

	Classic Movie Channels			Channels Targeting Female Audiences				
System	AMC	Fox Movie Channel	Turner Classic Movies	Lifetime	Lifetime Movie Network	Lifetime Real Women	Oxygen	WE
Comcast	0.57	0.09	0.33	0.46	0.21	-0.41	0.23	-0.30
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)
Time Warner	0.25	0.22	0.36	0.16	0.62	1.47	1.14	0.63
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)
Cox	0.11	-1.76	-0.02	-0.05	0.13	—	0.18	-1.14
	(0.05)	(0.09)	(0.04)	(0.05)	(0.04)		(0.04)	(0.06)
Charter	0.05	-0.12	-0.16	-0.04	0.36	0.14	0.70	0.06
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.04)
Cablevision	0.14	0.92	-0.43	0.03	—	—	0.96	1.40
	(0.10)	(0.10)	(0.09)	(0.10)			(0.10)	(0.22)

- Among these channels:
  - Modest evidence of Carriage Favoritism
  - Mixed evidence of Carriage Exclusion

Carriage of Regional Sports Networks

	New York DMA (No Terrestrial Exception)								Philadelphia DMA (Terrestrial Exception)	
System	Fox Sports Net NY (Reg)	Fox Sports Net NY (HD)	MSG (Reg)	MSG (HD)	Sports Net NY (Reg)	Sports Net NY (HD)	YES (Reg)	YES (HD)	Comcast Sports Net (Reg)	Comcast Sports Net (HD)
Comcast	0.62	0.00	0.62	0.00	0.62	0.00	0.62	0.00	0.83	0.66
Time Warner	0.83	0.00	0.85	0.48	0.78	0.48	0.80	0.48	—	—
Cox	—	—	—	—	—	—	—	—	—	—
Charter	—	—	—	—	—	—	—	—	—	—
Cablevision	0.96	0.51	0.96	0.51	0.96	0.51	0.95	0.01	0.50	0.00
DirecTV	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Dish	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Verizon	0.50	0.00	1.00	0.00	1.00	0.50	0.50	0.50	0.75	0.00
AT&T	—	—	—	—	—	—	—	—	—	—
RCN	1.00	0.00	1.00	0.00	0.80	0.00	1.00	0.40	—	—

- Reported are the share of headends carrying each offered network.

Carriage of Regional Sports Networks

	SD DMA (Terr Exc)	Boston DMA (No Terrestrial Exception)				Washington DMA (No Terrestrial Exception)			Southeast DMAs (Terrestrial Exception)		
System	4SD	Fox Sports NE (Reg)	Fox Sports NE (HD)	NESN (Reg)	NESN (HD)	Sports Net MidAtl (Reg)	Sports Net MidAtl (HD)	MASN	Sports Net (Reg)	Fox Sports South	Sports South
Comcast	—	0.97	0.03	1.00	0.86	0.74	0.21	0.00	0.77	0.87	0.61
TWarner	0.64	1.00	0.00	1.00	0.33	—	—	—	0.00	0.31	0.25
Cox	0.75	—	—	—	—	—	—	—	—	—	—
Charter	—	—	—	—	—	—	—	—	0.75	0.81	0.75
Cablevis	—	—	—	—	—	—	—	—	—	—	—
DirecTV	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00
Dish	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00
Verizon	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	—	—	—
AT&T	0.00	—	—	—	—	—	—	—	—	—	—
RCN	—	1.00	0.33	1.00	0.33	1.00	1.00	0.00	0.00	0.79	0.58

- There are strong effects of both Carriage Favoritism and Carriage Exclusion
  - For HD feeds of sports networks where non-discrimination rules apply
  - For all sports networks where they do not apply (due to the terrestrial exception)

Summary

We present two kinds of results so far:

1. Modest evidence of carriage favoritism and/or exclusion
   - Similarly modest (unreported) effects for other outcomes:
     - Tiering favoritism/exclusion
     - Channel positioning favoritism
   - Similarly modest (unreported) effects for other providers/experiments:
     - DirecTV and their integrated channels
     - Channel changes in response to integration
2. Strong evidence of favoritism for channels not covered by Program Access rules
   - HD feeds for regional sports channels
   - Sports channels covered by the "Terrestrial Exception"

Related Literature

- The patterns we've identified are related to previous work analyzing vertical integration in cable television markets
  - Waterman and Weiss (1996), *J. of Econometics*
  - Chipty (2001), *AER*
  - Chen and Waterman (2007), *RIO*
- The first two find evidence of integrated operators favoring affiliated channels w.r.t. carriage
  - The last finds evidence of integrated operators favoring affiliated channels w.r.t. tier placement.

Related Literature

It is also related to a growing empirical literature analyzing foreclosure incentives more generally:

- Vertical Integration and Foreclosure
  - Hastings and Gilbert (2005), *JIE*
  - Hortacsu and Syverson (2007), *JPE*
- Exclusion and Foreclosure
  - Asker (2005)
  - Lee (2009)

Measuring Foreclosure Incentives

- The great challenge: favoring one's own networks and/or disfavoring rivals' networks...
  - Can occur due to either efficiency *or* foreclosure reasons
- How can one distinguish between them?
- We don't have a perfect answer
  - In large part because measuring the efficiency motivations identified as being most relevant...
    - Industry-specific investment and option value
  - Are very hard to measure

Our Goal: Measure Foreclosure Incentives

- Our immediate goal is to measure (just) the foreclosure incentives
  - If large, speaks to the potential danger of foreclosure
  - If small, suggests efficiency motivations must be driving behavior

The Logic of our Approach

The logic of our approach to measuring foreclosure incentives follows Rey and Tirole (2007):

- We call carriage decisions based on profit effects in one's own market the *In-Market Effect*
  - e.g. The impact of an integrated distributor failing to carry a rival's channel on its joint profit in that (distribution) market
  - This may relate to market power in that market, but isn't considered foreclosing
- We call carriage decisions based on profit effects in other markets the *Out-Market Effect*
  - e.g. The impact of an integrated distributor failing to carry a rival's channel on its affiliated channel's profit in sales to other distributors
    - e.g., due to the program-budget effect outlined earlier
  - We call these the foreclosure incentives
    - Note not necessarily *foreclosing*

In- v. Out-Market Effects

- We already have an empirical industry model that measures in-market effects
  - Crawford and Yurukoglu (2009)
- The contribution in this paper is to specify and estimate a model that can also measure out-market effects

Crawford and Yurukoglu (2009) In Brief

- As earlier, Crawford and Yurukoglu (2009) does two things:
  1. Builds a estimable structural model of the US Pay TV industry:
     - ★ Demand, Pricing, Bundling, Bargaining
  2. Evaluates the welfare effects of à la carte program offerings
- I'll briefly summarize the most relevant parts of the model

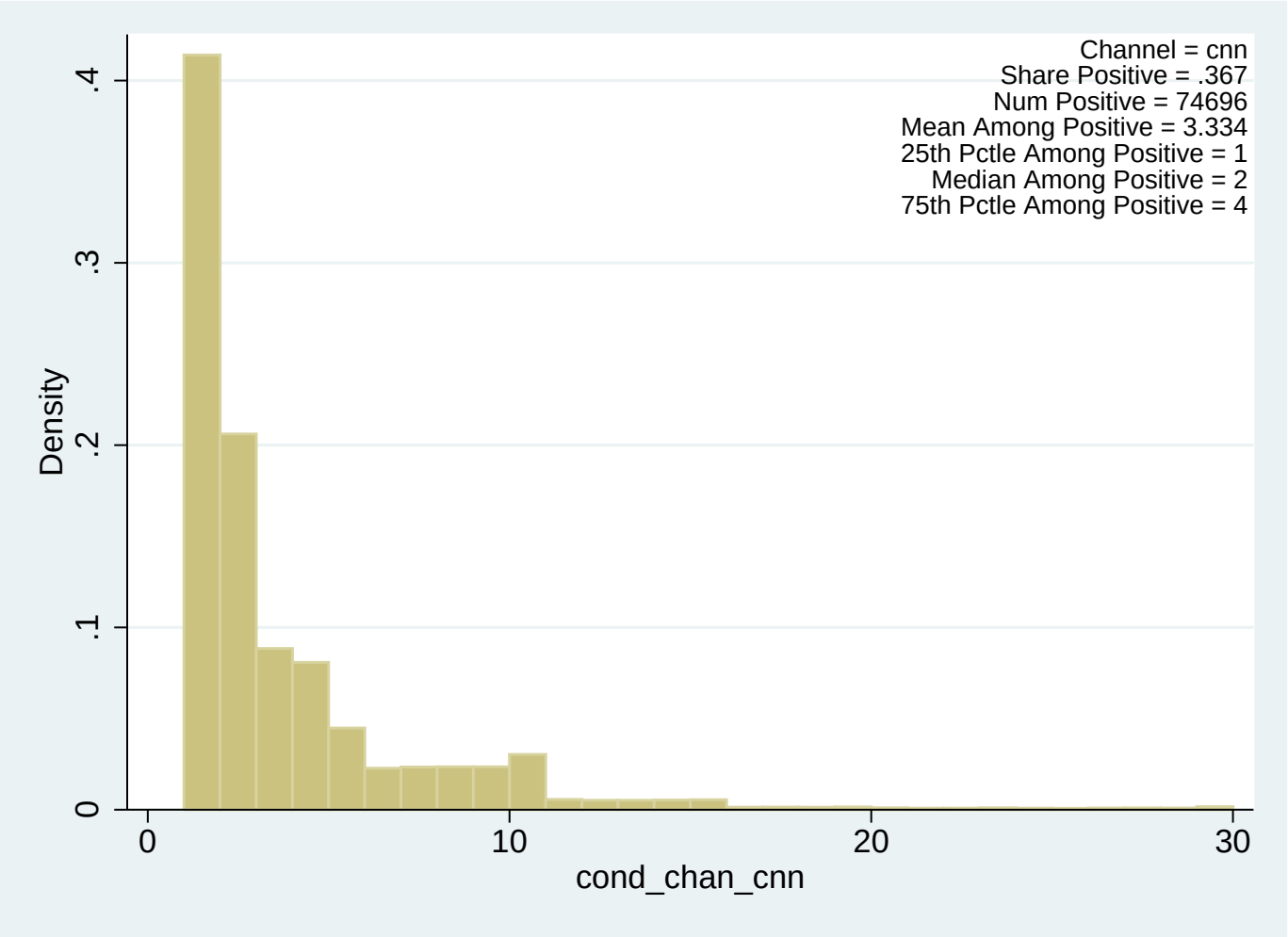
Crawford and Yurukoglu (2009): Demand

- The first contribution is to estimate demand...
  - For the individual cable networks that make up service bundles
    - This is tricky as we only observe prices of bundles, not the individual channels.
- The solution: use two sources of data
  1. Aggregate ratings (viewing) data traces out the relative utility for individual channels
  2. Aggregate bundle purchase data translates that utility into dollars
- (Important:) Ratings data also gives *correlation* in viewing, important for measuring cross-channel substitutability

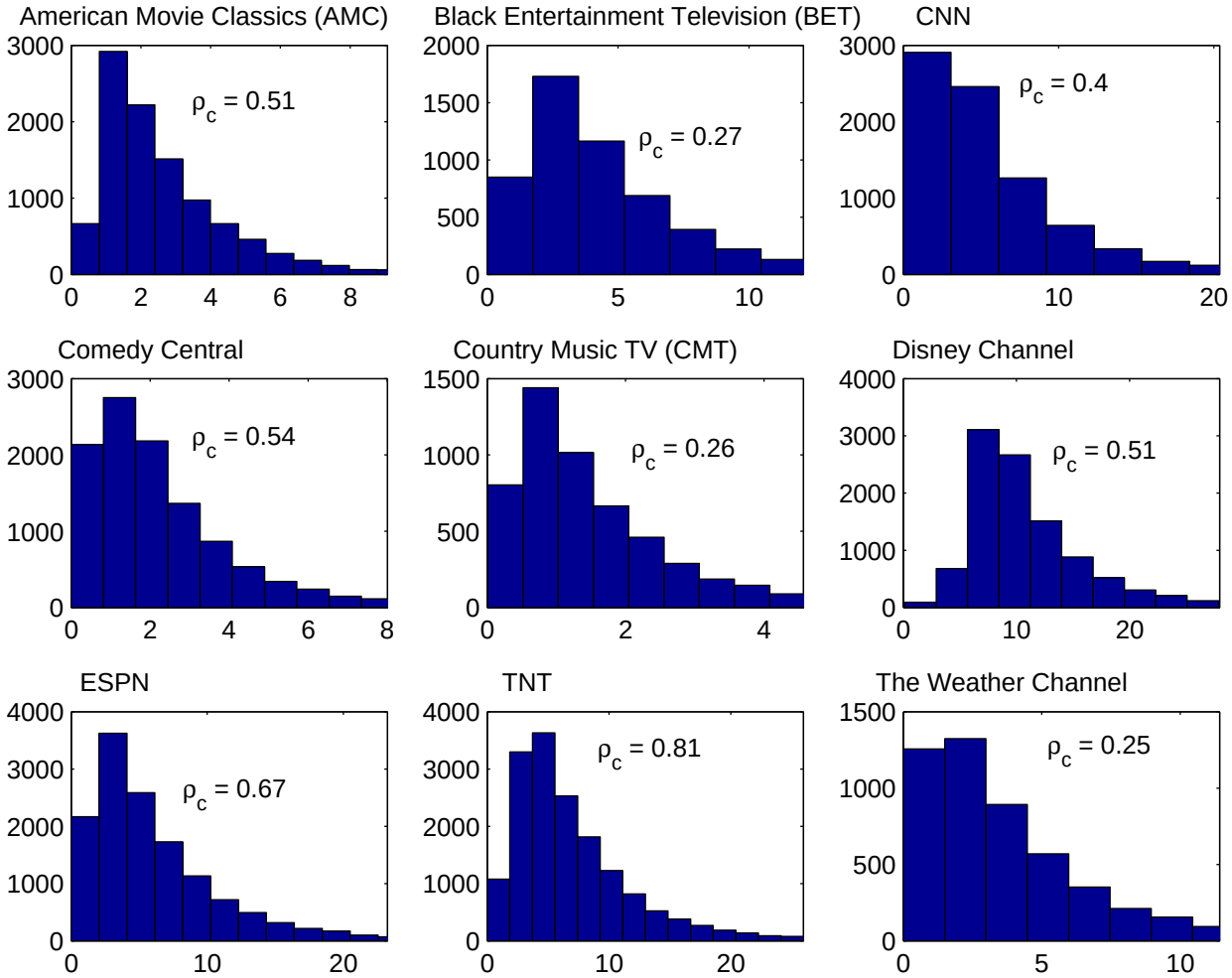
Crawford and Yurukoglu (2009): A Twist on Tastes

- The demand model is a discrete-choice random-coefficient model in the spirit of Berry, Levinsohn, and Pakes (1995) (BLP)
- Unlike BLP, we introduce a novel structure of tastes for channels based on "Long Tails"
  - Some (possibly many) people don't value a channel at all.
  - Those that do value it are distributed with a long tail
    - e.g. an Exponential

(Some Strong Support for this Assumption)



Demand Results: Estimated WTP for a Few Channels



Shown is the share of 20,000 simulated households that value each channel positively and the distribution of estimated WTP for that subset.

Crawford and Yurukoglu (2009): Pricing and Bundling

- Given demand, we assume cable systems optimally select the channels in their bundles and the prices of those bundles.
  - Assuming satellite is a non-strategic player due to national pricing
- Implies a profit function:

$$\Pi_{fm}(b_m, p_m) = \sum_{j \in b_{fm}} (p_j - \sum_{c \in C_j} \tau_{fc}) D_{jm}(b_m, p_m) \tag{1}$$

  - f denotes firm (distributor), m market, j bundle,
  - b_m are the bundles offered in market m with corresponding prices p_m
  - b_{fm} are firm f's bundles
  - τ_{fc} are the affiliate fees f pays to channel c for the channels, C_j, on bundle j
- We assume firm f in market m maximizes (2) with respect to b_{fm} and p_{fm}

The In-Market Distributor Profit

- Note $\Pi_{fm}(b_m, p_m)$ is the profit for the distributor in market m
  - $\Pi_f = \sum_{m \in M_f} \Pi_{fm}$ is the aggregate profit to distributor f across all his markets.
- Π_f is the (aggregate) *in-market profit* for distributors:
  - The decision to carry a channel (embodied in the choice of b_{fm}) only depends on the profit to the distributor in market m
- Note Π_{fm} takes the quality of channels as given
  - Indeed, there is no "quality" element in the existing models of demand or supply

Crawford and Yurukoglu (2009): Bargaining

- A second contribution is to model the bargaining process between distributors, f, and channels, c.
  - This is very important for predicting outcomes in a world without bundling
- The most relevant thing for this paper is the specification of channels' profits:

$$\Pi_{cm}(\tau_{fc}) = \tau_{fc} \sum_{j \in J_c} D_{jm}(b_m, p_m) \tag{2}$$

where

  - J_c are the bundles that include channel c, and
  - We assume that τ_{fc} maximizes f and c's bilateral Nash product:

$$NP_{fc}(\tau_{fc}; \Psi_{-fc}) = \left[\Pi_f(\tau_{fc}; \Psi_{-fc}) - \Pi_f(\infty; \Psi_{-fc})\right]^{\zeta_{fc}} \left[\Pi_c(\tau_{fc}; \Psi_{-fc}) - \Pi_c(\infty; \Psi_{-fc})\right]^{1-\zeta_{fc}}$$

The In-Market Channel Profit

- Π_{cm} is the profit for channel c in market m
  - $\Pi_c = \sum_{m \in M_c} \Pi_{cm}$ is the aggregate profit to channel c across all the markets where c is carried, M_c
- Π_c is the in-market profit function for channels needed (as a baseline) to measure foreclosure incentives.
  - A channel's profit in market m depends only on the decisions of the distributor in that market.
- Note:
  - As before, Π_{cm} takes the quality of channels as given
  - There is no advertising market effect (yet) for channels.

Crawford and Yurukoglu (2009) Summary

- Demand + Pricing + Bundling + Bargaining ⇒
  - Profits for Distributors
  - Profits for Channels
- These are the within-market profits
- How do we extend this model to measure out-market (foreclosure) incentives?

Measuring Foreclosure Incentives

- How do we extend this model to measure out-market (foreclosure) incentives?
- While we have not yet done this, we know the components of such a model:
  1. Measure the effects of scale on programming expenditure
  2. Measure the effects of programming expenditure on demand, both for
     - Viewer demand for programming
     - Advertiser demand for the audiences that watch that programming

Is it worth the effort?

- Our preliminary data analysis suggests modest effects of vertical integration in the US pay television market
- There are two lines of thinking regarding that question:
  - The true effects are modest
  - The true effects are not modest, but we're missing them

Why vertical foreclosure incentives may be modest

Vertical foreclosure incentives may be modest in this market for several possible reasons:

- Channels as complements
  - While channels are surely substitutes in use, they are likely complements at the time of bundle purchase.
  - This may soften the incentives to foreclose
- Audiences as substitutes?
  - It would seem channels would be substitutes to advertisers (if not viewers)
  - Is there stronger evidence of foreclosure for channels that rely more heavily on advertising revenue?
- The Program Access rules work
  - The evidence for foreclosure is much stronger where the program access rules don't apply

Why we may be missing vertical foreclosure incentives

We might be missing the effects of vertical integration for several reasons:

- We haven't adequately controlled for channel capacity
  - More channel capacity means space for more channels
  - Even if they belong to a rival
- We are looking in the wrong place
  - We are looking at carriage decisions for mature channels
  - Perhaps these are hard to exclude due to consumer/advertiser familiarity and demand?
  - Perhaps we should focus more at channels that are just launching?
- We are looking at the wrong time
  - The industry has consolidated considerably over time
  - Can we look back for effects due to changes in ownership?
  - Also a time before channels' dominance was set (e.g. news channels)

Conclusions

- This is the beginning of a research program analyzing foreclosure incentives in pay-television markets
  - I presented some preliminary work on vertical foreclosure
    - We are also interested in horizontal foreclosure (à la Whinston (1990) and Nalebuff (2004))
- The essence of our approach:
  - Measure the effects of decisions by firms with market power in one market...
    - On outcomes in related, potentially competitive, markets
  - It requires a well-specified empirical model of (own-market) industry demand and supply...
    - Which we have (Crawford and Yurukoglu (2009)
  - And a model that can allow for cross-market effects
    - Which we are working on...

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