

Competition for advertisers in media markets

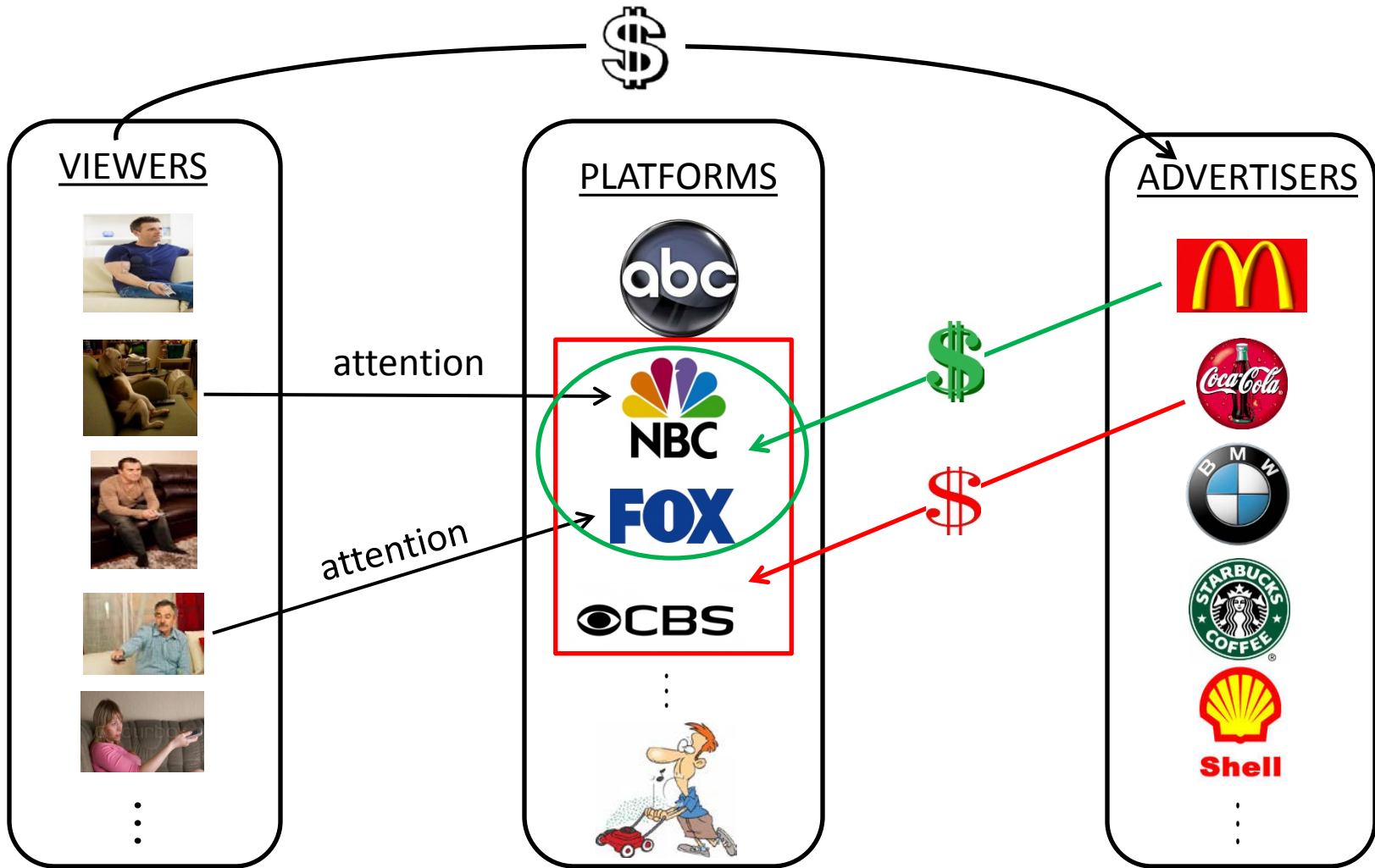
BOGOTA 2012-10-13

Simon P. Anderson

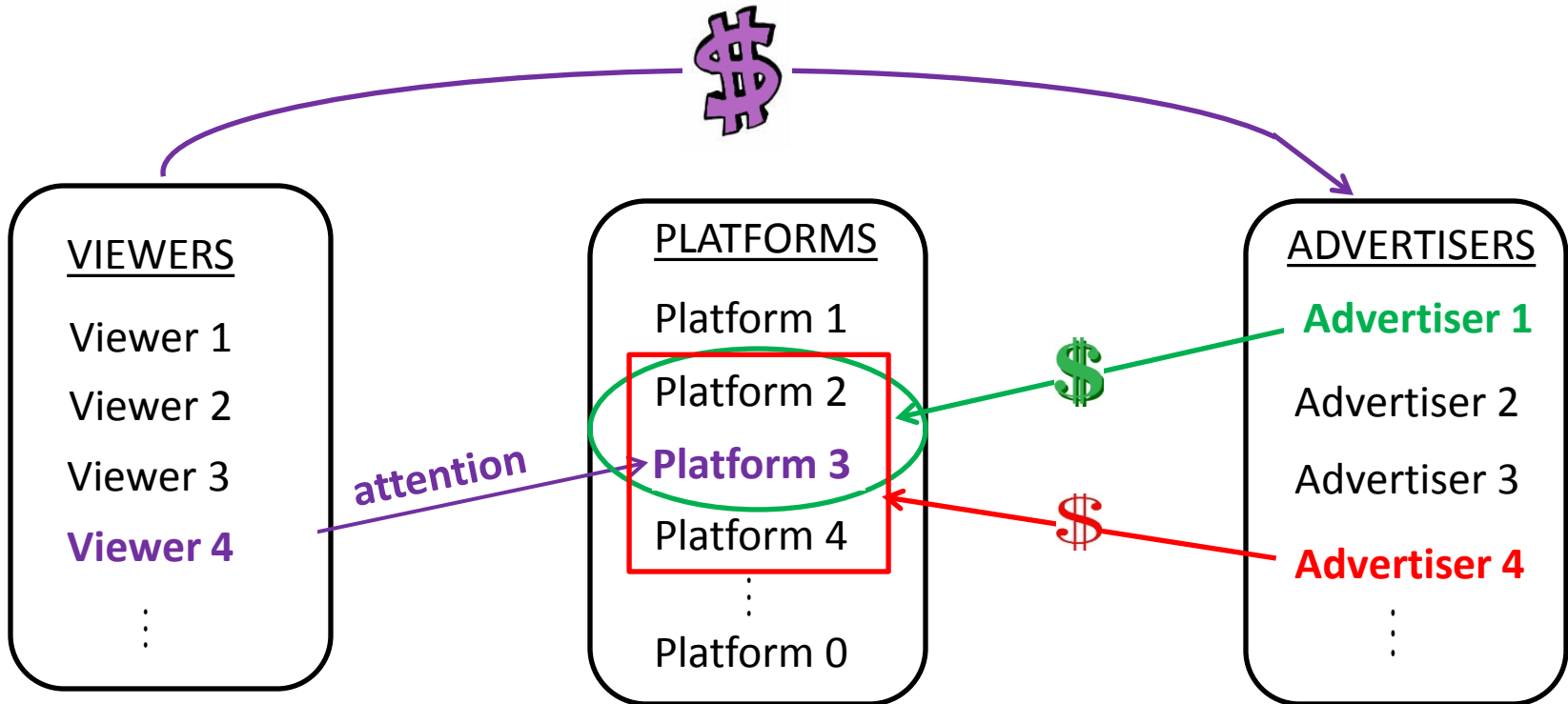
Oystein Foros and Hans Jarle Kind



2-sided business model



2-sided business model



Basic Set-up, overview

- Assumed typically (see Anderson-Coate)

Single-Homing-Consumers (SHC)

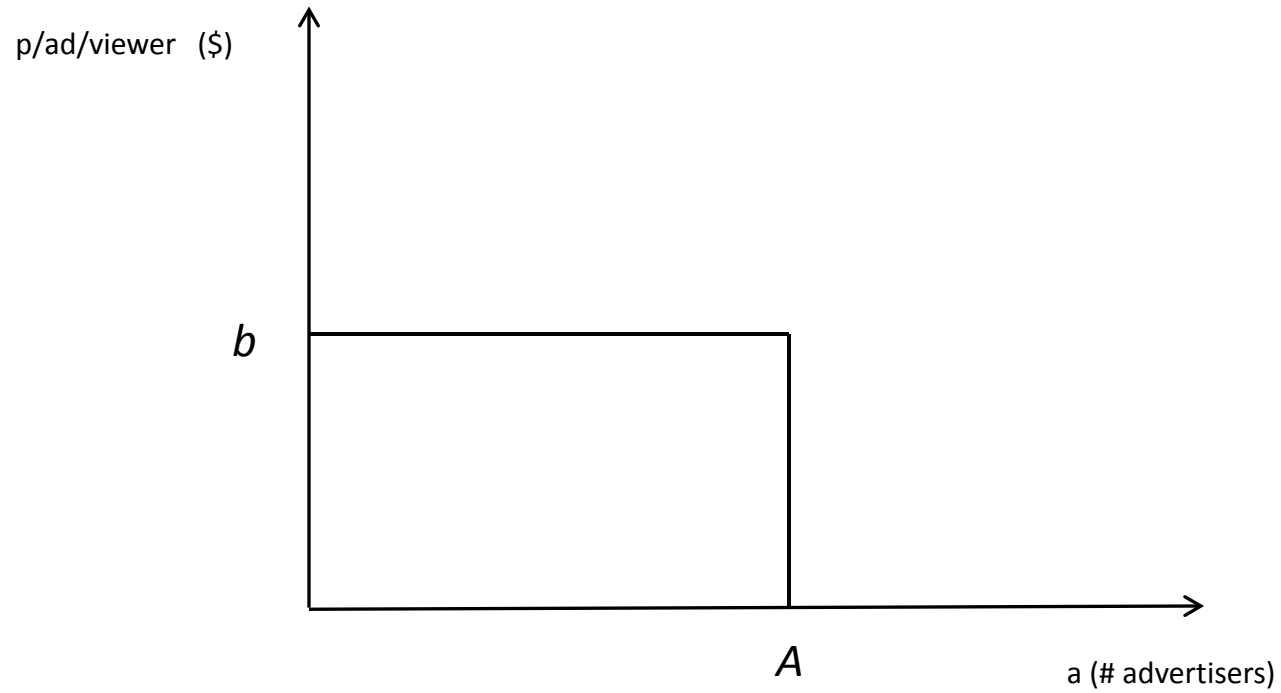
(exceptions: ACR, ACG)

- Leads to monopoly bottleneck (here in stark form)
- Here look at role of Multi-Homing-Consumers (MHC)
- First model: homogenous advertisers

Simple version – homogeneous advertisers

- Multi-homing
viewers/readers/listeners/surfers...
- Mechanism to introduce competition for
advertisers directly
- Previously pointed out by Ambrus-Reisinger
- Athey-Calvano-Gans (targeting)

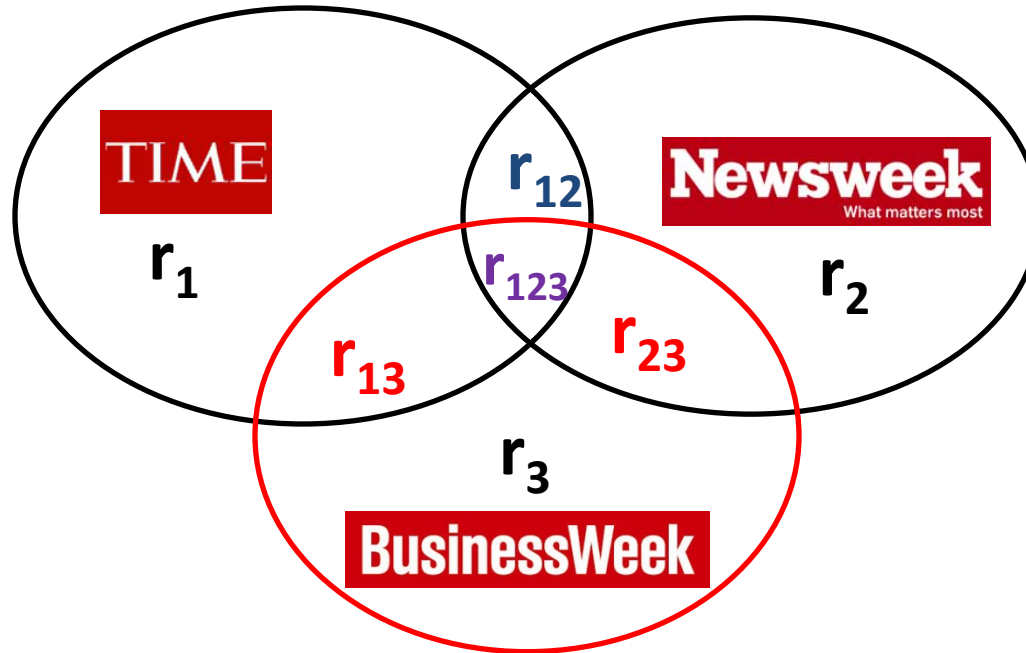
Advertiser Demand



Simplified version (Anderson Foros Kind 2011)

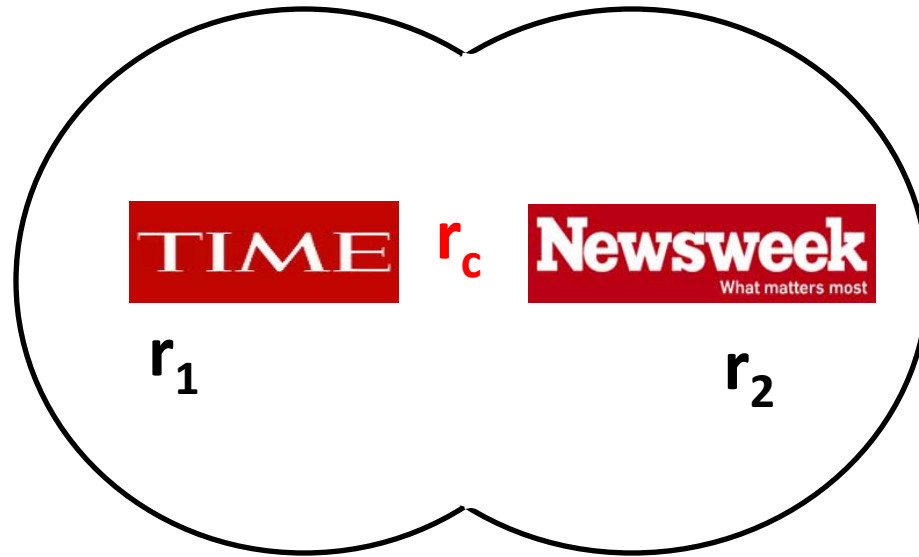
- r_c common; r_j exclusive viewers,
- Fixed number of homogenous advertisers,
wtp b per (unique) viewer
- Then equilibrium ad pricing has multi-homing
advertisers paying br_j for an ad on outlet j
- Incremental Pricing Principle
- [Venn diagrams]

Entry



- After 3 enters, 1's profit goes down from $b(r_1 + r_{13})$ to br_1
- Ad price goes down

Merger



- Before merger, ad prices are br_1 and br_2
- After merger, total price for putting ad on both channels is higher: $b(r_1 + r_c + r_2)$

objectives

- Allow endogenous homing on both sides of market
- What patterns are equilibria?
- Track performance and properties
- Much more to do!

Model Ingredients

- Advertisers ONLY care about eyeballs
(no correlation in platform and taste for advertised products) No tracking
Ad demand (advertiser valuation) of a consumer is independent of which other consumers are reached (e.g., constant returns to scale in goods production)
- Consumers care only about ad nuisance
(no subscription fees) [add this? Add welfare?]

Equilibrium Concept

- Platforms choose Price/ad
- (heterogeneous) Advertisers choose where to advertise, after observing P's
- Consumers (viewers/readers, prospective buyers) choose platform(s)
- Consumers rationally expect ad levels on channels

- Differs from other set-ups

[contrast other set-ups]

- Usual assumption is that platform's actions are observed by all subsequent agents
- Consumers OBSERVE beforehand how many ads are in on the site, on TV
- Here, they are rationally anticipated (consumers know, and they're right in equilibrium, but a deviation is not seen)

Regimes

- SHC or MHC coupled with SHA or MHA
- Rule out SHC and MHA generally
- General (and simple!) characterization of SHC-MHA, different from Anderson-Coate
- Add on now model of Advertiser demand
 - No equilibrium of type MHC-SHA
- Now add consumer MHC model; characterize equilibrium

SHC regimes

- Only equilibrium is monopoly pricing of ads!
(price per consumer at monopoly level)
- Equilibrium consumer demands are at the levels corresponding to these monopoly ad levels on each channel

- An equilibrium IFF consumers don't want to MH at those ad levels
- Channels can't do better than set monopoly access prices since consumers aren't expecting deviation

Hence simple algorithm to find – monopoly price, then demands

SHC equilibrium

- Given SHC, expect $r_i(\mathbf{a})$
 - Advertiser buys on Channel i if value per viewer, θ , exceeds $P_i / r_i(\mathbf{a})$ (price/ad/viewer, p_i)
 - Platform profit is $\pi_i = P_i (1 - F(P_i / r_i(\mathbf{a})))$
- So P_i solves $p_i = (1 - F(p_i)) / f(p_i)$ with $p_i = P_i / r_i(\mathbf{a})$
- E.g., linear advertiser demand, $P_i = r_i(\mathbf{a}) / 2$

Advertisers MH – no equilibrium of type SHC-MHA
[notice advertising announcement may be a
Prisoners' Dilemma]

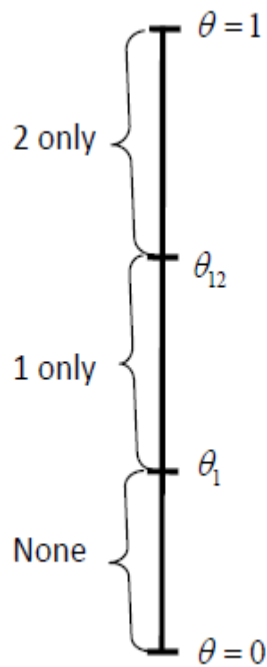
MHC and SHA?

- Need now a model of ad demand in face of MHC
- Natural is Vertical Differentiation, Mussa-Rosen '78
- Advertiser θ 's pay-off on Channel i is
$$\theta r_i(\mathbf{a}) - P_i$$
- Here, $r_i(\mathbf{a})$ plays role of "quality"
- Higher quality sets higher price
- Indifferent advertisers: $\theta_{0L} r_L(\mathbf{a}) = P_L$
 $\theta_{LH} r_H(\mathbf{a}) - P_H = \theta_{LH} r_L(\mathbf{a}) - P_L$ so that $\theta_{LH} = (P_H - P_L) / (r_H - r_L)$

Advertiser Side: Vertical Differentiation

- SH Advertisers
(Classical VD):

Utility: $V_i = \theta r_i - P_i$



Then,

$$\theta_{12} = \frac{P_2 - P_1}{r_2 - r_1}$$

$$\theta_1 = \frac{P_1}{r_1 + r_c}$$

MHC and SHA? (2)

- Hence $\pi_H = P_H a_H = P_H(1-F(\theta_{LH}))$
- And $\pi_L = P_L a_L = P_L (F(\theta_{LH}) - F(\theta_{OL}))$
- Then focs: $a_H = P_H f(\theta_{LH}) / (r_H - r_L)$
And $a_L = P_L (f(\theta_{LH}) / (r_H - r_L) + f(\theta_{OL}) / r_L)$
- For uniform distribution, $a_H = 2a_L$
So that contradicts $r_H > r_L$
(need to generalize this result)

MHC and SHA? (3) – exception!

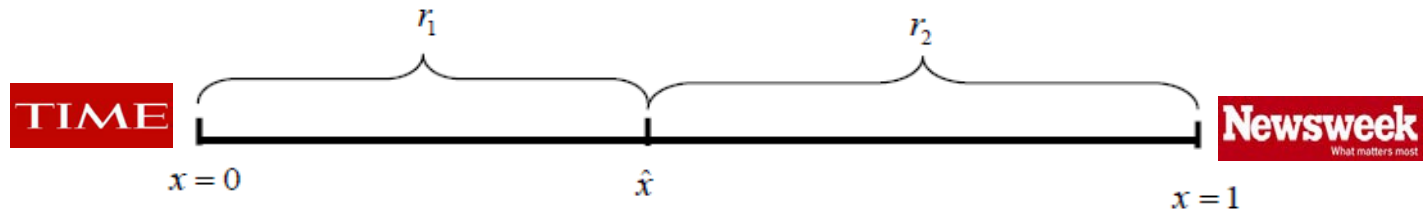
- Suppose that all consumers MH (watch all channels)
- Then all channels are perfect substitutes, and ad prices are zero
- So there is an equilibrium iff viewers MH at max ad levels per channel, like the earlier analysis of constant b
- [The case of $r_1 = r_2$ with $r_c > 0$ is easy because likewise price is zero]

MHC & MHA

- Deploy the full model!
- Properties / take –aways:
- Higher nuisance raises profit because reduces overlap!

Reader Side: Horizontal Differentiation

- SH Readers (Classical Hotelling):

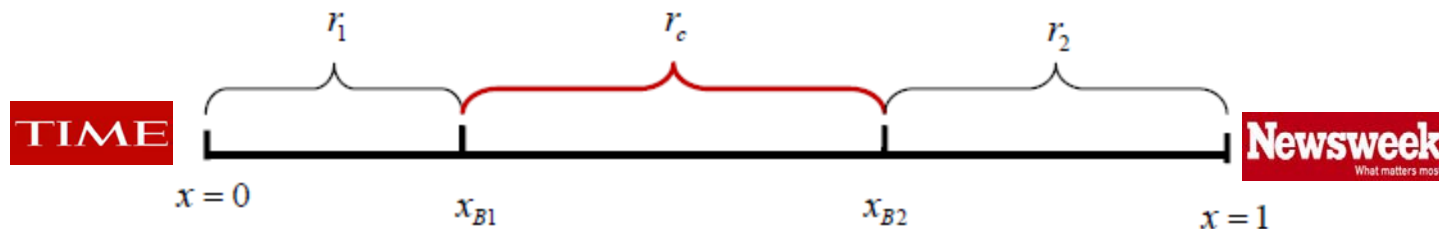


Utility:

$$u_1 = (R - tx)Q_1 - \gamma a_1$$

$$u_2 = [R - t(1 - x)]Q_2 - \gamma a_2$$

- MH Readers:

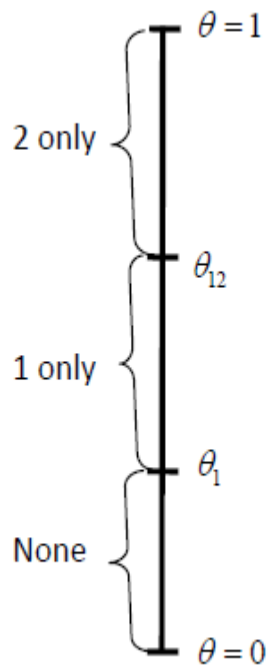


$$u_{12} = u_1 + [R - t(1 - x)]Q_2(1 - \beta Q_1) - \gamma a_2$$

Incremental

Advertiser Side: Vertical Differentiation

- SH Advertisers (Classical VD):



Utility:

$$V_i = \theta(r_i + P_{ic}) - P_i$$

$$V_B = \theta(r_1 + r_2 + r_c) - P_1 - P_2$$

Then,

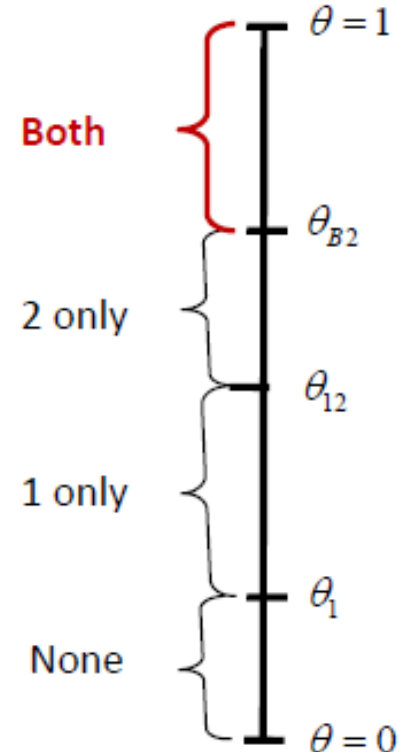
$$\theta_{B2} = \frac{P_1}{r_1}$$

$$\theta_{12} = \frac{P_2 - P_1}{r_2 - r_1}$$

$$\theta_1 = \frac{P_1}{r_1 + r_c}$$

Incremental

- MH Advertisers:



MHC-MHA results

- Higher ad nuisance RAISES ad volume (more for larger platform)
- Relaxes overlap! (more exclusives)
- Raises ad price and profit for smaller platform, and can do for larger too

Some Take-Aways

If not all consumers MH, then advertisers MH

Under complete MHC there is no reason to advertise on both platforms

Under SHC the platform has a monopoly over all consumers

Under partial MHC, platforms only have monopoly power over a fraction of consumers.

Importance of overlap!

Still need to do!

- Can we make progress similarly with other solution concepts?
- Difference (here and there) between setting Price per ad and price per viewer
- Can we include subscription fees?
- Do some welfare
- Extend and consider “puzzles”: public broadcaster, entry, mergers ... with MHC