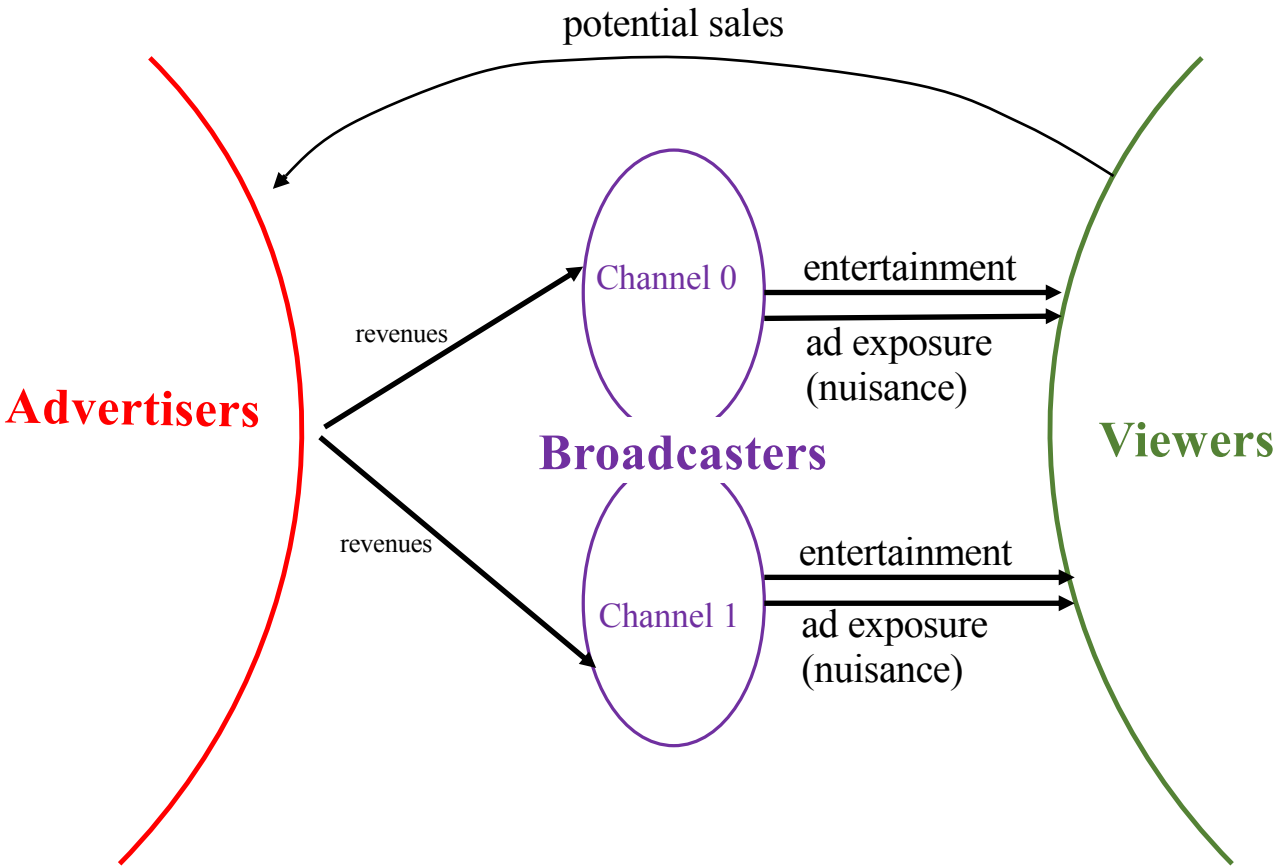
TV Advertising and Viewing

Anderson and Coate (2005, *Review of Economic Studies*)

Two sides with a negative externality



TV Viewing Market: Description

There are N potential viewers.

- They dislike watching ads (a).
- They have a preferred station λ (Hotelling).
- They can only watch one station (single-homing).

There are two **differentiated** stations.

- Think **ESPN** and **Lifetime/Hallmark**
- Don't charge viewers to watch.
- Ad levels a deter viewers – set in the advertising market.

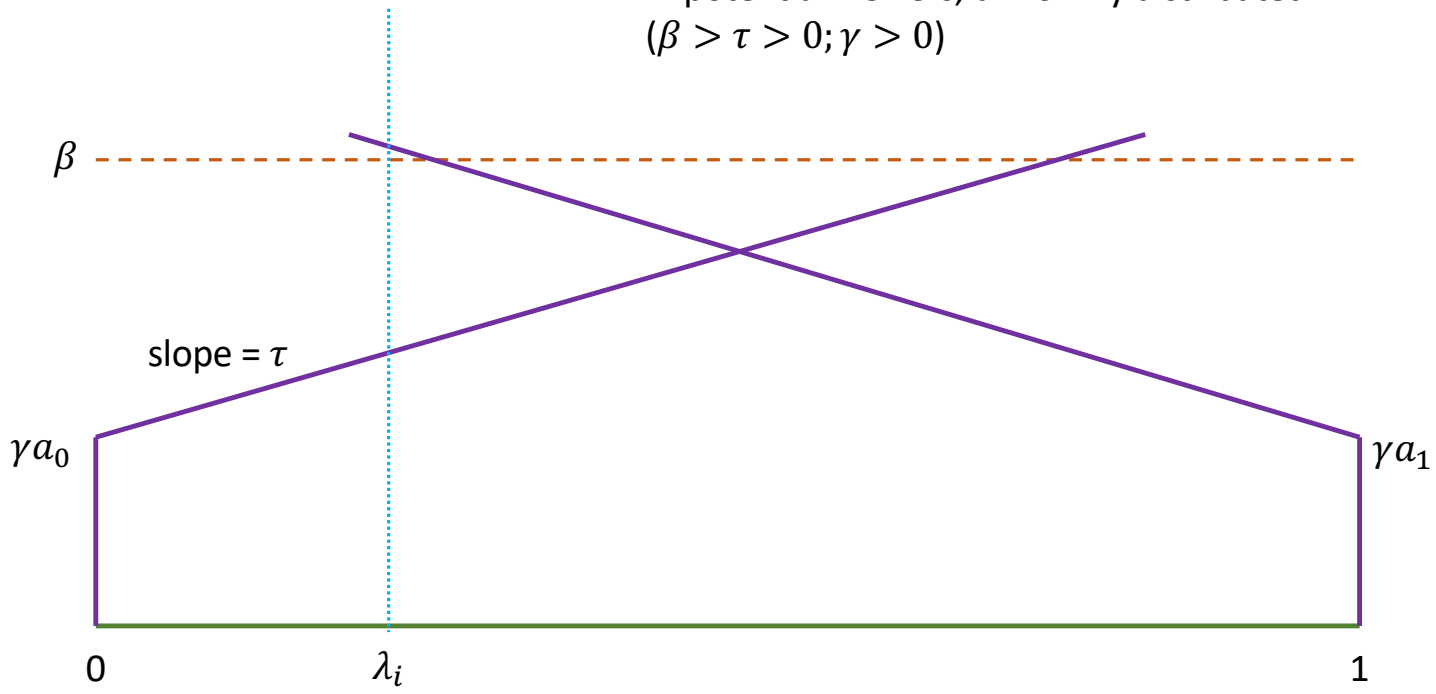
TV Viewing Market

$$v_{i0} = \beta - \gamma a_0 - \tau\lambda$$

$$v_{i1} = \beta - \gamma a_1 - \tau(1 - \lambda)$$

Description
β: base valuation
a: advertising

N potential viewers, uniformly distributed
$(\beta > \tau > 0; \gamma > 0)$



Advertising Market: Producers

(Warning: a lot of abstraction)

- m ***monopoly*** producers of new goods.
- Think Budweiser + Ford + Coca-Cola + General Mills + etc.
- (this is not a model of competition in the gods market!)
- If a viewer sees an ad, learns their willingness to pay and will purchase if price is less than willingness to pay.
- Each new good has zero marginal cost and type $\sigma \in [0, \bar{\sigma}]; \bar{\sigma} < 1$.
- A viewer has willingness to pay $\begin{cases} \omega \; with \; prob. \sigma \\ 0 \; with \; prob. \; 1 - \sigma \end{cases}$
- Fraction of producers with type less than σ is $F(\sigma)$, with $F(0) = 0$.

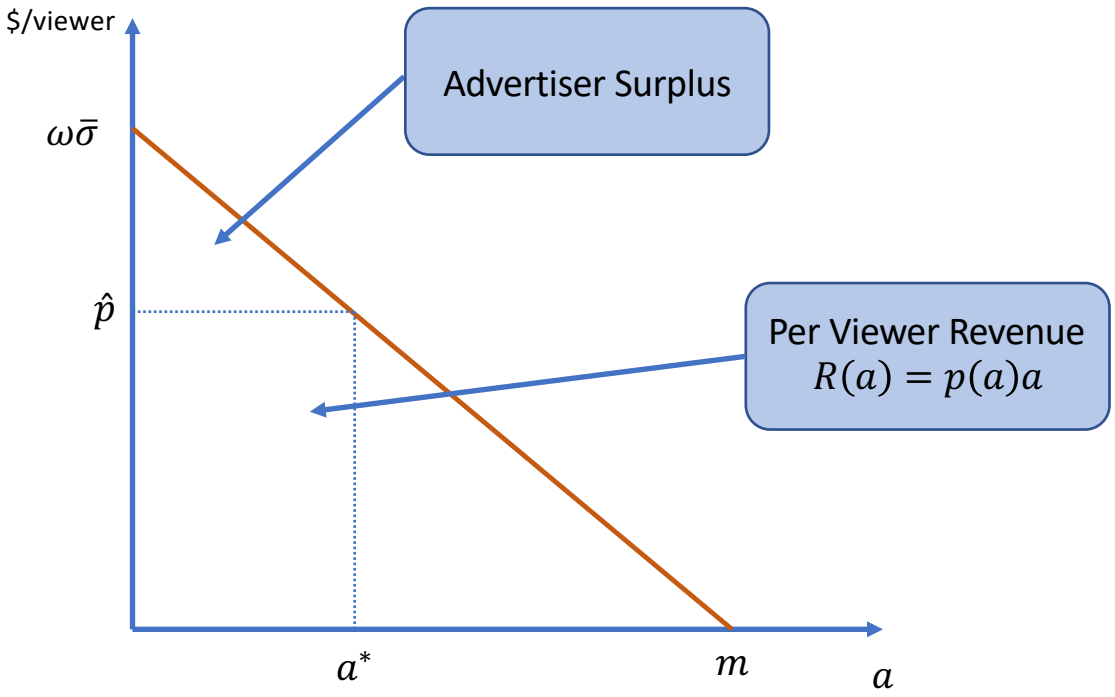
Advertising Market: Ad prices

Implication 1: Since consumer is either willing to pay ω or 0, the price of the product will be ω***.***

Implication 2: Producer willing to pay $\sigma\omega$ to place an ad.

Implication 3: If and ad reaches V viewers, number of firms wishing to advertise is $a(P,V) = m \cdot [1 - F\left(\frac{P}{V\omega}\right)]$. (demand curve for advertising)

Advertising Market: Per Viewer Demand



*Demand won't exactly be linear like this…see in a few slides.

Network Effects

Example of **indirect network effect.**

Positive

Advertisers benefit when more viewers are on the platform.

Negative

Viewers do not like ads.

Alternative Network Effects.

Positive-Positive Indirect Network Effects

- Video games. Game developers benefit from more players on the hardware. Players benefit from more variety in games.
- Marketplaces, like Amazon.
- Compatibility standards like EV charging.

(more uses increases supply of complementary product)

Positive Direct Network Effects

- Users of iMessage
- Twitter/Facebook; Uber (both ways)

(directly benefit from another user)

The Platform (TV Channel)

Goal of the TV Channel is to get both sides "on board."

A level of advertising implies a per-viewer advertising price.

$$\pi_0 = R(a_0)N_0$$

where N_0 is the viewer demand for Channel 0.

The platform decides the advertising level.

First Order Condition:

$$R'(a_0)N_0 + R(a_0)\gamma N_0' = 0$$

Balancing both sides of the market

First Order Condition:

$$R'(a_0)N_0 + R(a_0)\gamma N_0' = 0$$

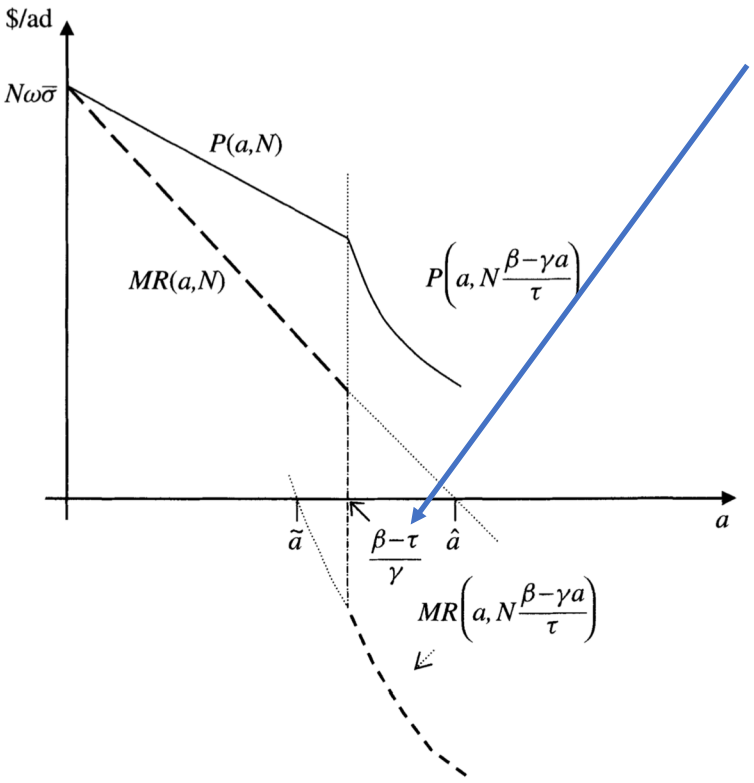
If you increase ads, prices fall for all current advertisers, but you gain advertisers.

If you increase ads, you (might) lose some viewers.

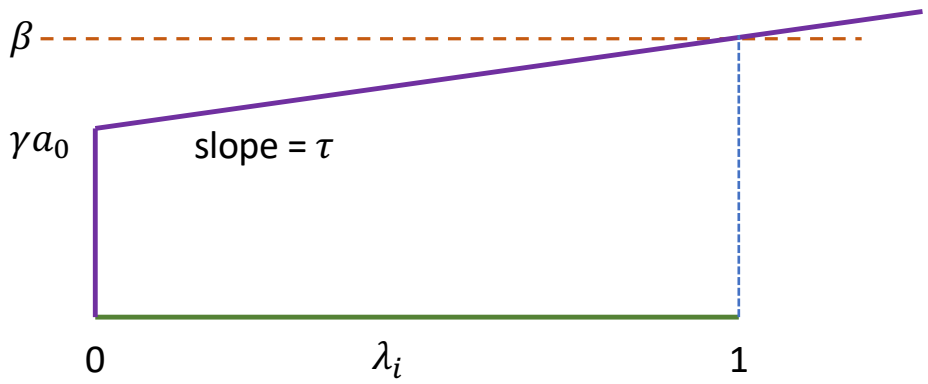
Monopoly

First Order Condition:

$$R'(a_0)N_0 + R(a_0)\gamma N_0' = 0$$



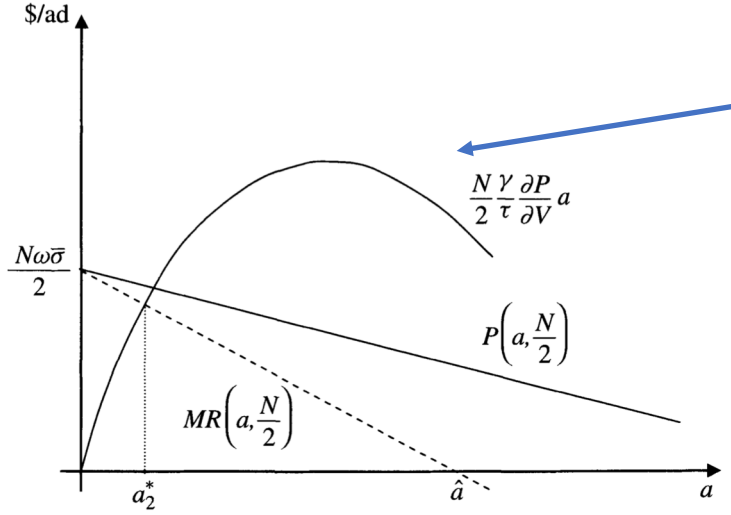
The viewer at $\lambda = 1$ is indifferent.



Duopoly

Finding the indifferent condition, we have that viewers with $\lambda < \frac{1}{2} + \frac{\gamma}{2\tau}(a_1 - a_0)$ will watch the program at location 0.

At equilibrium, each broadcaster balances the negative effect of higher advertising levels on viewers, with the positive effect on marginal revenue (in the advertising market).



Cost of increasing ads is losing viewers to the rival.

This is effectively the marginal cost of ad production for the platform.

(these are the curves for $\frac{N}{2}$ share of each platform)

Optimal provision of advertising?

What would a benevolent dictator choose?

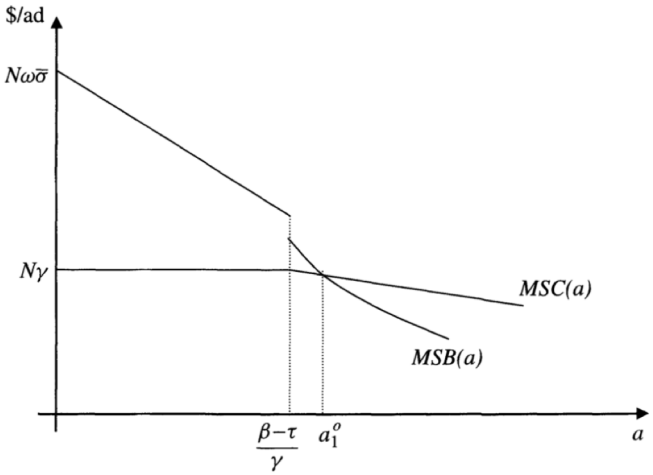
Where is surplus coming from?

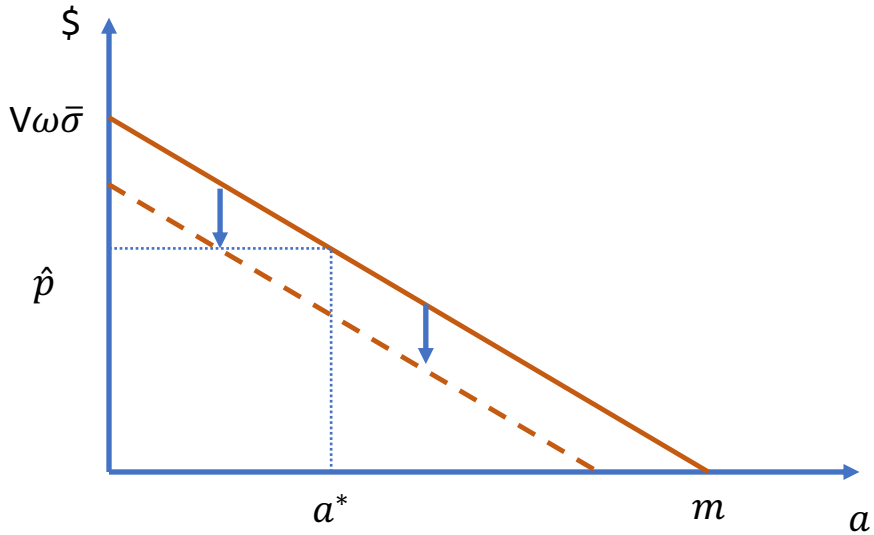
1. Area under β in the Hotelling model.
2. Surplus for advertisers.

Optimal Provision

Consider increasing advertising. This is good for advertisers and bad for consumers.

At some point, consumers will start to "switch off," so there is an additional cost to all the advertisers of a decrease in viewers.





Optimal v. Market Provision of Ads.

Take the case when γ tends to zero.

From a social welfare perspective, since consumer don't dislike ads, all advertisers should be allowed to show ads.

But the **optimal platform decision** is to maximize revenue, and it is a monopolist/duopolist, so they restrict ads lower than m**.**

As γ gets high, then platform will still show ads (in order to make revenue) even when the total naissance costs exceeds advertiser surplus.

Merger

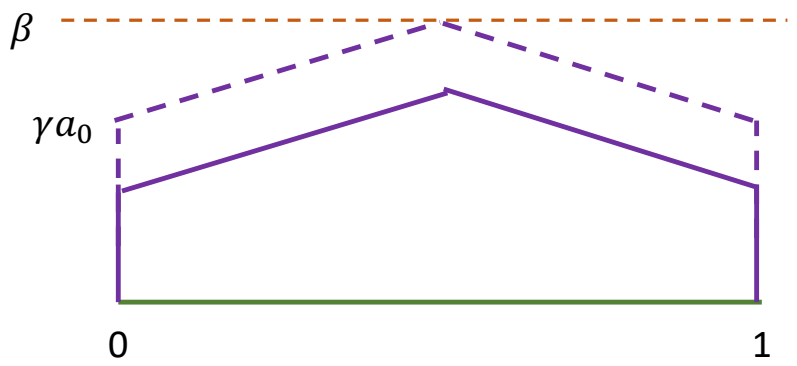
Compare two cases

1) Two channels competing. [We have done this.]
2) Two channels owned by the same operator.

Monopoly Owner of Both Stations

The monopolist can raise ad levels without losing viewers, all the way until $\lambda = \frac{1}{2}$ is indifferent between all options.

Why? They don't lose viewers.

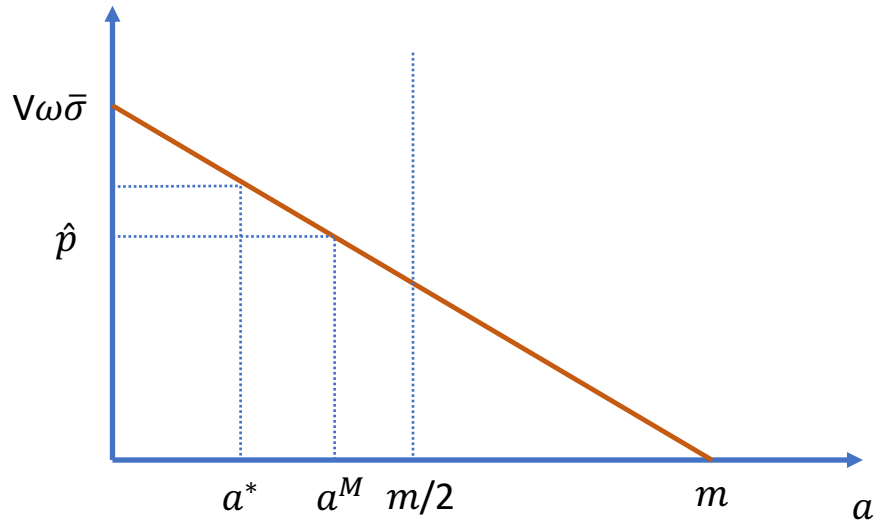


Monopoly Owner of Both Stations

Raising ads helps increase revenue in the advertising market.

(Remember $\frac{m}{2}$ would be the optimal for the unconstrained monopolist.)

Monopoly implies lower prices!



Monopoly Owner of Both Stations

Broadcaster surplus ↑

Advertiser surplus ↑

Viewer surplus ↓

Multihoming Viewers

Viewers

Can watch more than one channel.

Advertisers

Value the first impression from a viewer at $\$b$, and an additional impression of the same view at $\$(\sigma \cdot b)$ with $\sigma < 1$.

What a viewer is worth reached on

1 channel: $\$b$

2 channels: $\$(b + \sigma b) = \$b(1 + \sigma)$

Principal of Incremental Pricing

There exists a unique equilibrium (under some other mild conditions) at which each platform sets a price equal to

$$P_0 = b[x_0 + \sigma s_0^1]$$

$$P_1 = b[x_1 + \sigma s_1^0]$$

x_0: are exclusive viewers (”eyeballs”) on Channel 0

s_0^1: are viewers on watching Channel 0 that also watch Channel 1

Channels can fully price exclusive viewers, and partially price multi-homers.

The Effects of a Merger

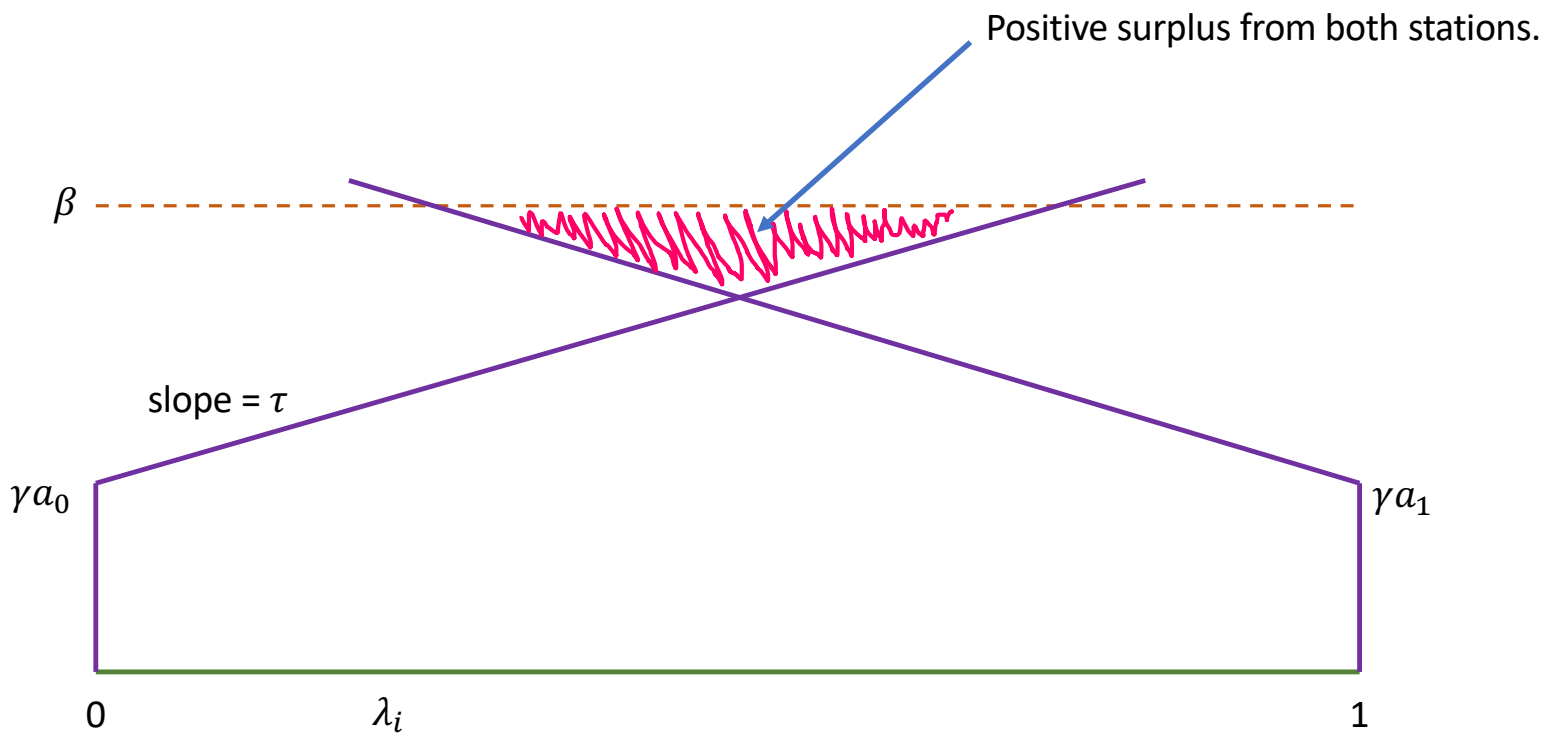
Proposition. A merger between two channels strictly increases advertising prices per consumer when the two channels have overlapping viewers.

$$P^{pre} = b(x_0 + \sigma s_0^1)$$

$$P^{post} = b(x_0 + x_1 + s_0^1 + additional\ viewers)$$

In the benchmark model with single-homing consumers, ad prices went down after a merger. Here we have the opposite result.

Visualizing Multi-homing Viewers



Where do channels locate?

If $\sigma = 0$, then channels can only price exclusive viewers, so channels locate at the extremes.

As σ becomes larger, channels locate closer to the middle and share more overlapping viewers.