Attention Oligopoly

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Motivation: Mergers between Digital Platforms

- Social media platform mergers:
  - 2012: Facebook acquires Instagram for $1 bn
  - 2014: Facebook acquires Whatsapp for $19 bn
- Merger analysis:
  - FTC, OFT – Instagram: relevant market definition is camera apps
    - competition from Hipstamatic and Camera+
    - no revenue generation
  - WhatsApp: market for messaging apps.

Attention Brokers

- Model digital platforms as attention brokers (Wu 2018) who find ways to get users to spend time on their platforms
- An attention broker:
  1. Exploits individual usage data to infer real-time consumption preferences of individual users (Agrawal et al., 2018).
     - eg learn that user wants to buy a refrigerator or needs a plumber
  2. Sells individually targeted advertising space to firms that supply the product needed (retail industry)
     - eg refrigerator manufacturers or local plumbers

Who Fits the Attention Broker Definition?

- Social media?
- Search engine?
- New York Times?
- Netflix?
- A billboard?
- ...
- The paper has both attention brokers and mass advertising outlets

Sketch of Model: Consumers

- Each consumer uses (exogenously) a certain set of digital platforms
- The type of the consumer is the product he is interested in (refrigerator, plumber)
- Consumer is (more) aware of incumbent/large/famous firms and (more) unaware of entrant/small/obscure firms
- If the consumer sees an ad about an entrant on at least one platform, he becomes (more) aware of the entrant's product

Sketch of Model: Platforms

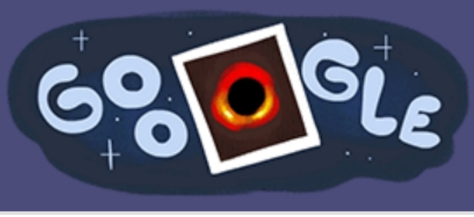
- Larry Page, one of the founders of Google, in 2000: "Artificial intelligence would be the ultimate version of Google. The ultimate search engine that would understand everything on the web. It would understand exactly what you wanted, and it would give you the right thing."
- Omniscient platforms who auction off targeted ads

Sketch of Model: Retail Industry

- Firms compete to buy ads that are targeted to consumers that want their product
- Entrants do it to get known
- Incumbents do it to prevent entrants to become known

Example with Three Platforms

J	m_J
$\varnothing$	0.263
Facebook	0.459
Instagram	0.014
Twitter	0.011
Facebook, Instagram	0.094
Facebook, Twitter	0.070
Instagram, Twitter	0.005
Facebook, Instagram, Twitter	0.084
Total	*1.000*



heinz ketchup

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What's On Your Menu?

People also search for

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12 ketchups tasted, ranked

1

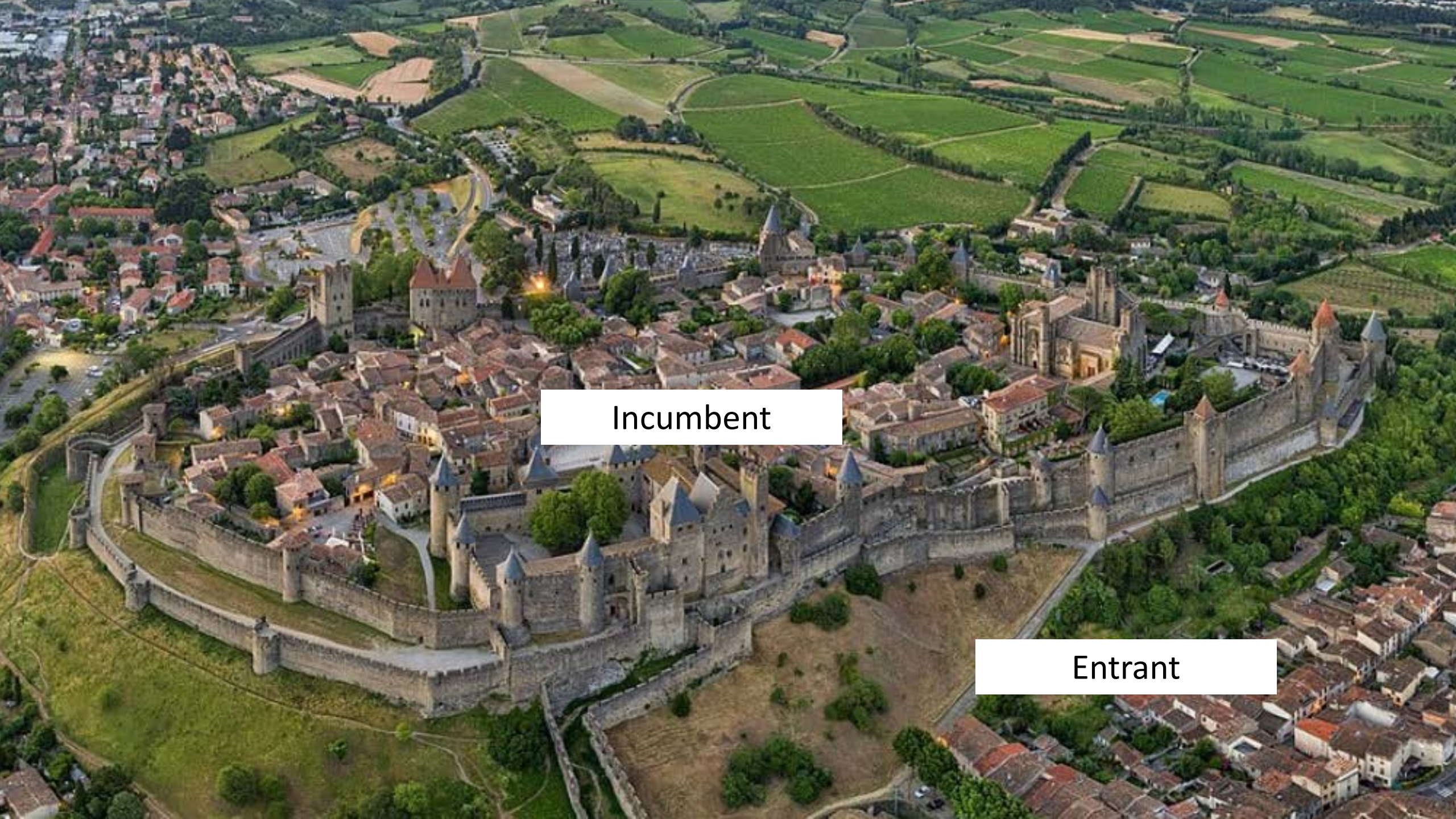
Sir Kensington's Ketchup Classic

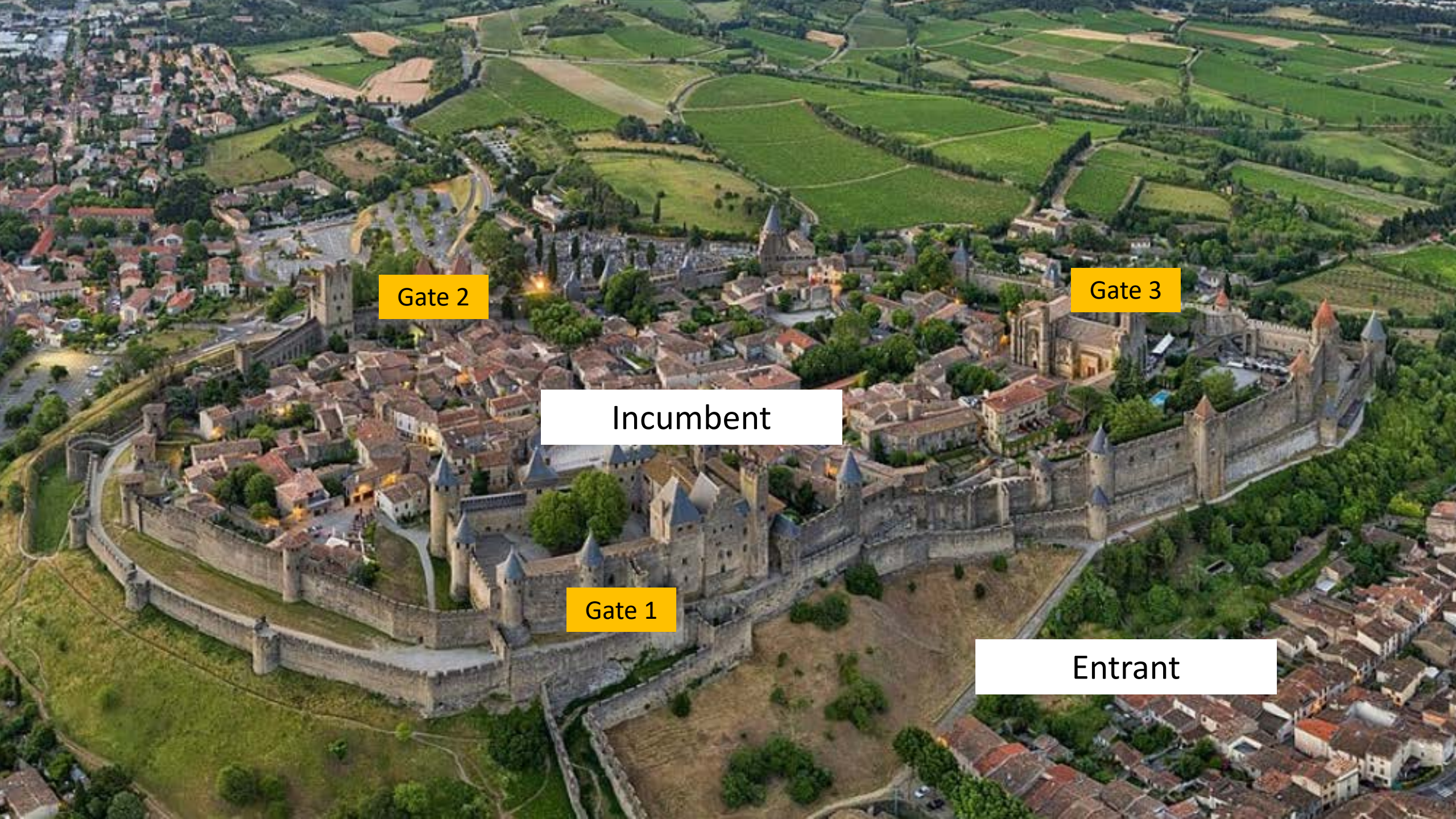
12 / 12

(E. Jason Wambsgans / Chicago Tribune)

Made with "vine-ripened tomatoes" and without high fructose corn syrup, Sir Kensington's far outscored the field to take first place. It was noticeably chunky, one taster likened it to tomato paste, and sported a flavor balanced between sweet and spicy. "One of the few with complexity," wrote a fan. Another taster noted there were other flavors at work in this ketchup, like onions, and compared it to "a good red pasta sauce." But a fourth taster who liked the brand still complained: "This is fancy people ketchup." $4.29 for 20 ounces.

We tasted 12 leading brands of ketchup in search of the best; they're ranked in the gallery above, from the lowest scoring to the highest. (Jason Wambsgans/Chicago Tribune; Shannon Kinsella/food styling)

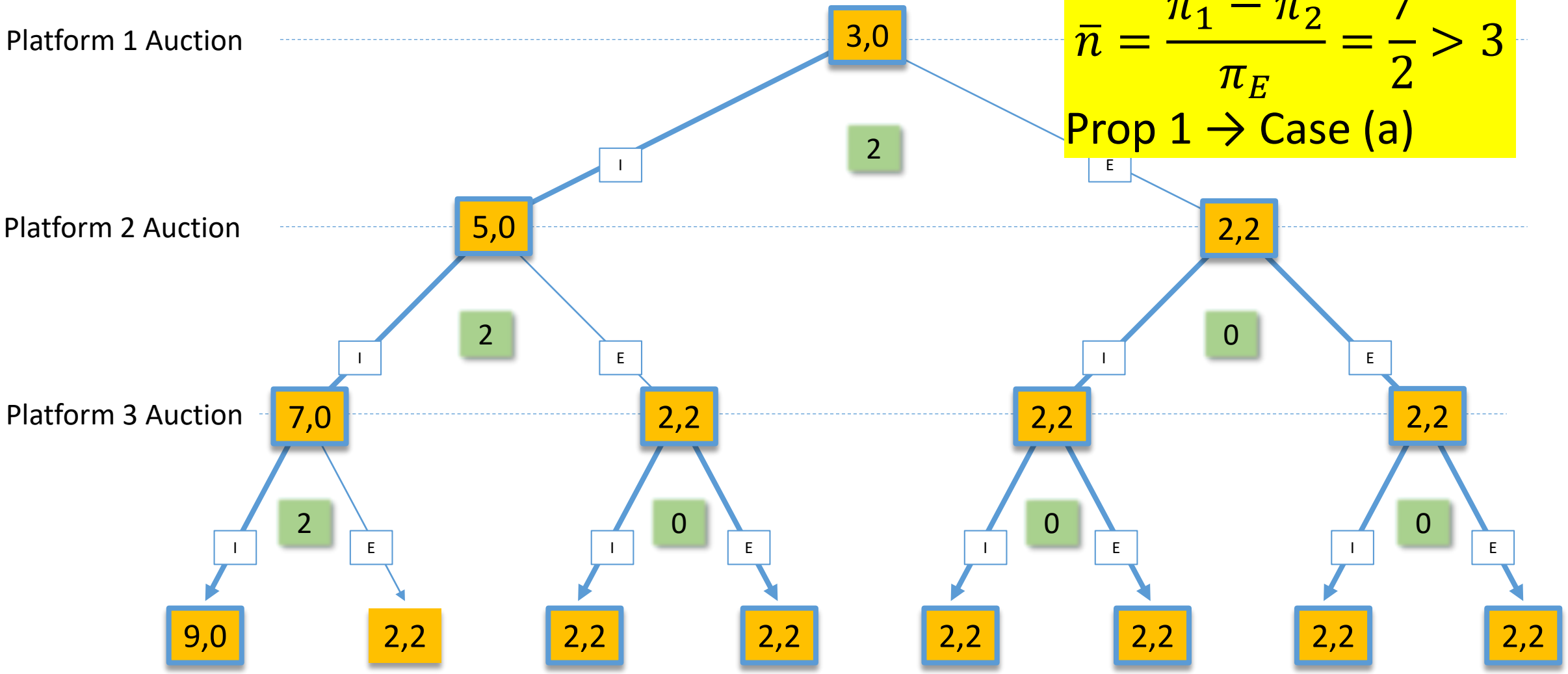

Incumbent
Entrant


Gate 2
Gate 3
Incumbent
Gate 1
Entrant

Example 1: $\pi_1 = 9, \pi_2 = \pi_E = 2 \rightarrow$ Incumbent Monopoly

$$\bar{n} = \frac{\pi_1 - \pi_2}{\pi_E} = \frac{7}{2} > 3$$

Prop 1 → Case (a)



Special case

F is a uniform distribution with support on $[0, M]$ with $M > \pi_1 - \pi_2$.

Corollary

Expected consumer surplus is given by

$$\bar{U} = a - b \sum_J \frac{m_J}{n_J},$$

where a and b are constants.

Merger Analysis

- Platforms i and j merge.
- The only thing that changes is that now the new owner can – but does not have to – sell ads on the two platforms as a bundle.
- Three sets of consumers:
  - Those that used neither of the two merging platforms: no action
  - Those that used only one platform: no action
  - Those that used both platforms: choose whether to sell the two ads independently or as one bundle (with a second price auction)
    - in both case the auction order is still randomized
-
-

Proposition

The aggregate loss in consumer surplus due to a merger between platform i and platform j is given by:

$$\Delta \bar{U} = -(u_2 - u_1) \sum_{J \in M_{ij}} m_J \left(F\left(\frac{\pi_1 - \pi_2}{n_J - 1} \right) - F\left(\frac{\pi_1 - \pi_2}{n_J} \right) \right).$$

where M_{ij} is the set of segments where both platforms are present.

Corollary

If F is a uniform distribution, consumer surplus loss is given by

$$\Delta \bar{U} = -b \sum_{J \in M_{ij}} \frac{m_J}{n_J (n_J - 1)},$$

where b is a constant.

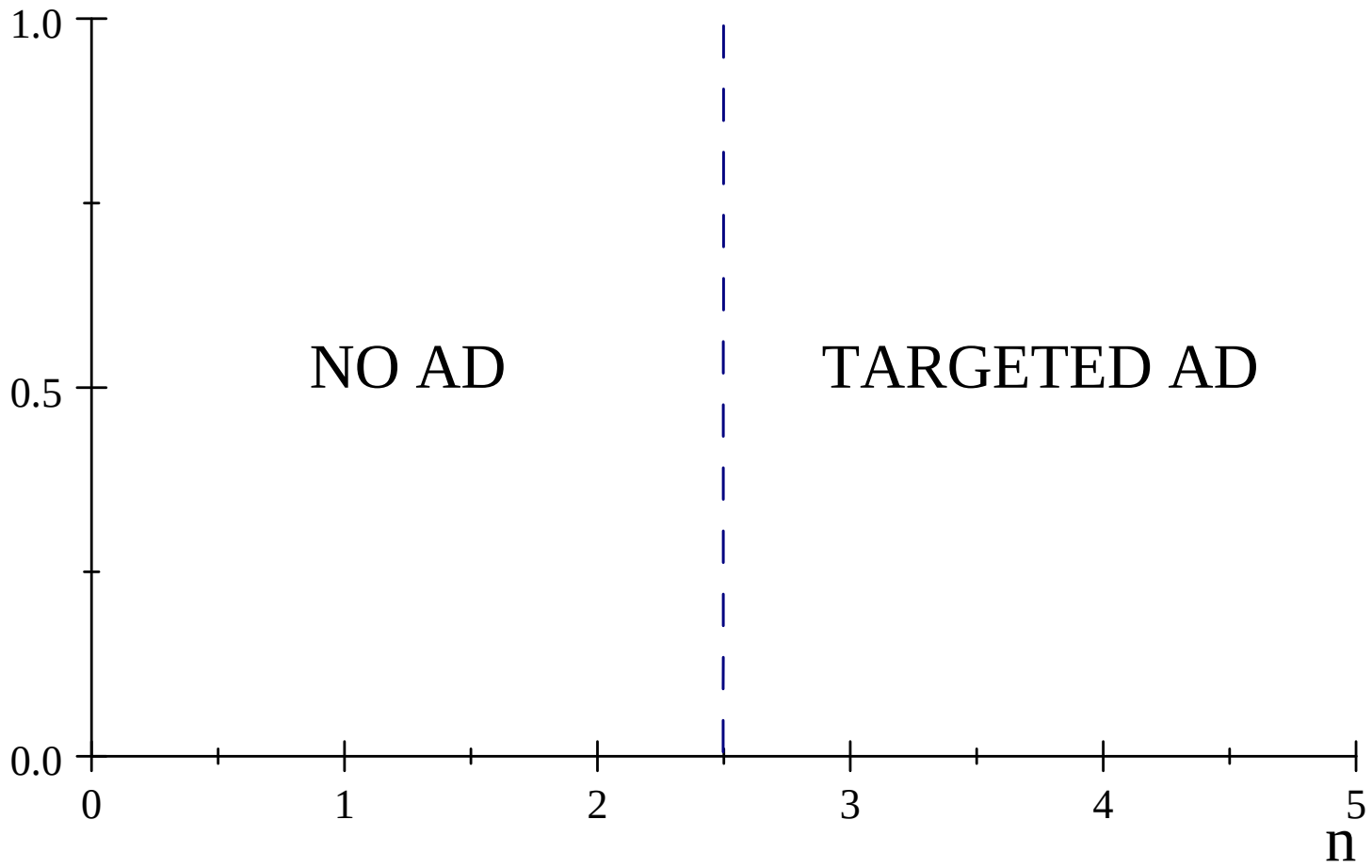
Application to US Social Media Platforms

- Pew Institute Survey on Social Media Trends.
  - July 12 to August 8, 2016 (wave 19).
  - 4,579 participants: online (4,165) and mail (414).
  - Drawn from the American Trends Panel
  - 899 people refused
- Usage of Facebook, Instagram, and Twitter

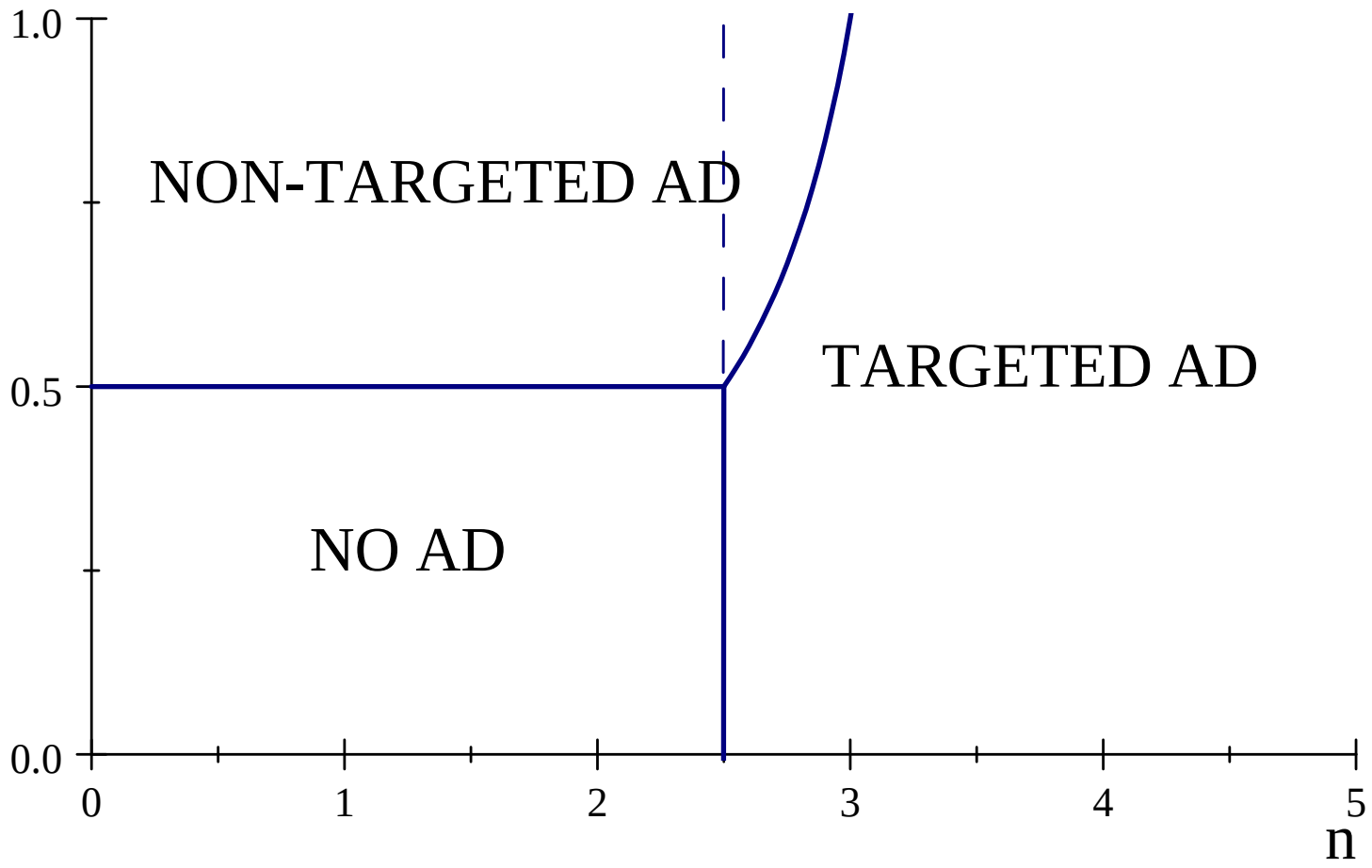
Merging Pair	(1) *Lower Bound*	(2) *Upper Bound*	(3) *Pairwise Overlap*	(4) *Three-way Overlap*	(5) *Welfare Effect*
Facebook-Instagram	0%	19.3%	9.4%	8.4%	6.1%
Facebook-Twitter	0%	17.3%	7.0%	8.4%	4.9%
Instagram-Twitter	0%	17.3%	0.5%	8.4%	1.7%

Targeted and Non-Targeted Advertising

- Add mass advertising
- Firms can buy:
  1. Targeted ads in auctions run by platforms
  2. Non-targeted ads from mass media at flat rate a
- Recall that γ_k is the share of consumers who are interested in product k
- Rank industries according to γ_k
  - industries with large γ_k are mainstream
  - industries with small γ_k are niche



Presence of an Entrant Ad in Equilibrium: x-axis: number of platforms (n); y-axis: size of industry (γ_k/a).



Presence of an Entrant Ad in Equilibrium: x-axis: number of platforms (n); y-axis: size of industry (γ_k/a).

Conclusions

- Analysis of one aspect of competition between attention brokers
- No radical departure from standard competition assessment but highlights:
  - Potential anticompetitive effect on product knowledge and hence product competition
  - Importance of looking at individual attention patterns alongside aggregate usage shares
- To-do list:
  - Attention as a continuous variable
  - Endogenous mergers