

# Media Markets as Two-Sided Markets: Consumer Behavior and Search Engines

**Markus Reisinger**

WHU - Otto Beisheim School of Management

The Pros and Cons of Antitrust in Two-Sided Markets

Stockholm, Swedish Competition Authority

November 28, 2014

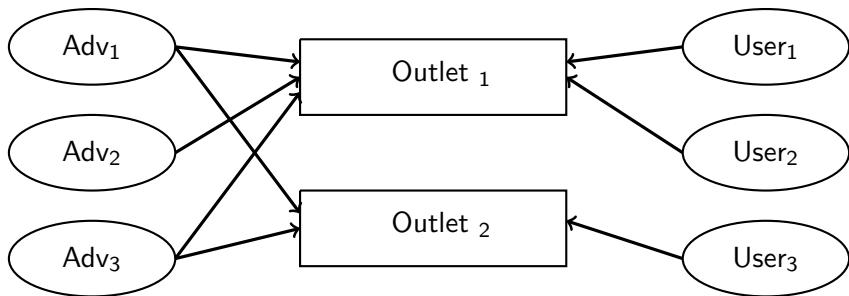
# Media Markets

- Media markets are often two-sided markets
- Platforms (newspapers, radio stations, broadcasters, websites) need to bring two sides on board:  
consumers (readers, listeners, viewers, users) and advertisers
- Indirect externalities: Advertisers benefit from consumers; consumers often dislike advertising
- Advertising revenue in the US in 2012: 175 billion US\$ (around 41% from TV and 21% from Internet media)

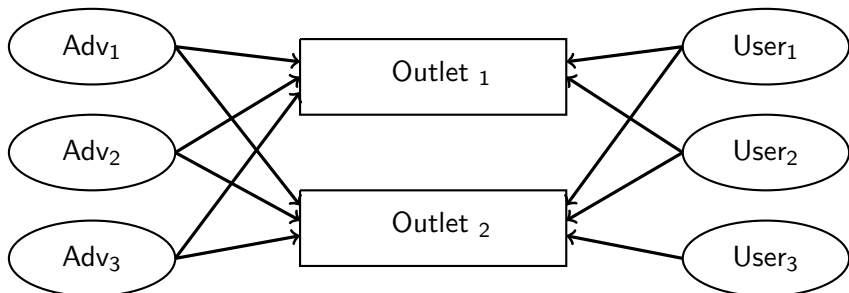
# Media Markets

- Consider Internet media here
  - Advertising revenues were steadily increasing in the last years (increase by 500% since 2003)
  - Several interesting features of the Internet, e.g., consumers often receive content for free
  - Focus on two aspects:
    - a) *Consumers choosing multiple outlets (website is "just one click away")*
    - b) *Search engines and search bias*
- ⇒ Based on overview article jointly written with Martin Peitz "The Economics of Internet Media"

- In traditional audiovisual media, consumers often stick to one media outlet for the relevant time period (single-home)
  - Advertisers are active on many outlets (multi-home)
- Model is one of competitive bottlenecks



- In the Internet, consumers also multi-home
- Distinguishing feature of online consumption: Users spread their attention across a wide array of outlets
- Example from December 2012:  
Google Ad Network reaches 93.9% of users, AOL Advertising 84.2% and AT&T AdWorks 83.9%.



- Competitive-bottleneck model:
  - Outlets fight for the exclusive turf of users
  - Outlets have monopoly power of delivering users' attention to advertisers
- Competition is driven by business-stealing considerations on the user side
- If advertising is a nuisance to users, competition leads to reduced advertising (advertising is a shadow price to users)

- Multi-homing users:
  - Advertisers can reach a user on multiple outlets
  - Outlets do no longer have monopoly power
- Advertisers are willing to pay less for 'shared' users than for 'exclusive' users
- This gives rise to new competitive effects

- Findings based on Ambrus, Calvano and Reisinger (2014)
- Suppose a new outlet enters:
  - **Duplication effect:**
    - Shared user is exposed to the ad multiple times
    - advertising is less valuable
    - Reduces advertising intensity
  - **Business-sharing effect:**
    - After entry, some (formerly exclusive) users are shared with entrant
    - Losing shared users is less detrimental than losing exclusive users
    - Increases advertising intensity
- **Composition** of user demand becomes important



- Implication:  
Fiercer competition can lead to **increased** advertising
- This is consistent with findings in the US cable television industry ("FOX News puzzle")
- Recommendations for competition policy can change drastically when users multi-home
- Anderson, Foros and Kind (2014) provide a related analysis

- Users often access websites via a search engine
- Search engine provides organic and sponsored links
- Organic link reflect relevance of listings according to an algorithm
- Sponsored links are paid for by advertisers:
- Advertisers pay per click and bid in a second-price auction:
  - Higher per-click-price secures rank closer to top
  - Click-through-rate is also important
  - Google uses a quality score to determine the rank

# Search Bias

Does search engine list results in the best interest of consumers?

## Different forms of biases

- (i) Bias coming from the tension between organic and sponsored links
- (ii) Bias within the sponsored links
- (iii) Bias within the organic links
- Example: search engine integration
  - Google owns many media platforms (Youtube, Google maps, Zagat)
  - Organic results may favor these websites
  - European Commission in 2012 lists this as a potential abuse of dominant position
  - FTC found that Google changed its algorithm to privilege its own content

# Bias due to Organic versus Sponsored Links

## Formulation based on Taylor (2013)

- Two search engines,  $i \in [g; y]$
- After a query, each search engine displays an organic link (O-link) and an advertised link (A-link)
- A-link has an exogenous match probability  $q$  and gives the search engine a benefit  $b > 0$  if a user clicks on it
- Match probability  $p_i$  of the O-link is chosen by search engine  $i$ , with  $p_i \in [0, p^{max}]$
- Increasing  $p_i$  is costless for each search engine
- Users face search costs  $S > 0$  when visiting a search engine and costs  $s > 0$  when clicking a link

# Bias due to Organic versus Sponsored Links

- Welfare maximizing outcome: Both search engines set  $p_i = p^{max}$
  - But: If  $q$  is large enough, there is an equilibrium in which  
 $p_g = p_y = q < p^{max}$   
Search-quality degradation!
  - Trade-off of the search engines:  
Higher quality attracts more users  
Higher quality prevents users from clicking on the advertised link
- Self-cannibalization
- White (2013) provides a related analysis

# Bias due to Competition between Advertisers

Only advertised links

## Formulation based on Eliaz and Spiegler (2011)

- Single search engine sets a per-click-price to advertisers
- Continuum of advertisers competing in the product market
- Advertisers are characterized by their probability with which the product has a positive value for consumers (matching probability)
- Advertisers are heterogeneous with high and low matching probabilities
- Consumers are heterogeneous with respect to their valuation, conditional on a match being formed

# Bias due to Competition between Advertisers

Only advertised links

In equilibrium, search engine sets a per-click-price to attract relatively many low-relevance advertisers

- Trade-off of the search engine:

Setting a per-click-price such that high-relevance advertisers are attracted increases user demand

Attracting mainly high-relevant consumers leads to fierce competition between advertisers and lower profits

Search-quality degradation!

- See Chen and He (2011) for related results

## Formulation based on de Cornière and Taylor (2014)

- Single search engine and two media outlets
  - Users are distributed on a line of length 1; media outlets are located at the endpoints of the line
  - Users are not aware of their location  $x$  before using the search engine (users do not know which media outlet they are most interested in without the search engine)
  - Search engine and outlet make profits via advertising
  - Advertising on a media outlet and on the search engine are substitutes
- Profit of the search engine falls in the advertising levels of the outlets



- Search engine works as follows:
    - (i) User enters a query
    - (ii) Search engine maps the query into a latent location and directs the user to an outlet
- Cutoff rule such that users with  $x \leq \bar{x}$  are directed to outlet 1 and users with  $x > \bar{x}$  are directed to outlet 2

### Definition of a bias:

If the search engine sets a different  $\bar{x}$  than users would have set it is biased.

- Call  $x^U$  the optimal cutoff rule for users. Then, the search engine is biased in favor of outlet 1 if and only if  $x^U > \bar{x}$ .

- Trade-off of the search engine:

Setting  $\bar{x}$  close to  $x^U$  ensures high user participation

If advertising on outlet  $i$  is a particularly close substitute to advertising on the search engine, the search engine prefers to bias results against platform  $i$

- Even without integration, a bias can occur (as long as platforms are not symmetric)

- Search engine is integrated with platform  $i$
- Effects on the bias:
  - Search engine benefits from revenues on platform  $i$  and so biases in favor of platform  $i$
  - Search engine cares more about participation and implements higher quality (less-biased results)
- Integration can increase or decrease the level of the bias!
  - Burguet, Caminal and Ellman (2014) provide a related analysis

# Summary on Search Engines

Quote

The goals of the advertising business model do not always correspond to providing quality search to users. [...] we expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers.

# Summary on Search Engines

Quote

The goals of the advertising business model do not always correspond to providing quality search to users. [...] we expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers.

Sergey Brin and Larry Page, founders of Google,  
before Google was advertising financed.