Aggregators and the News Industry
Charging for Access to Content

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The Internet has drastically altered the nature of competition in the news industry. Focus on:
Introduction
Motivation and Aims

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2. Aggregators (e.g., Google News, Digg.com) - an increasingly significant source of traffic. Allow consumers to search amongst firms. What are their effects on content quality, consumer welfare and firm profitability?
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Results have implications for the ongoing debate about the effects of aggregators on the news industry.

Media market competition - Anderson and Coate (2005) - here focus on vertical rather than horizontal differentiation.
Focus on the market for a single story.

$n$ firms simultaneously make content quality ($x$) and subscription price decisions ($p$).

Some consumers use aggregators to select firms based on quality.
Consumer utility:

\[ U_i(x, p) = \delta u(x) - \lambda_i p \]

\[ u(0) = 0 \quad u'(\cdot) > 0 \quad u''(\cdot) < 0 \]

\[ \lim_{x \to 0} u'(x) > 0 \quad \lim_{x \to \infty} u'(x) = 0 \]
Model
Consumers

\[ U_i(x, p) = \delta u(x) - \lambda_i p \]

- Loyal subscribers - \( \lambda_i = 1 \) - have a preferred firm and are willing to pay to access content. Uniformly distributed across firms.
- Searchers - \( \lambda_i \to \infty \) - use an aggregator to find the firm providing the highest quality level for free.

Justification:
1. 64% of visitors average only 1 visit per month and 82% of consumers unwilling to pay for content (Pew Research Center, 2011).
2. Concentration of a user's consumption negatively related to use of aggregators (Athey and et al., 2011).
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- \( \mu \in (0, 1) \) - proportion of consumers who are searchers. Interpret \( \mu \) as the importance of the aggregator.
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- $\beta$ - exogenous advertising revenue generated by each visitor.
- $c(x)$ - cost of content investment $x$.
- $c(0) = 0, c'(\cdot) > 0, c''(\cdot) > 0, \lim_{x \to 0} c'(x) = 0$ and $\lim_{x \to \infty} c'(x) = \infty$. 
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Focus on the unique symmetric mixed strategy equilibrium in which:

1. Every firm provides content for free with probability $\alpha^*$.  
2. Firms charging for access select a content level $x^*_M$ and set a price $p_M = \delta u(x^*_M)$.  
3. Firms providing free content select a content investment $x$ from $F(x)$ defined on $[0, \bar{x}]$.
Model
Mixed strategy equilibrium

If \( p_i > 0 \): 

\[ \max_{p_i > 0, x_i \geq 0} \pi_M(x_i, p_i) = \frac{\beta(1 - \mu)}{n} + \frac{(1 - \mu)}{n} p_i - c(x_i) \]

s.t. \( U(x_i, p_i) = \delta u(x_i) - p_i \geq 0 \)
If $p_i = 0$:

$$E[\pi_i(x)] = \frac{\beta(1 - \mu)}{n} + \beta \mu [1 - \alpha(1 - F(x))]^{n-1} - c(x)$$
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If a firm charges for access to its content it earns subscription revenues from loyal subscribers but loses the possibility of attracting the aggregator’s traffic.
Equilibrium Pricing

Proposition

If \( \frac{(1-\mu)\delta u(x^*_M)}{n} - c(x^*_M) < \beta \mu \) then

\[
\alpha^* = 1 - \left( \frac{1}{\beta \mu} \left( \frac{(1-\mu)\delta u(x^*_M)}{n} - c(x^*_M) \right) \right)^{\frac{1}{n-1}}
\]

Otherwise \( \alpha^* = 0 \).

Comment

1. This equilibrium generates observed mix of pricing strategies.
2. \( \alpha^* = 1 \) is never an equilibrium.
Proposition

With probability $1 - \alpha^* - p_M = \delta u(x_M^*)$, where $x_M^*$ is s.t.

$\left(1 - \mu\right) \frac{\delta}{n} u'(x_M^*) = c'(x_M^*)$.
Proposition

- With probability $1 - \alpha^*$ - $p_M = \delta u(x_M^*)$, where $x_M^*$ is s.t.
  \[
  \frac{(1-\mu)\delta}{n} u'(x_M^*) = c'(x_M^*).
  \]

- With probability $\alpha^*$ - the content distribution is:
  \[
  1 - F(x) = \frac{1}{\alpha^*} \left( 1 - \left( \frac{1}{\beta \mu} \left( \frac{\delta u(x_M^*)(1-\mu)}{n} + c(x) - c(x_M^*) \right) \right)^{\frac{1}{n-1}} \right)
  \]
  on $[0,\bar{x}]$ where $\bar{x} = c^{-1} \left( \beta \mu + c(x_M) - \frac{(1-\mu)\delta u(x_M^*)}{n} \right)$. 

Equilibrium

Quality
### Proposition

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  on $[0, \bar{x}]$ where $\bar{x} = c^{-1} \left( \beta \mu + c(x_M) - \frac{(1-\mu)\delta u(x_M^*)}{n} \right)$.

- $E(\pi(x)) = \frac{\beta(1-\mu)}{n} + \frac{(1-\mu)\delta u(x_M^*)}{n} - c(x_M^*)$
Results
Comparative statics: Equilibrium strategies - \(1 - \alpha^*\) and \(x_M^*\)

\[
1 - \alpha^* = \left( \frac{1}{\beta \mu} \left( \frac{(1 - \mu) \delta}{n} u(x_M^*) - c(x_M^*) \right) \right)^{\frac{1}{n-1}}
\]

\[
\frac{(1 - \mu) \delta}{n} u'(x_M^*) = c'(x_M^*)
\]

- Both increase when:
  1. Fewer consumers use aggregators (\(\downarrow \mu\));
  2. Consumers have a higher willingness to pay (\(\uparrow \delta\));
  3. Advertising revenues are lower (\(\downarrow \beta\));
  4. Fewer firms compete (\(\downarrow n\)).
Implications
Comparison: Pricing strategies across content areas

Comment

*Can explain differences in pricing strategies and content qualities across content areas.*
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- Why were The Financial Times and The Wall Street Journal amongst the first to introduce paywalls?
- Why is most entertainment news provided free of charge?
- $\alpha_{\text{enter}} > \alpha_{\text{finance}}$?
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- Why were The Financial Times and The Wall Street Journal amongst the first to introduce paywalls?
- Why is most entertainment news provided free of charge?
- $\alpha_{\text{enter}}^* > \alpha_{\text{finance}}^*$?
  - More consumers use aggregators to search for entertainment news? - $\mu_{\text{enter}} > \mu_{\text{finance}}$. 
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- Why were The Financial Times and The Wall Street Journal amongst the first to introduce paywalls?
- Why is most entertainment news provided free of charge?
- $\alpha_{\text{enter}}^* > \alpha_{\text{finance}}^*$?
  1. More consumers use aggregators to search for entertainment news? - $\mu_{\text{enter}} > \mu_{\text{finance}}$.
  2. Higher willingness to pay for financial news? - $\delta_{\text{enter}} < \delta_{\text{finance}}$. 

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- Why were The Financial Times and The Wall Street Journal amongst the first to introduce paywalls?
- Why is most entertainment news provided free of charge?
- $\alpha^{*}_{\text{enter}} > \alpha^{*}_{\text{finance}}$?
  1. More consumers use aggregators to search for entertainment news? - $\mu_{\text{enter}} > \mu_{\text{finance}}$.
  2. Higher willingness to pay for financial news? - $\delta_{\text{enter}} < \delta_{\text{finance}}$.
  3. Small number of specialist financial news firms? - $n_{\text{enter}} > n_{\text{finance}}$. 
Comparative statics: Equilibrium strategies - $F(\cdot)$

\[
1 - F(x) = \frac{1}{\alpha^*} \left( 1 - \left( \frac{1}{\beta \mu} \left( \frac{(1 - \mu) \delta}{n} u(x^*_M) + c(x) - c(x^*_M) \right) \right)^{\frac{1}{n-1}} \right)
\]

- The free quality distributions can be ranked in terms of stochastic dominance.
- In particular:

\[
\mu' > \mu \Rightarrow F(\cdot; \mu') \text{ fosd } F(\cdot; \mu)
\]
As more consumers use the aggregator - $\mu$ increases:

1. Expected free quality level increases, whilst the content quality charged for decreases.
2. Expected profits of the firms decrease.
3. Expected utility of a loyal subscriber increases.
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Comment

Aggregators may harm firms but may also increase product quality and consumers may benefit.
Examples show that the expected free content levels can be above or below the social optimum.

A public broadcaster and asymmetric equilibria.

Endogenising $\mu$ through differences in costs of using the aggregator.

Choice of media firm by loyal subscribers.
Conclusions

- Develop a model in which *ex ante* identical media firms pursue different pricing strategies.
- Can explain differences in pricing strategies and content investments across content areas.
- Emphasise the potential benefits as well as costs of increased use of aggregators by consumers.