News Aggregators and Competition among Newspapers in the Internet

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June, 2013
Google threatens to drop French media links over fees plan

French newspaper publishers have called on the government to make search engines pay to link to their content

Angelique Chrisafis in Paris
guardian.co.uk, Friday 19 October 2012 17.02 BST
Google News faces mass newspaper boycott in Brazil

BY Robert Andrews

A skirmish between Google and newspapers over crawling of news headlines suggests Latin America's digital publishing sector is maturing. But can Google keep publishers sweet enough to exploit opportunities in the fast-growing Brazilian market?
Outline

• Stylized Facts (The Advent of Internet)
• Debate (Puzzle)
• Model
• No Aggregator
• Aggregator
• Opting out
• Comparison
• Extension: Third parties’ content
Stylized Facts

I Advertising Revenue of Newspapers

- 50% cut since 2000 (FTC, 2010)
- 80% of revenues came from advertising, and 20% came from subscription (FTC, 2010)
- The newspapers are the worst among the news media
Print Advertising Revenue Falls, Online Grows

Source: The State of the News Media, 2013
Stylized Facts

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• 50% cut since 2000 (FTC, 2010)
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II Audiences

• Stiff competition from new media on the internet (web-only news, blogs and news aggregators)
• The traditional media are losing their consumers to the online media
Where People Got News Yesterday

Source: The State of the News Media, 2013
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III Aggregator

- The aggregators are the most important player in online media.
- Outsell (2009): 57% (Internet)=31% (agg)+8% (newspaper site) +18%(other)
<table>
<thead>
<tr>
<th>Online news sources used most often ...</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yahoo/Yahoo News</td>
<td>26</td>
</tr>
<tr>
<td>Google/Google News</td>
<td>17</td>
</tr>
<tr>
<td>CNN</td>
<td>14</td>
</tr>
<tr>
<td>Local news sources</td>
<td>13</td>
</tr>
<tr>
<td>MSN</td>
<td>11</td>
</tr>
<tr>
<td>Fox</td>
<td>9</td>
</tr>
<tr>
<td>MSNBC</td>
<td>6</td>
</tr>
<tr>
<td>New York Times</td>
<td>5</td>
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<tr>
<td>AOL</td>
<td>5</td>
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<tr>
<td>Huffington Post</td>
<td>4</td>
</tr>
<tr>
<td>Facebook</td>
<td>3</td>
</tr>
<tr>
<td>ABC/ABC News</td>
<td>3</td>
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<tr>
<td>Wall Street Journal</td>
<td>3</td>
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<tr>
<td>BBC</td>
<td>2</td>
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<tr>
<td>USA Today</td>
<td>2</td>
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<tr>
<td>Internet service providers</td>
<td>2</td>
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<tr>
<td>ESPN</td>
<td>2</td>
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<tr>
<td>Washington Post</td>
<td>2</td>
</tr>
<tr>
<td>The Drudge Report</td>
<td>2</td>
</tr>
</tbody>
</table>

Where People Get News Online?

Source: Pew Research Center, 2012
Debate

The effect of news aggregators on the news media, and especially on the quality of journalism is a significant concern.

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- News aggregators “steal” traffic from news sites. ⇒ lower quality
"When this work is misappropriated without regard to the investment made, it destroys the economics of producing high quality content."

- Rupert Murdoch, owner of News Corp. and The Wall Street Journal
"By providing the first few lines of our stories to internet users, (Google) reduces the chances that they will look at the entire story in our websites,"

- Carlos Fernando Lindenberg Neto, ANJ president
Debate

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There are two type of arguments in this debate:

• News aggregators “steal” traffic from news sites. ⇒ lower quality

• News aggregators “help” newspapers to find readers for the best contents. ⇒ higher quality
"Google makes it easy for users to find the news they are looking for and to discover new sources of information... We send more than four billion clicks each month to news publishers"

- Google, comments on FTC discussion draft, 2010
A Big Picture

**Sequential Consumption:**
From *homepage* to *individual articles*
A Big Picture

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**Business-stealing Effect:**
Aggregators reduce the traffics to newspapers’ *home pages*

**Readership-expansion Effect:**
Aggregators can increase the traffics to *original articles* of newspapers
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**Question:**
How does the presence of aggregators affect quality choice of newspapers?
Main Results

If the increase in attention from high quality contents is large enough, the presence of aggregator would

- change strategic interactions of quality choices of newspapers from strategic substitutes to strategic complements.
- lead to specialized newspapers
- increase the average quality of newspapers
- improve the consumer surplus and welfare
- have ambiguous effect on the profit
Literature Review

- **News Aggregator**
  - **Empirical** (Chiou and Tucker, 2011 and Athey and Mobius, 2012): given supply side behavior, they find that readership expansion effect dominates business stealing effect
  - **Theoretical** (Dellarocas, Katona, and Rand, 2012): A single-issue model with focus on interactions between quality choice and link decisions (i.e. every newspaper can provide a link to a rival’s content)

- **Two-sided Market with Media**
  - Anderson and Coate (2005)
  - Athey, Calvano, and Gans (2012): consumer-tracking technology
Model (Newspapers)

Newspapers $\in \{1, 2\}$

- **Ideological view:** Hotelling model, (Mullainathan and Shleifer, 2005)
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**Consumers** a unit mass of consumers distributed uniformly
- **Ideological view**: the location of a reader represents his/her ideological view.
- **Single-homing**: they visit only one newspaper (site)
Model (Payoffs)

Consumers
- Depending on the quality of an article, each consumer

<table>
<thead>
<tr>
<th>Utility</th>
<th>Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>$u_0$</td>
<td>1</td>
</tr>
<tr>
<td>$u_0 + \Delta u$</td>
<td>$1 + \delta$</td>
</tr>
</tbody>
</table>
Model (Payoffs)

Consumers

- The ideological characteristic is modeled by linear transportation cost, \( t \)

\[
U^1(x) = \mu(s_1) \Delta u + u_0 - xt
\]
\[
U^2(x) = \mu(s_2) \Delta u + u_0 - (1 - x)t
\]
Model (Payoffs)

Newspapers

- Quadratic cost of investing (not possible to invest on more than half of the issues).

\[
C(\mu(s_i)) = \begin{cases} 
\infty & \mu(s_i) > \frac{1}{2} \\
 c\mu(s_i)^2 & \mu(s_i) \leq \frac{1}{2}
\end{cases}
\]

- Allows to choose average quality and coverage of issues in a separate way.
Model (Payoffs)

Newspapers

- Quadratic cost of investing (not possible to invest on more than half of the issues).
- Each unit of attention generates $\omega$ dollars of advertising revenue; $\omega$ is normalized to one.

$$
\pi_i(s_i) = \alpha_i [1 + \delta \mu(s_i)] - c \mu(s)^2
$$

where $\alpha_i$ is newspaper $i$'s market share
Model

Assumptions \((\delta, \beta, c)\)

- Full Coverage: \(t < u_0\)
- Interior market share: \(0 \leq \beta = \frac{\Delta u}{t} < 1\)
- Interior quality: \(c > \frac{\delta \beta}{4} + \frac{\delta}{2} + \frac{\beta}{2}\)

Timing

- Each newspaper \(i\) chooses \(s_i\).
- Each consumer chooses between the newspapers (and aggregator)
No Aggregator

**Lemma 1.** Newspapers’ choice of average quality, $\mu_i$, are strategic substitutes, in the absence of aggregator.
Quality 2
Quality 2 \uparrow \Rightarrow \text{Market share for 1} \downarrow \Rightarrow \text{Quality 1} \\
\text{Strategic Substitute}
No Aggregator

**Lemma 1.** Newspapers’ choice of average quality, $\mu_i$, are strategic substitutes, in the absence of aggregator.

**Proposition 1.** There is a unique equilibrium in which the average quality of newspapers is $\mu^* = \frac{\delta + \beta}{4c - \delta \beta}$
Model (Aggregator)

**Aggregator’s Technology**

- publishes summary of articles on its site with a link to the original articles.
- For a given issue, the aggregator finds and publishes only the higher quality article.
- For a given issue, if the quality is the same (high or low) the aggregator picks one randomly.
Model (Aggregator)

Aggregator and Consumers

• **Benefit:** Consuming more high quality contents
• **Cost:** Consuming news with more ideological mismatch
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Aggregator and Newspapers

<table>
<thead>
<tr>
<th></th>
<th>No Agg</th>
<th>Agg</th>
</tr>
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<tbody>
<tr>
<td>Newspaper</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>$1 + \delta$</td>
<td>$\delta$</td>
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</table>
Model (Aggregator)

Lemma 2. Newspapers are not directly in competition with each other: For any given \((s_1, s_2)\), there exists no \(x \in [0,1]\) such that

\[
\min\{U_1(x), U_2(x)\} > U_{Agg}(x).
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\]

Lemma 3. The market shares of newspapers 1 and 2 are

\[
\alpha_1 = \frac{1}{2} - \frac{\Delta u \mu(s_2) - \mu(s_1 \cap s_2)}{t} \frac{1 - \mu(s_1) + \mu(s_2)}{1 - \mu(s_2) + \mu(s_1)}
\]

\[
\alpha_2 = \frac{1}{2} - \frac{\Delta u \mu(s_1) - \mu(s_1 \cap s_2)}{t} \frac{1 - \mu(s_1) + \mu(s_2)}{1 - \mu(s_2) + \mu(s_1)}
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Model (Aggregator)

Aggregator and Newspapers
- **Business Stealing Effect**: Steals the readers who would be loyal to newspapers otherwise.
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Aggregator and Newspapers

- **Business Stealing Effect**: Steals the readers who would be loyal to newspapers otherwise.
- **Readership Expansion Effect**: Aggregator brings revenue of $\delta$ to high quality articles of 1 from readers who would be loyal to 2 otherwise.
Proposition 2. Given quality of 1 and 2, newspapers strictly prefer either max differentiation or min differentiation.
Proposition 3. Given min differentiation, there exists a continuum of symmetric equilibria in which newspapers invest on the same issues:

1) \( \mu_1 = \mu_2 = \mu^m \in \left[ \frac{\delta}{4c - \delta \beta}, \frac{1}{2} \right] \), if \( c \leq \frac{\delta}{2} + \frac{\delta \beta}{4} + \beta \)

2) \( \mu_1 = \mu_2 = \mu^m \in \left[ \frac{\delta}{4c - \delta \beta}, \frac{\delta + 2\beta}{4c - \delta \beta} \right] \), if \( \frac{\delta}{2} + \frac{\delta \beta}{4} + \beta < c \)
Aggregator (Specialization)

**Lemma 5.** *Given max differentiation, quality choices are strategic complements.*
Quality 2

\[ x_1 \quad Agg \quad x_2 \]

\[ x_1 \quad Agg \quad x_2 \]
Quality 2 $\Rightarrow$ Readership Expansion for 1
Strategic Complements

Quality 2 $\uparrow \Rightarrow$ Readership Expansion for 1 $\uparrow \Rightarrow$ Quality 1 $\uparrow$
Aggregator (Specialization)

For given symmetric equilibrium $\mu$

- Market share of the aggregator is $2\beta\mu$ ($\beta\mu$ from each)
- Business-stealing effect: $\beta\mu$
- Readership-expansion effect: $\beta\mu\delta\mu$

Readership-expansion effect dominates Business-stealing effect if

$$\beta\mu < \beta\mu\delta\mu \iff \delta\mu > 1$$
Proposition 4. *Given max differentiation*, there is a unique symmetric equilibrium, in which newspapers invest in disjoint sets of issues;

1) \( \mu^M = \frac{1}{2} \), if \( c \leq \frac{\delta}{2} - \frac{\beta}{2} + \frac{3}{4} \delta \beta \)

2) \( \mu^M = \frac{(- \beta + 2 \delta \beta - 2c) + \sqrt{(- \beta + 2 \delta \beta - 2c)^2 + 2 \delta^2 \beta}}{\delta \beta} \), if \( c > \frac{\delta}{2} - \frac{\beta}{2} + \frac{3}{4} \delta \beta \)
Proposition 5. There exist $0 < \delta^m \leq \delta^M$ such that

\[
\forall \delta < \delta^m \text{ the min differentiation is the unique class of eq} \\
\forall \delta > \delta^M \text{ the max differentiation is the unique class of eq.}
\]
Extension (Opting out)

- Publishers can remove their contents form Google news (opt out).
- However, fewer than 1 percent have opted out of the service,
  - Josh Cohen, head of Google’s news division
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**Proposition 6.** When opting out option is available to each newspaper,

1) among the continuum of min differentiation equilibria, only the equilibrium quality without the aggregator survives opting out
2) max differentiation (specialization) eq survives for high $\delta$
Comparison: Quality

**Proposition 7.** In the maximum differentiation equilibrium, the quality of newspapers increases compared to case of no aggregator, $\mu^M \geq \mu^*$
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Proposition 8. If the presence of the aggregator leads to the specialization equilibrium

i) Consumer surplus increases, \( CS^M > CS^* \).

ii) The profits of newspapers increases if the cost is low, and decreases otherwise \( \exists \hat{c} \mid \forall c > \hat{c} : \pi^M < \pi^* \), \( \forall c < \hat{c} : \pi^M > \pi^* \).

iii) Social welfare is higher.
Discussions: Effect on Profits

\[ \pi_i(s_i) = \omega \alpha_i [1 + \delta \mu(s_i)] - c \mu(s)^2 \]

What matters is not \( c \), but \( c/\omega \), where \( \omega \) is ad revenue per attention. Because of advertising congestion, Internet lowers \( \omega \) and hence aggregators are likely to reduce newspapers’ profit (Anderson, Foros, Kind and Peitz 2012)
Contents from Third Parties

• In the model of two newspapers, a single newspaper can reduce the market share of the aggregator to zero

• If there are many news sites (large and small), this is impossible

• Extension: we introduce $u_T$, the utility that each consumer can get through the aggregator (from third parties’ content) even if both newspapers opt out.
Proposition 9. Suppose that the utility from third party content is high enough $u_T \geq \frac{\Delta u}{2} \max\{1, \frac{3}{\delta}\}$

i) The maximum differentiation, $\mu(s_1 \cap s_2) = 0$, is a dominant strategy for each newspaper.

ii) For all $\delta \geq 0$ newspapers’ quality choices are strategic complements.

iii) For all $\delta \geq 0$ there is a unique symmetric equilibrium, $\mu^T$, where newspapers invest on disjoint set of issues,

\[
\delta \in [0, \delta^T] \quad \mu^T = 0 \\
\delta \in [\delta^T, \bar{\delta}^T] \quad 0 < \mu^T < \frac{1}{2} \\
\delta \in [\bar{\delta}^T, \infty) \quad \mu^T = \frac{1}{2}
\]
Contents from Third Parties

• The value of $\delta$ is the key parameter.

• Empirical studies allow us to pin down a lower bound of $\delta$:
  
  ▶ Chiou and Tucker (2012) exploit a contract dispute which led Google News to remove the content from AP. They show that the presence of the AP content on Google News would have increased traffic to the news sites indexed by Google News.

  ▶ Athey and Mobius (2012) find that after adding content from new local outlets to Google News, traffic increases not only to these new outlets but also to the old outlets.

\[
\frac{\partial \pi_T}{\partial \mu_T} \mid_{\mu_T=\text{cst}} > 0 \iff \delta \mu_T > 1
\]

Readership-expansion effect dominates Business-stealing effect
Proposition 10. If $\delta \mu^T \geq 1$:

i) The presence of aggregator improves the quality, $\mu^T \geq \mu^*$

ii) When the aggregator is present, each newspaper has no incentive to opt out

iii) The presence of the aggregator increases consumer surplus and social welfare.
Conclusion

Impact of news aggregator on the quality choices of newspapers

- Changes the strategic interactions of quality choices from strategic substitutes to strategic complements.

- Specialization Eq in the presence of aggregator and higher quality

- However, specialization is likely to weaken newspapers’ role as curators