Newspapers in Times of Low Advertising Revenues

Charles Angelucci and Julia Cagé

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Introduction

- Newspaper industry is considered a crucial industry: it informs the political debate, etc.

- **Two-sided industry**: newspapers serve two distinct groups of consumers – readers and advertisers.
  - Each group cares about the presence and characteristics of the other.

- Industry in crisis. In part due to **decline in advertising revenues**.
  - Long-term decline in advertising revenues.
  - Advertising expenditures on print media have decreased even more sharply since 2000 (31.2 %).
US newspapers advertising revenues (% GDP)
At the same time, newspapers are increasingly adopting subscriber-based readerships.

This is achieved through charging a relatively low subscription price. *New York Times*: home delivery 7 days per week costs $7.70, versus $2.50 per day at the newsstand.

We investigate whether this change in business model can be linked to the drop in advertising revenues.

- Two-sided market $\Rightarrow$ Price discrimination & change in the composition of readers.
Main empirical challenge: isolate the “advertising revenues” effect on pricing choices.

Idea: use **exogenous shock** on advertising revenues:

- Introduction of advertising on French Television in 1968.
- Shifts exclusively the incentives to price discriminate stemming from advertising revenues.

Use differences-in-differences (DD) approach.

- **National** (treatment group) vs. **local** (control group) daily newspapers in France, 1960-1974.
Preview of the empirical analysis (ct’d)

- National newspaper advertising: mostly commercial ads that are relatively close substitutes to those broadcasted on television.

- Local newspapers: mostly local ads.

⇒ Both local and national newspapers affected by the shock, but national newspapers affected to a greater extent.

  - National newspapers: more likely to respond. → “Treated” group.
  - Local newspapers: less likely to respond. → “Control” group.

- Alternative estimation strategy: low vs. high reliance on advertising revenues in 1967 (before shock).
Preview of the data

- We collected a unique dataset on local and national French daily newspapers, 1960-1974:
  - Advertising: amount and type of ads in newspapers (directly from the paper version of newspapers) and on TV; as well as advertising prices.
  - Balance sheets of the newspapers (from the French Ministry of Informations non-publicly available records in the National archives).
Preview of the empirical results

- Newspapers adopt a more subscriber-based readership as a consequence to the drop in advertising revenues.

↔ The decrease in advertising revenues leads to an increase in price discrimination.

- Increase driven by a decrease in the price charged to subscribers.
  - No statistically significant change in the price charged to unit buyers.

- As a result, change in the composition of readers: higher share of subscribers.

- This phenomenon is not easily explained with current theoretical work.
  - We build a two-sided market and second-degree price discrimination model to rationalize it.
Estimation strategy: Graphical illustration

<table>
<thead>
<tr>
<th>Year</th>
<th>Average price ratio - National newspapers</th>
<th>Average price ratio - Local newspapers</th>
</tr>
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<tbody>
<tr>
<td>1960</td>
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<tr>
<td>1974</td>
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</tbody>
</table>
Intuition

- Newspapers prefer subscribers.
- But advertisers prefer unit buyers (higher probability to read).
- Hence the newspaper readjusts towards more subscribers following the shock.
  - The negative shock on advertisers leads to the newspaper catering less to what advertisers want.
Preview of the model

Simple model of a two-sided market in which the platform (the newspaper) engages in second-degree price discrimination on one side of the market.

- Newspapers must attract both readers and advertisers.
- Newspapers can be purchased by readers either by subscription or at the newsstand on a day-by-day basis.
Preview of the model (ct’d)

- **Newspapers** price discriminate between subscribers and unit buyers.

- **Readers** are
  - Uncertain as to their future benefit from reading,
  - Heterogeneous in their taste for reading.

- **Advertisers** are heterogeneous in
  - Their outside option (payoff when placing ads on alternative platforms),
  - Their taste for subscribers,
  - Their taste for occasional buyers.
Main insights

- Independently of the presence of advertisers, the scope for price discrimination stems from:
  - Readers’ uncertainty regarding their willingness-to-pay in future periods,
  - Readers’ heterogeneity in their average willingness-to-pay.
- An increase in the outside option of advertisers leads to a change in the prices charged to readers and an increase in price discrimination.
Literature review: Determinants of price discrimination

- **Consumers uncertainty**: Glazer (1982).

  ⇒ We introduce the advertising side in the profit function of newspapers.
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- **Competition**: Borenstein (1991); Borenstein and Rose (1994); Busse and Rysman (2005); Seim and Viard (2011); Dai et al. (2012).
  
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- **Past purchase behavior**: Caillaud and De Nijs (2014); Carroni (2015).
  ⇒ Our focus is on second-degree price discrimination rather than BBPD.
Literature review: Two-sided markets

- **Theoretical papers**: Rochet and Tirole (2003); Weyl (2010); White and Weyl (2010).

- **Empirically**: Berry and Waldfogel (1999); Anderson and Coate (2000); Rysman (2004); Argentesi and Filistrucchi (2007); Jin and Rysman (2013); Fan (2013).
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\[\Rightarrow\] No price discrimination.
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⇒ No price discrimination.

E.g. Seamans and Zhu (2014): the entry of Craigs list leads to an increase in subscription prices charged by local newspapers.

- But focus only on subscribers.

⇒ We investigate whether advertisers prefer unit buyers or subscribers. → Advertisers’ preference for unit buyers explains why newspapers react to the negative shock by decreasing the subscription price.

- *Price discrimination matters on the reader side.*

- Their modeling approach (perfect price discrimination on both sides in a Hotelling framework) does not fit well with the newspaper industry.
- No empirical analysis.

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⇒ Our paper: first analysis of second-degree price discrimination in a two-sided market.

⇒ First attempt to link price discrimination and decrease in advertising revenues in the newspaper industry.
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   - Preview of the model
   - Literature review

2 Model
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   - Results and intuition

3 Industry and data characteristics
   - Historical background
   - Newspaper industry characteristics
   - Data

4 Empirical analysis
   - Estimation strategy & Results
   - Robustness checks
   - Interpretation
   - Structural estimation
   - Alternative estimation strategy

5 Conclusion
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Conclusion
A two-sided market

- A profit-maximizing monopoly newspaper.
  - Chooses price charged to advertisers, unit buyers and subscribers.
  - We do not model the actual production of news.
    - We implicitly assume that the newspaper produces content that is of interest to at least some readers.

- A continuum of readers of mass one. They can either:
  - Subscribe to the newspaper to receive all the distinct issues produced by the newspaper during the period;
  - Buy some issues on occasions.

- A continuum of advertisers of mass one.
Notations

- The newspaper produces $n$ distinct issues during the period of interest.
  - $t$: given date/issue, $t = 1, \ldots, n$.

- $S$: subset of readers who choose to subscribe.

- $O$: subset of readers who buy only on occasions.

- $A$: advertisers.

- $p^i$: price charged group $i = O, S, A$.

- $c^i$: marginal cost of serving group $i$. 
Readers

Payoff to reader \( i \) from reading the newspaper at date \( t \):

\[
U_{i,t}^R = \theta_i - \gamma_i N^A + \epsilon_t - p^i
\]  

1. \( \theta_i \): reader \( i \)'s taste for reading.

2. \( \gamma_i N^A \): reader \( i \)'s taste/distaste for the quantity \( N^A \) of ads.
   - Pair \( (\theta_i, \gamma_i) \) drawn according to joint pdf \( f^R(\theta, \gamma) \).

3. \( \epsilon_t \): shock common to all readers at date \( t \).
   - Drawn according to \( U[\epsilon, \bar{\epsilon}] \); i.i.d. across dates/issues.

Reader \( i \) observes the realization of \( \epsilon_t \) before deciding whether to purchase the newspaper.

\( \Rightarrow \) Not subscribing allows readers to make informed purchasing decisions.
Subscription vs. Unit purchase

Reader $i$’s expected payoff when subscribing ($U_i^S$):

$$\sum_{t=1}^{n} \Pr \left( \theta_i - \gamma_i N^A + \epsilon_t \geq 0 \right) \cdot \mathbb{E} \left[ \theta_i - \gamma_i N^A + \epsilon_t \mid \theta_i - \gamma_i N^A + \epsilon_t \geq 0 \right]$$

- $n p^S$

Expected payoff of a reader who chooses to be an occasional reader ($U_i^O$):

$$\sum_{t=1}^{n} \Pr \left( \theta_i - \gamma_i N^A + \epsilon_t - p^O \geq 0 \right) \cdot \mathbb{E} \left[ \theta_i - \gamma_i N^A + \epsilon_t - p^O \mid \theta_i - \gamma_i N^A + \epsilon_t - p^O \geq 0 \right]$$
Advertisers

- Advertisers decide whether to place an ad for the $n$ issues at price $np^A$.

- Expected payoff to advertiser $j$ of placing an ad:

$$
\sum_{t=1}^{n} \left( b^S_j \mathbb{E}[\hat{N}^S] + b^O_j \mathbb{E}[\hat{N}^O] - np^A \right)
$$

- $b^S_j$: advertiser $j$’s taste for active subscribers.

- $b^O_j$: advertiser $j$’s taste for active occasional readers.
Advertisers (ct’d)

- Advertiser $j$ has outside option $u_j^A$.
- 3-tuple $(b_j^S, b_j^O, u_j^A)$ drawn according to joint pdf $f^A(b^S, b^O, u^A)$.

- Advertiser $j$ places an ad in the newspaper for $n$ issues at price $np^A$ iff:

$$\sum_{t=1}^{n} \left( b_j^S \mathbb{E}_e \left[ \hat{N}^S \right] + b_j^O \mathbb{E}_e \left[ \hat{N}^O \right] \right) - np^A \geq u_j^A$$
Newspaper’s problem

- Newspaper chooses $p^O$, $p^S$, $p^A$ to maximize profits:

$$\Pi = \Pi^O + \Pi^S + \Pi^A$$

$$= n \left( p^O - c^0 \right) d^O \left( p^O, p^S, p^A \right) + n \left( p^S - c^S \right) d^S \left( p^O, p^S, p^A \right) + n \left( p^A - c^A \right) d^A \left( p^O, p^S, p^A \right)$$

- Unlike advertisers, the newspaper cares about the total number of subscribers, as opposed to the active number of subscribers.
Results

- Per-unit subscription price lower than newsstand price. Only readers with sufficiently high taste for reading subscribe.

- Pricing rules adopted by newspaper qualitatively identical to situation with three sides.
  - Second-degree price discrimination in two-sided market. ⇒ As if three distinct sides: advertisers, occasional readers, subscribers.
Results (ct’d)

- Advertisers do affect the extent of second degree price discrimination.

- Newspaper readjusts towards more subscribers following shock (e.g., increase in advertisers’ outside option) if, prior to shock, marginal advertisers place higher weight on occasional buyers than the newspaper.
  - Following negative shock on advertisers’ side – which leads to the newspaper catering less to what advertisers want – the newspaper readjusts its readership towards more subscribers.

- Increase in price discrimination through decrease in subscription price or increase in unit price?
Open question

- Empirically: ↓ subscription price; no change in unit price.
- Newspapers want to build strong subscriber pool.
- How can one rationalize this finding theoretically?
  - Main issue: very strong force that suggests that, following the shock, the newspaper should pay less attention to what advertisers want (i.e., more readers), since it can make less money out of them.
Open question

- Empirically: ↓ subscription price; no change in unit price.
- Newspapers want to build strong subscriber pool.
- How can one rationalize this finding theoretically?
- Possible explanations:
  - There is also a **negative shock on the reader’s side**, which leads to the newspaper decreasing prices to readers.
    - Does not seem like the right explanation here: no change in the number nor in the quality of the programs broadcasted on TV.
Open question

- Empirically: ↓ subscription price; no change in unit price.
- Newspapers want to build strong subscriber pool.
- How can one rationalize this finding theoretically?
- Possible explanations:

  1. There is also a **negative shock on the reader’s side**, which leads to the newspaper decreasing prices to readers.

  2. **Externality** effect.

- Assume that readers dislike ads and advertisers dislike (other) ads.
- Prior to shock, advertisers willingness to pay for a slot in the newspaper is high, and higher the lower the number of other ads.
- The newspaper is able to put few ads in its pages, and charge high prices to readers and advertisers.
- Post shock, if advertisers are no longer willing to pay for “exclusivity”, the newspaper increases quantity of ads, and must charge a lower price to readers to compensate them.
Open question

- Empirically: ↓ subscription price; no change in unit price.
- Newspapers want to build strong subscriber pool.
- How can one rationalize this finding theoretically?
- Possible explanations:
  1. There is also a **negative shock on the reader’s side**, which leads to the newspaper decreasing prices to readers.
  2. **Externality** effect.
  3. **Competition** effect

   - When TV starts competing for advertisers with newspapers, newspapers have no choice but to offer a “better” product to advertisers, that is, more readers (which is achieved by setting lower reader prices).
The introduction of advertisement on French Television

- French Television: entirely state-owned from 1945 to 1981.
  - A national agency is in charge of providing radio and television content.

- Only one channel available until 1963; second channel introduced in 1964; third one in 1972.

- Increasing TV penetration.

- Channels financed mostly through a fee (redevance) until 1968.

- By law, commercial or brand advertising is forbidden, with the exception of “collective advertising”.

The introduction of advertisement on French Television

- The transition to color on the Second Channel, the 3rd channel, and the need to produce an increasing number of programs means that the ORTF experiences severe financial difficulties.

- Decision to introduce advertising on television made public on October 1967.

- Despite strong resistances, first advertisements broadcasted in October 1968.
  - Time devoted to advertisement: 2 minutes per day in 1968; 4 in 1969, 8 in 1970, and more than 12 in 1971.
  - In 1971, advertising revenues represent 22% of the ORTF total revenues.
Time devoted to advertisement on television

![Graph showing the increase in minutes per day devoted to advertisement on television from 1965 to 1971. The graph shows a steady increase in the time devoted to advertisement over the years.]
Number of new advertisements broadcasted on television

Year | Number of Advertisements
--- | ---
1968 | 0
1969 | 500
1970 | 1,000
1971 | 1,500
1972 | 2,000
1973 | 2,500
1974 | 3,000
The introduction of advertising on TV:
A negative shock on national newspapers ad revenues

- The introduction of ad on TV has a negative impact on the advertising revenues of daily *national* newspapers.
- National newspapers’ advertisements consist mostly of commercial ads that are relatively close substitutes to those broadcasted on television, while a large share of advertisements in local newspapers is local in nature.
- We document a strong *substitution effect* between advertisements on TV and advertisements in national newspapers (but not in local newspapers).
Advertising revenues

![Chart showing advertising revenues for national news, local news, and television in 1967 and 1974.]

- National news: 1967 - [value], 1974 - [value]
- Local news: 1967 - [value], 1974 - [value]
- Television: 1967 - [value], 1974 - [value]
Advertising revenues (ct’d)

<table>
<thead>
<tr>
<th>Year</th>
<th>National daily newspapers</th>
<th>Local daily newspapers</th>
<th>Magazines</th>
<th>Radio</th>
<th>Outdoor</th>
<th>Cinema</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>14%</td>
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<td>1974</td>
<td>11%</td>
<td>20%</td>
<td>12%</td>
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</tbody>
</table>
Substitution effect

- We collect new data on the amount and kind (food, fashion, home, travel, electrical goods,...) of advertisements on:
  - **Television.**
    - We build a dataset that contains all the *new* advertisements broadcasted on TV between 1968 and 1974.
    - Between 1968 and 1974, 7,337 different advertisements were broadcasted on TV.
  - **National newspapers.**
    - Sub-sample of 4 newspapers.
  - **Local newspapers.**
    - Sub-sample of 10 newspapers.
We created 25 advertisement categories.

1. Accessory (handbag; umbrella; suitcase;...)
2. Agriculture
3. Alcoholic drink
4. Automobile
5. Banks, insurances and loans
6. Body care (deodorant; toothpaste; shaving foam;...)
7. Clothing
8. ...

And also classify each advertisement in newspapers as local or national.
Substitution effect (ct’d)

- We document the existence of a substitution effect between advertisements in national newspapers and advertisements on television.
  - 24% of **local advertisements** in national newspapers vs. 44% in local newspapers.
  - Consistent with existing aggregate data on revenues: the share of local advertisements in advertising revenues of local daily newspapers was equal to 43% in 1967 (IREP).

- Advertisements broadcasted on TV: only certain types of goods.
TV ad by category (1971)

- Food and non-alcoholic drink: 34%
- Household products: 29%
- Body care: 3%
- Clothing: 5%
- Household electrical goods: 4%
- Automobile: 6%
- Electronic devices and computer hardware: 10%
Electronic devices and computer hardware

Electronic devices and computer hardware (number)


Number of advertisements in National Newspapers:
- 1964: 1
- 1965: 2
- 1966: 2
- 1967: 3
- 1968: 4
- 1969: 3
- 1970: 3
- 1971: 4
- 1972: 3

Number of advertisements on TV:
- 1964: 0
- 1965: 0
- 1966: 0
- 1967: 0
- 1968: 3
- 1969: 3
- 1970: 3
- 1971: 3
- 1972: 3

Legend:
- National Newspapers (number)
- Television
OTC Drugs

OTC Drugs (number)

National Newspapers (number)
Television

<table>
<thead>
<tr>
<th>Year</th>
<th>National Newspapers</th>
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<tbody>
<tr>
<td>1964</td>
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<td>1965</td>
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<td>1966</td>
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<td>1971</td>
<td>2</td>
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<td>1972</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Television</th>
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</thead>
<tbody>
<tr>
<td>1969</td>
<td>1</td>
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<td>1970</td>
<td>1</td>
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<tr>
<td>1971</td>
<td>2</td>
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<tr>
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<td>2</td>
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5 Conclusion
French daily newspaper industry

- **National** daily newspaper industry.
  - 10 general information newspapers.
  - Total circulation: 4.2 million copies a day.
  - Average circulation of a newspaper: 350,000 copies.

- **Local** daily newspaper industry.
  - 90 newspapers.
    - We have data for 61 out of these 90 newspapers (they represent more than 87% of the total local daily newspaper circulation).
  - Total circulation: 7.8 million copies a day.
  - Average circulation of a newspaper: 100,000 copies.
French daily newspaper industry (ct’d)

- Copies sold either at the newsstand or through subscription.
  - Average share of unit buyers: 70%.
  - Average price ratio: 0.86.

- Revenues come from sales and from advertising.
  - Average share of advertising revenues: 45%.
  - Quantity of advertisement: 3 pages per newspaper issue, i.e., 19% of the content of the newspaper.
Data

- Annual panel dataset on local and national newspapers in France between 1960 and 1974.
  - Data on prices: unit price, subscription price, and number of issues per year.
  - Data on revenues (from sales and from advertising) and on costs.
  - Data on circulation (share of unit buyers and of subscribers).

- Data on the price, the type and the quantity of advertising.
  - We collect data on the amount and type of advertising per issue directly from the paper version of the newspapers.
  - 2 measures of advertising price:
    - Listed prices per advertising slot.
    - \((\text{Total advertising revenues}) \div (\text{newspaper circulation})\)
Estimation strategy

- Compare pre-1968-to-post-1968 change in prices of national newspapers to change in prices of local newspapers over same period.

\[
\log \text{ price ratio}_{n,t} = \alpha + \beta_1 D_{\text{after}} + \beta_2 (D_{\text{after}} \ast D_{\text{national news}}) + \lambda_n + \gamma_t + \epsilon_{n,t}
\]

- \(D_{\text{national news}}\): indicator variable for national newspapers.
- \(D_{\text{after}}\): indicator variable for post-1968 period.
- \(n\): newspapers; \(t\): years.

Key identifying assumption: price trends would be the same for local and national newspapers in the absence of treatment.

- The treatment induces a deviation from this common trend.
Estimation strategy: Graphical illustration

Graph showing the price ratio (daily subscription price / unit price) for national and local newspapers from 1960 to 1974. The graph indicates a trend in the price ratio over the years, with a notable decrease in 1967.
Estimation strategy (ct’d)

- Local newspapers may also have suffered from the shock; but much less (lower share of national ads). ⇒ Treatment heterogeneity.
- Hence our estimates are a lower bound.
Results: Effect on prices

<table>
<thead>
<tr>
<th></th>
<th>Price ratio</th>
<th>Subscription price</th>
<th>Unit price</th>
<th>Advertising price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>-0.01</td>
<td>1.29***</td>
<td>1.30***</td>
<td>0.48***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>-0.12***</td>
<td>-0.12***</td>
<td>-0.01</td>
<td>-0.25***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.02)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.46</td>
<td>0.98</td>
<td>0.98</td>
<td>0.89</td>
</tr>
<tr>
<td>Observations</td>
<td>967</td>
<td>967</td>
<td>967</td>
<td>662</td>
</tr>
</tbody>
</table>
## Results: Effect on circulation

<table>
<thead>
<tr>
<th></th>
<th>Number unit buyers</th>
<th></th>
<th>Number subscribers</th>
<th></th>
<th>Share subscribers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>-0.09**</td>
<td>-0.00</td>
<td>-0.10</td>
<td>-0.11</td>
<td>-0.09</td>
<td>-0.20</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.09)</td>
<td>(0.06)</td>
<td>(0.16)</td>
<td>(0.06)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.14**</td>
<td>0.13**</td>
<td>0.16***</td>
<td>0.15**</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Unit price</td>
<td>-0.11</td>
<td>0.10</td>
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<td></td>
<td></td>
<td>0.17**</td>
</tr>
<tr>
<td></td>
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<td>(0.09)</td>
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<td>Subsc. price</td>
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</tr>
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<td></td>
<td>(0.10)</td>
<td>(0.11)</td>
<td></td>
<td></td>
<td></td>
<td>(0.10)</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.99</td>
<td>0.99</td>
<td>0.97</td>
<td>0.97</td>
<td>0.96</td>
<td>0.96</td>
</tr>
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<td>968</td>
<td>963</td>
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</tr>
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</table>
## Results: Effect on revenues

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>From sales</th>
<th>From advertising</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>1.12***</td>
<td>1.22***</td>
<td>1.34***</td>
<td>0.91***</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>-0.13***</td>
<td>-0.10***</td>
<td>-0.27***</td>
<td>-0.45*</td>
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<tr>
<td></td>
<td>(0.05)</td>
<td>(0.04)</td>
<td>(0.07)</td>
<td>(0.24)</td>
</tr>
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<td>R-sq</td>
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<td>0.99</td>
<td>0.98</td>
<td>0.74</td>
</tr>
<tr>
<td>Observations</td>
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<td>964</td>
<td>968</td>
<td>627</td>
</tr>
</tbody>
</table>
## Results: Effect on content

<table>
<thead>
<tr>
<th></th>
<th>Number of pages</th>
<th>News hole</th>
<th>Advertising space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>0.42***</td>
<td>0.35***</td>
<td>0.62***</td>
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<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>0.00</td>
<td>-0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.94</td>
<td>0.91</td>
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</tr>
<tr>
<td>Observations</td>
<td>995</td>
<td>995</td>
<td>995</td>
</tr>
</tbody>
</table>
Robustness checks

- We perform a number of robustness checks to reinforce the validity of our estimation identification strategy.
  - We add an **industry-specific time trend** to the list of controls. ⇒ Allows treatment and control newspapers to follow different trends in a limited but potentially revealing way.
  - We allow for **flexible time-varying effects** of the negative shock on advertising revenues ("pulse" variables).
  - We restrict our sample to newspapers for which we have information for the entire period 1960-1974 (**balanced sample**).
  - We control for **inflation**.
1 Introduction
   - Preview of the empirical analysis
   - Preview of the model
   - Literature review

2 Model
   - Set-up
   - Results and intuition

3 Industry and data characteristics
   - Historical background
   - Newspaper industry characteristics
   - Data

4 Empirical analysis
   - Estimation strategy & Results
   - Robustness checks
   - Interpretation
     - Structural estimation
     - Alternative estimation strategy

5 Conclusion
Interpretation of our results

- While newspapers have a preference for subscribers, advertisers prefer unit buyers.
  - Consistent with the theoretical predictions of our model.

- Hence the newspaper readjusts towards more subscribers following the shock.
  - The negative shock on advertisers leads to the newspaper catering less to what advertisers want.
  - Effect reinforced in case the newly marginal advertisers (following the shock) also put more weight on occasional readers than subscribers.
Advertisers’ preference for unit buyers

- The newsstand helps subscribers increase their reach: whereas a subscription goes to one person or one household, a newsstand copy of a newspaper reaches more people.

- Consumers buying at the newsstand have a real interest in the newspaper – the newsstand buyer is probably likely to spend more time reading the newspaper than the comparable subscriber.
Advertisers’ preference for unit buyers
Advertisers’ preference for unit buyers

To estimate advertisers’ preference for unit buyers, we turn to structural analysis.
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5 Conclusion
Structural model

- Model of newspaper demand in which newspapers compete for both readers and advertisers.

- Framework that endogenizes newsstand prices, subscriptions prices and advertising rates.

- Assumption: the national newspapers segment and the local newspapers segment are two independent markets.

- Set-up:
  - Cross-section of markets (counties) indexed by $c \in 1, \ldots, C$.
  - Each market has a unit mass of homogeneous potential advertisers, and a mass $S_c$ of households indexed by $i$.

- Newspaper profit comes from both selling newspapers to readers and selling advertising space to advertisers.
Demand for newspapers

- County demand for newspapers derived from the aggregation of heterogeneous households’ discrete choices.
  - Discrete choice model: a household in the model buys no more than one newspaper on each newspaper segment; and no more than one copy of a newspaper.

- All households in a county face the same choice set.

- Number of daily newspapers available in county $c$ in year $t$: $J_{ct}$.

- A households $i$ in this county gets utility $u_{ijt}^s$ from subscribing to newspaper $j$ in year $t$, utility $u_{ijt}^n$ from buying newspaper $j$ at the newsstand in year $t$, and utility $u_{i0t}$ from an outside choice.
Demand for newspapers (ct’d)

- Conditional indirect utility of household $i$ in county $c$ from subscribing to newspaper $j$ in year $t$:

$$u_{ijt}^s = p_{jt}^s \alpha + x_{jt} \beta_{ict} + z_{ct} \phi + \zeta_{jct} + \epsilon_{ijt}$$

- $p_{jt}^s$: annual subscription price.
- $x_{jt}$: vector of newspaper characteristics (news content quality index).
  - News hole (nonadvertising space).
  - Number of advertising pages.
  - Number of reporters.
- $z_{ct}$: demographics of county $c$.
- $\zeta_{jct}$: unobservable county/year-specific taste for newspaper $j$. 
Demand for advertising

• Demand for advertising modeled as in Rysman (2004), to which we add the distinction between unit buyers and subscribers:

\[ a(r_{jt}, q_{jt}, H_{jt}; \eta, \lambda) = e^\eta H_{jt}^{\lambda_0} (q_{nt}^n)_{jt}^{\lambda_1} (q_{st}^s)_{jt}^{\lambda_2} r_{jt}^{\lambda_3} \]

• \( r_{jt} \): newspaper \( j \)'s advertising rate.

• \( q_{jt}^n \): newspaper \( j \)'s total number of subscribers.

• \( q_{jt}^n \): newspaper \( j \)'s total number of unit buyers.

• \( H_{jt} \): number of households in newspaper \( j \)'s circulation area.
Estimation

- We estimate demand for newspapers and demand for advertising simultaneously by using a simple logit model.

\[
\ln (\delta_{jct}) - \ln (\delta_{0t}) = p_{jt} \alpha + \beta_1 \text{news hole}_{jt} + \beta_2 \text{advertising pages}_{jt} \\
+ \beta_3 \text{number of journalists}_{jt} + z_{ct} \phi + \zeta_{jct}
\]

\[
\ln (a_{jt}) - \ln (a_{0t}) = \eta + \lambda_0 \log H_{jt} + \lambda_1 \log q_{jt}^n + \lambda_2 \log q_{jt}^s \\
+ \lambda_3 \log r_{jt} + \epsilon_{jt}
\]

- Exogenous instruments: wages; cost of paper; cost of distribution; cost of printing; BLP instruments.
The average price elasticity of demand on the readers’ side is -1.17
The average price elasticity of demand on the advertiser side is -0.84.

The average occasional buyers elasticity is 1.7. \(\Rightarrow\) A 1\% increase in the share of occasional buyers leads to a 1.7\% increase in the advertising market share of the newspaper.
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   - Structural estimation
   - Alternative estimation strategy

5 Conclusion
Alternative estimation strategy

- *Within* local newspapers empirical strategy.
  - Ad dependency measured as shares of ad revenues in total revenues.
  - Lot of variations in the extent to which different newspapers rely on advertising.
Reliance on advertising (1967)
To investigate the effect of a drop in advertising revenues depending on the reliance on advertising, we estimate the following regression equation:

\[ y_{n,t} = \alpha + \nu_1 D_{\text{after}} + \nu_2 \left( D_{\text{after}} \ast D_{\text{high reliance}} \right) + \lambda_n + \gamma_t + \epsilon_{n,t} \]

where \( D_{\text{high reliance}} \) is an indicator variable equal to one for local daily newspapers whose reliance on advertising revenues in 1967 was above the median, and 0 for those whose reliance was below (for the consistency of the estimate, we drop the newspapers that are just around the median).
<table>
<thead>
<tr>
<th></th>
<th>Price ratio</th>
<th>Subscription price</th>
<th>Unit price</th>
<th>Advertising price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>-0.01</td>
<td>1.30***</td>
<td>1.32***</td>
<td>1.44***</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.02)</td>
<td>(0.03)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>High reliance x Post-1968</td>
<td>-0.04***</td>
<td>-0.03**</td>
<td>0.01</td>
<td>-0.07**</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.36</td>
<td>0.98</td>
<td>0.97</td>
<td>0.89</td>
</tr>
<tr>
<td>Observations</td>
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<td>549</td>
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### (a) Prices

<table>
<thead>
<tr>
<th></th>
<th>Number unit buyers</th>
<th>Number subscribers</th>
<th>Share subscribers</th>
</tr>
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<tbody>
<tr>
<td>Post-1968</td>
<td>-0.09**</td>
<td>-0.28***</td>
<td>-0.20***</td>
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<tr>
<td></td>
<td>(0.04)</td>
<td>(0.08)</td>
<td>(0.08)</td>
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<tr>
<td>High reliance x Post-1968</td>
<td>-0.04</td>
<td>0.17***</td>
<td>0.16***</td>
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<td>(0.03)</td>
<td>(0.04)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.99</td>
<td>0.97</td>
<td>0.96</td>
</tr>
<tr>
<td>Observations</td>
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<td>548</td>
<td>548</td>
</tr>
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</table>

### (b) Circulation

<table>
<thead>
<tr>
<th></th>
<th>Total revenues</th>
<th>From sales</th>
<th>From advertising</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>1.11***</td>
<td>0.97***</td>
<td>1.37***</td>
<td>1.72***</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(0.04)</td>
<td>(0.06)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>High reliance x Post-1968</td>
<td>-0.05**</td>
<td>-0.02</td>
<td>-0.07**</td>
<td>-1.34***</td>
</tr>
<tr>
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<td>(0.02)</td>
<td>(0.02)</td>
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<td>(0.25)</td>
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<tr>
<td>R-sq</td>
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<td>0.71</td>
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<td>Observations</td>
<td>546</td>
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<td>550</td>
<td>368</td>
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</table>

### (c) Revenues

<table>
<thead>
<tr>
<th></th>
<th>Number of pages</th>
<th>News hole</th>
<th>Advertising space</th>
<th>Share of advertising</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>0.44***</td>
<td>0.39***</td>
<td>0.64***</td>
<td>0.19*</td>
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<tr>
<td></td>
<td>(0.04)</td>
<td>(0.04)</td>
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<td>(0.10)</td>
</tr>
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<td>High reliance x Post-1968</td>
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<td>-0.02</td>
<td>-0.03</td>
</tr>
<tr>
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<td>(0.02)</td>
<td>(0.02)</td>
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<tr>
<td>R-sq</td>
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<td>0.93</td>
<td>0.86</td>
<td>0.71</td>
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<td>Observations</td>
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<td>551</td>
<td>551</td>
<td>551</td>
</tr>
</tbody>
</table>

### (d) Content
1 Introduction
   - Preview of the empirical analysis
   - Preview of the model
   - Literature review

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   - Alternative estimation strategy

5 Conclusion
Conclusion

- Model in which a profit-maximizing newspaper must attract both readers and advertisers.
- Scope for second degree price-discrimination because of readers’ uncertainty regarding their utility from reading in future periods.
- As long as advertisers prefer large readerships to smaller one, prices charged to readers tend to be lower than absent the advertisers’ side of the industry.
- Following a general increase in the outside option of newspapers, price discrimination tends to go up.
- Consistent with the empirical evidence we obtain using French daily newspapers between 1960 and 1974.
Conclusion (ct’d)

- This empirical finding has implications for the 21st century newspaper industry.

- It sheds light on the observed current tendency for newspapers to favor subscriber-based readerships through low subscription prices (and high newsstand prices).

- It also sheds light on more recent tendency observed for US newspapers to charge less for a print subscription than for an online subscription despite that it is much more costly to deliver a print than a digital subscription.

  - E.g. the Greensboro News & Record is charging $187.12 for a 7-day, 52-week print subscription but $215.40 for a digital one.

- What is driving this new pricing strategy?

- Consistently with our results, may be due to the fact that a digital reader is worth less than a print reader (see e.g. Noam, 2009).
This empirical finding also political economy implications.

Subscribers and unit buyers differ in a number of ways, in particular in terms of their socio-economic characteristics.

Tendency of newspapers to increasingly adopt subscriber-based readerships may affect who reads newspapers ⇒ who votes.

Introduction of TV ads also lead to development of new forms of public support to newspapers in late 70’s.

What will be the new model for the media with the internet-induced decline in ad revenues?
Advertising revenues and political participation

- Generally speaking, low advertising revenues might lead to lower resources for the media and a decrease in the quality of information and political participation.

- Our findings show that low advertising revenues can also lead to more political polarization.
  - Newspapers react by increasing price discrimination between subscribers and unit buyers.
  - To the extent that these are different social and political groups, this could contribute to a more polarized access to information and to diverging turnout rates by socio-economic groups.
Thanks for your attention!
US newspapers advertising revenues (billion dollars)
French daily newspapers advertising revenues (million euros)
Collective advertisement
Electronic devices and computer hardware

![Graph showing the share of advertisements in National Newspapers and on TV from 1964 to 1972. The graph indicates an increase in the share of advertisements in National Newspapers and on TV over the years, particularly a significant increase in 1971.](image-url)
OTC Drugs

OTC Drugs (share)

- Share of advertisements in National Newspapers (%)
- Total number of advertisements on TV


National Newspapers (share)

Television
## Summary statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>sd</th>
<th>Min</th>
<th>Max</th>
<th>Obs</th>
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</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit buyer price</td>
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<td>0.10</td>
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<td>Subscription price</td>
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<td>0.08</td>
<td>0.94</td>
<td>967</td>
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<td>Price ratio</td>
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<tr>
<td><strong>Revenues</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Total revenues</td>
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<td>0.10</td>
<td>247.12</td>
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<td>Revenues from advertising</td>
<td>12.89</td>
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<td>22.03</td>
<td>0.06</td>
<td>181.27</td>
<td>968</td>
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<td>Revenues from sales</td>
<td>13.53</td>
<td>5.51</td>
<td>18.45</td>
<td>0.03</td>
<td>123.87</td>
<td>964</td>
</tr>
<tr>
<td>Share of advertising in total revenues (%)</td>
<td>45</td>
<td>45</td>
<td>11</td>
<td>6</td>
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<td>962</td>
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<td><strong>Expenditures</strong></td>
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</tr>
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<td>Total expenditures</td>
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<td>958</td>
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<td>Number of journalists</td>
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<td>39</td>
<td>67</td>
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<td>840</td>
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<td>Profit</td>
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<td>Share of unit buyers (%)</td>
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<td>75</td>
<td>23</td>
<td>2</td>
<td>100</td>
<td>971</td>
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<td>Share of subscribers (%)</td>
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<td>22</td>
<td>1</td>
<td>98</td>
<td>968</td>
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<td>307</td>
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<td>970</td>
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<td>995</td>
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<td>Share of advertising</td>
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<td>17</td>
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Revenues and expenditures are in million francs
## Industry-specific time trend

<table>
<thead>
<tr>
<th></th>
<th>Price ratio</th>
<th>Subscription price</th>
<th>Unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-1968</td>
<td>-0.01</td>
<td>1.29***</td>
<td>1.30***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>-0.07***</td>
<td>-0.09**</td>
<td>-0.01</td>
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<tr>
<td></td>
<td>(0.03)</td>
<td>(0.04)</td>
<td>(0.04)</td>
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<tr>
<td>Industry-specific trend</td>
<td>-0.01*</td>
<td>-0.01</td>
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<tr>
<td></td>
<td>(0.00)</td>
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* Industry-specific trend: Yes, Yes, Yes

R-sq: 0.47, 0.98, 0.98
Observations: 967, 967, 967
## Timing of the effect

<table>
<thead>
<tr>
<th></th>
<th>Price ratio</th>
<th>Subscription price</th>
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<th>Unit price</th>
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<tbody>
<tr>
<td><strong>Pre intro ad TV</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(1965-1967)</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td></td>
<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.03)</td>
<td>(0.03)</td>
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<tr>
<td><strong>Short-run intro ad TV</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1968-1970)</td>
<td>-0.10***</td>
<td>-0.11***</td>
<td>-0.01</td>
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<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
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<td>(0.02)</td>
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<tr>
<td><strong>Long-run intro ad TV</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1971, onwards)</td>
<td>-0.14***</td>
<td>-0.14***</td>
<td>0.00</td>
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<td>(0.02)</td>
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<tr>
<td><strong>R-sq</strong></td>
<td>0.47</td>
<td>0.98</td>
<td>0.98</td>
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<td><strong>Observations</strong></td>
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## Sample selection

<table>
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<tbody>
<tr>
<td>Post-1968</td>
<td>-0.01</td>
<td>1.29***</td>
<td>1.30***</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.02)</td>
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<tr>
<td>National x Post-1968</td>
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<tr>
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## Inflation

<table>
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<th>Current Unit price</th>
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<th>Constant Unit price</th>
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<td>0.04***</td>
<td>0.56***</td>
<td>0.52***</td>
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<td>(0.02)</td>
<td>(0.02)</td>
<td>(0.01)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>National x Post-1968</td>
<td>-0.11***</td>
<td>-0.13***</td>
<td>-0.01</td>
<td>-0.12***</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.01)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.05***</td>
<td>0.21***</td>
<td>0.27***</td>
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