

Effects of Competition on Advertising Behavior and Content

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Marketing Science

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Motivation

Competitors advertise in-sync

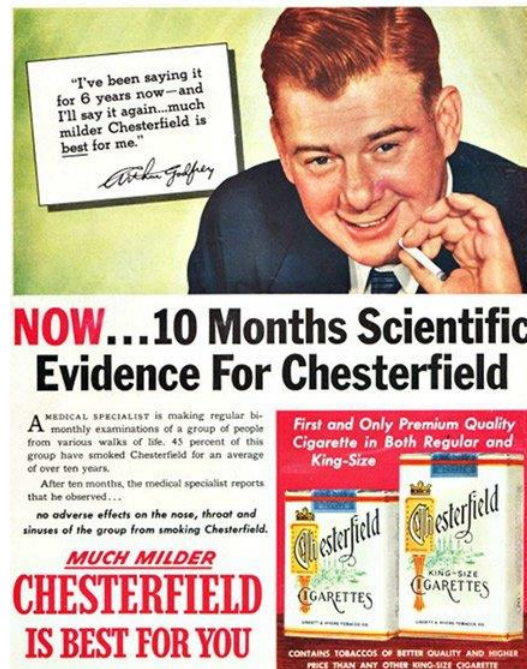
- Ad **pulsing** (systematic on/off switching) is the **dominant form of advertising incidence** (theoretically Freimer & Horsky, 2012; Dubé et al. 2005; empirically Gijzenberg & Nijs, 2019)
- Concerning the timing of advertisements, **in-sync** is more **common** (Gijzenberg & Nijs, 2019) and **profitable** (Freimer & Horsky, 2012) than out-of-sync for competitors



- Generally, **competition only plays minor role** in marketing decisions compared to internal factors (Gijzenberg & Nijs, 2019)
 - **Advertising schedules** for different brands are largely **uncorrelated** (Dubé et al. 2005)

Motivation

Competitors imitate their ad style and content



Research on ad imitation of competitors goes back to 1923

Research Questions

How does competition intensity affect the advertising behavior of firms?

1

2

Is the competition intensity reflected in industry ad design?

Data

- **Print ads**

- 1950 – 2000
- Nearly 280.000 total ads of more than 20.000 different brands
- **Airline** industry: over 6000 ads of nearly 170 brands



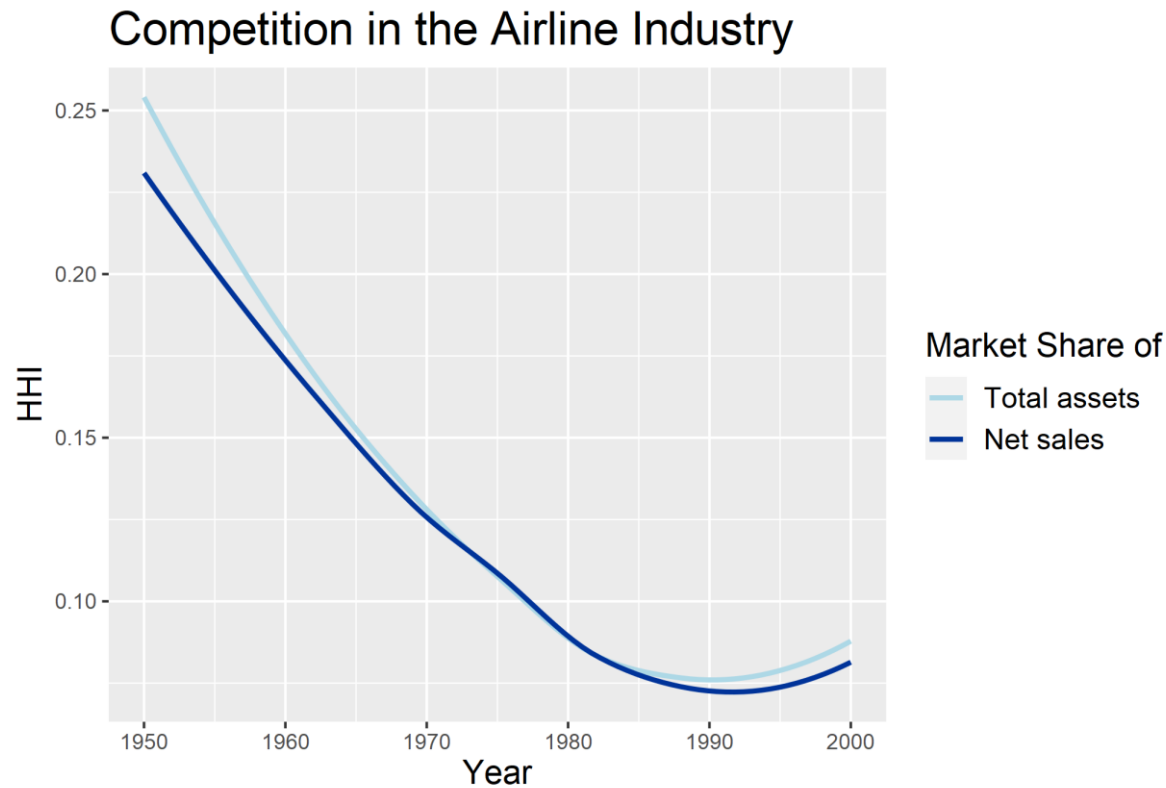
The
Economist

- **Measuring Competition**

- Herfindahl-Hirschman index (HHI) for market concentration
- Using firm sales from the **Compustat** database to compute market shares from 1950 – 2000 (following e.g., Giroud & Mueller, 2010)

$$HHI_t = \sum_{i=1}^{N_t} S_{it}^2$$

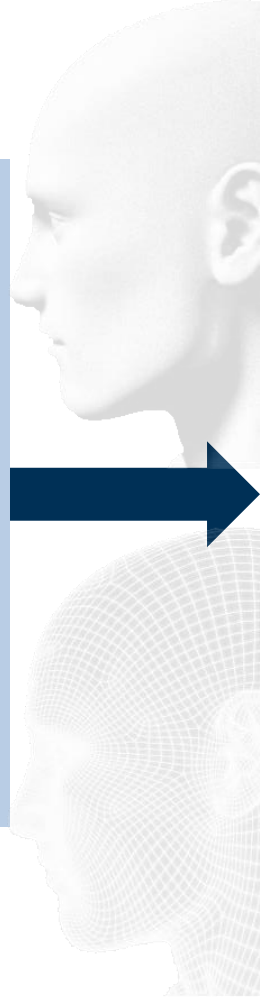
Competition is generally decreasing over time



Data Preprocessing of the Original Data



- 1) Create a training dataset
 - 3) Parameter optimization & test
 - 5) Check results and handle exceptions
-
- 2) Train a Faster R-CNN (ResNet-101)
 - 4) Process all pages



Data Preprocessing of Print Ads

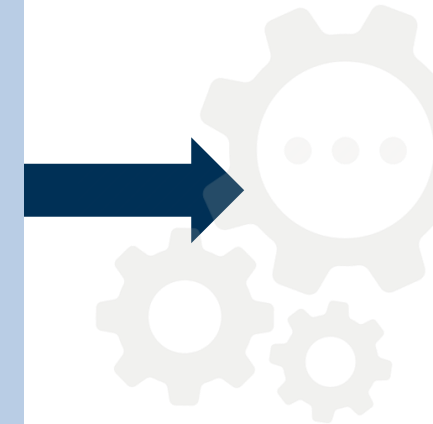


Natural Language Processing

- Brand detection
- Sentiment analysis
- Text categorization
- Text readability

Computer Vision

- OCR
- Face detection
- Color analysis
- Feature complexity
- Object detection
- Visual similarity of ads



Methods: Visual Similarity of Print Ads

Siamese Neural Network

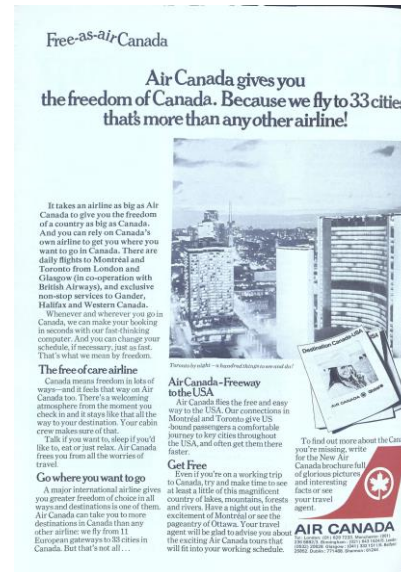
- ResNet50, Triplet Loss, fine tuned with 9000 manually labeled pages



Positive



Anchor



Negative

Methods: Ad campaign detection

Visual Similarity based

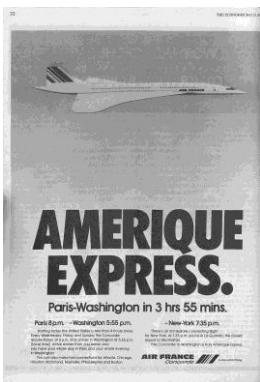
- drop in similarity of neighboring ads on timeline



Campaign



Campaign



Not part of campaign

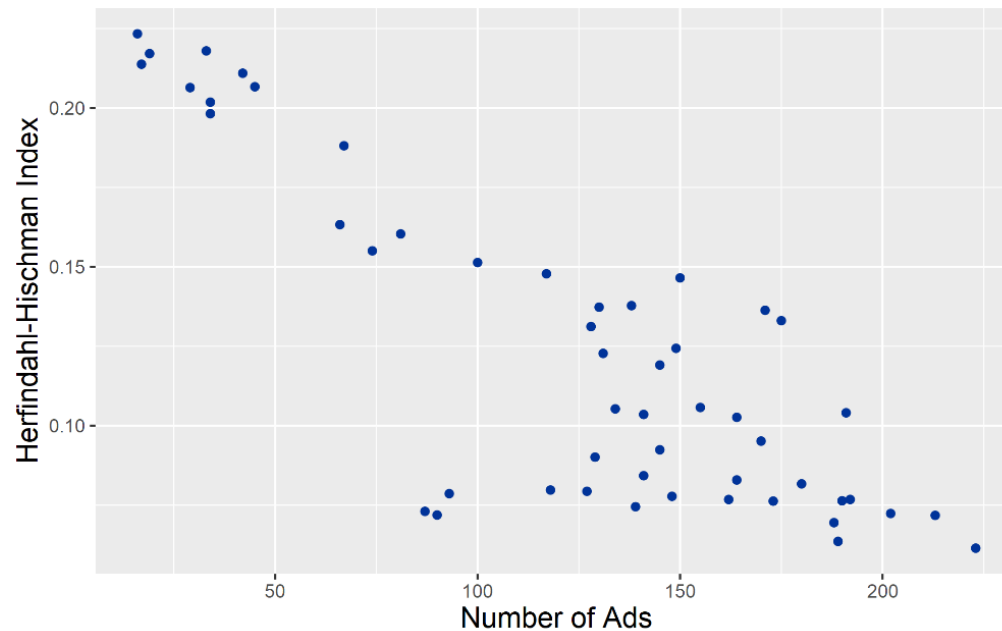


Campaign

Preliminary Findings RQ 1

Increasing competition is related to more airline ads

RQ1: Effect of Competition Intensity on Ad Behavior



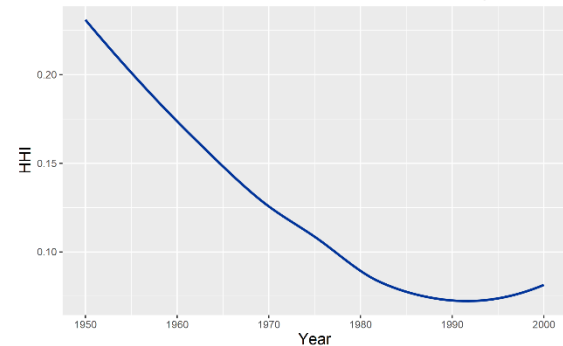
Is this fully accounted for by the increasing number of competing brands?

Preliminary Findings RQ 1

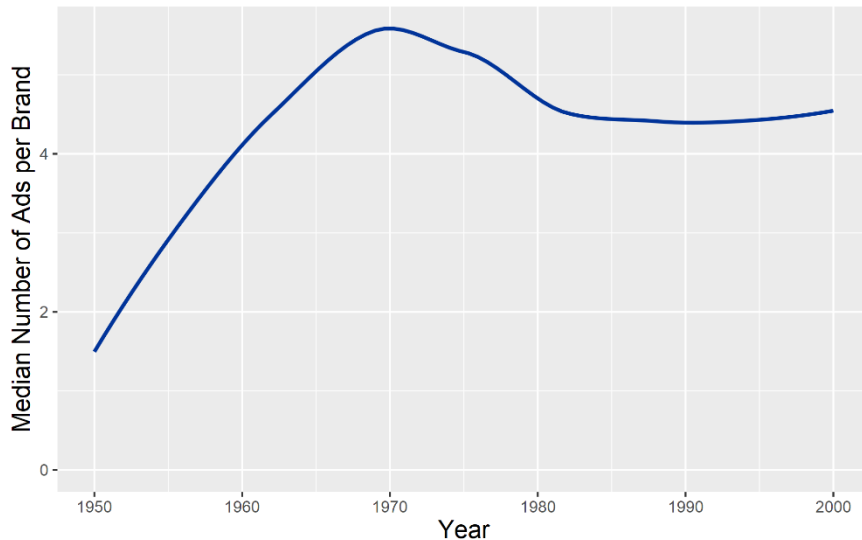
More frequent pulsing and shorter campaigns drive this increase in airline ads

It seems that **firms increase** their **advertising intensity** with competition.

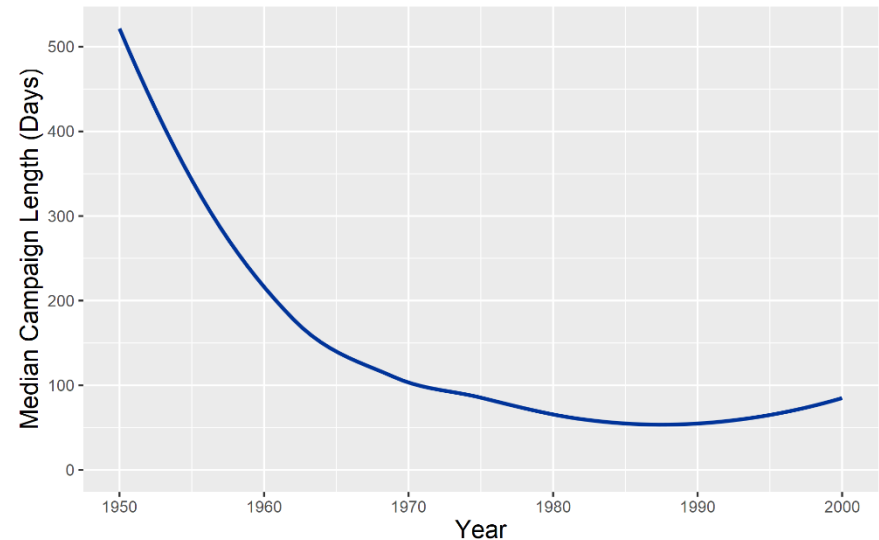
Reminder: Competition in the Airline Industry



RQ1: Effect of Competition Intensity on Ad Behavior



RQ1: Effect of Competition Intensity on Ad Behavior

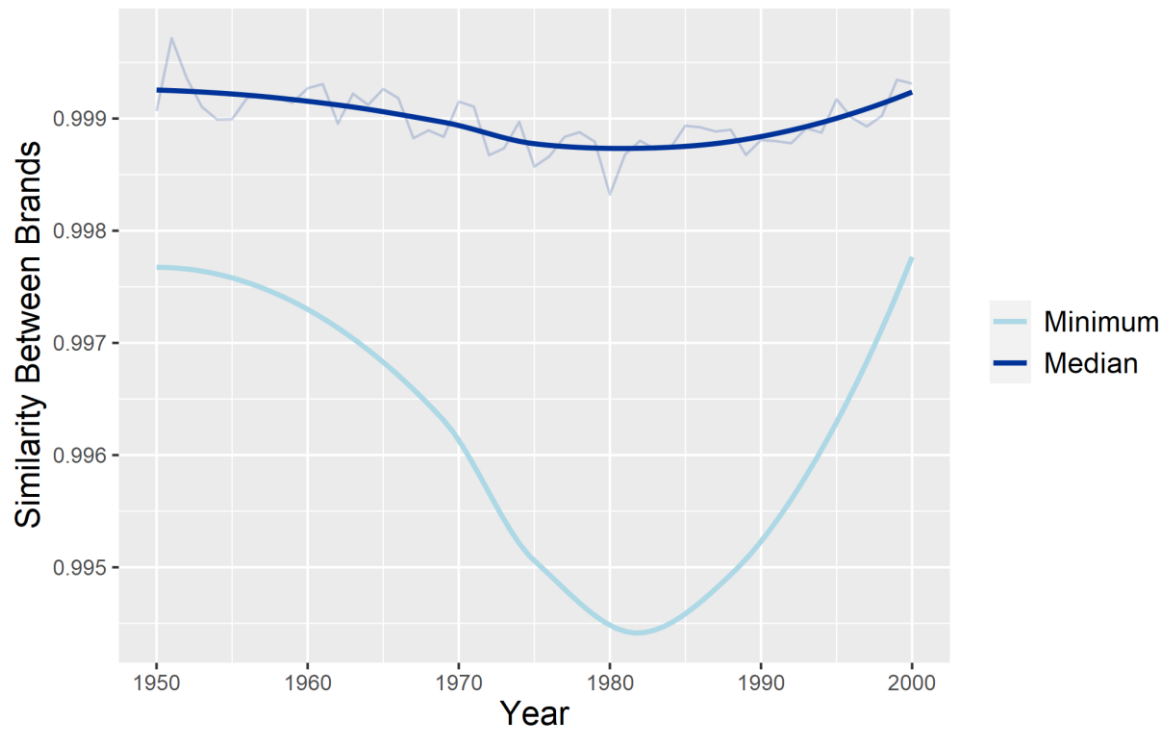


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Preliminary Findings RQ 2

Increasing competition is related to a lower similarity between airline ads

RQ2: Effect of Competition Intensity on Ad Content



Summary and Outlook

Competition intensity is reflected in more frequent pulsing, shorter campaign intervals and higher similarity to ads of other brands.

Watch out in the future for ...

- **Robustness check** with alternative competition metrics
- Include **textual similarity**
- More **industries**

The End

Thank you for your attention!

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Let's connect on LinkedIn: [Leonie Gehrman](#) 😊