Search, Design, and Market Structure

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Motivation: The e¤ect of the Internet

- Lower search costs were expected to lead to harsher competition and lower pro…ts
- What do the empirical studies show? On sales:
  - Long tail: Anderson (2004,6,9), Brynjolfsson, Hu and Smith (2006) etc.
  - Superstars: , Goldmanis, Hortacsu, Onsel and Syversson (2010)
  - Both? Elberse and Oberholzer-Gee (2006), Tucker and Zhang (2007), Oestreicher-Singer and Sundararajan (2008)
- Radical changes to existing industries/new industries?
  - book publishing, eBay stores

Search and Design

- Standard search model, random sequential search to obtain price-quotes and learn match realizations
  - Ceteris paribus, lower search costs lead to lower prices
- Model introduces ...rm design choices
  - marketing/information
  - type of product ranging from broad (lowest common denominator) to niche (very specialized)
- Search costs a¤ect pricing but also product variety

Results and Contributions

- Modelling contribution
  - Bring together models of search and models of design/information provision
  - design in a search model/competition in design model
- Characterization of Equilibrium
  - Prevalence and coexistence of very di¤erent design strategies
  - "Low-type" …rms specialize, "high-type" …rms go mass-market
- Comparative Statics
  - Pro…ts and prices can be non-monotonic in search costs
  - Model delivers coexistence of long-tail and superstar e¤ects

Model

- Continuum of …rms of measure 1, endowed with a production technology v $H(\ )$ on V.
- Continuum of consumers of measure m.
- Consumer l when consuming good from …rm i at price p_i gains utility (not including any search costs)

$$u_{li}(p_i) = v_i + \#_{li} \quad p_i$$

where $\#_{li}$ $F_s(.)$ is the value of the …rm-consumer speci…c match and is i.i.d. across l and i.

- The cost of visiting an adTq1001398wi.20.7rg0.20.20.7RDoming.i38e

whenConsumer a[(Consumer)]TJ/F3973621Tf151.8720Td[(i)]TJ/F2

Consumer Strategy

- Consumer strategy: choose whether or not to continue search, choose whether or not to buy
  - Note that with a continuum …rms, irrelevant whether or not consumers hold onto previous o¤ers
- Optimal stopping rule U: a consumer continues searching until he …nds an o¤er such that $v \quad p + \# \quad U$

Equilibrium

We look for Nash Equilibria in consumer and …rm strategies

- There is always a class of boring equilibria, …rms charging high prices and design irrelevant
- Optimal for …rm to choose either a broad ($s = B$) or niche ($s = N$)
- Can characterize …rm behaviour by an indi¤erent …rm V between the two design strategies
  - …rms with v V choose niche and v V choose broad

Equilibria with degenerate design

- Can characterize c_B such that if c c_B then all …rms choose broad design
- Can characterize c_N such that if c c_N then all …rms choose niche design
- In these cases, then when c goes down:
  - Consumer surplus U goes up
  - Prices and pro…ts go down
- When c_N c_B then there must be co-existence of di¤erent designs in equilibrium.

Comparative Statics

Proposition

Under the assumptions above, when all …rms are active then

1. *There is a unique equilibrium (U, V) for each search cost c. When di¤erent …rms choose di¤erent design strategies then as the search cost decreases*
2. *Consumer surplus (U) increases*
3. *There are more niche …rms (V increases);*
4. *Pro…ts of the highest and lowest quality …rms increase if and only if $\overline{q}_N$ $\overline{q}_B$ H L;*
5. *The superstar e¤ect arises; and,*
6. *The long tail e¤ect can, but need not, arise; a su¢ cient condition for the long tail e¤ect to arise is $\overline{q}_N$ $\overline{q}_B$ H L.*

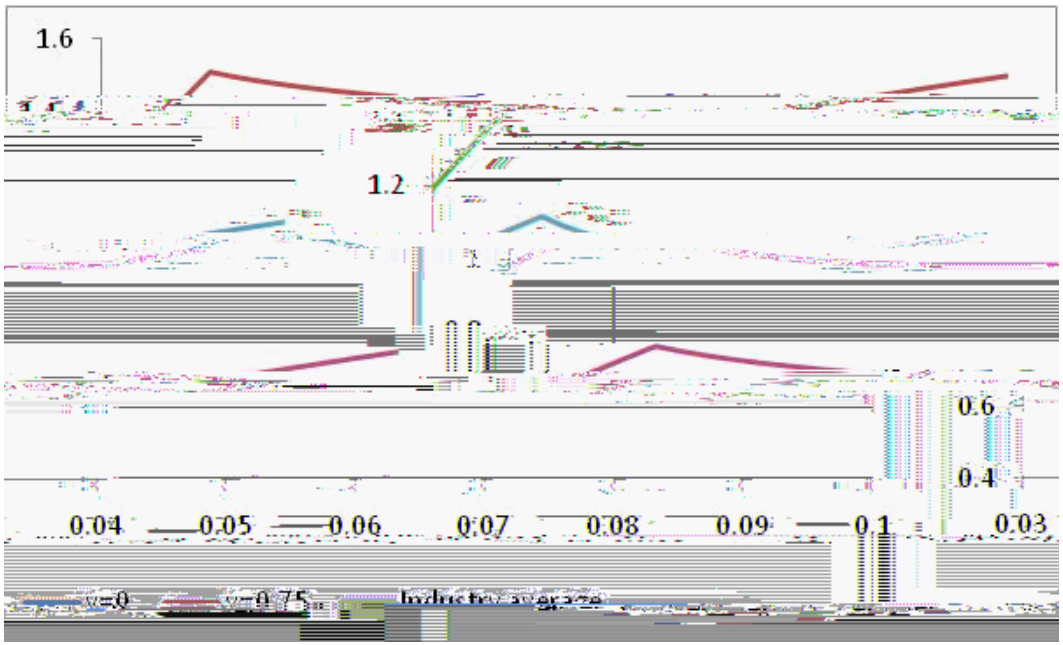
Example

- Linear demands
  - niche distribution uniform on $[\ \ 12, 4]$
  - broad distribution uniform on $[\ \ 3, 3]$
- Types uniformly distributed on $[0, 0.75]$

Prices against search costs

For a given ...rm at $v = 0.5$

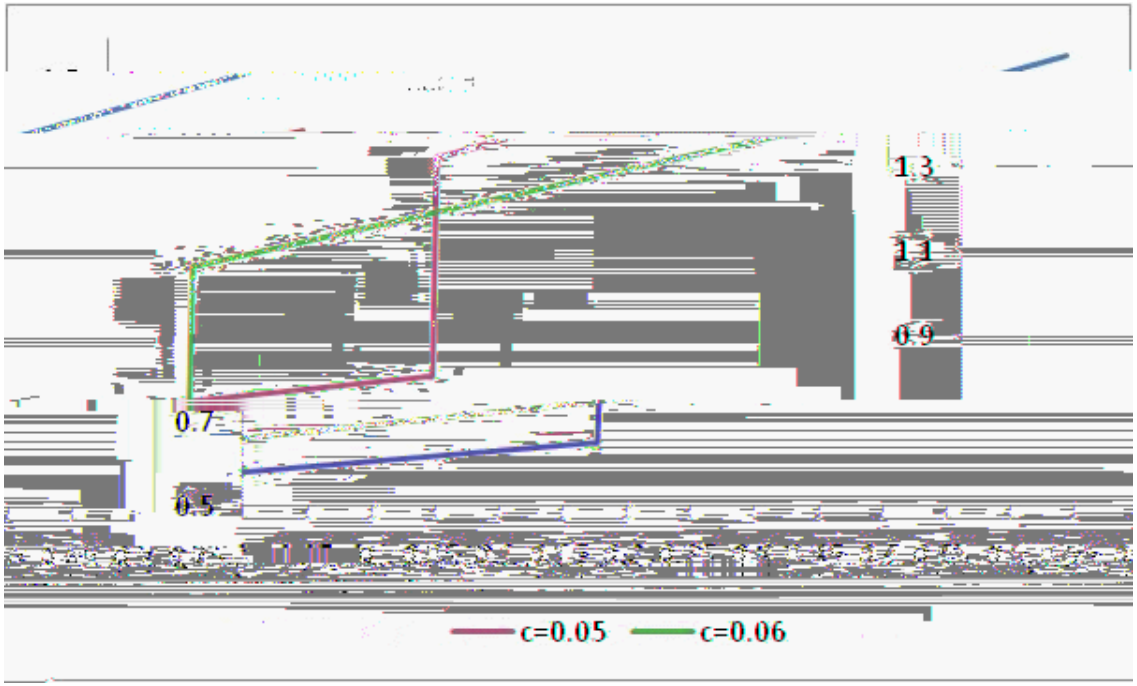
Pro…ts against search costs



Note: We consider a …xed number of …rms. We could allow free entry, then average pro…ts would be zero and the number of …rms would vary non-monotically in search costs.

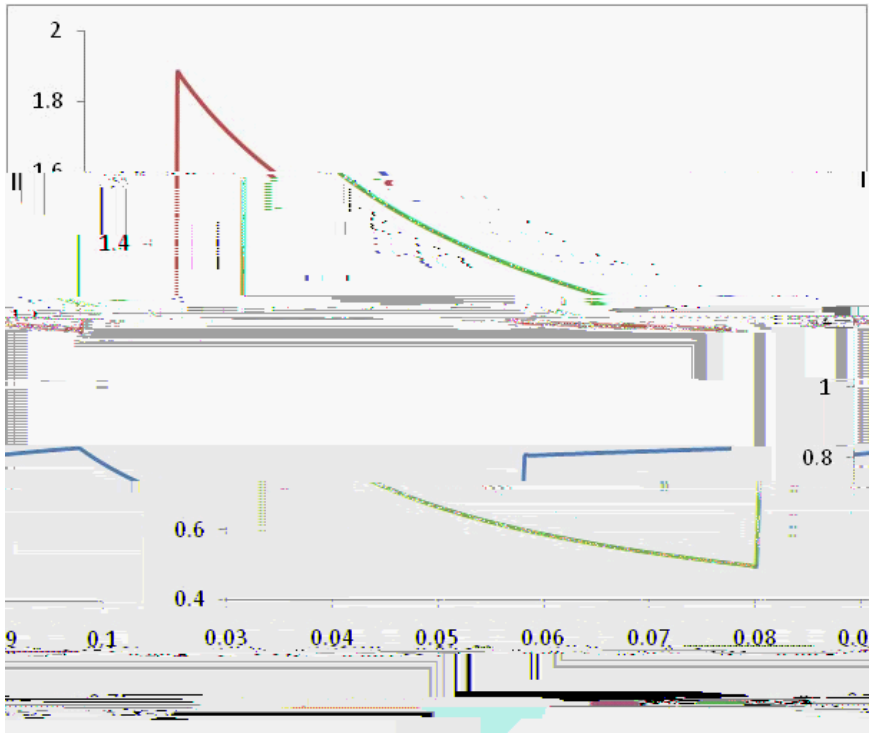
Sales against quality

Sales against quality (v) at two di¤erent search costs ($c = 0.05$ and $c = 0.06$).



- long tail and superstar e¤ects; disappearing middle

Market share against search costs for highest and lowest ...rms



- superstar e¤ects everywhere but at a single point
- longtail e¤ects at intermediate range

Conclusions

- Simple and tractable model that integrates consumer search and …rms' strategic price and product design choices.
- Search costs a¤ect product design
- Prevalence and coexistence of very di¤erent design strategies, with rich price and sale distributions
- Firms with better technologies will tend to adopt broader strategies
- Prices and pro…ts may be non-monotonic in search costs
- Long tail and superstar e¤ects
- Vertical di¤erentiation vs product designs changes bringing horizontal di¤erentiation important for which way results go
- Paper also provides a full characterization and shows similar results when all …rms are ex-ante homogeneous