Is Google the Next Microsoft?  
Competition, Welfare and Regulation in Internet Search

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Internet Search Engines

Figure: Unknown in 1998, today a household name
Some History

- Discovery of potential of targeted ads 2000
  - Suddenly search was more than just a portal
- Grown massively over the last decade
  - Today G’s revenues > $10 Billion pa
  - Most visited website on the planet
Search Market Increasingly Concentrated

<table>
<thead>
<tr>
<th>Company</th>
<th>United Kingdom</th>
<th>United States</th>
<th>Australia</th>
<th>Hong Kong</th>
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<td>Google</td>
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<td>59.1</td>
<td>84.0</td>
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<td>Yahoo!</td>
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<td>19.3</td>
<td>3.2</td>
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<tr>
<td>Microsoft</td>
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<td>7.7</td>
<td>5.8</td>
<td>3.2</td>
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<td>Sogou</td>
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<td>Baidu</td>
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<td>0.0</td>
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</tr>
</tbody>
</table>

**Table:** Percentage market share in Sept 2007 (As of Apr 2009: Google now 91% in UK, 73% in US, 91% in Australia)
Grown More So Over Time

[Graph showing market share over time for various WSS and NA services]
Important Questions to Answer

• Why so concentrated?

• Will it evolve (further) towards monopoly?

• Implications of concentration for
  • Consumers
  • Search engines
  • Advertisers

• In particular would monopoly be good/bad?
  • How?

• If bad what could regulators do?
Relation to the Literature

- Growing number of papers on auctions and advertising (Varian 2007, Edelman et al 2007)
- ‘Antitrust’ and Search Engines: very limited
- Existing theory of course relevant
- Models of quality differentiation (Shaked and Sutton etc)
- Multi-sided markets/platforms (Armstrong 2006 etc) – fairly limited
Investigations
Salient Points

- Technology: Software + Service
  - Algorithms + Data Centres
  - Large fixed cost, low MC business (both parts)
- Power: Search engines are information gatekeepers
  - Determine importance and control what we find
  - ‘If you post but aren’t indexed did you ever post?’
  - Affect behaviour of most other parts of the ecosystem
- Pricing and business model
  - Do not charge users ... 
  - But sell users attention to advertisers
Agents and Innovations

- Users/Queries (U), Advertisers (A), Search Engines (S), [Content Providers]
- SE have quality $v$ (quality of organic results)
- U heterogenous but all value quality +vely
- SE do not charge users
- So no. of users a a function of quality alone
- SE (ad) rev: $R$ function of no. users and quality
- Search engine costs: fixed only
- Profits: $\Pi = R(q(v), v) - c(v)$
- Effect of quality on revenue by 2 avenues
- $R_v$: direct effect – rev for fixed set of queries
- $R_q v'$: increase in no. of queries
Market Structure
Market Structure

• ‘Bertrand’ style competition in quality
  • Users all value quality +vely
  • And no prices for users (o/w Shaked-Sutton-like)

• Exact outcome would depend on structure of moves etc

• Two issues: dominance and contestability
  • In general convergence towards dominance likely
  • Fits current data
  • But: might still be contestable (Stackelberg model!)
  • 100% not a problem if because they’re just the best
Market Structure II: Contestability

- Determinants of contestability
  - Size and sunkness of fixed costs - Harris/Vickers
  - ‘Lock-in’ due to e.g. switching costs
- Fixed costs large and growing esp. for ‘service’ side
  - And most are sunk (e.g. R&D)
- ‘Lock-in’
  - Brand effects
  - First-mover advantages (variation in market shares)
  - Learning ‘lock-in’ – e.g. query refinement
Welfare
Social Welfare

- \( SW = \) user utility from search \((U)\) - cost of search
  - Both with monopolist and w/ central planner
  - Advertising and SE profits net out (see paper ...)
- Optimal social quality \(v^W\): \(U'(v^W) = U_v + U_q q' = c'\)
- Monopolist chosen level: \(R'(v^M) = R_v + R_q q' = c' + c'_A\)
- Ignore costs of ads \((c_A)\) + focus on \(U(til)\) versus \(R(ev)\)
- LHS declining in quality so ...
Functions to Welfare Outcomes

If marginal utility (U’) > marginal revenue (R’)

⇒ then monopolist under-provides quality

(and vice versa)

(Classic effect – here quality in place of output)
Demand Effects

- Normally: social benefit extra query $< \text{rev benefit}$
- Here not so clear
  - Revenue comes via adverts not via charges to users
  - Ad rev for a query could be $> \text{than SB from query}$
  - Just ‘because’ or due to
  - Complementarities and economies of scale in ads
- That said: a lot of socially beneficial queries give 0 rev
- Hard to say without data but IMO likely that $R_q q' < U_q q'$
Direct Quality Effects

- Clear that $U_v \geq 0$ – quality increases utility of existing queries
- $R_v$: argue that $< 0$
  - ‘Substitution’ effect: organic search substitutes for ads
  - ‘Antagonism’ effect: search may give info that deters using ads (e.g. vitamins)
- $\Rightarrow R_v < U_v$
Putting it Together

Monopolist undersupplies (distorts) quality

1. Because of classic ‘social-private’ gap
2. Effect of quality on existing user/query base
Concluding Remarks
Summary of Results

- Analyze search engine market from IO perspective
- Market Structure: monopoly likely
- And unlikely to be/remain contested
- Monopoly and welfare
- Possible for both too much/too little quality but ...
- Monopolist likely to undersupply quality
  - Classic social-private gap
  - Quality for existing users: substitution and antagonism
Policy

- Should already be keeping a close eye on search
- Could directly regulate quality
  - Who do you appeal your page rank to?
- Promote competition
  - Could separate search software and service
  - Public funding (under license)
- Search as general purpose technology
Microsoft <-> Google

- Technology: share key features (e.g. cost structure)
- Profitable: Both highly so
- Anti-competitive incentives: Yes for both
- Dominance: Yes for both
- Contestable: No for MS, ? for Google now (though No likely in future)