Pricing Network Effects: Competition

AEJ: Microeconomics

Fainmesser, Galeotti, AEJ: Micro '20

Discussed by Andreas Haupt

July 26, 2021

Harvard Theory Reading Group

Prologue

https://www.youtube.com/watch?v=NokEE3I4z0Y

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- Other users might be influenced by influencer purchases
- Users, however, also have their own tastes
- Main Question: How do horizontal price competition and competition with network effects interact?

Why Interesting, Why Challenging

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- Regulation: How much information on influence to allow?

Why is this hard?

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- Interior solution
- Does not come at a cost: Taste heterogeneity is strong compared to network externality

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Hotelling Style Setup with Network effects

- Continuum $[0,1]$ of unit-demand agents, typical agent i

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- Utilities:
  - $u_i(1, x_{-i}, \mathbf{p}^0, \mathbf{p}^1) = (i-1)\tau - p_i^1 + \gamma \mathbb{E}[Ix(I)]$,
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  - Firms maximize profit

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- Every parent of a user that consumes 1 (resp. 0) gives γ utility for consuming 1 (resp. 0)

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  - bounded strategic complementarity of consumers' decisions, which gives existence and uniqueness of equilibrium
- No endogenous choice of users whether to disclose influence

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- Information acquisition by firms is strategically complementary
- Hence firms invest much into learning about influence

Demands (Prop. 1)

If the horizontal differentiation is strong enough compared to the network externality, $\gamma \mathbb{E}[I] < \tau$, and a technical condition

$$D_i(\mathbf{p}^0, \mathbf{p}^1) = \frac{1}{2}\left(1 - \frac{1}{\tau}\Delta p_i - \frac{\gamma \mathbb{E}[I]}{\tau(\tau - \gamma \mathbb{E}[I])}\overline{\Delta p}\right)$$

Prices (Prop. 2)

If network effects are weak, $\gamma I_{\max} < \frac{1}{2}$, then, there is a unique equilibrium in the pricing stage. This equilibrium is symmetric.

$$p = \tau - \gamma \mathbb{E}[I]$$

is the non-targeted price.

$$p(I) = p + \frac{\gamma(\mathbb{E}[I] - I)}{2 - w}$$

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Misallocations and Surpluses

The welfare loss from misallocation is

$$M(w) = \frac{1}{2}\frac{w(1-w)}{\tau}\operatorname{Var}(p(I)) = \frac{\gamma^2}{(2-w)^2}\operatorname{Var}(I)$$

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Use investment stage with cost αw^2

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- Simplify to $w^0 = w^1 = w$, and solve FOC to get internal solution w^*

Equilibrium Characterization

The set of stable equilibria depend on $K = \frac{\gamma^2 \operatorname{Var}(I)}{2\tau\alpha}$ (Prop. 7):

- $\frac{32}{27} < K$: $w = 1$

Only producer surplus changes compared to exogenous w.

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- Vary τ (Prop. 8)

Related Work

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- Fainmesser, Galeotti AEJ: Micro forthcoming: Modelling concerns of influencers that they might loose their followers

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- Do the comparative statics break with arbitrarily small levels of homophily?
- Where outside of influencer marketing can this model be applied?
- And many other questions which would re-introduce expectations.

Epilogue

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