

# Mergers in Innovative Industries: The Role of Product Market Competition

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## Background

- Academic literature and antitrust practice have focused on the short-run price effects of mergers.
- Arguably, the effects of mergers on investment/innovation may be more important in some markets.
- Not everyone agrees though that antitrust authorities should account for such effects (cf., Dennis Carlton, Testimony before FTC Hearing on Global and Innovation-based Competition, 1995):

*Current policy has focused mostly on the competitive harms that a merger would cause in the near future. A policy relying on potential competition in the far future in certain products or potential competition in the far future in yet unspecified and unknown products requires the analyst to predict the far future. But the far future is much harder to predict than the near future and any active antitrust policy which foregoes efficiency gains in the near future to achieve speculative competitive gains in the far future is likely to harm not help consumers.*

# The Model

- Single technological leader (value  $V_n$ ),  $n$  followers (values  $W_n$ ).
- Continuous time, Poisson innovation.
- Values satisfy:

$$\begin{aligned}rV_n &= \pi_n^l - nx_n(V_n - W_n) \\rW_n &= \pi_n^f + x_n(V_n - W_n) - c(x_n)\end{aligned}$$

where

$$c'(x_n) = V_n - W_n$$

- Note: Leader does not innovate.

# Analysis

- Combining these equations, we obtain the aggregate innovation rate:

$$nx_n = \frac{\Delta\pi_n}{c'(x_n)} - x_n - \frac{c(x_n)}{c'(x_n)} - r$$

where  $\Delta\pi_n \equiv \pi_n^I - \pi_n^f$  is profit gap.

- Note: The RHS is decreasing in  $x_n$ .
- The following results follow immediately:
  - An increase in  $\Delta\pi_n$  induces an increase in  $x_n$ . [Prop. 2]
  - An increase in  $n$  increases  $nx_n$  iff  $(n/x_n)(dx_n/dn) > -1$ . [Prop. 3]
  - Suppose  $\Delta\pi_n$  is nondecreasing in  $n$ . Then, a decrease in  $n$  (a “merger”) induces a decrease in  $nx_n$ . [Prop. 4]
  - Suppose  $\Delta\pi_n$  is strictly decreasing in  $n$ . Then, for  $n$  sufficiently large, a decrease in  $n$  (“merger”) induces an increase in  $nx_n$ . [Prop. 5]
- For welfare analysis, assume that each innovation increases consumer surplus by  $\delta_n$ .
- Hence, a merger can affect discounted consumer surplus both statically (through  $cs_n$ ) and dynamically (through  $nx_n$ ).

# Comments

- Important, policy-relevant topic.
- Simple, elegant model.
- Model a bit too stylized?
  - ▶ A merger is isomorphic to a reduction in the number of firms (no matter whether merger is between leader and follower or between two followers).
  - ▶ The technological leader does not innovate.
  - ▶ All followers are identical.
- What do we gain from dynamic nature of model? (Note: There is a large literature on the static effects of competition on firms' incentives to invest.)
- Implicit assumption: Merger has negative efficiency (involves closing down of one research lab). Merged firm would have an incentive to keep two independent research labs.
- Here: One-time exogenous merger. To understand effect of merger policy, would need to consider effect of prospective merger on innovation incentives (cf., Henry & Nocke).