Killer Acquisitions and Beyond: 

Policy Effects on Innovation Strategies

Igor Letina, Armin Schmutzler and Regina Seibel

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Background

• Current practice: start-up acquisitions are waved through.
  → Acquisitions by Google, Amazon, Apple, Facebook and Microsoft (31.6 billion USD in 2017).
  → Google acquired about one firm per month between 2001 and 2018.

• Recent concern about eliminating potential competition:
  → Crémer et al. (2019) (“EU Report”),
  → Furman et al. (2019) (“Furman Report”),

• Anti-competitive motive particularly salient in the case of killer acquisitions (Cunningham, Ederer and Ma 2021).
Intention to act against acquisition of start-ups

- CNBC, September 14, 2021:

DOJ official signals firm stance against ‘killer acquisitions’

- Politico, July 30, 2021:

EU steps up Big Tech crackdown with in-depth probe of latest Facebook deal

Kustomer takeover plan gets extra scrutiny as regulators look to tackle digital giants buying up promising startups.
Intention to act against acquisition of start-ups

- The Australian, August 27, 2021:

**ACCC wants merger reform to crush ‘killer acquisitions’**

Facebook, Google and Apple have gone from inventors to ‘serial acquirers’, sparking the need for competition reform, says ACCC boss Rod Sims.

- Chief Executive of the CMA, Andrea Coscelli, lecture on February 9, 2021:

Many of us are now familiar with the statistic that – between 2008 and 2018 of the 400 acquisitions made globally by the 5 largest digital firms – none has been blocked by competition authorities. But it remains a powerful one. It is very hard to look at those numbers, to look at the state of the relevant markets today, and conclude with hindsight that the balance has been struck correctly.
What is the right balance?

- **Ex post effect:**
  - (Potential) competition is preserved.
  - (Potential) loss of acquisition synergies.

- **Ex ante effect:**
  - Selling the firm can foster innovation by entrants (Rasmussen 1988).
  - But prohibiting acquisitions could increase innovation by incumbents.

- **This paper:**
  - Focuses on the ex ante (innovation) effect.
  - Analyzes how innovation strategies of start-ups and incumbents react to policy interventions.
  - Analyzes both “killer acquisitions” and the “genuine acquisitions”
Our paper

- Not only the amount of resources but also the choice of research projects matters.

- We develop a framework where firms can choose both in which projects to invest and how much to invest.

- This allows us to uncover an important channel: a ban on acquisitions affects the incentives to invest in new projects differently from incentives to invest in duplicate projects.
Main Results

• Prohibiting killer acquisitions has a strictly negative innovation effect.

• Prohibiting genuine acquisitions has a weakly negative innovation effect.
  → We provide conditions under which the effect is zero.

• Innovation effect is likely to be small (and prohibition of acquisitions justified) when:
  → entrant has low bargaining power,
  → incumbent’s profits after entry are large.
Literature

- Innovation effects of mergers between incumbents.
- Cunningham et al. (2021) provide empirical evidence + explain rationale behind discontinuing development, but not initial innovation decisions.
- Innovation effects of start-up acquisitions:
Roadmap

Model

Investments under the Laissez-Faire Policy

Prohibiting Acquisitions

Other Policies

Discussion and Further Results
Model: Overview

- Two firms: incumbent and entrant.
- Incumbent faces entry challenge.
- Contrary to incumbent, entrant has to innovate to produce.

Laissez-faire model:

1. Firms choose investments in different R&D projects.
2. Incumbent can acquire the entrant.
3. Commercialization decision.
4. Product market competition.

Alternative: No-acquisition policy (without Stage 2).
Model: Investment Stage

- Incumbent $I$ and entrant $E$ simultaneously choose how much to invest in each project $\theta$ from $\Theta = [0, 1)$.
- Firms choose research intensity $r_i(\theta) \in [0, 1]$.
- Marginal cost of investing in project $\theta$ is $C(\theta)$, where $C : \Theta \rightarrow \mathbb{R}_+$ is well-behaved and strictly increasing.
- Total investment cost: $\int_0^1 r_i(\theta)C(\theta)d\theta$. 
Model: Investment Stage

- Only one project, $\hat{\theta} \in \Theta$ is correct (leads to an innovation).
- Each project is equally likely to be the correct project.
- The correct project yields high technology $H$ (drastic innovation) with probability $p$, otherwise non-drastic innovation $L$.
- Firm innovates with probability $r_i(\hat{\theta})$.
- Patent for innovator (probability $1/2$ if both innovate).
- Firms learn technology state from $(\ell, 0)$, $(\ell, L)$, $(\ell, H)$, $(L, 0)$, $(H, 0)$, where $\ell$ is incumbent’s default technology.
Model: Investment Stage

\[ r_i(\theta) \]
Model: Stages of the Game

Acquisition stage 2:
- The incumbent can acquire the entrant by paying the foregone profits plus a share $\beta$ of the bargaining surplus.
- Acquisition iff bargaining surplus is strictly positive.
- Patents are transferred to the acquiring firm.

Commercialization stage 3:
- Patent holder can commercialize at cost $\kappa$.
- Firms’ final technology states $t_{fin}^I$ and $t_{fin}^E$ are realized.

Market stage 4:
- Incumbent profits $\pi(t^I_{fin}, t^E_{fin})$; entrant profits $\pi(t^E_{fin}, t^I_{fin})$. 
Assumption 1 (Market profits)

(i) Profits are non-negative.

(ii) Without an innovation, the entrant earns zero profits.

(iii) Technology $H$ corresponds to a drastic innovation.

(iv) Competition decreases total profits:

$$\max \{ \pi(L, 0), \pi(\ell, 0) \} > \pi(\ell, L) + \pi(L, \ell).$$

Assumption 2 (Commercialization costs)

(i) $\pi(L, \ell) \geq \kappa$;

(ii) $\pi(H) - \pi(\ell, 0) \geq \kappa$. 
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Subgames

Lemma 1 (Acquisitions)

Acquisition stage 2:

• The incumbent acquires the entrant iff the entrant holds the patent to $L$.

Commercialization stage 3:

• Entrant commercializes both technologies.
• Incumbent commercializes $H$ always and $L$ iff $\pi(L, 0) - \pi(\ell, 0) \geq \kappa$.

Market stage 4:

• Incumbent profits $\pi(t_I^{fin}, t_E^{fin})$; entrant profits $\pi(t_E^{fin}, t_I^{fin})$. 
Critical Projects

- Characterization of equilibrium investments will rely on critical projects: $\theta_1^1, \theta_1^2, \theta_2^1$ and $\theta_2^2$.

\[
C(\theta_1^1) = pv_E(H) + (1 - p)v_E(L, \ell)
\]
\[
C(\theta_2^1) = \frac{1}{2} (pv_E(H) + (1 - p)v_E(L, \ell))
\]
\[
C(\theta_1^2) = pv_I(H) + (1 - p)v_I(L, 0) - v_I(\ell, 0)
\]
\[
C(\theta_2^2) = \frac{p}{2} v_I(H) + (1 - p) \left( \frac{1}{2} v_I(L, 0) + \frac{1}{2} v_I(\ell, L) \right) - (1 - p) v_I(\ell, L).
\]
Critical Projects

- $C(\theta^1_i)$ equals expected value increase to firm $i$ if it invests in the project when the other firm does not.
- $C(\theta^2_i)$ analogous for the case that both firms invest.
Critical Projects

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Critical Projects

- $C(\theta_i^1)$ equals expected value increase to firm $i$ if it invests in the project when the other firm does not.
- $C(\theta_i^2)$ analogous for the case that both firms invest.
Critical Projects

- $C(\theta^1_i)$ equals expected value increase to firm $i$ if it invests in the project when the other firm does not.
- $C(\theta^2_i)$ analogous for the case that both firms invest.
Under laissez-faire, the only possible relations between the critical projects are:

(i) \( \theta^1_I \leq \theta^2_I = \theta^2_E < \theta^1_E \);

(ii) \( \theta^2_I = \theta^2_E < \theta^1_I < \theta^1_E \);

(iii) \( \theta^2_I = \theta^2_E < \theta^1_E \leq \theta^1_I \).

Relation (iii) can only arise in the genuine acquisitions case.
Equilibrium Investments

Figure: Proposition 1 – Equilibrium portfolio if $\theta_1^I < \theta_1^E$.

- A simple equilibrium (where firms either invest maximally or not at all in each project) always exists.
- In the killer acquisitions case, only $\theta_1^I < \theta_1^E$ can arise.
Figure: Proposition 1 – Equilibrium portfolio if $\theta^1_I \geq \theta^1_E$.

- In the genuine acquisitions case, also $\theta^1_I \geq \theta^1_E$ can arise.
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The Effects on Variety

Note: $\theta^1_E(N) < \theta^1_E(A)$ and $\theta^1_I(N) = \theta^1_I(A) = \theta^1_I$.

Proposition 2

(i) In any equilibrium under the no-acquisition policy,
(a) variety is weakly smaller than in any equilibrium under laissez-faire
(b) the innovation probability is weakly smaller than in any simple equilibrium under laissez-faire.

(ii) The inequalities in (i) are strict, except that there is no effect on variety in the genuine acquisitions case if $\theta^1_E(A) \leq \theta^1_I$. 
The Effects on Variety and Duplication

Figure: Laissez-faire (left), no-acquisition (right).
The Effects on Variety and Duplication

Corollary 2 (Duplication effect)

(i) \( \theta^2_I(N) > \theta^2(A) \)

(ii) \( \theta^2(A) > \theta^2_E(N) \).
Proposition 3

(i) The size of the policy effect is:
   (a) weakly increasing in entrant bargaining power $\beta$;
   (b) weakly decreasing in incumbent duopoly profits $\pi(\ell, L)$.

(ii) The effects in (i) are strict if $\theta_1^I < \theta_1^E(A)$ and they are zero if $\theta_1^I > \theta_1^E(A)$. 
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Restrictions on technology usage

- Prevents acquisition of promising start-ups.
- Otherwise, the critical values lie between those with laissez-faire and prohibition of acquisitions $\rightarrow$ smaller negative effect than prohibition.
- No effect on killer acquisitions. $\rightarrow$ Turns some genuine acquisitions into killer ones.
Prohibition of “killing”

- Prevents acquisition of promising start-ups.
- Smaller negative effect than prohibition.
- No effect on genuine acquisitions. → Turns some killer acquisitions into genuine ones.
Taxing acquisitions

- Prevents acquisition of promising start-ups.
- Smaller negative effect than prohibition.
- Treats killer and genuine acquisitions equally.
Increasing profitability of IPOs

- Prevents acquisition of promising start-ups.
- Positive effect on innovation (at a cost).
- Increases duplication of both firms.
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Innovation vs. Competition Effect

Overall effect on CS is in line with the effect on innovation for parametrized examples.
Results robust to

- Innovation uncertainty at the time of acquisition.
- Asymmetric chances of receiving patents.
- Heterogeneous commercialization costs.
- Heterogeneous innovation outcomes.
- Multiple entrants.
to conclude...
Conclusion

• We analyze the innovation effects of policies targeting start-up start-ups.

• We show that the (negative) innovation effect is likely to be small when:
  → entrant has low bargaining power,
  → incumbent’s profits after entry are large.

• Genuine acquisitions may be just as problematic as the killer acquisitions.