Comment on “Technology Entry in the Presence of Patent Thickets” by Hall, Helmers and von Graevenitz

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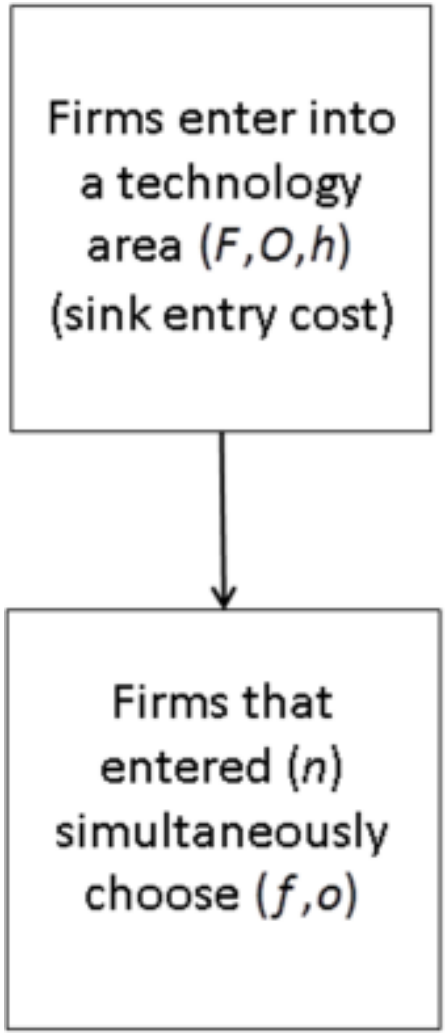
The question and the answer

- Do denser thickets cause less entry into a technology area?
- Answer: yes
  - Patent thickets increase holdup potential
  - A one standard deviation increase in triplet count reduces the hazard of entry into a technology area by 15-20%
- Is it large or small?
  - In an important sense it is “not large”
  - Patent holdup theory is inconsistent with the paper findings and data

Context

- Paper motivated as part of the patent thickets/patent holdup/royalty stacking literature
  - Clearly it is not about royalty stacking = Cournot complements (very precise mechanism)
  - (Seemingly) a paper on patent holdup, defined as something that increases expected legal costs
  - Clearly a paper about thickets; but thickets is a broad concept (see Egan and Teece, 2015)
- A paper on R&D entry and investment, not about licensors demanding royalties from manufacturers

A game about R&D entry and investment



Modeling of complexity *F* ("facets") and opportunity *O*

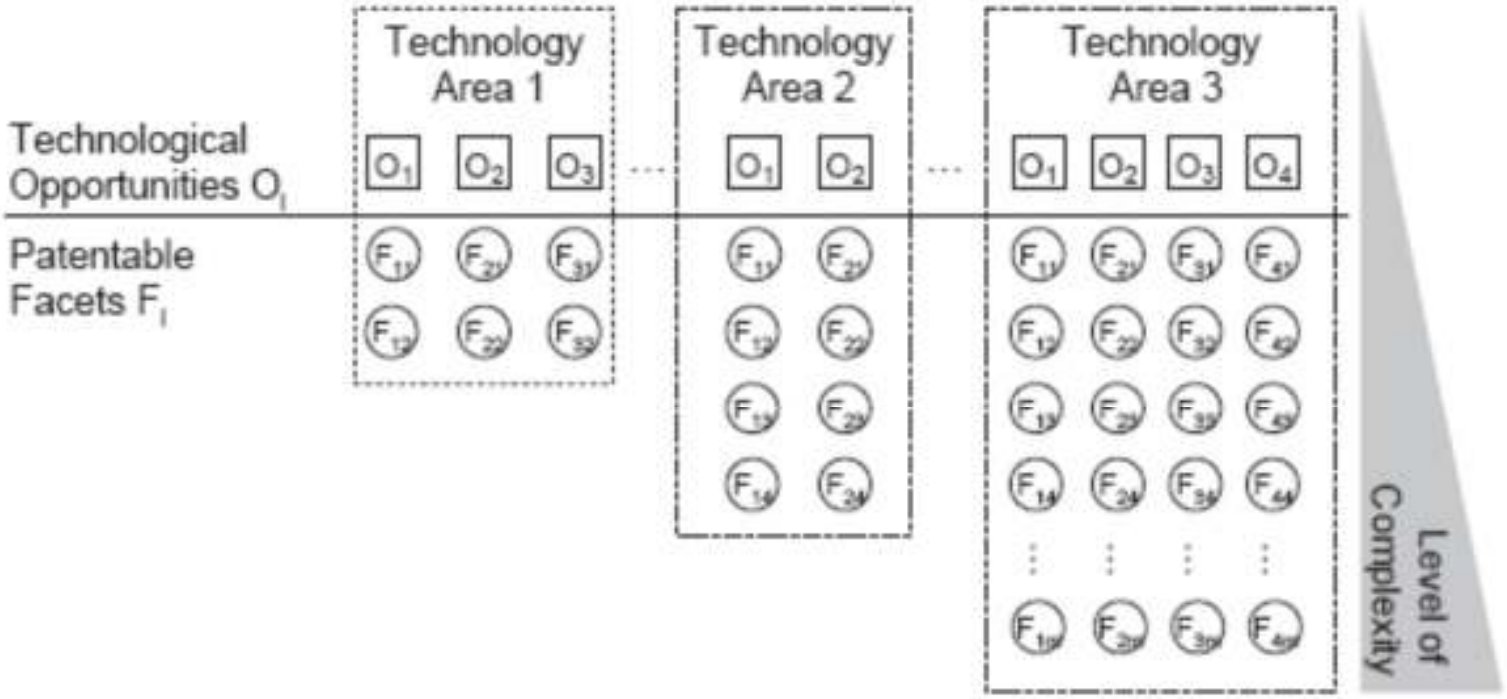
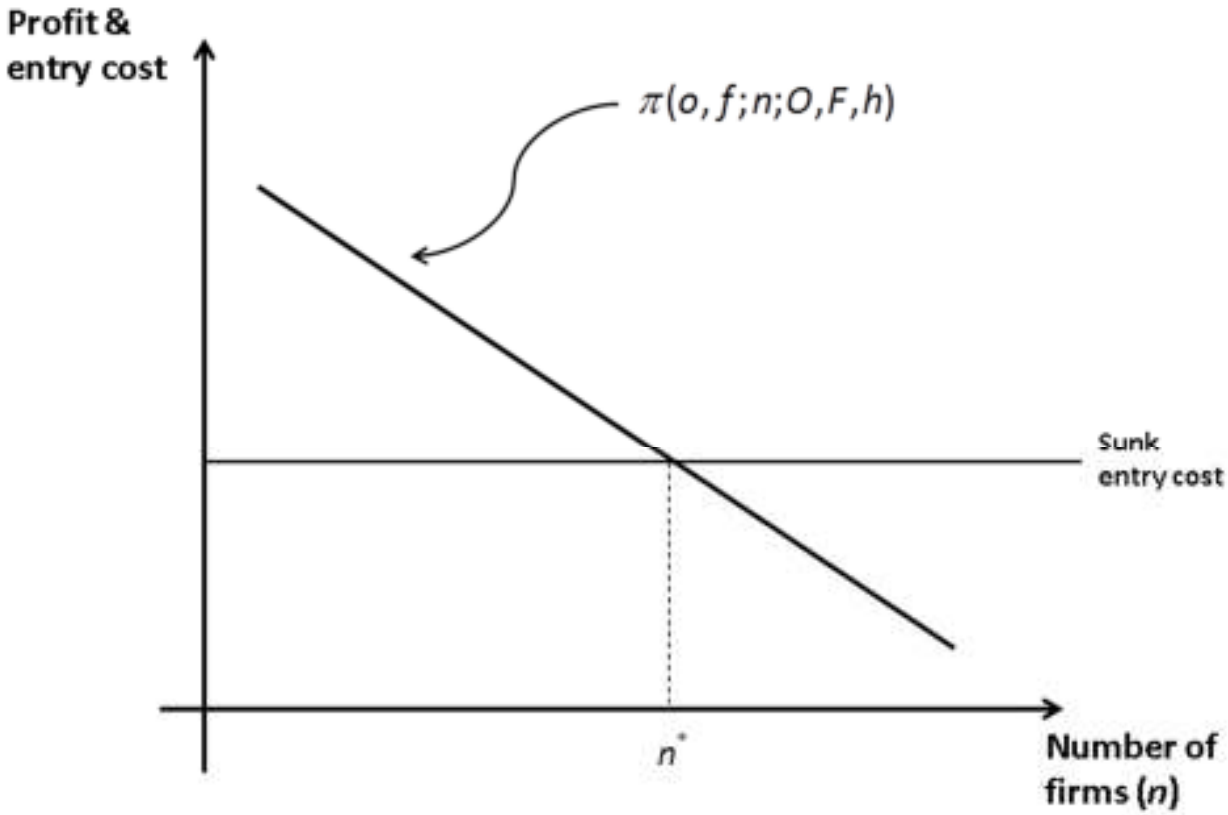


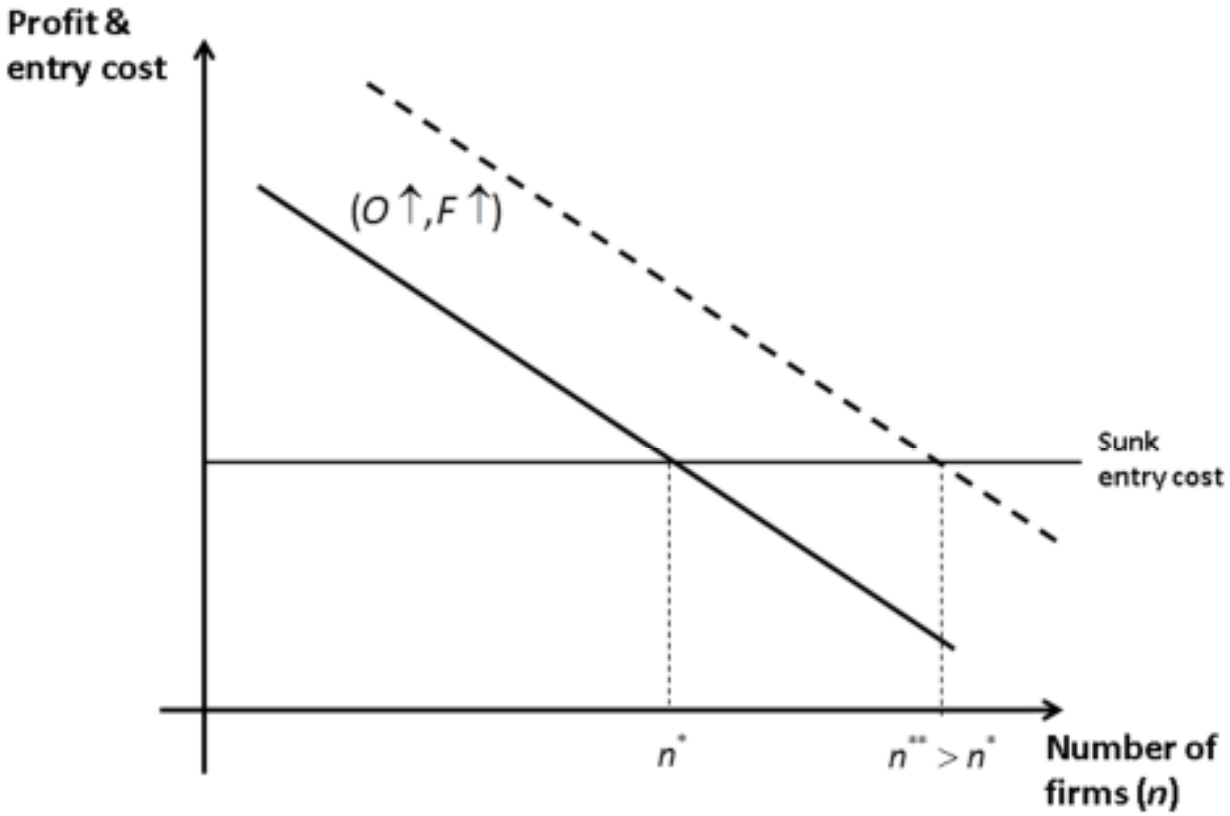
Figure 1
Complexity and the Number of Patentable Facets per Technological Opportunity

Source: Von Graevenitz, Wagner and Harhoff (2013)

Equilibrium with entry



Opportunities and complexity are good for R&D, profits and entry



Complexity *F* ("facets") and opportunity *O* are akin to product differentiation

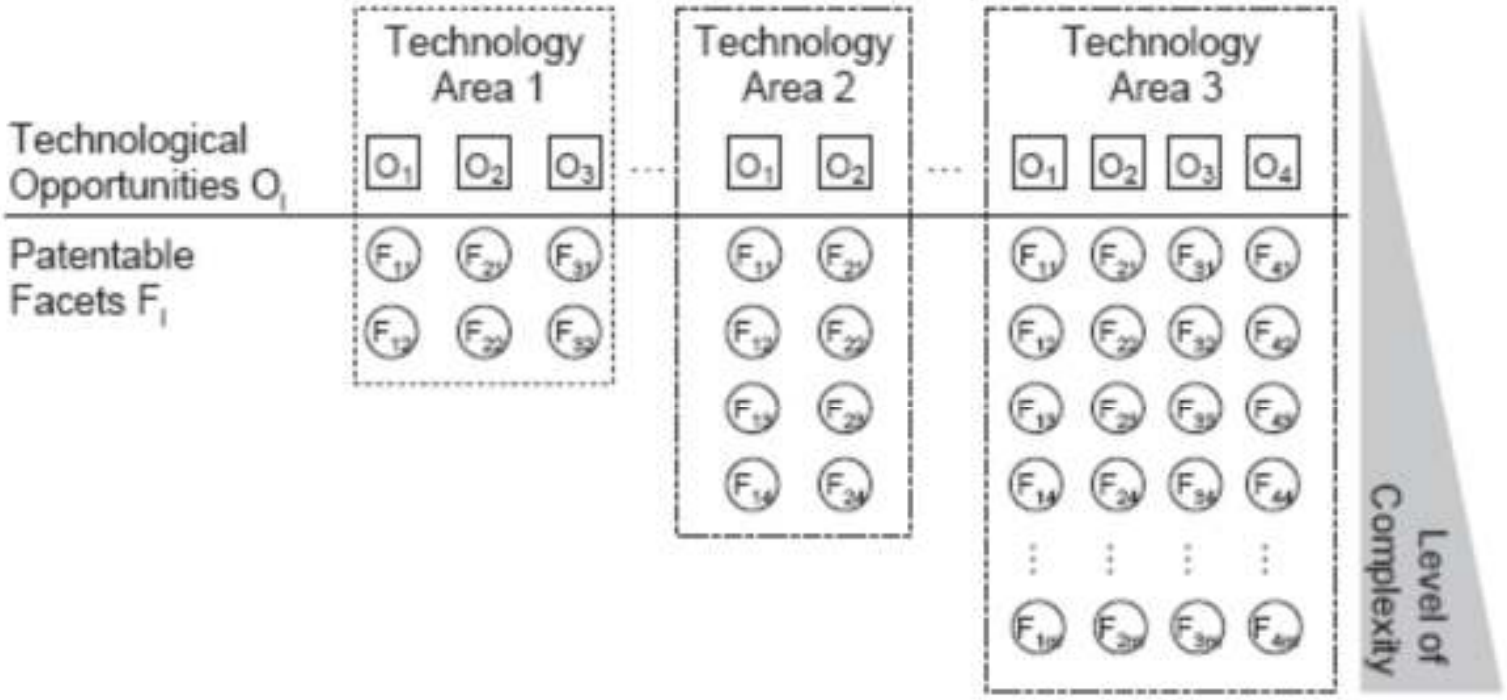
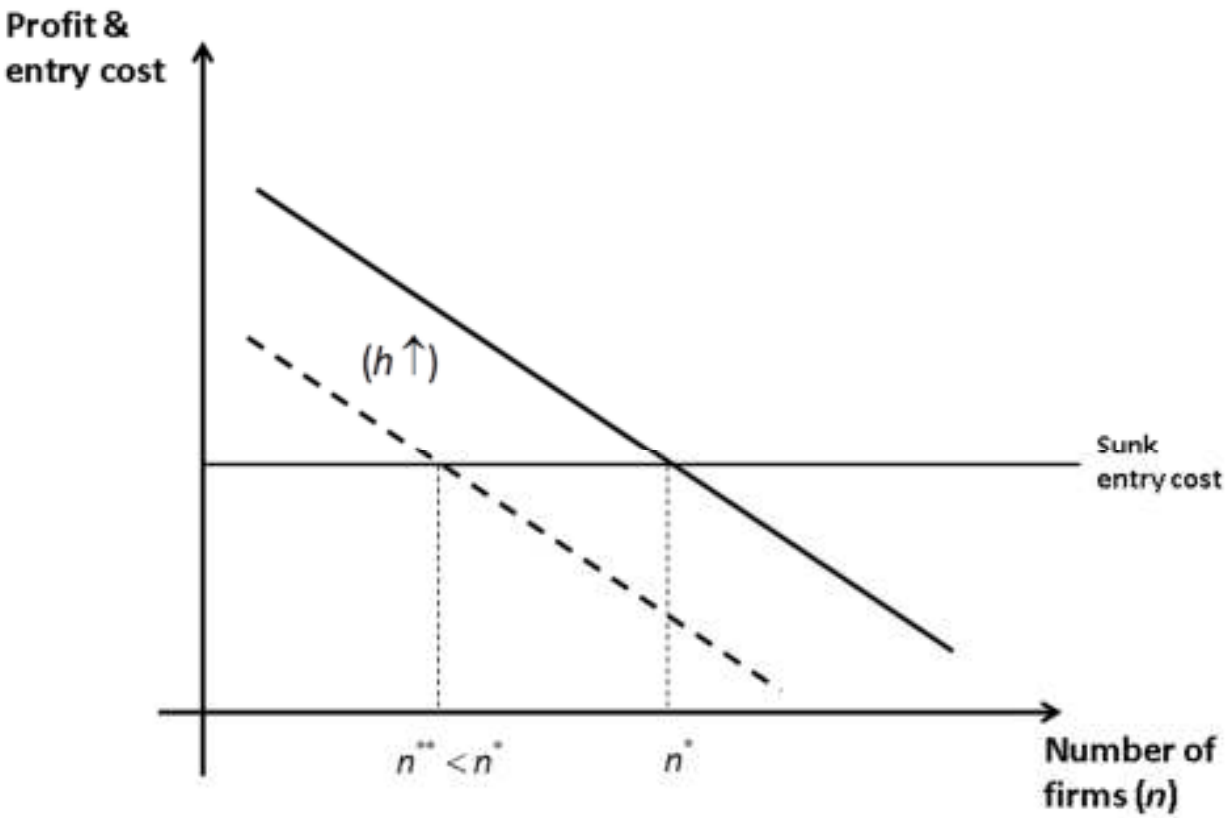


Figure 1
Complexity and the Number of Patentable Facets per Technological Opportunity

Source: Von Graevenitz, Wagner and Harhoff (2013)

Holdup potential is bad for R&D, profits and entry



The profit function and litigation costs

- Model: The higher *h* → holdup is more likely → higher (legal costs)

$$\pi(o, f; n; O, F, h)$$
$$= o \cdot \left(V(F^*)\Delta(s) - L(pf, s; h) \right) - C_c(o)$$

Any parameter that affects second-stage costs in the same way would do the same

- Model: The higher h → holdup is more likely → higher (legal costs) → lower profits → less first-time patenting
- Legal costs, bargaining costs, SSO cost, regulation cost, development costs, marketing costs, and so on

$$\pi(o, f; n; O, F, h)$$

$$= o \cdot \left(V(F^*)\Delta(s) - I(pf, s; i) \right) - C_c(o)$$

$$I = L, B, S, R, D, M....$$

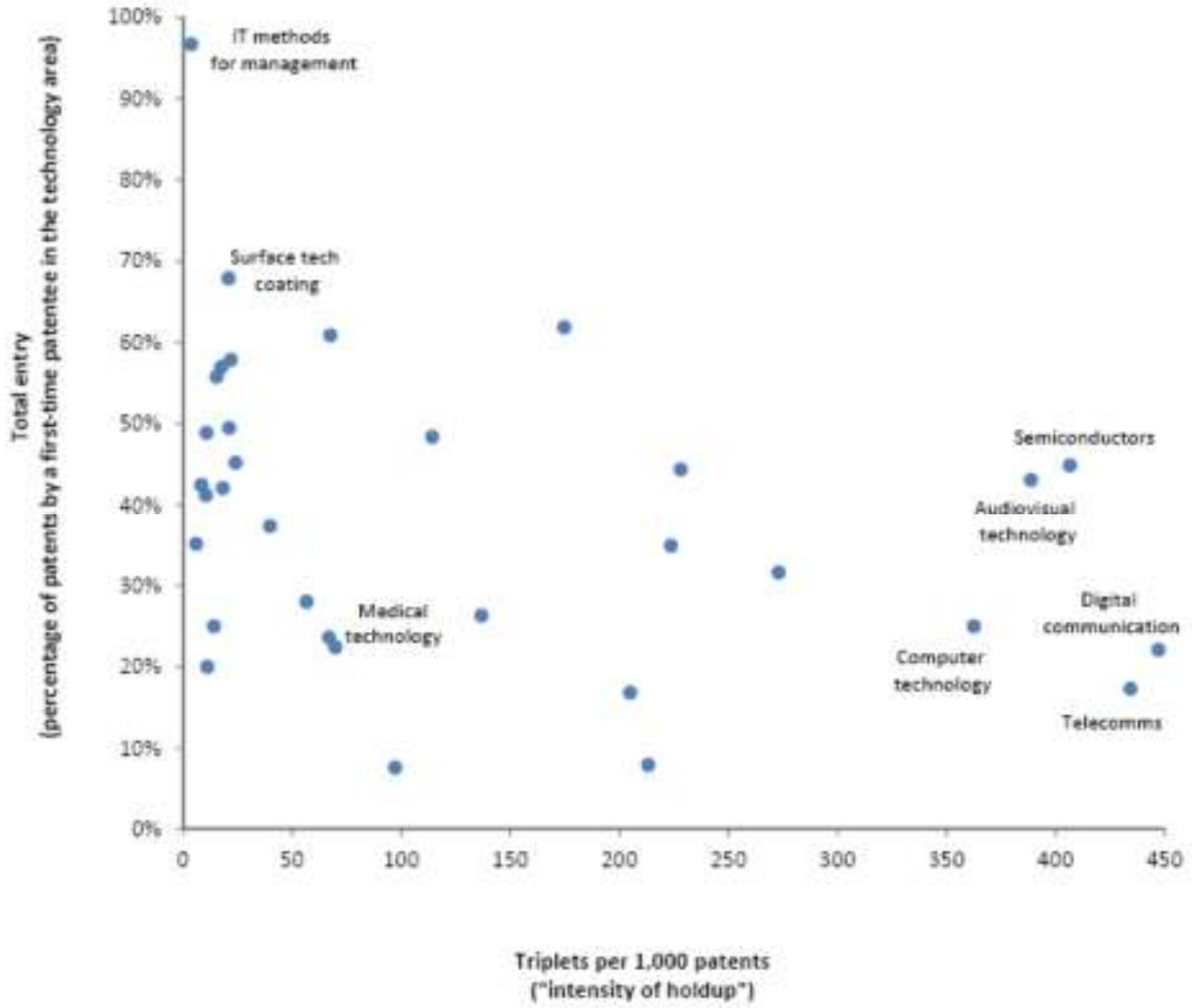
Results

- Elasticities of the hazard of entry:
  - Triplets: –0.1
  - Complexity: 0.1
  - Technological opportunity: 0.5
- One standard deviation increase of the log of complexity → 32% increase in hazard of entry
- One standard deviation increase of the log of triplet density→ 15-20% decrease in hazard of entry
- Doubling of firm's past patents → doubling of the hazard of entry

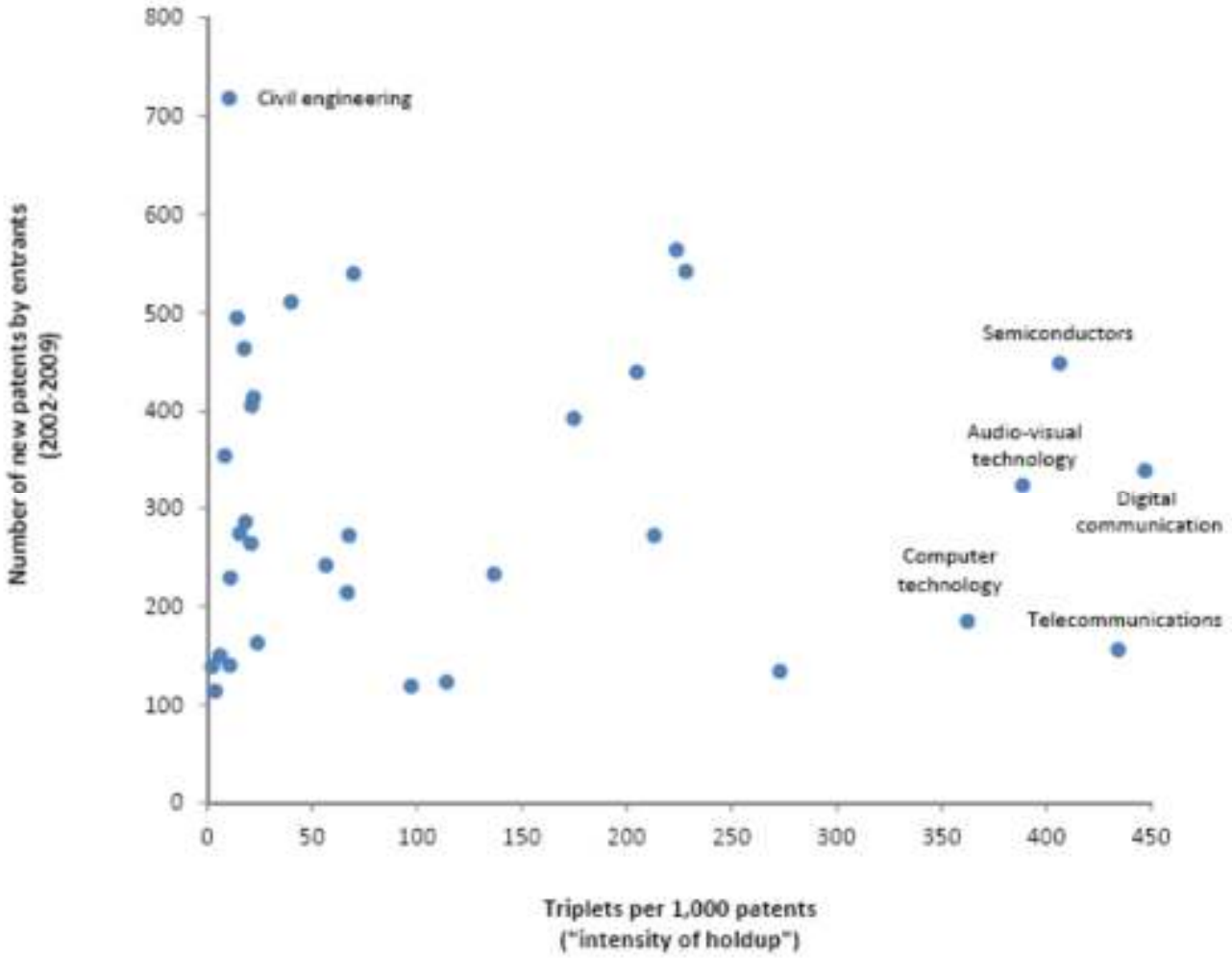
Is this evidence of thickets and patent holdup?

- Link with holdup is a conjecture; no evidence
  - Model: The higher *h* → holdup is more likely → higher legal costs → lower profits → less first-time patenting
  - Empirics: More triplets per 1,000 patents→ holdup is more likely → higher legal costs → lower profits → less first-time patenting
- Thickets (Gupta, 2013):
  - Many patents reading on the same *product* (yes)
  - Multiple patents reading on the same technology (no)
- Model is about R&D, firms mutually making it more difficult to capture value of patents; not about licensors holding up manufacturers
- More important: it finds marginal effects (nothing wrong), not the discrete, large effects claimed by patent holdup theorists

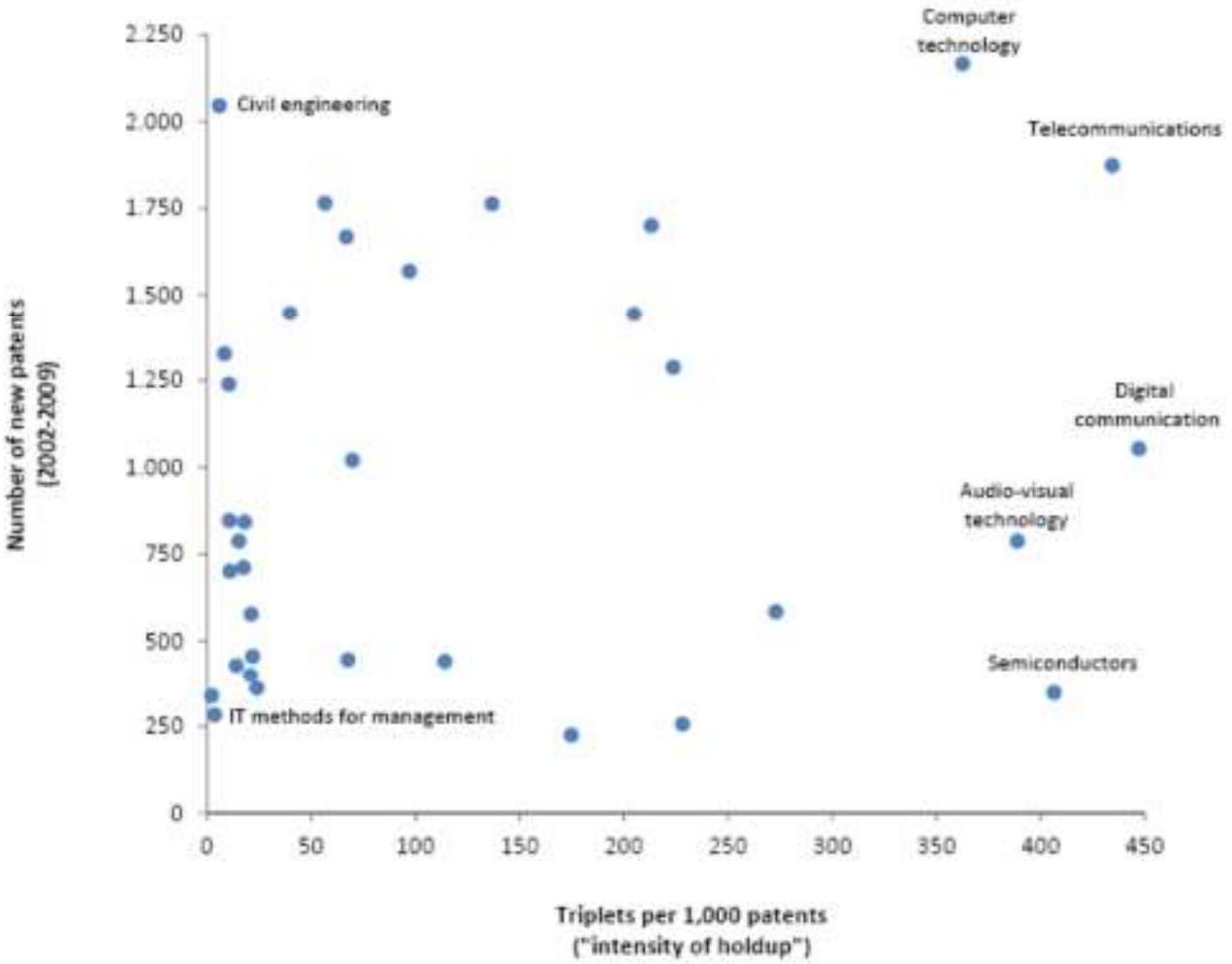
Patenting by entrants and triplets

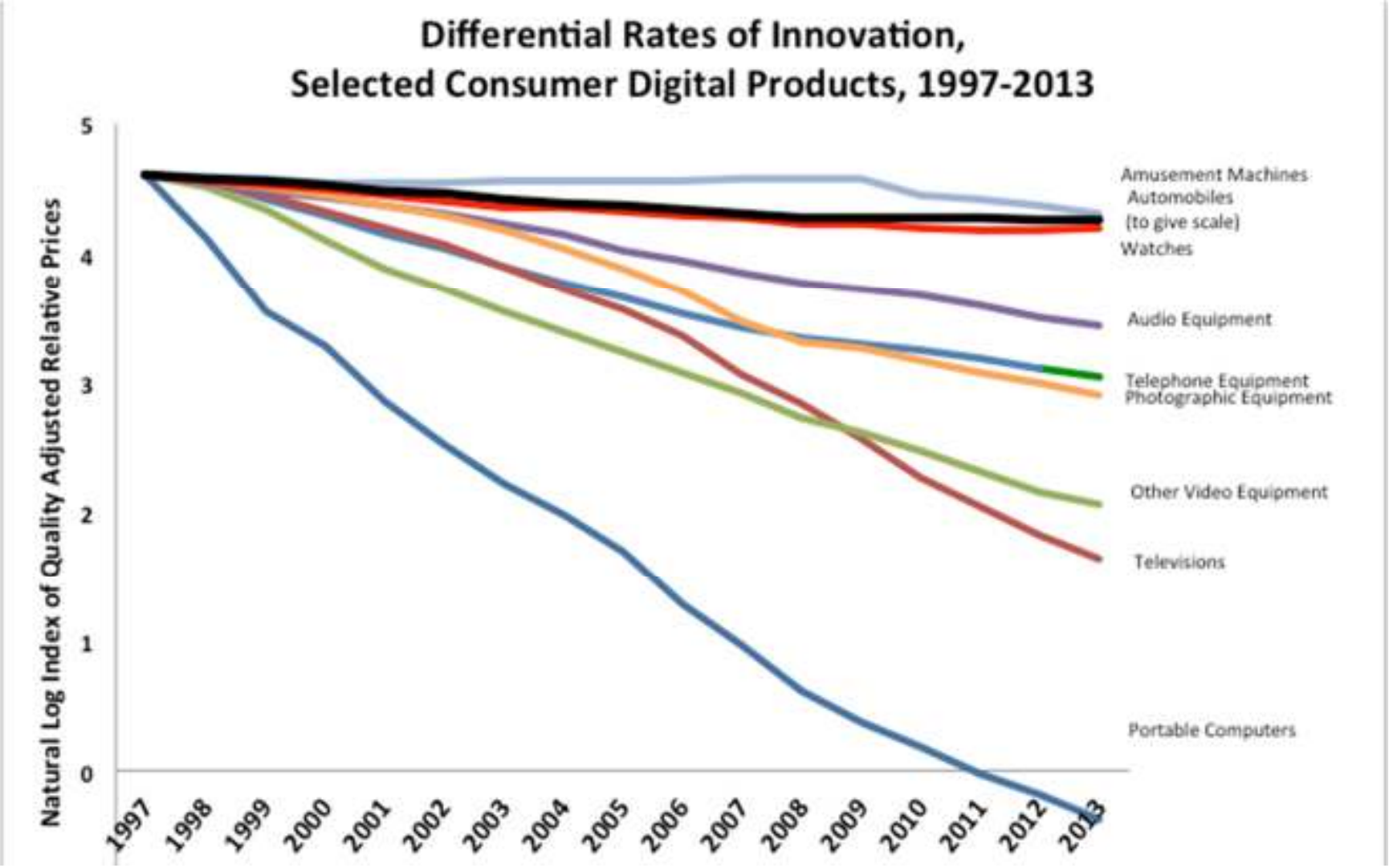


Patenting by entrants and triplets



Patenting and triplets




Differential Rates of Innovation,
Selected Consumer Digital Products, 1997-2013
Natural Log Index of Quality Adjusted Relative Prices
5
4
3
2
1
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Amusement Machines
Automobiles
(to give scale)
Watches
Audio Equipment
Telephone Equipment
Photographic Equipment
Other Video Equipment
Televisions
Portable Computers

Paper is motivated as part of the patent holdup literature ...

- Patent holdup & R&D literature
  - Seldom if ever models R&D investment
  - Thickets matter because many patents read on the same product, not because a patent holder can block another's patent
  - Patent holders charge excessive royalties to manufacturers
  - Not about marginal effects; it predicts large negative effects on innovation and recommends substantial reform & antitrust intervention

Paper is motivated as part of the patent holdup literature

- This paper
  - About entry into R&D and R&D investment
  - Model is in the transaction cost holdup tradition: two-stage game which allows firms to anticipate and adapt to holdup potential (less entry increases profits and pays for the higher expected costs of litigation)
  - It estimates (and finds) an effect at the margin, but there is robust first-time patenting
- If the effect is about holdup, then patent holdup theory is inconsistent with the findings of this paper

Thank you