

# Disentangling a Conceptual Thicket: The Economics of Patent Holdup

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# What is the chain of logical reasoning that supports Patent Holdup theory?

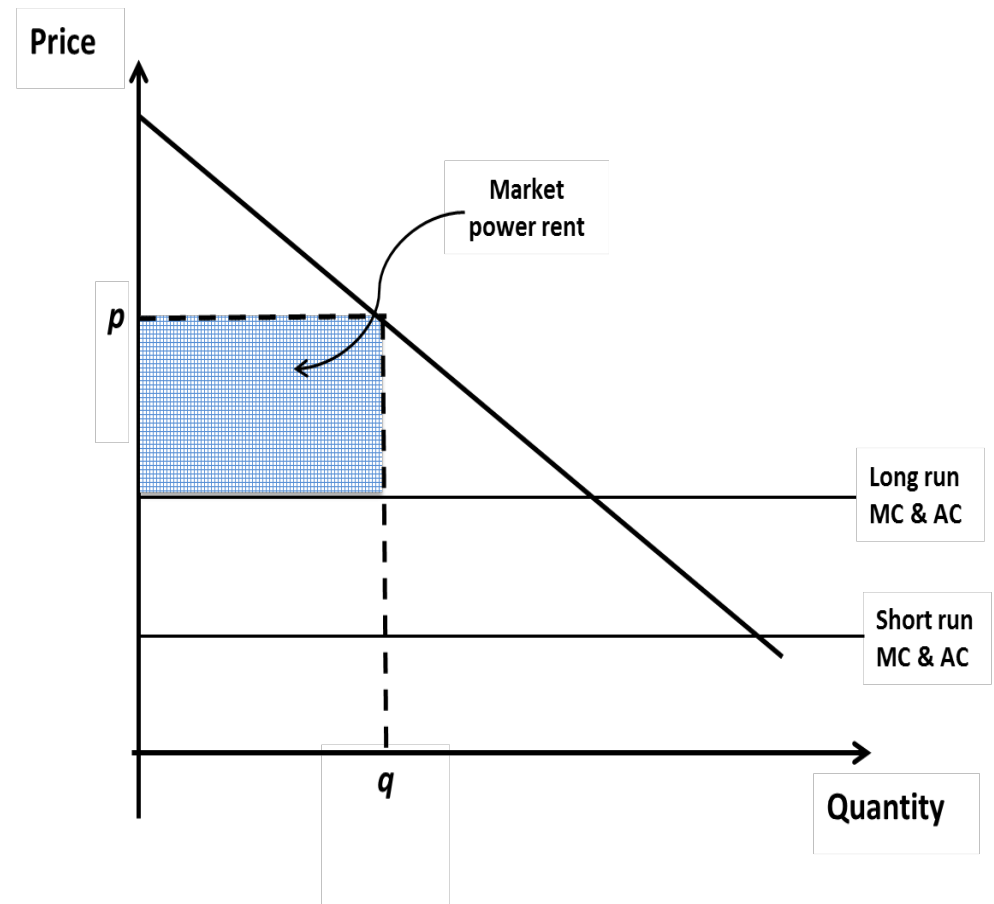
1. Patent owners use patents to holdup downstream manufacturers (a la transaction cost economics).
2. A patent that is essential to a standard confers market power beyond the value of the patent itself.
3. Cournot complements give rise to “royalty stacking.”
4. 1+2+3 → rents are being earned, innovation is constrained, consumers are harmed, → a policy response is required.
5. The problem is particularly acute in SEP-intensive, IT industries, because there are thousands of patents that may be used to hold up or be stacked.

# What are the questions to be answered?

1. As a matter of logic, can the three components—patent holdup, royalty stacking, and a patented technology getting market power from a standard—be bundled together?
2. As a matter of theory, could each of the three components independently threaten innovation?
3. Is there evidence that they have hurt innovation in SEP-intensive, IT industries?
4. Can patent holdup theory be made relevant to SEP-intensive, IT industries if it is recast as a theory about marginal effects?
5. Why are these mechanisms not operating in SEP-intensive, IT industries?

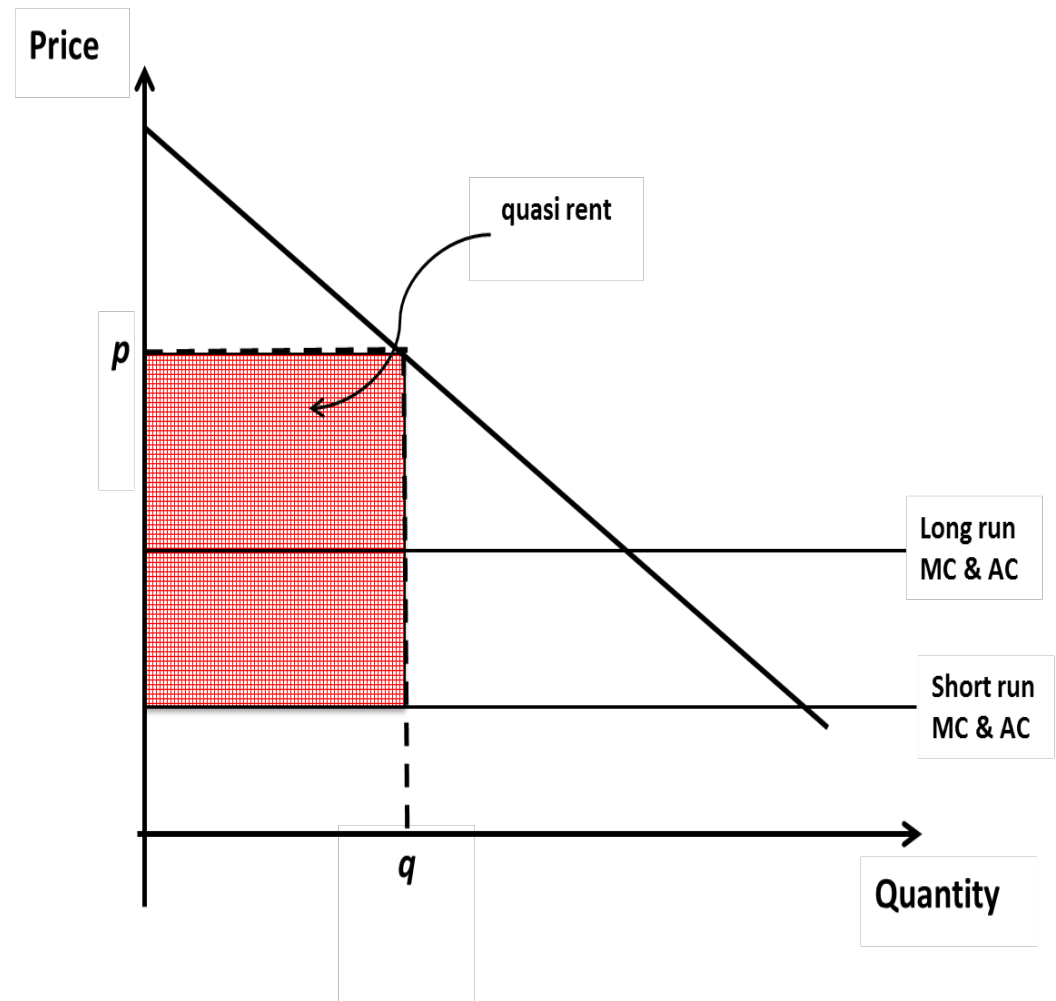
# Royalty stacking and the generalized exercise of market power conferred by an industry standard are the same thing

- A patented technology included in an industry standard may confer market power.
- An important technology covered by a patent may confer market power.
- Royalty stacking (Cournot Complements) is simply several patent holders exploiting whatever market power they have, from whatever source, over a single demand curve.
- Downstream producers anticipate all of this, and invest and price accordingly.



# Holdup and the systematic long run exercise of market power cannot go together

Holdup is a one-time, appropriation of quasi-rents through opportunistic behavior in the presence of asset-specific investments. By definition it is not anticipated.



# The chain of logical reasoning in Patent Holdup Theory is not internally consistent

1. Holdup and royalty stacking/ generalized exploitation of market power are distinct mechanisms that rule each other out.
3. Each implies distinct strategic interactions among firms (different games).
4. Each has a different implications for the size of individual royalties.
5. → Evidence for one is not evidence for the other two. (e.g., evidence of a manufacturer paying list price royalties to multiple patent holders is consistent with the hypothesis of royalty stacking, but indicates that holdup is not taking place).

# Could each of the three mechanisms independently threaten innovation?

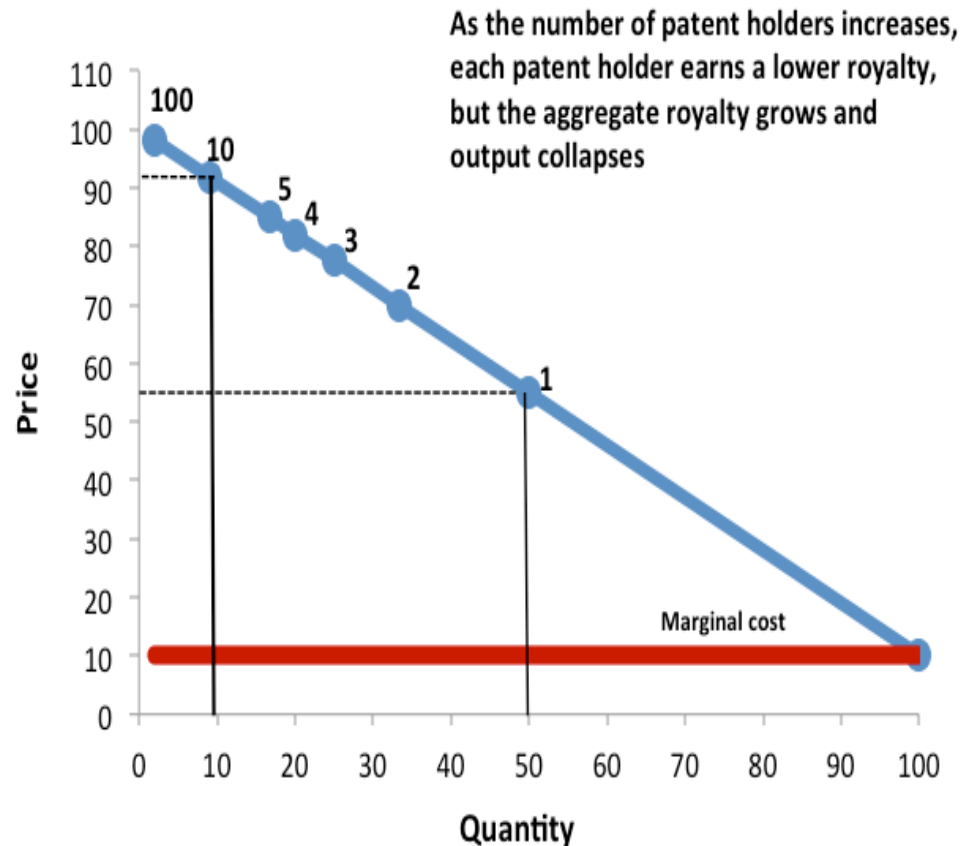
Holdup → The firm earns no return on its capital. Therefore it does not reinvest, and ultimately shuts down. There is no innovation. The industry collapses.

Firms backward induct, and therefore do not invest in the first place, which is why the transactions cost literature is mainly about private ordering solutions to a *potential problem*. Its not about antitrust.

# Could each of the three mechanisms independently threaten innovation?

Royalty Stacking/generalized market power →

- In principle, the industry could survive, because the downstream firms anticipate the exercise of market power, and take that into account when they invested. Quasi-rents are not appropriated.
- But, the industry dies because demand is choked off by rising prices. In order to bear the royalties, downstream firms must increase prices. Output falls. The industry collapses.
- Note: that the mechanics are different from holdup.





Is there evidence in the literature that holdup or the generalized exploitation of market power have hindered innovation in SEP-intensive, IT products?

- No.
- The literature does not test hypotheses against data about equilibrium economic outcomes (prices, output, firm entry, margins).
- The literature provides scattered anecdotes about high royalties or opportunistic behavior—but these contradict royalty stacking, are non-systematic, and according to some critics are inaccurate.
- The literature cites studies that are consistent with the hypothesis that there are patent thickets in some industries—but this is evidence about an assumption of the theory, not a test of the theory.

# We are not the first to point this out

Denicolo et.al, (2008)

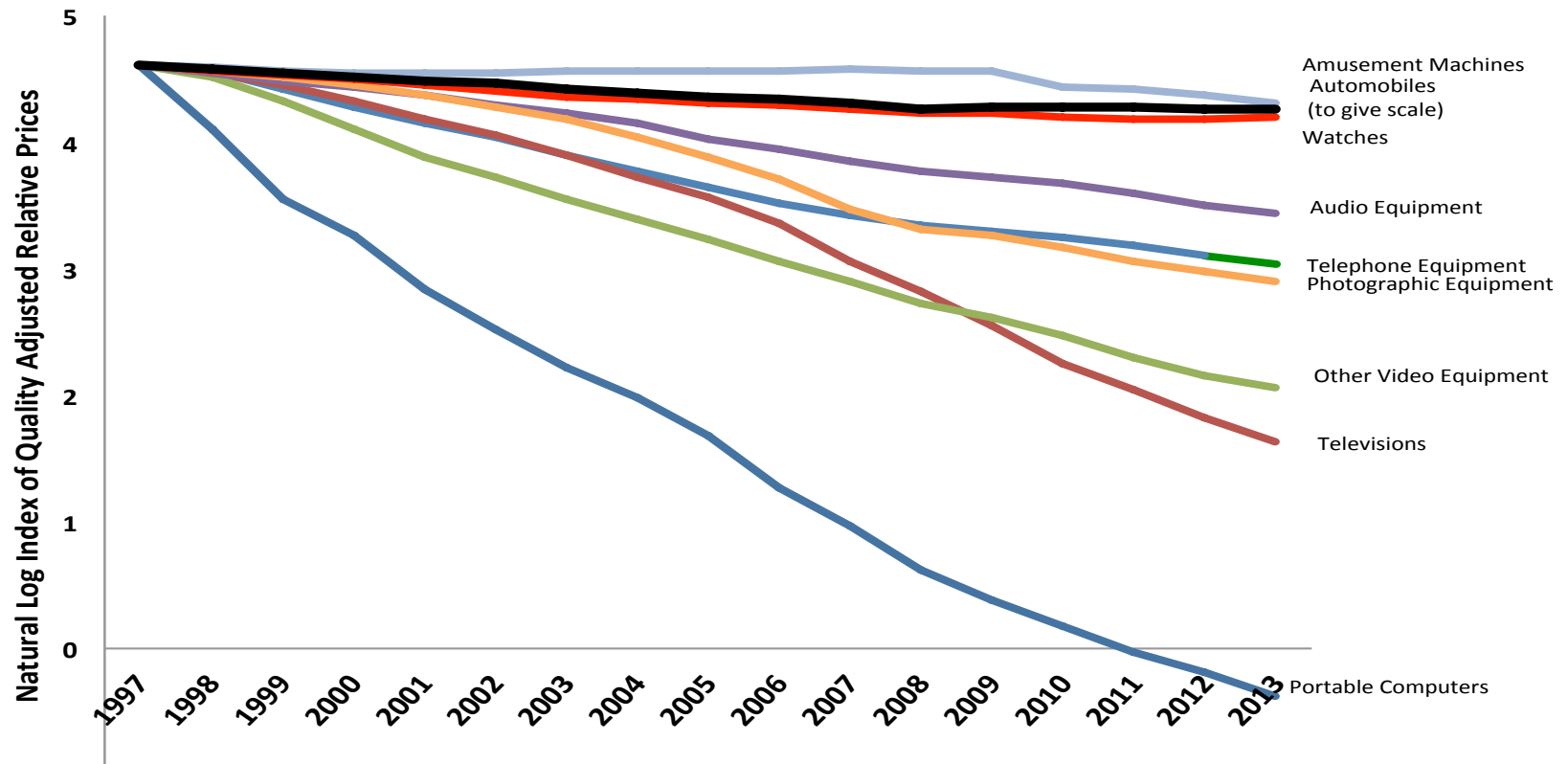
Layne-Farrar (2014)

Gerardin, Layne-Farrar and Padilla (2008)

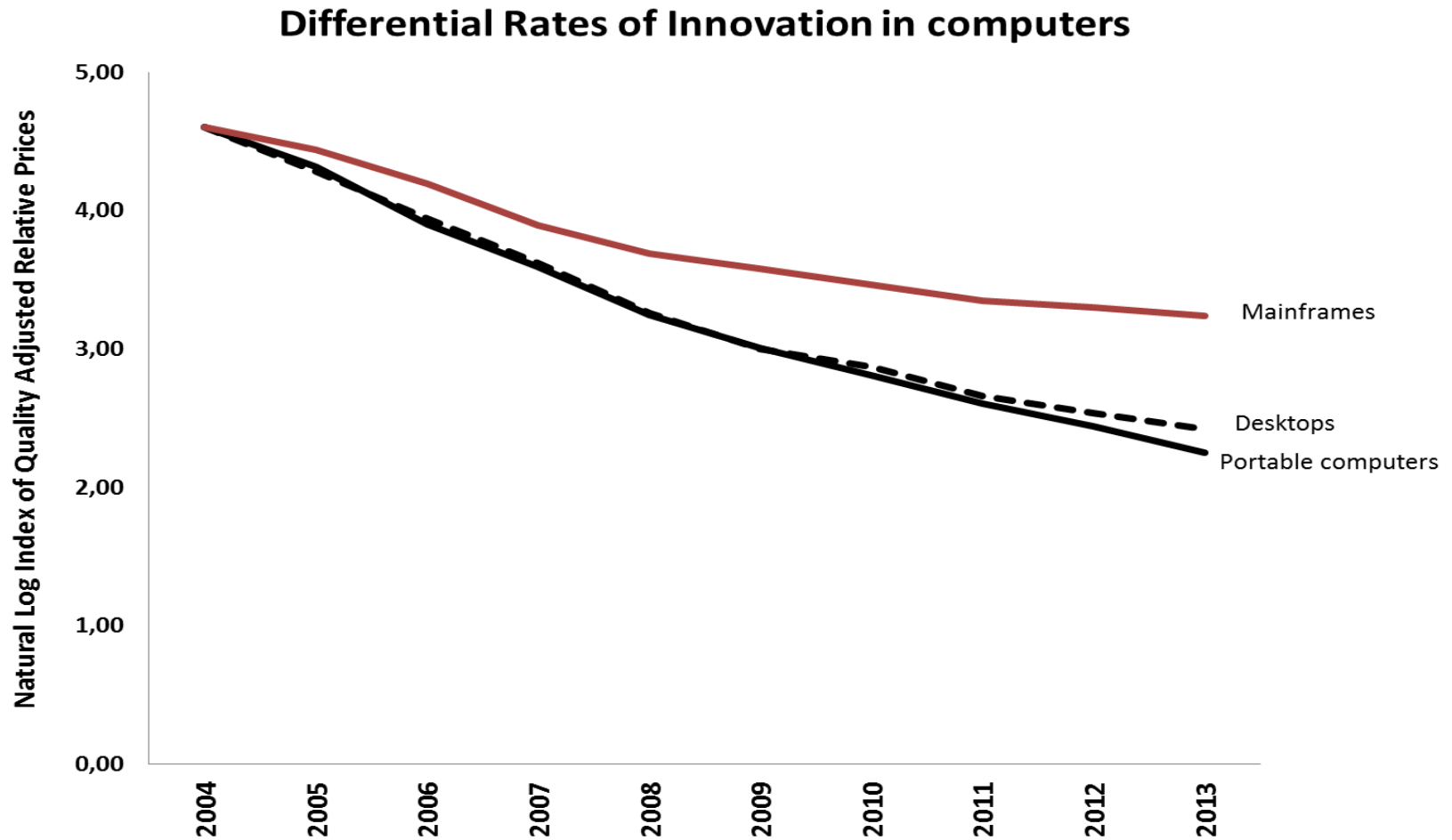
Egan and Teece (2015)

# Can we find evidence that holdup or the generalized exploitation of market power have hurt innovation in SEP-intensive, IT industries?

**Differential Rates of Innovation in Selected Consumer Digital Products and Automobiles, 1997-2013**

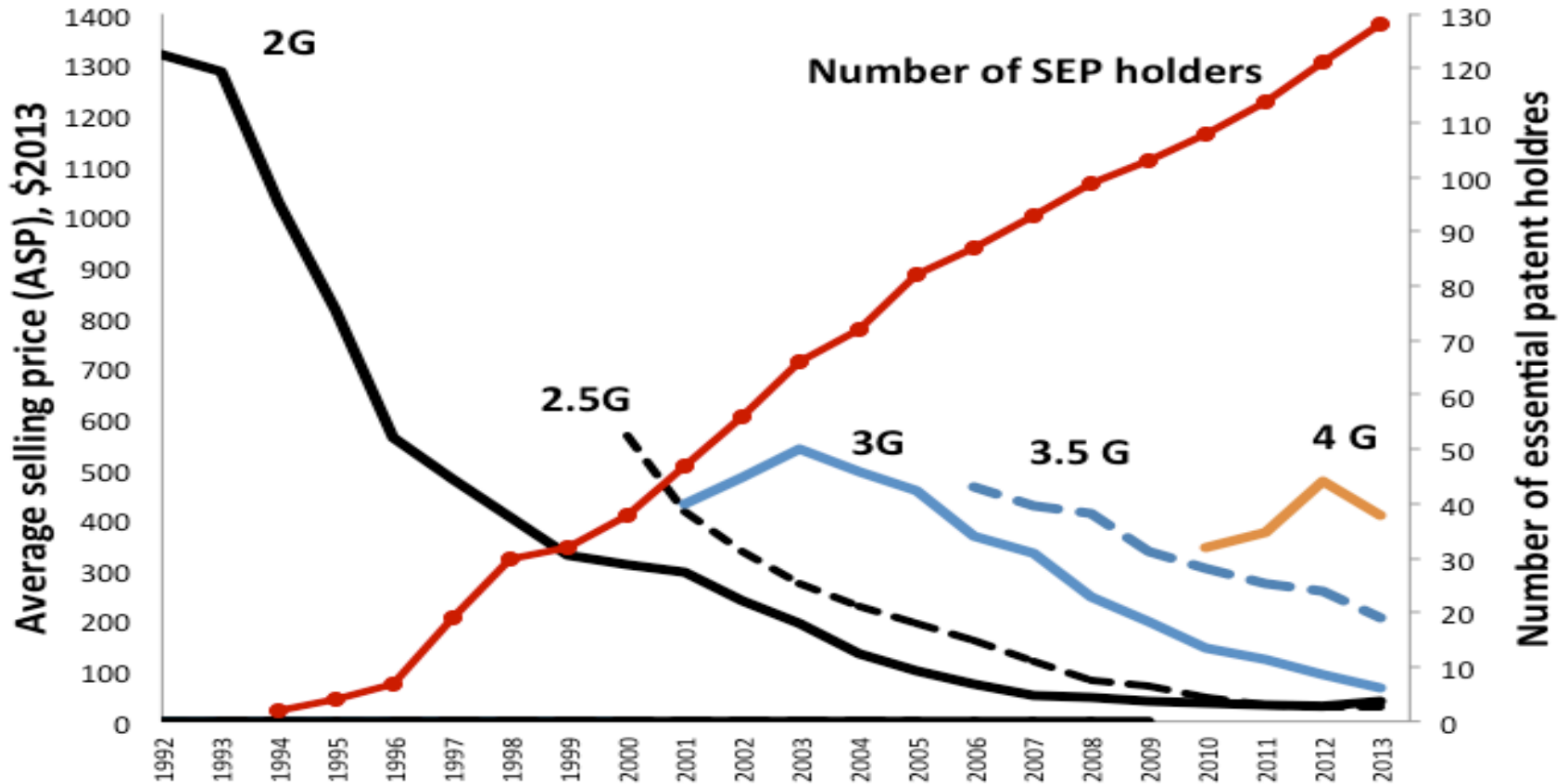


The evidence does not suggest that being SEP-intensive comes at a cost to innovation  
(see diff in diff in Galetovic, Haber, Levine JCLE 205)



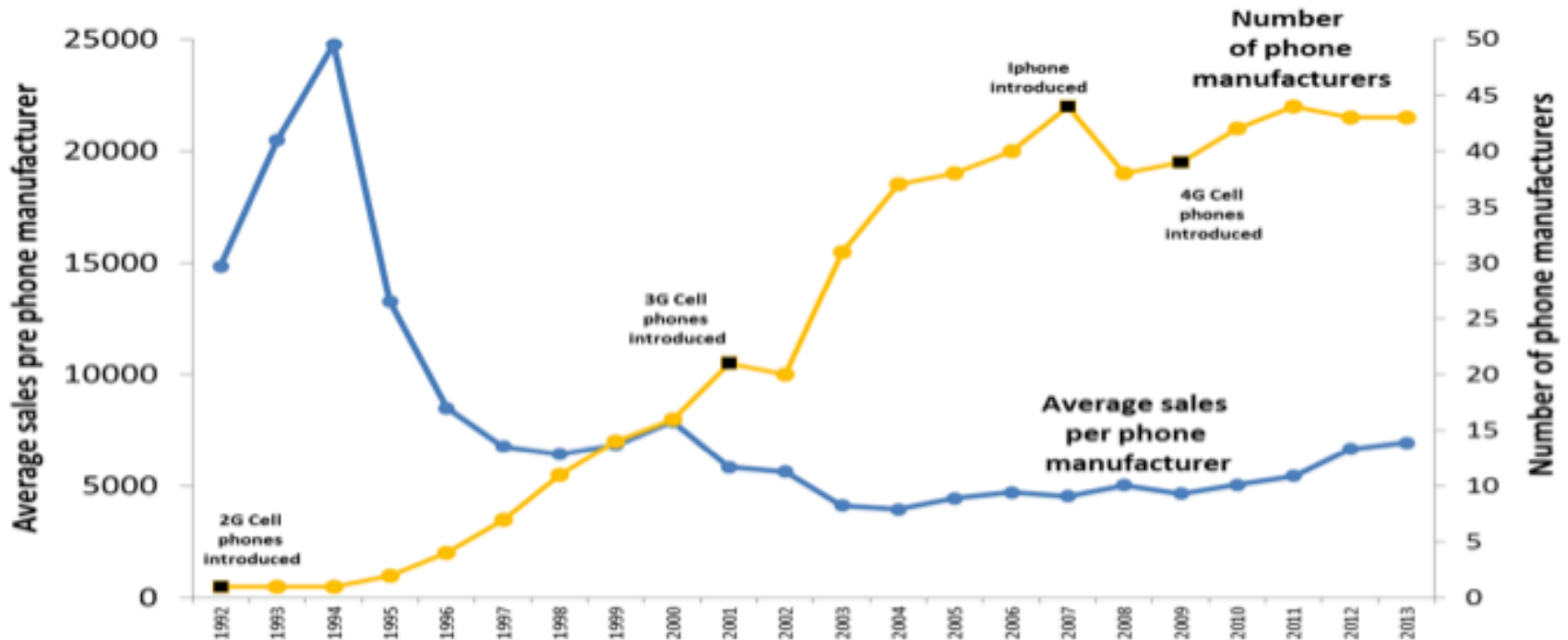
Is the data on SEP-holders and prices for wireless phones from Galetovic & Gupta (2016) consistent with the hypothesis of royalty stacking?

**Real Prices of Phones, by Generation, and Number of SEP Holders, 1992-2013**



A second test of the hold-up/systematic exploitation of market power hypothesis: from Galetovic & Gupta (2016)  
 If there is hold-up in the wireless phone industry, why are new firms entering?

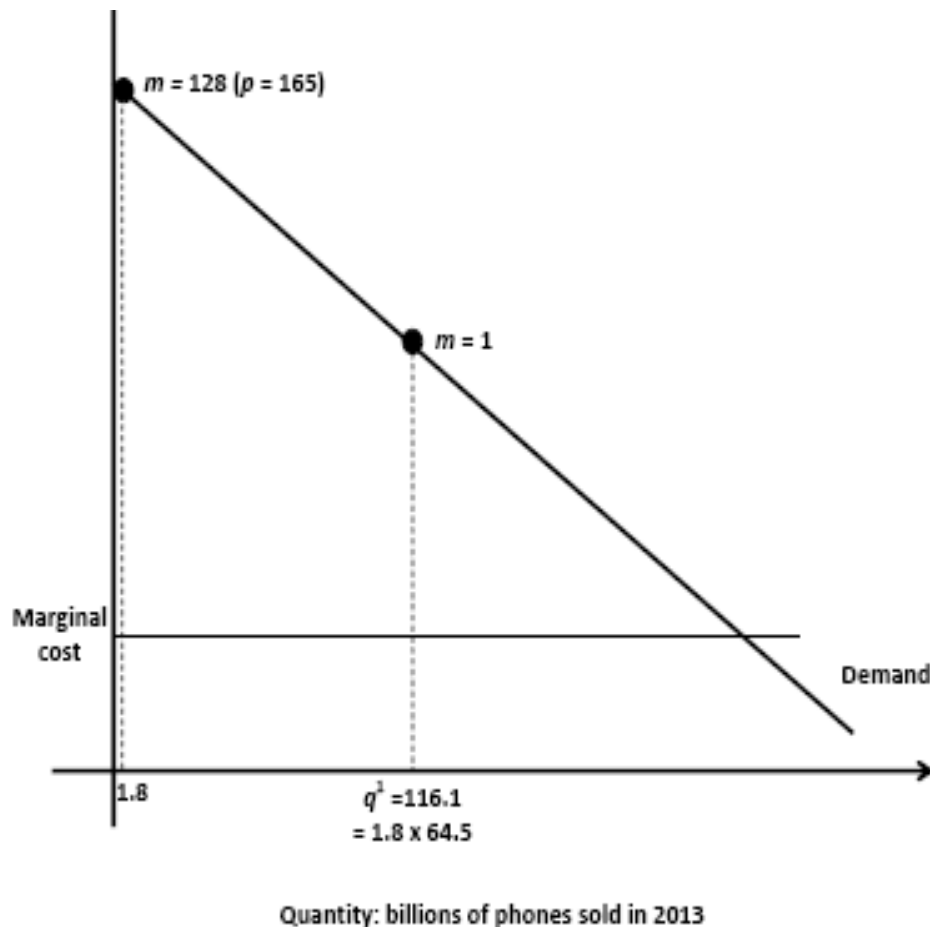
**Number of of phone manufacturers and average sales per firm  
 (1992-2013, millions of 2013 \$)**



Can patent holdup theory be made relevant to SEP-intensive, IT industries if it is recast as a theory about marginal effects?

- As a matter of theory, the answer is no.
- The mechanics of holdup, royalty stacking/ generalized exercise of market power dictate that surplus increases for whatever reason the patent owners will raise the royalty rate. Royalty rates are endogenous!

A counterfactual exercise: What would have to be true for the actual data about the wireless phone industry to be generated by a process of royalty stacking?



Obviously, everyone on the planet is not going to buy 22 phones per year! What happens if we constrain penetration to 1 phone per person per year? More absurdity: the measured elasticity of the observed quantity and price would have to be nearly infinite. Any sensible restriction on the parameters will yield another parameter that is absurd.



## The Fundamental Flaw:

Patent Holdup theory has the wrong model about the process of innovation in SEP-intensive, IT industries

