

Standard Essential Patents and the “Hold Up” Hypothesis

Alexander Galetovic (Universidad de los Andes)

Stephen Haber (Stanford)

Ross Levine (Berkeley)

What, exactly, is “Hold Up?”

1. Hold up has a precise definition in economics: It arises when part of the return on an agent’s relationship-specific investments is ex post expropriable by his trading partner. Knowing about this future renegotiation, the agent might choose to invest less ex ante than he would have done in the absence of the ex post opportunistic behavior by his trading partner.
2. Investment and innovation are “held up” because Firm A and Firm B cannot keep a bargain.
3. As a result, consumers are hurt, because products do not exist, or they are more costly than they would be otherwise. *The whole point is consumer welfare.*

Three factors must be true in order for there to be holdup

- A. There have to be quasi-rents created by relationship specific investments.
- B. There have to be incomplete contracts.
- C. There has to be opportunism.

A Textbook Example of Hold Up: The Banana Industry

1. Once a grower picks his fruit it starts to decay—rapidly.
2. The shipper can therefore take advantage of the grower, by changing the terms of their contract ex post (on the dock).
3. But once a shipper has his boat half full, growers can take advantage of the shipper (who has a boat full of rotting fruit), by changing the terms of their contract on the dock.
4. Each side can “hold up” the other, and as a result, there is no incentive for growers to plant trees or shippers to buy boats—and hence there are no bananas on breakfast tables.

The SEP holdup hypothesis

1. An inventor and a producer make large, difficult to redeploy investments in a technology, but the price of the technology is not pre-negotiated.
2. The inventor's technology becomes standard-essential through a standard-setting organization.
3. The inventor behaves opportunistically by claiming that the patent is worth more than its incremental value to the standard.
4. If the inventor is successful, she will appropriate the quasi-rents, driving up the producer's marginal costs, and driving down her rate of return on capital.
5. In the short run, the producer could make up for higher marginal costs by charging more for the product (consumers lose), but that just creates larger incentives for opportunism by the inventor.
6. In the long run, the producer backward inducts, and the product is not produced. *Thus, when holdup cannot be solved, production is an out of equilibrium phenomenon.*

One way to solve holdup, if it exists:

Overcome information asymmetries and opportunism through costly lawsuits, and those lawsuits drive up prices and harm consumers.

The testable implication is that prices of goods in SEP industries should be high and stagnant. *If one observes falling prices the SEP holdup hypothesis fails.*

Another way to solve holdup, if it exists: Vertical Integration

- Vertical integration overcomes information asymmetries and opportunism by creating a single firm. (In the banana industry the same firms that grow the fruit, ship the fruit, and distribute the fruit. Other classic examples : Sugar and Electrical Power).
- *But*, there is almost always a stage in the production chain in which there are sizable scale economies. Thus, industries characterized by vertical integration also tend to be characterized by large firms with market power (e.g, 3 firms control 50% of the world banana market; electrical power is produced and distributed by local monopolies).
- *Thus*, firms in “hold up” industries tend to have weak incentives to compete. Innovation is slow (e.g. the slow introduction of the banana box and the Cavendish Banana).

There are two testable implications if vertical integration is the solution to holdup in SEP industries

A. Vertically integrated producers

B. High and stagnant relative prices.

If one observes decentralized production or falling relative prices the SEP holdup hypothesis fails.

The testable implications of the SEP holdup hypothesis

1. There are no products (easily rejected).
2. Vertical integration.
3. Stagnant prices.

What evidence is not relevant to testing the SEP holdup hypothesis

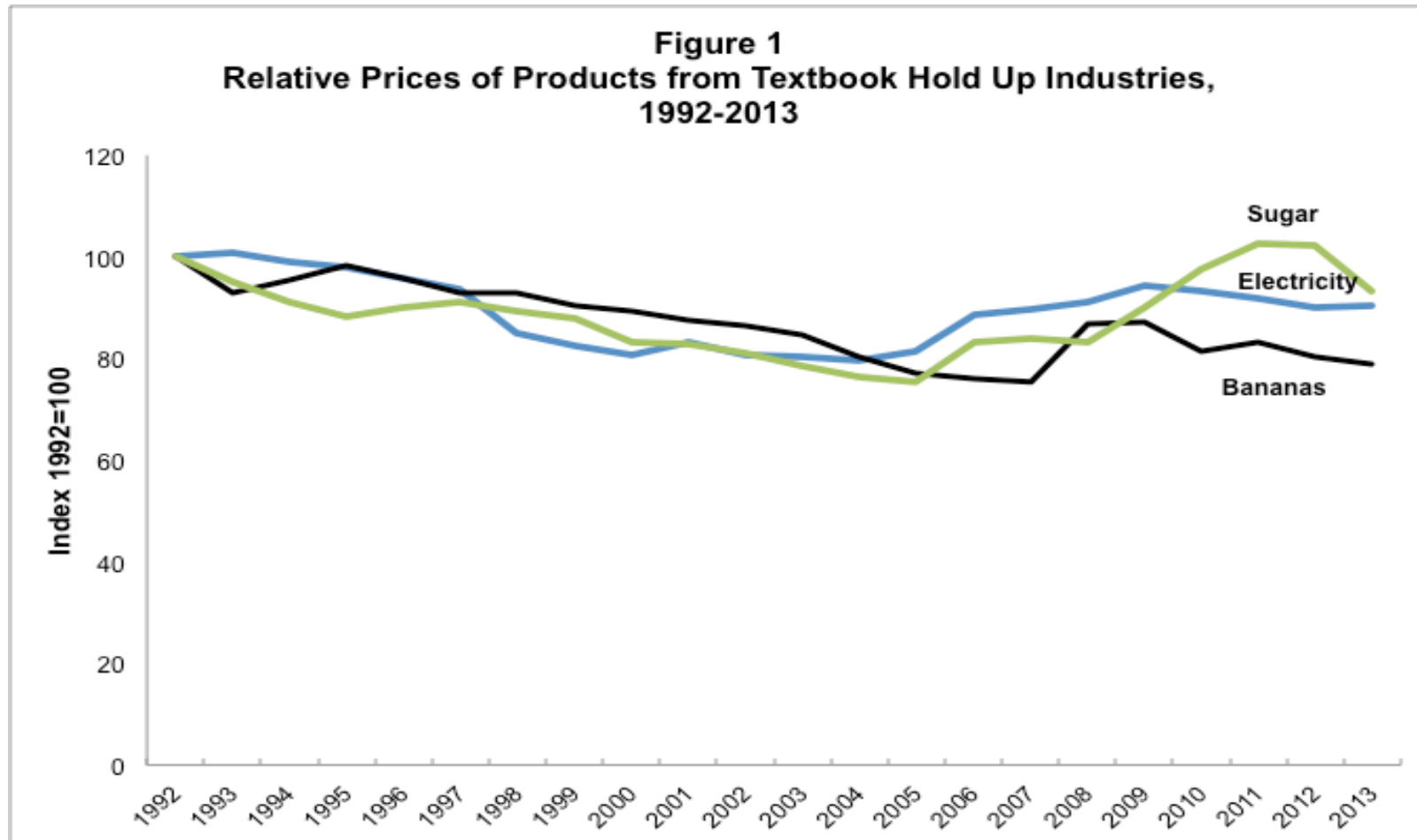
1. That Producer A claims that Inventor B wants “too high” a price for its product is not evidence of holdup. And that Inventor B claims that Producer A is offering “too low” a price for B’s invention is not evidence of “reverse holdup.” Both are evidence that Producer A and Inventor B are negotiating with each other.
2. That Inventor B sells her invention to Intermediary C, and that Producer A claims that Intermediary C wants “too high” a price for the invention is also not evidence of holdup. It is evidence that there is a market.
3. That Producer A and Inventor B sue each other over the price is not evidence of holdup. Lawsuits only matter if they drive up the prices facing consumers and reduce consumer welfare.

Being clear about hypothesis testing

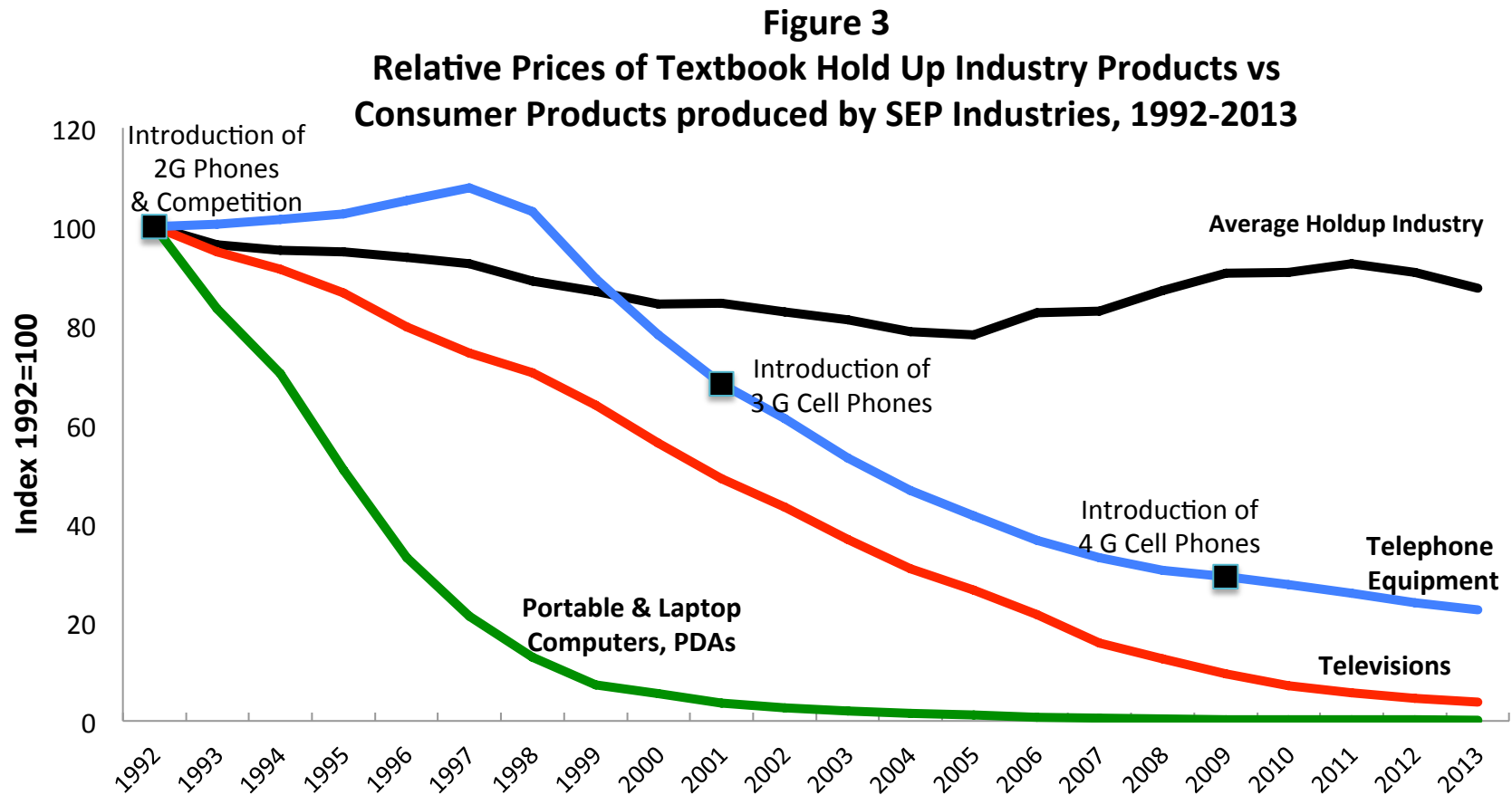
An industry can be vertically integrated, and prices can be stagnant, but the cause may be something other than hold up.

But, if an industry is decentralized and prices are falling, then it is strong evidence against the hypothesis that the industry is characterized by holdup.

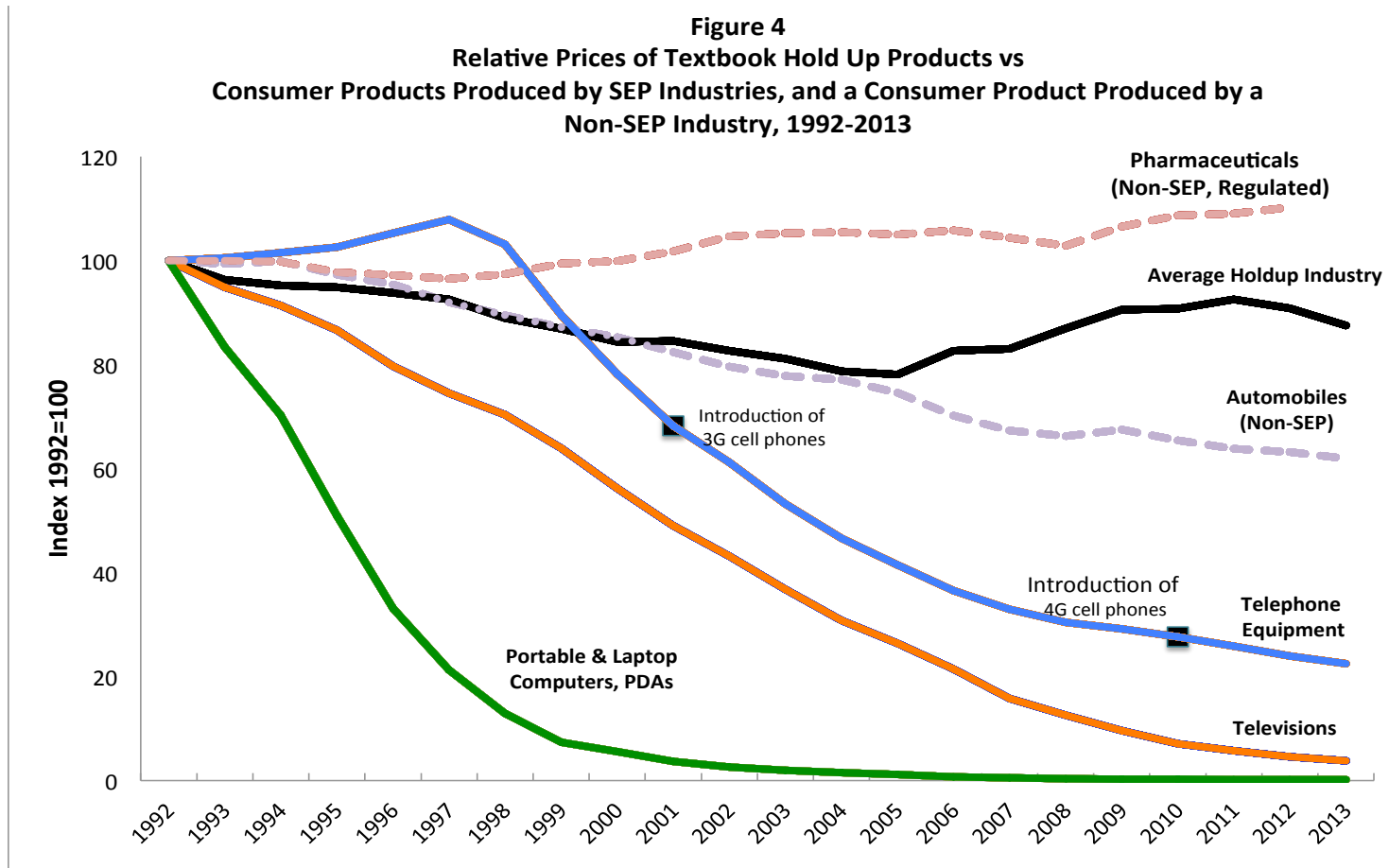
Prices do not move in “hold up” industries,
because there is little innovation



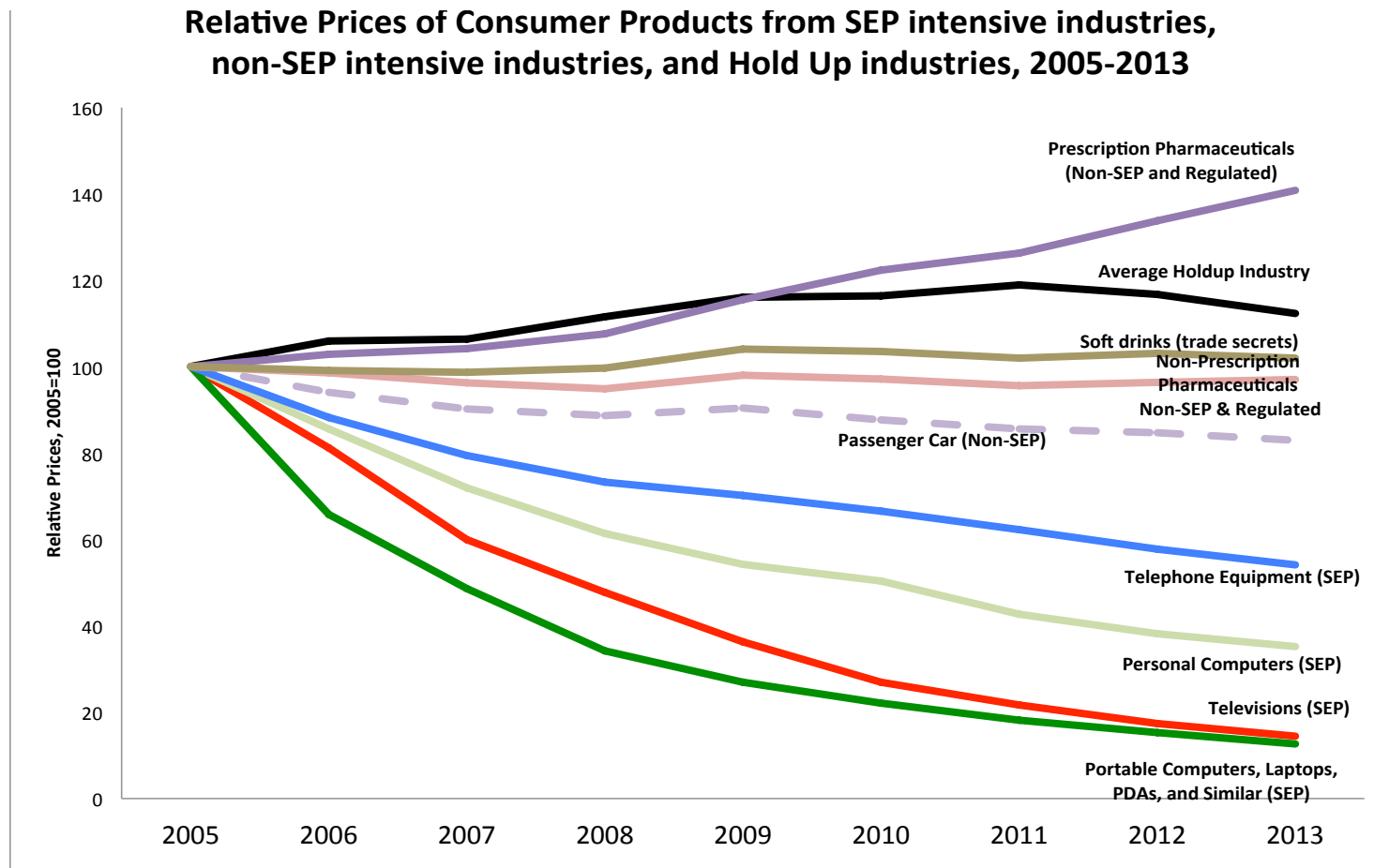
Does the price data suggest that SEP industries are characterized by holdup?



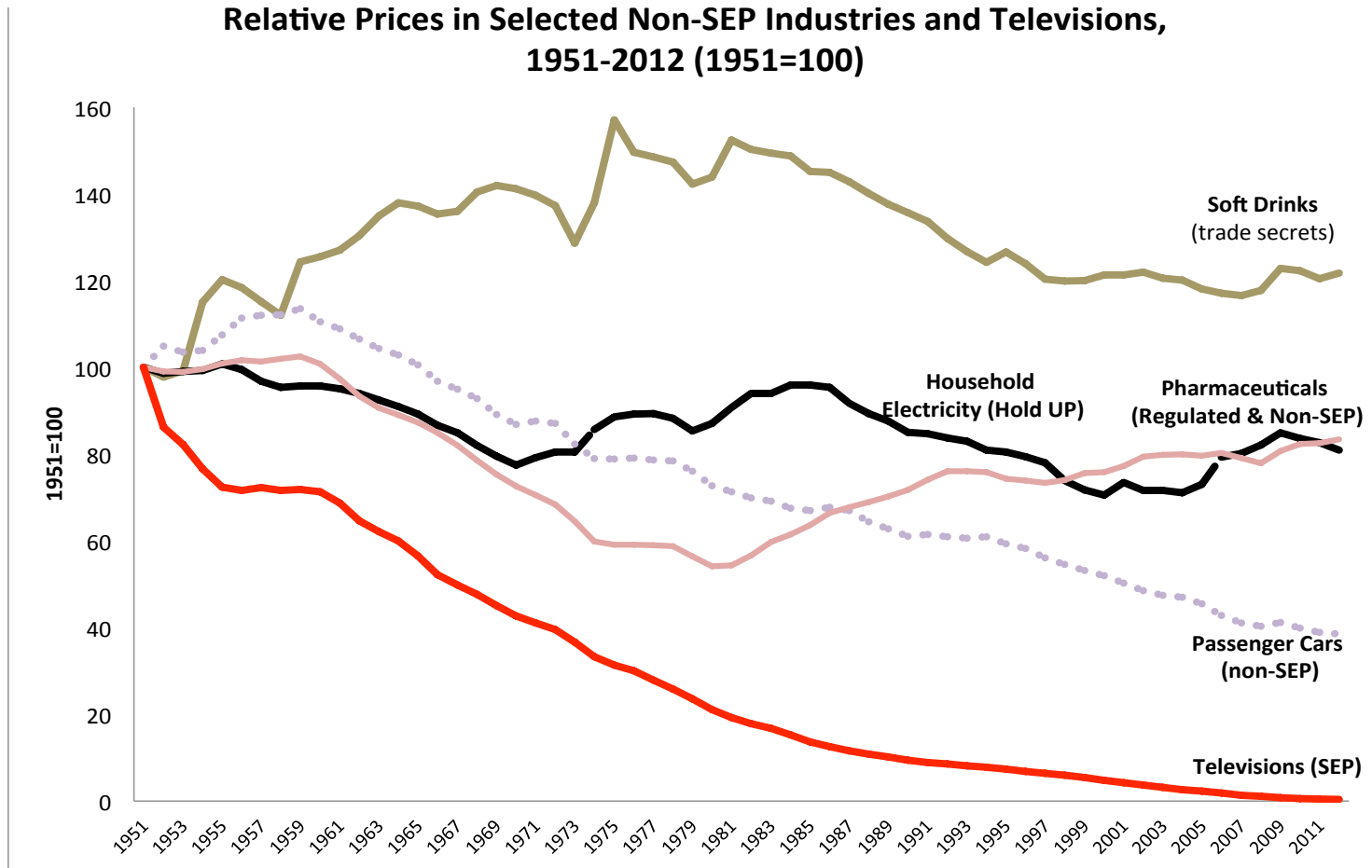
How do SEP industry price changes compare to other patent intense (non SEP) industries?



Have price declines in SEP industries slowed, relative to other industries since 2005?



Over the long run, SEP industries have seen steeper price declines than other industries

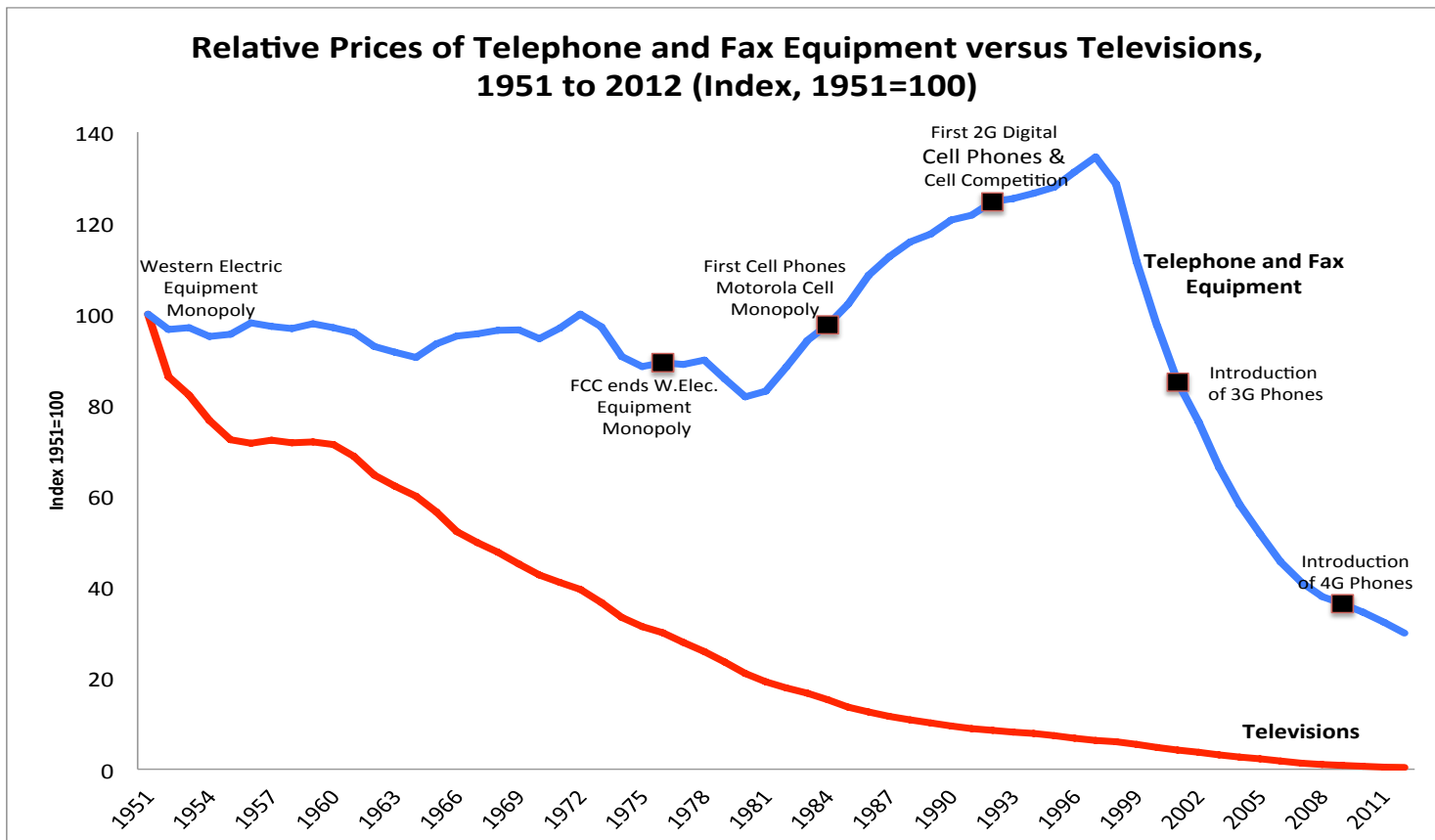


Yes, but...couldn't prices fall faster without SEPs?

Anything is possible, but there are reasons to be skeptical:

1. There is about a 1:1 relationship between differential productivity growth and price declines.
2. The *maximum* rate of long-run differential productivity growth for an industry is typically less than 6% per annum.
3. The rate of price decline in SEP industries is in excess of 6% per annum.
4. Thus, the price declines in SEP industries are very fast against any realistic standard.

Telephones provide a test of the “without SEP” hypothesis: once cell phones full of SEP patents were introduced, prices of phones dropped quickly



Are SEP Industries vertically integrated, like textbook holdup industries?

- In brief, no, they are not.
- Laptops, Televisions, Personal Computers, and Cell Phone production are characterized by large numbers of specialist firms that provide inputs to manufacturers. (e.g., Seagate makes hard drives for laptops, AU Optronics makes flat panel displays for televisions, and Qualcomm makes chipsets for cell phones).

Yes, but....couldn't we do even better with less litigation and more regulation?

- A perfect regulatory system that defines and enforces property rights at zero cost and with zero uncertainty and that eliminates market imperfections would be nice. But, it exists only as a theoretical abstraction.
- In the real world, the options are:
 1. A system based on private ordering (SSO's).
 2. A system based on ex-post litigation.
 3. A system based on ex-ante regulation.

What are the conditions under which a system based on litigation is inferior to a system based on regulation?

1. When defendants have fewer resources than plaintiffs so that they are at a disadvantage in the courts---but that is not the case in most patent litigation.
2. When courts can be subverted by special interests (and regulators cannot)—but the evidence for the U.S. points in the opposite direction.

Conclusions

1. The hypothesis that there is patent holdup in industries characterized by SEPs is not consistent with the evidence about relative prices or industrial structure.
2. The implication is either that:
 - A. Most disputes in SEPs are settled via private ordering;
 - B. Or, the cost of litigation in SEP's is trivial compared to the size of SEP industries.
3. Moving to a patent system based more on regulators rather than private ordering and courts may produce worse outcomes from the point of view of social welfare.