

Patents and Innovation: Examining the “Hold Up” Hypothesis

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What, exactly, is “Hold Up?”

1. Hold up has a precise definition in economics: it occurs when two firms cannot make a time-consistent commitment to one another, because of bilateral monopoly and asset specificity.
2. Investment and innovation are “held up” because Firm A and Firm B cannot keep a bargain.

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 term “hold up” is frequently misused in the literature on patents.

1. In the literature on the patent system, any time Firm A wants to charge Firm B more for an input than Firm B wants to pay, some scholars claim that Firm A is “holding up” Firm B.
2. By that definition, I spend my entire day “holding up” my dean.

What patent hold up would really look like

An inventor and a producer make large, difficult to redeploy, investments in a technology, but the price of the technology is not pre-negotiated (the producer might even think that there is no patent and the price is zero).

After the investments occur, either side can behave opportunistically by renegotiating the price of the technology. The inventor can claim that the patent is worth 100 percent of the value of the product. The producer can claim that the value of the patent is zero (the patent is invalid).

Both the inventor and the producer know, ex ante, that this opportunistic renegotiation can occur. Therefore neither invests in the first place: the inventor does not invent; and the producer does not create a new product (or improve an old one). Society loses.

When holdup exists, how is the problem solved?

- Vertical Integration (e.g., the shipper buys the banana plantation from the grower).
- In fact, in the Banana Industry, the same firms that grow the fruit, own the ships, the rail cars, the marketing operation, and the entire distribution chain.
- Other classic examples of industries in which holdup is solved by vertical integration: Sugar and Electrical Power.

The vertical integration solution reduces incentives to innovate

1. There is almost always a stage in the production chain in which there are sizable scale economies.
2. Industries characterized by vertical integration therefore 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).
3. The result is that firms in “hold up” industries tend to have weak incentives to compete.

There are two telltale signs that an industry is characterized by holdup

1. Vertical Integration.
2. Stagnant relative prices (an outcome of weak incentives to innovate prior to vertical integration, and weak incentives to compete after vertical integration).
 - Note: that Firm A claims that Firm B wants “too high” a price for its product is not evidence of holdup. And that Firm B claims that Firm A is offering “too low” a price for B’s product is not evidence of “reverse holdup.” Both are evidence that Firm A and Firm B are negotiating with each other.
 - Note: that Firms A and B sue each other over the price is not evidence of holdup. All negotiation takes place in the shadow of litigation.
 - Note: that Firm B sells its product to Intermediary C, and that Firm A claims that Intermediary C wants “too high” a price for the product is also not evidence of holdup. It is evidence that there is a market.

What should we look for to test the hypothesis that SEP industries are characterized by patent holdup?

1. Prices of products produced by SEP industries should be stable relative to all other prices.
2. Production in SEP industries should take place in vertically integrated firms.

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.

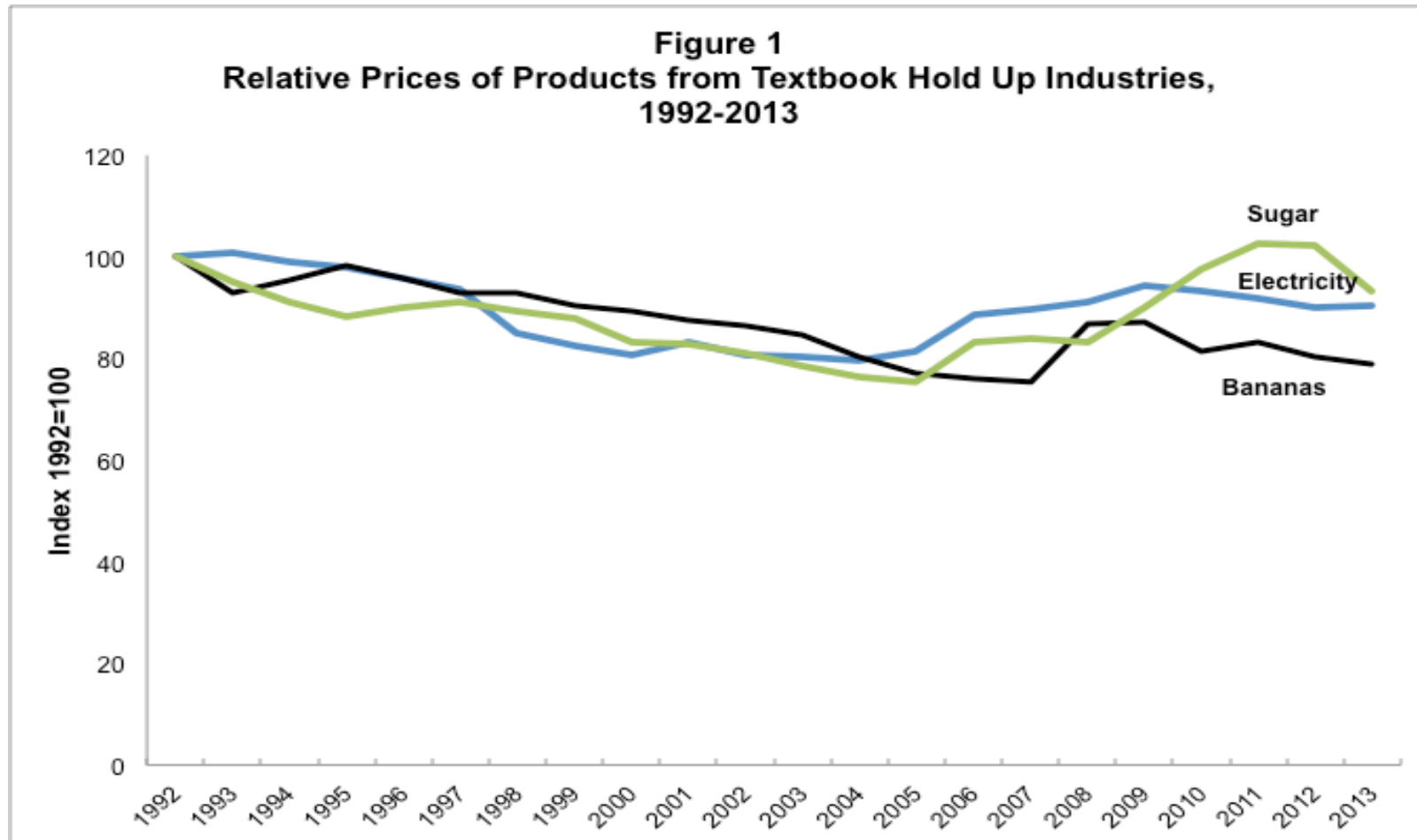
But, if an industry is decentralized and prices are falling, then it is strong evidence against the hypothesis that the industry is characterized by holdup.

Being clear about the limits of the data

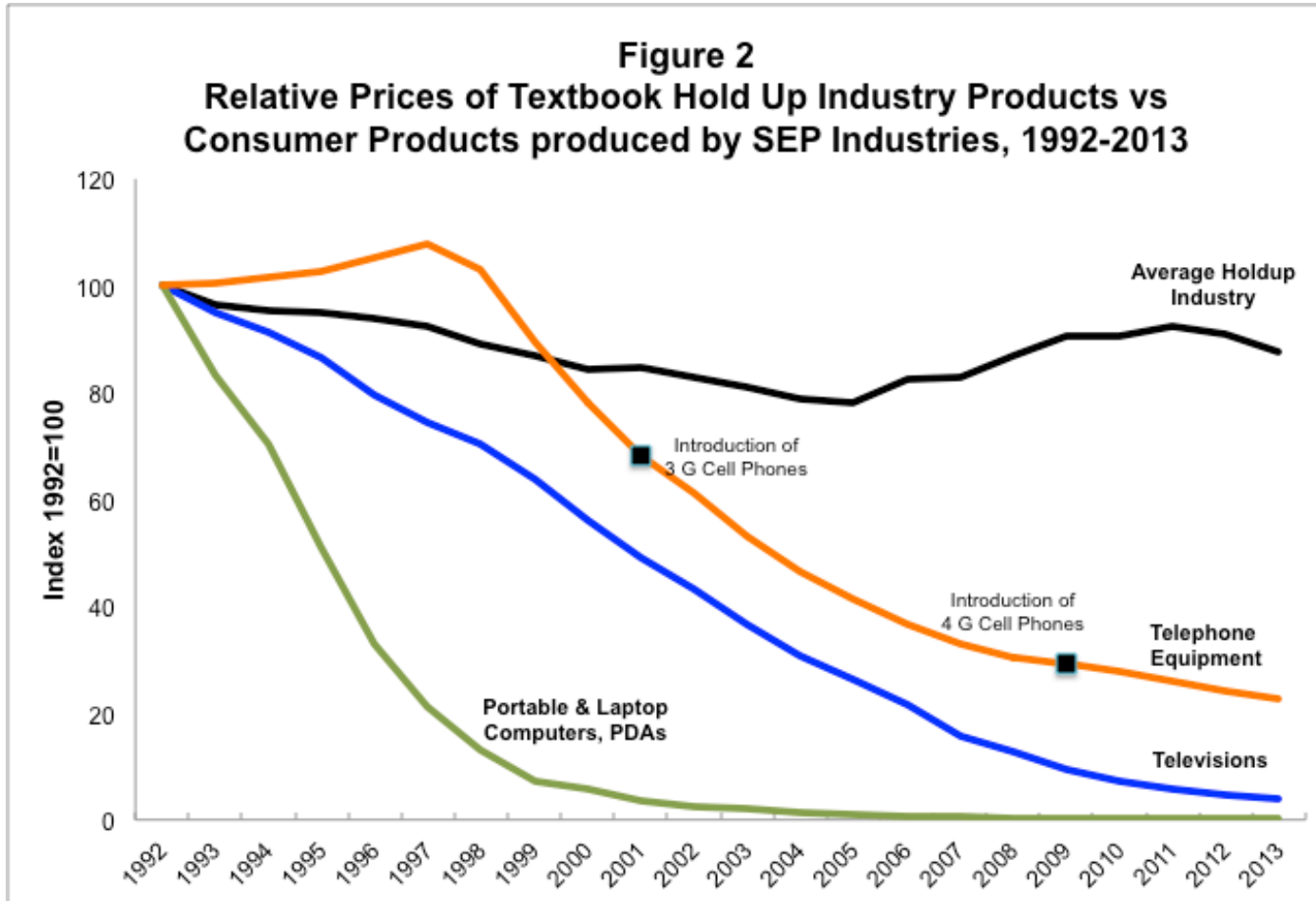
Data on prices is conditional on there being a product. If hold-up is endemic, products may not come into existence, and there would be no data.

But...the argument that SEPS cause hold-up is based on statements about actual industries, not hypothetical ones.

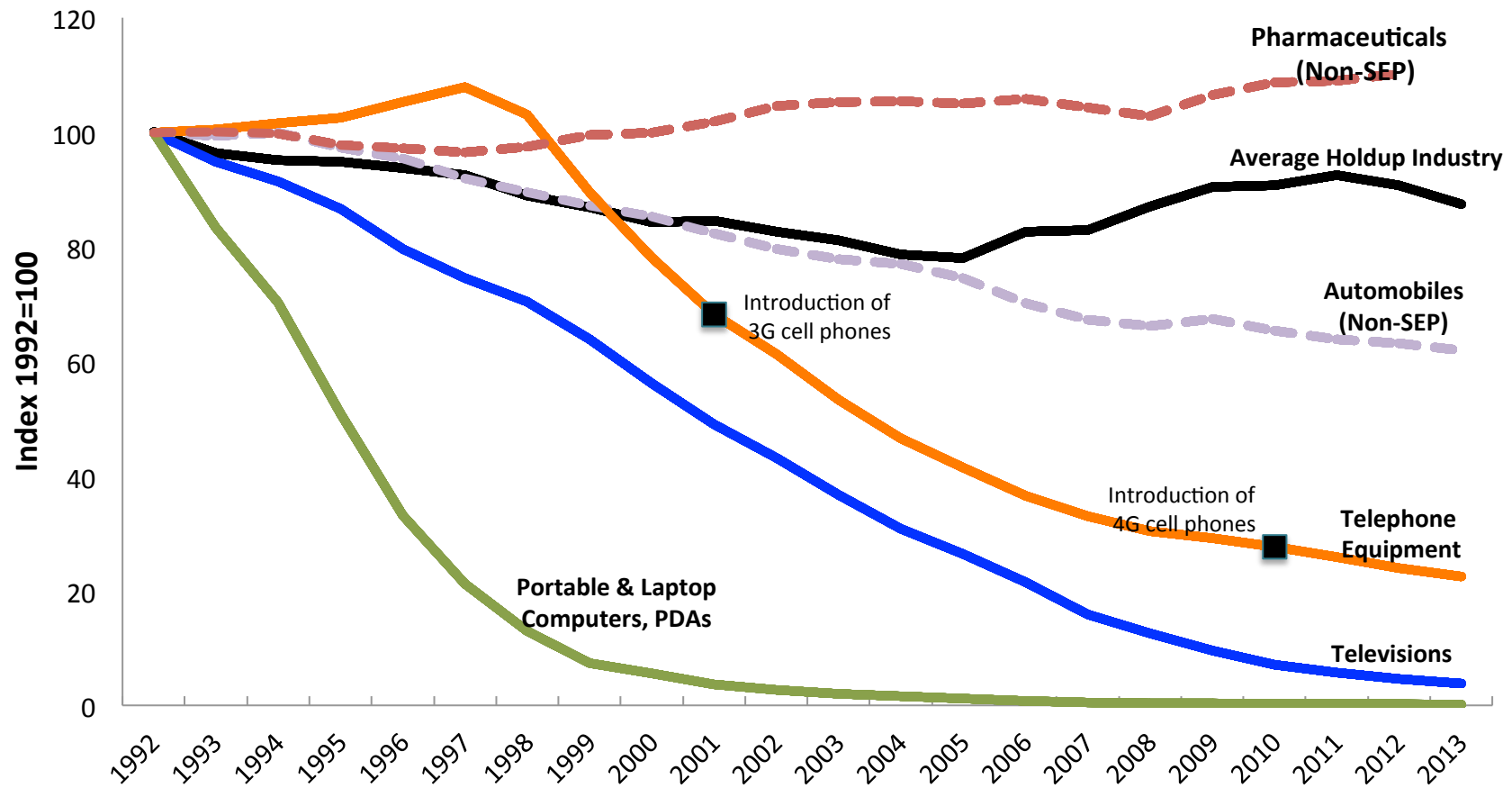
Prices do not move in “hold up” industries, because there is little innovation



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

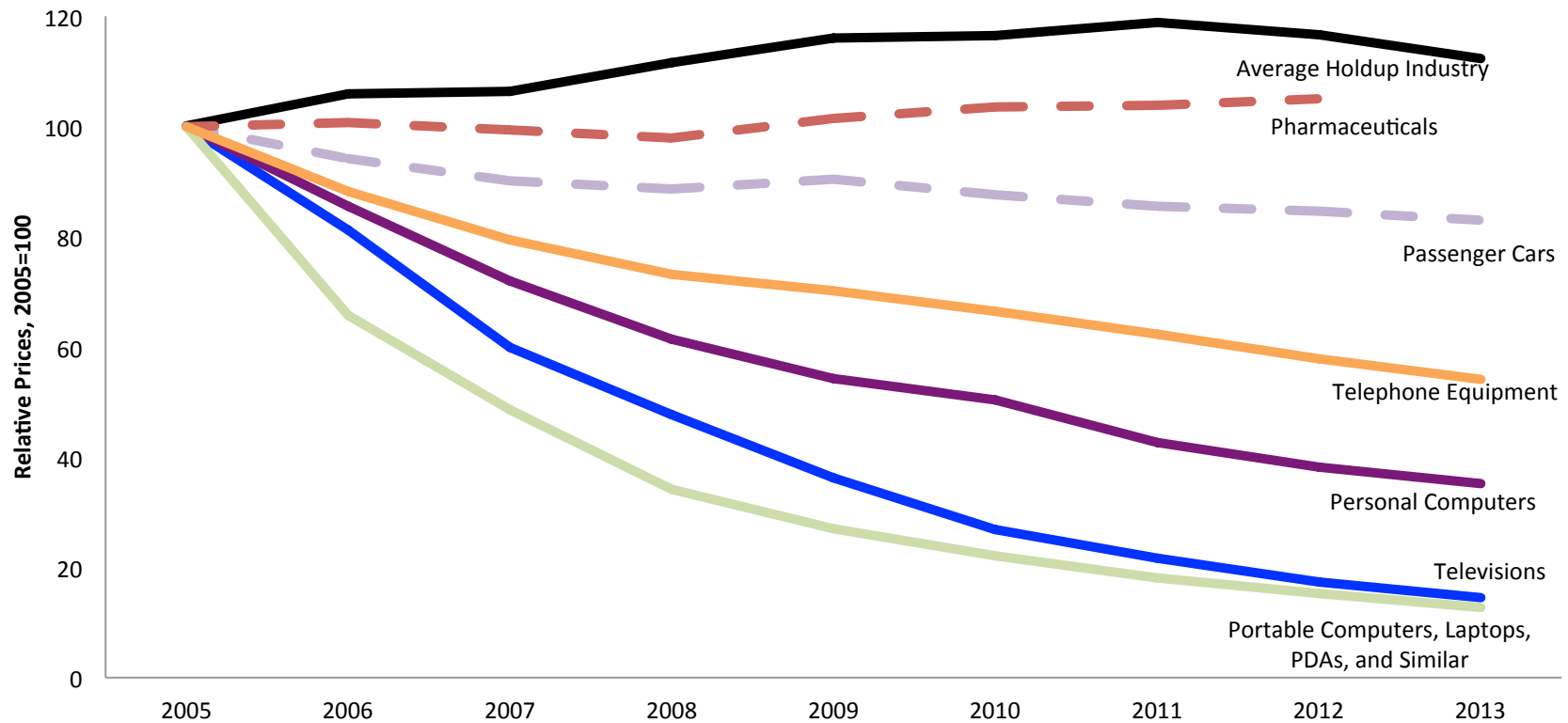


Did prices in SEP industries decline more slowly than prices in patent-intensive, non-SEP industries?



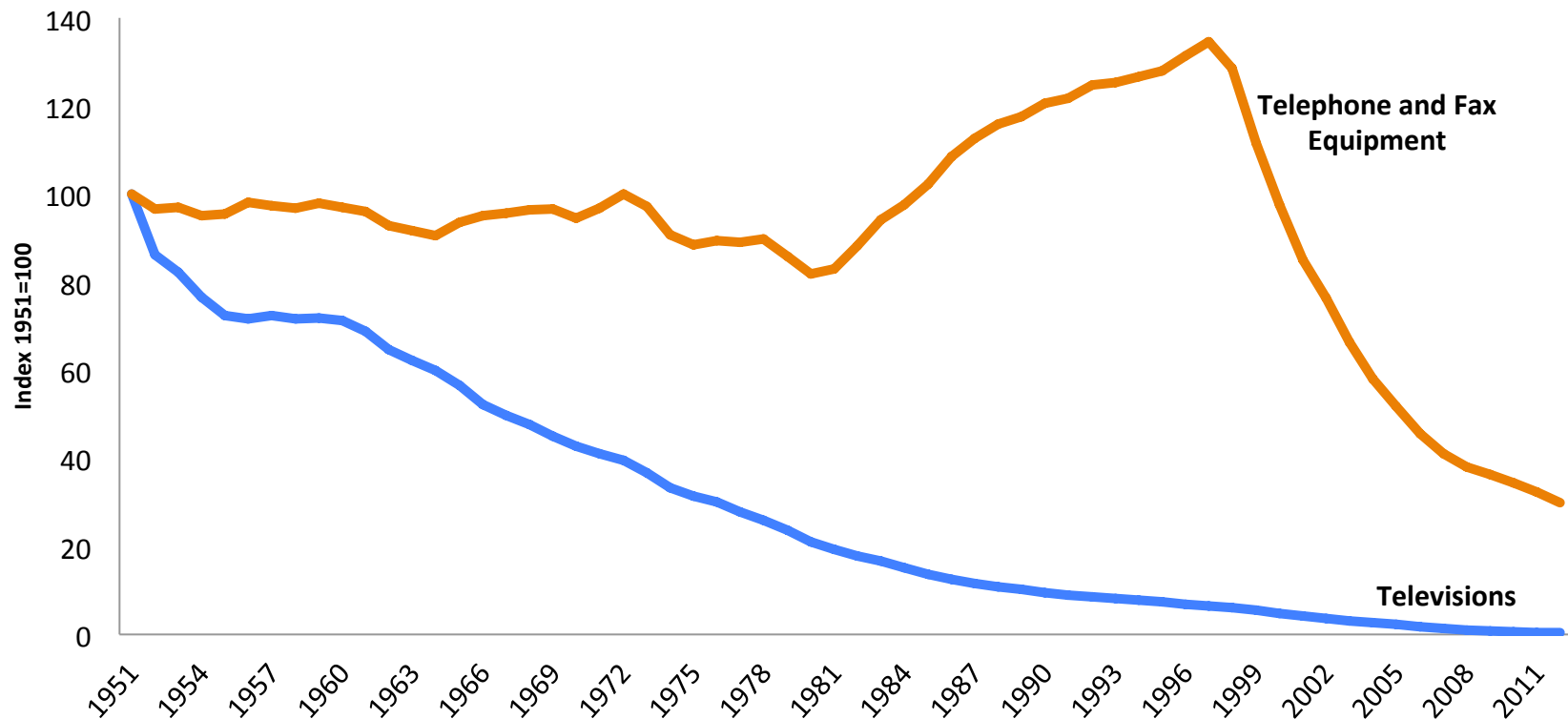
Have price declines in SEP industries slowed, relative to other industries since 2005?

Relative Prices of Consumer Products from SEP intensive industries, non-SEP intensive industries, and Hold Up industries, 2005-2013

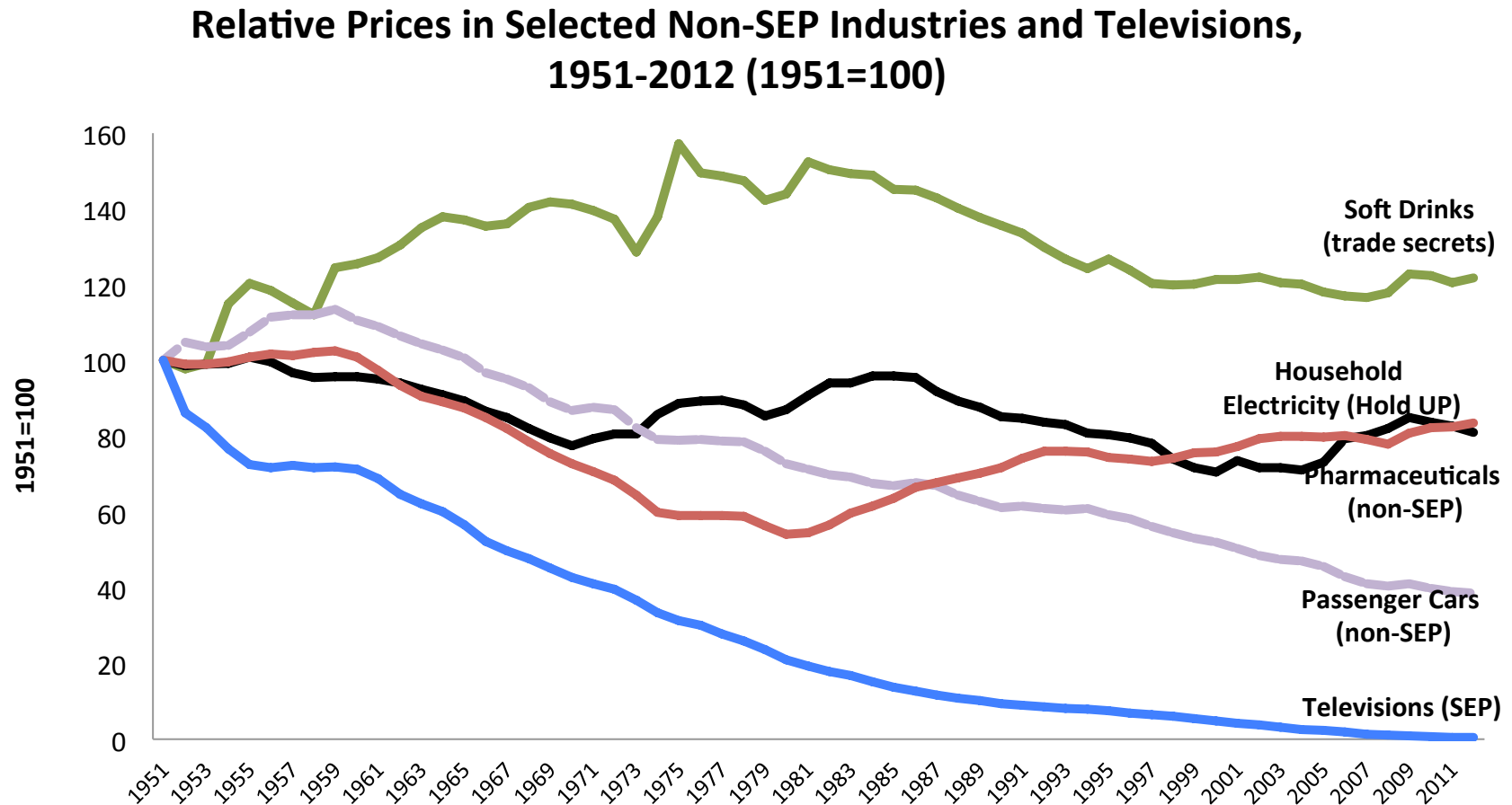


Telephones provide an experiment: once cell phones full of SEP patents were introduced, prices of phones dropped quickly—the opposite of the patent holdup thesis

Relative Prices of Telephone and Fax Equipment versus Televisions, 1951 to 2012 (Index, 1951=100)



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



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 ex-post litigation.
 2. 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. Moving to a patent system based more on regulators rather than courts may produce worse outcomes from the point of view of social welfare.