

Innovation and market structure

From structure to innovation and from innovation to structure

The relationship between market structure and innovation runs in both directions: market structure influences innovation but equally, innovation influences market structure.

<https://www.youtube.com/watch?v=QJnP8jzBjvk>

- There is a large literature on the question of how different market structures will generate different patterns of innovation.
- Equally, it is well recognised that the innovative activities of different firms will impact on market structure.

From structure to innovation and from innovation to structure

- The innovative activities of different firms will impact on market structure either:
 - because innovative activity influences performance
 - because of the connection between innovation and entry: often innovations by incumbents may act as a barrier to entry, but at the same time, especially in the formative stages of a market, innovation may come from new entrants.
- While the two causal chains – from structure to innovation and from innovation to structure – can be separated conceptually, in theoretical studies of strategic innovative behaviour, the two are interconnected

FROM MARKET STRUCTURE TO INNOVATION

The effect of market structure on innovation depends on the dual forces of incentive and opportunity.

- By **incentive**, because a firm in a particular market structure has an incentive to innovate.
- By **opportunity**, because a firm in a particular market structure has an opportunity to engage in innovation.
 - This will depend in large measure on the profitability of the firm because it is well recognised that it is hard to raise external capital to fund innovative activities, in part because innovation is so risky, but even more so because of a fundamental information asymmetry between the innovator and the lender.

FROM MARKET STRUCTURE TO INNOVATION: perfect competition

Under **perfect competition**, firms cannot make super-normal profits and this severely constrains their *opportunity* to innovate.

The extent of incentive for perfectly competitive firms depends on whether:

- perfect competition is a **permanent condition** → no *incentive*
- perfect competition **might be altered by innovation** → there is an *incentive*

FROM MARKET STRUCTURE TO INNOVATION: Monopoly

Under monopoly, firms make super-normal profits and hence there is plenty of *opportunity* to innovate.

But is there an *incentive*? The answer to this depends on whether:

- the monopoly is a **permanent condition** and there is no prospect of entry → little incentive and therefore little innovation.
- the monopoly is **contestable** → great incentive to innovate and also a great opportunity, so we would expect a lot of innovation.

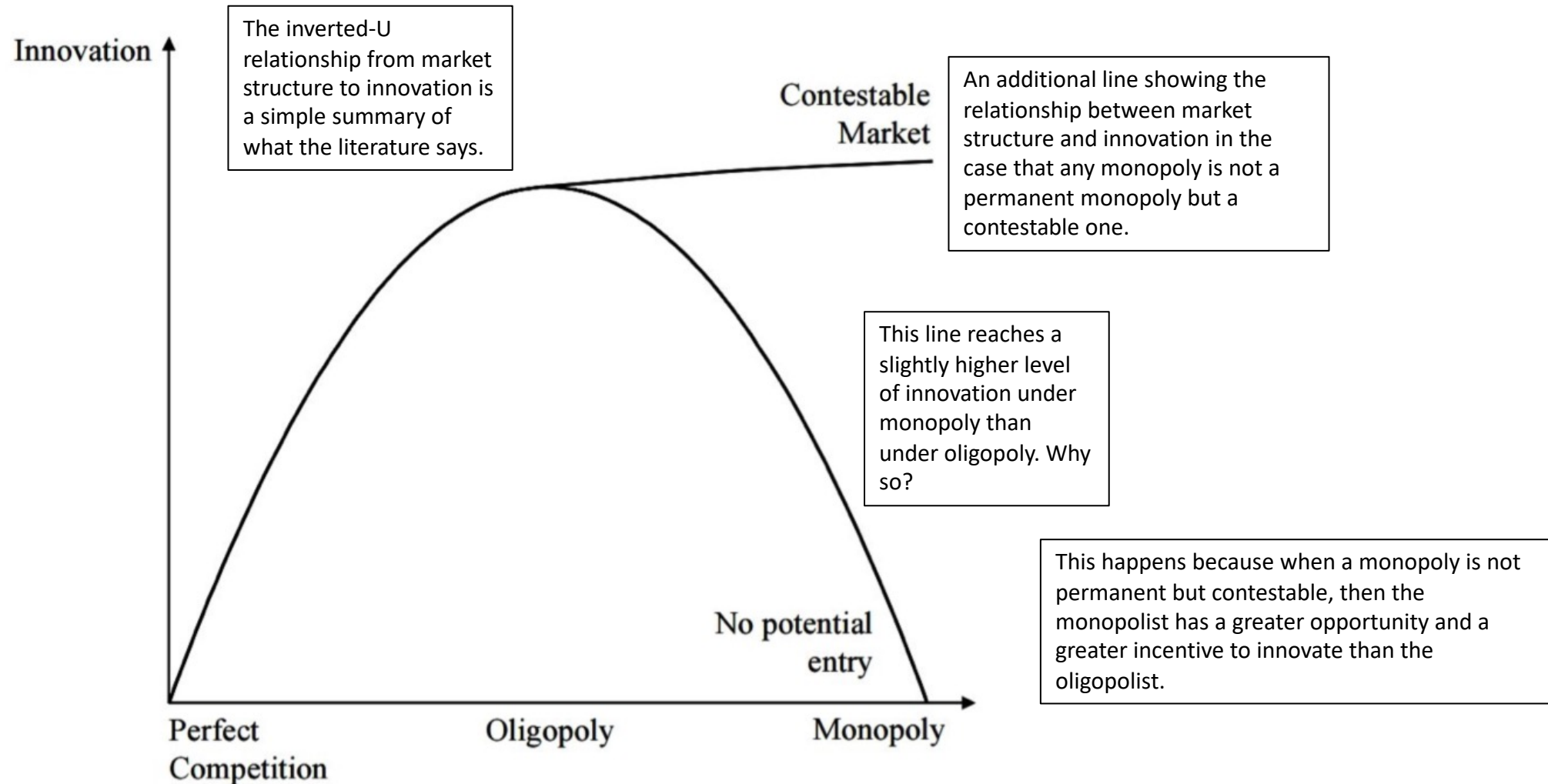
FROM MARKET STRUCTURE TO INNOVATION: Oligopoly

In the case of oligopoly, we find that there is both *opportunity and incentive*.

- There is *opportunity* → the oligopolist makes some super-normal profits, even if not as much as the monopolist.
- There is *incentive* → the oligopolist's market share cannot be taken for granted and needs to be defended against raids by existing rival oligopolists.

As there is always opportunity and incentive, in this market structure, then there is always innovation.

The relationship from market structure to innovation



FROM INNOVATION TO MARKET STRUCTURE

The literature about the reciprocal relationship between innovation and market structure can perhaps be categorised along two axes.

1. is it empirical or theoretical?
2. which discipline does it stem from: economics or organisational behaviour?

Three sub-sections follow: the first on empirical economics, the second on theoretical economics, and the third on organisational behaviour.

FROM INNOVATION TO MARKET STRUCTURE: Empirical evidence

Two polar positions have emerged:

Rapid technological change under difficult imitation conditions tends to increase concentration (Phillips 1956, 1966, 1971; Horowitz 1962; Mansfield 1962, 1968, 1983, 1984)

Innovation can generate barriers to entry and so lead to sustained concentration (Comanor 1964; Stonebraker 1976; Freeman et al. 1965; Mueller and Tilton 1969; Pavitt and Wald 1971)

Rapid technology change and high imitation costs are a force for increased concentration (Menge 1962; Dosi 1984; and Malerba 1985; Katz and Phillips 1982; Altschuler et al. 1985)

Recent innovations (post Second World War) have tended to reduce minimum efficient scale and so have been deconcentrating →

Blair (1972): while from the late eighteenth century through to the 1930s technological change had been a force towards increased concentration, the position was changing as newer key technologies were having the opposite effect, reducing plant size and capital requirements for optimal efficiency.

FROM INNOVATION TO MARKET STRUCTURE: Economic Theory --> 'success breeds success'

- Most of the economic theory that analyses how rapid technology change impacts on market structure tends to imply persistent dominance, or 'success breeds success', and so supports the thesis that rapid technology change is concentrating.
- Schumpeterian hypotheses:
 - 'success breeds success' principle → Large firms and firms with market power can take advantage of such scale economies as there are in R&D and have the retained profit with which to finance R&D programmes.
 - In addition, a companion Schumpeterian hypothesis notes that successful innovation reinforces market power, and the prospect of a monopoly position consequent on innovation is one of the chief attractions of such innovative activity. Size and market power facilitate some aspects of innovation, and innovation reinforces size and market power.

FROM INNOVATION TO MARKET STRUCTURE: Economic Theory--> theory of de facto standards

A different strand of this literature which also predicts persistent dominance is the economic theory of de facto standards.

De facto standards are fascinating because they emerge organically, without formalized adoption processes.

They gain prominence through widespread use and acceptance, often becoming the default choice in a particular domain. Several theories attempt to explain their emergence and prevalence.

Similar first-mover advantages apply to producers of pioneering brands, even outside a standards context.

FROM INNOVATION TO MARKET STRUCTURE: Economic Theory

--> rapid technology change to reinforce concentration

One further strand of the literature that finds rapid technology change to reinforce concentration is that which looks at how the cost of R&D increases with speed.

- This suggests that rapid change is likely to be concentrating because development costs will increase as the speed of development increases (Scherer, 1984).
- It would be wrong, however, to imply that all economic theory presumes in favour of persistent dominance. There are parts of the patent race literature (e.g. Reinganum, 1985) in which drastic innovations give the entrant a greater incentive to innovate than the incumbent.
- Gort and Klepper (1982) suggested that many major innovations would emanate from new entrants, and would tend to occur in the earlier stages of the product life cycle, while many minor incremental innovations would be introduced by existing producers and would occur throughout the life cycle.
- Winter (1984) found that in the entrepreneurial regime, new entrants were responsible for about twice as many innovations as incumbents, while in the routinised regime, established firms were responsible for the vast majority of innovations.

FROM INNOVATION TO MARKET STRUCTURE: Organisational Behaviour

A central idea is that radical innovations can present severe difficulties for established firms (Daft, 1982; Tushman and Anderson, 1986) and are easier for the small and new firm to exploit.

- The organisation literature has for some time suggested that large incumbent firms are slow to adapt to the challenges of competence-destroying innovations.

CASE STUDY: WILL THE INTERNET LEAD TO PERFECT COMPETITION?

What are the implications of one particular and pervasive innovation on market structure?

Over the last ten years or so, several commentators have claimed that use of the Internet in e-business would help to bring about perfect competition.

For example, a survey of Internet economics in *The Economist* (2000) concluded:

- the Internet cuts costs, increases competition and improves the functioning of the price mechanism. It thus moves the economy closer to the textbook model of perfect competition

There are several steps in this argument, but two of the most important are these:

1. that the Internet will undermine monopolistic pricing schemes such as 'noisy' price discrimination;
2. that barriers to entry into e-commerce are low.

It is unlikely that the Internet can really stop price discrimination altogether.

But there must be doubt that the Internet will actually bring the economy closer to perfect competition.

CASE STUDY: WILL THE INTERNET LEAD TO PERFECT COMPETITION?

The End of Price Discrimination?

In many markets (from mobile phones to financial services) the consumer is faced with a bewildering array of different products, services and prices. Economists know that often this is not an accident, but evidence of price discrimination by suppliers. Rather than set a single price for all buyers, the supplier's goal is to extract higher revenues from those prepared to pay premium prices, without losing the custom of those who are not.

Price discrimination generally works along four dimensions:

- time,
- space,
- buyer characteristics and
- product differentiation.

Some of this variation in prices is systematic. Thus, for example, we know that peak-time tickets are more expensive than off-peak. This is unremarkable, and we live with it.

Some of the price variation, however, is 'noisy'. Prices vary over time and from store to store in a random and unsystematic way.

The End of Price Discrimination?

Salop (1977) explained that:

- those consumers with a low opportunity cost to their time can search out the best bargains.
- those consumers with a high opportunity cost to their time do not search and expect to pay over the odds.

Since the first group tend to be unwilling to pay high prices, while the second group are often prepared to pay high prices, this 'noisy' price discrimination sorts consumers very effectively. Marketers have more recently coined the term, 'confusion marketing' to describe the practice of segmenting markets in this manner.

This 'noisy' price discrimination only works if search is time-consuming and costly. But with the Internet it becomes much easier and less time-consuming to monitor this 'bewildering array' of prices.

- For example, several web-sites continually monitor all available mortgage products so that the potential borrower can feed in his details and then receive an individualised ranking of the best deals. This property also increases the effectiveness of the price mechanism. If a new entrant offers a bargain, then any regularly updated survey can bring this to consumers' attention very rapidly.

Optimists believe therefore that the Internet will undermine price discrimination and thereby force prices down towards perfectly competitive levels.

CASE STUDY: WILL THE INTERNET LEAD TO PERFECT COMPETITION?

Implications

There should be no doubt that a technology with such potential can have a huge impact on the nature of competition. Schumpeter (1954) described how, 'competition from the new commodity, the new technology, the new source of supply, the new type of organisation', is so effective that, 'it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly'. Schumpeter would have been very interested in the Internet.

Some have gone as far as to argue that the Internet will make the economy more like the textbook model of perfect competition.

We have looked at two steps in that argument:

- (1) Will the Internet bring an end to monopolistic and discriminatory pricing?
- (2) Will the Internet reduce barriers to entry into e-commerce?

In both cases, the answer seems to be 'no'.

Some discriminatory pricing practices may not be Internet-resistant, but many are, and in any case the same technology makes it possible for online suppliers to invent new methods of price discrimination.

Moreover, while the technological barriers to entry in e-commerce are small and declining, the marketing barriers to commercial success are large and growing. All this must cast doubt on the idea that the Internet will make the economy more like perfect competition.

The Internet is deceptive.

It seems to help the village store compete in the metropolis, but it also helps the superstore compete in the village.