

Intellectual Property

Econ 1101

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ECON 1101 Lecture 12.1

1. Introduction to Intellectual property

the pharmaceutical industry

2. Example of Global Drug Market

Wigitor

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Introduction to intellectual property

ECON 1101 Intro to IP

Why do we study patents?

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We would like to know:

- How do patents and intellectual property protections affect the profitability and actions of firms in the market?
- What is the impact of different patent regimes on firms' incentives to innovate and develop new products?
- If the market fails to offer a profit motive for product development, what alternatives can push research forward?

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Application to the pharmaceutical industry

Application: the pharmaceutical industry

As we saw in class, when the cost structure of the industry is such that there are large fixed costs (big economies of scale), we might end up with:

- a single firm in the market (natural monopoly)
- where it would only be profitable to produce if there is only one firm in the market and it has monopoly rights
- otherwise there might be no production at all

A distinctive feature of the pharmaceutical industry is that drug research (a fixed cost) is extremely expensive

- Industry claims to invest over \$40 billion a year
- By some estimates, \$800 million to produce a new drug

Application: the pharmaceutical industry

Patents are used as incentive for these firms to make the research for new drugs

- Patents offer monopoly rights for certain period of time and allow the firm to charge a higher price (monopoly price)
- Higher price (actual profits) may allow it to overcome the high FC

When patents run out, original drugs are quickly replaced by cheaper “generics”

- In the United States, a patent lasts for 20 years.
- When a patent expires, other companies are free to enter and market the generic equivalent of a drug.

Effect of patent expiration

Zocor (Merk) patent expired on June 23, 2006

- Before patent expiration, Merck sales \$800 million per quarter



In the figure:

- sales immediately dropped to less than \$200 million a quarter, (75 % ↓)
- Sales continued to deteriorate beyond 2006 as generics ate away more of Zocor's market share.

Effect of patent expiration

A more recent example: Liptor

- Best selling drug of all time, \$10 billion a year to Pfizer
- Expired in 2011, has also lost huge fraction of sales

The pharmaceutical industry

Another characteristic of the pharmaceutical industry in the US is that drug companies make a disproportionate share of their profits from sales in the US.

Example Zocor:

- In 2005 the value of Zocor sales worldwide was \$4.4 billion
- \$3.1 billion of the \$4.4 billion was in the US (almost 75%)

- Other estimates have U.S. at around half of the market even though we have only 5% of people and 25% of income

- Compare this with Canada – where there are price regulations :
 - drug prices are lower in Canada than in the US

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2. Example of a global drug market: winter

Modeling Patented Monopolies: ex of a global drug market

- Bigpharma, Econland, Wigitor
- General Rule:
 - don't invest if expected operating profits < fixed cost
 - consider investing if expected operating profits > FC
- Where operating profits = profits not including fixed cost
 - $OP = p \cdot q - TCV = q[p - AVC]$
- And expected OP consider the probability of success
- The general rule is the same as consider investing only if net expected value of investment > 0
 - where net expected value = expected (OP) - FC

Example of a global drug market

We review 3 cases:

- (A) Patent: full monopoly rights
- (B) No patent: perfect competition (free entry)
- (C) Regulation: price higher than (B) but lower than (A) ($P_{max}=3$)

Big Pharma a global company producing under the 3 cases in different regions of the world:

- makes 9 million dollars a year
- with a 20 yr patent 18 billion of lifetime OP
- With 50% probability of success expected OP = 9 billion
- Finally we asses the investment decision under different FC scenarios

Summary

- If fixed costs are high, there's a chance that the pharmaceutical company will not invent the drug, making the economy worse off overall
- Without patent protection, other companies (both domestic and foreign) may just steal the drug. So a pharmaceutical will not invent the drug.

Notes

- Slides are not self contained since we worked mainly on the whiteboard
- For more information you can consult slides 12 (i)