

HSS 201: Economics for Engineers

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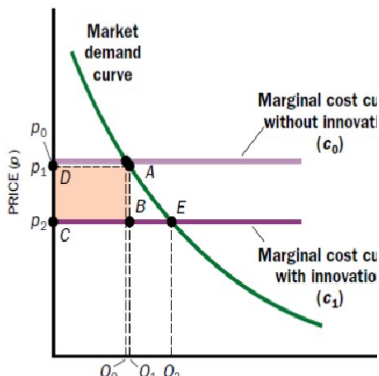
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Technological Change and Imperfect Competition

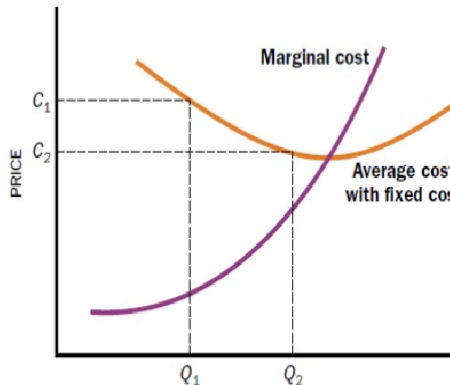
Competition always promotes developing a new product or have new ways of producing the existing product. Technological change and imperfect competition are linked for four major reasons.

- ➊ Initially, invest in R&D expenditures, which simulate innovation and/or inventions. These innovations or inventions are protected using patents.
- ➋ Industries in which technological change is important typically have high fixed costs and thus their average costs decrease over a wide range of output, another characteristic that limits competition.
- ➌ Industries characterized by rapid technological change are also industries in which the benefits of increasing experience in a new production technique can lead to rapidly decreasing costs.
- ➍ Banks are generally unwilling to lend funds to finance R & D, raising capital is difficult for new and small firms.

Effects of Patent



R&D as a Fixed Cost



Large fixed costs in the form of R&D expenditure. Industries with large R & D expenditures face declining average cost curves up to relatively high levels of output. When there are large fixed costs, large firms will have lower average costs than small firms and enjoy a competitive advantage.

Competition spurs R & D

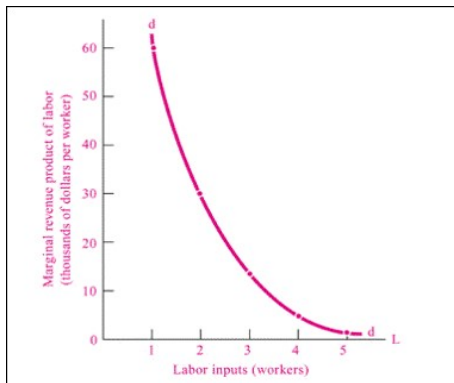
- 1 A new innovation enables firms to enjoy profits
- 2 If a firm innovates, it would not survive
- 3 R & D provides an alternative to prices as a way for firms to compete; it is one of the most important arenas for competition in modern economies.

Competition impedes R & D

- 1 Competitors may imitate, thus eroding returns from innovation.
- 2 Competition erodes the profits required to finance R & D. It mostly happens in industries that are less differentiated.
- 3 Patents give a single firm a protected position for a number of years.
- 4 The fixed costs of R & D give large firms an advantage; thus industries in which R & D is important may have few firms.
- 5 Learning by doing gives a decided advantage to the first entrant into a market.
- 6 Limited access to capital markets for financing R & D is a disadvantage to new and small firms.

The Demand for Factors of Production

Labor Demand

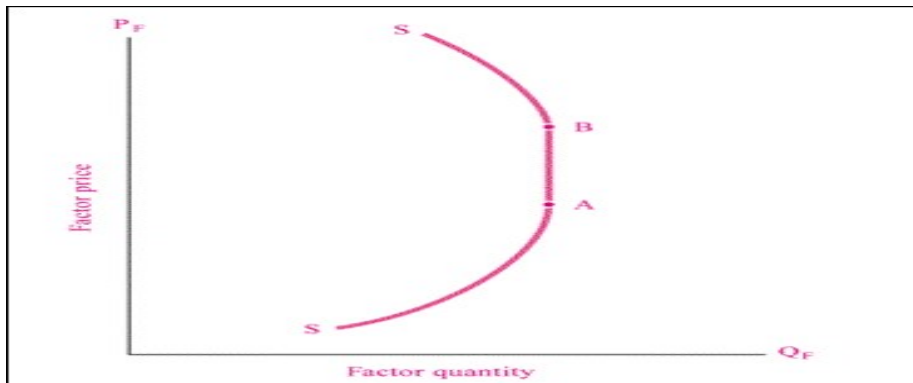


An Example with One Factor of Production

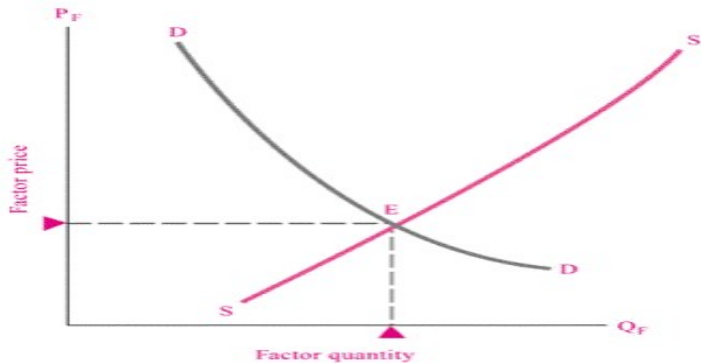
Labour	TP	MP	P	MRP
0	0	-	3	-
1	20,000	20,000	3	60,000
2	30,000	10,000	3	30,000
3	35,000	5,000	3	15,000
4	38,000	3,000	3	9,000
5	39,000	1,000	3	3,000

If you hire one worker, the additional revenue (the MRP) is 60,000 while the marginal cost of the worker is 20,000, so your extra profit is 40,000. A second worker gives you an MRP of 30,000 for an additional profit of 10,000. The third worker produces extra output yielding revenue of only 15,000 but costs 20,000; hence, it is not profitable to hire the third worker

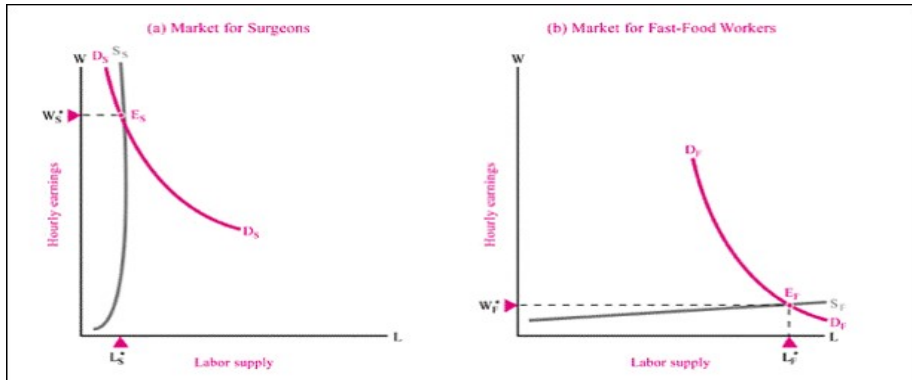
Supply of Labour



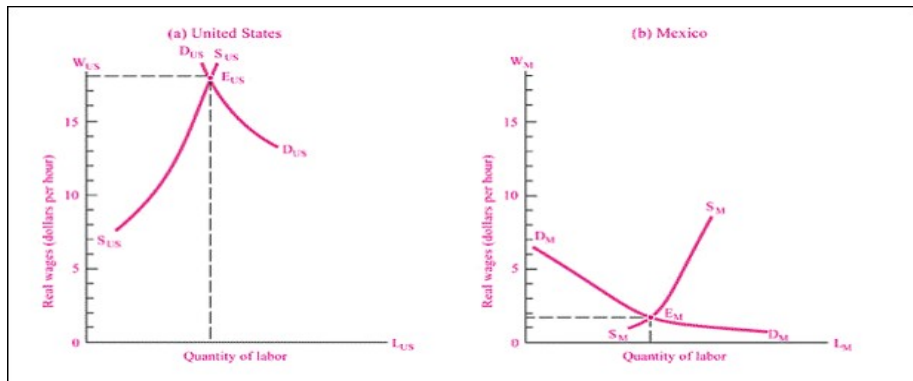
Equilibrium



Labor Market for Surgeons and fast-Food Worker



Favorable Resources, Skills, Management, Capital, and Technology Explain High U.S. Wages



What is Market Failure

Market failure is a situation where, buyers and sellers experience inefficient allocation of goods and services.

In market failure, a competitive market leads to the economically efficient output level.

When markets fail, government intervention rises.

Causes of Market Failure

- ① Monopoly
- ② Imperfect market Information - Asymmetric Information
 - Adverse Selection: At the same price level, two different quality of goods exists
 - Moral hazard: When a party whose actions are unobserved can affect the probability or magnitude of a payment associated with an event.
- ③ Public Goods
 - Non-Excludable: Good is nonexclusive if people cannot be excluded from consuming it.
 - Non-Rival: Good for which the marginal cost of its provision to an additional consumer is zero.
E.g., Street lights
- ④ Externalities: Action by either a producer or a consumer which affects other producers or consumers, but is not accounted for in the market price.
 - Positive Externality: Increase in Forest Cover
 - Negative Externality: Carbon Emissions