

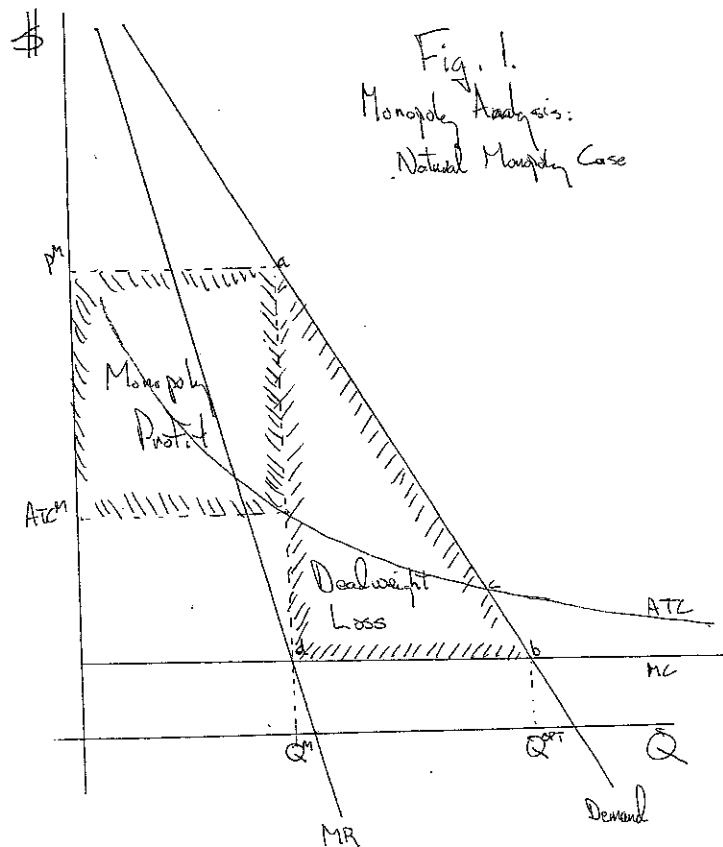
Analysis of profit-maximizing monopoly firms falls into two cases, differentiated by the cost structures of the monopoly firm. One case, let's call it Case 1, involves a monopoly with a U-shaped ATC and a rising MC curve. Case 1 was covered in class and is analyzed in all editions of Mankiu at the beginning of the monopoly chapter. The second case, call it Case 2, investigates the profit maximizing behavior of a monopoly firm with an ATC curve that never bottoms (is always falling) and a low and constant MC curve. This is the natural monopoly case, the case where a single producer can produce a product at lower cost than two (or more) producers). This was covered in the lectures. Mankiu does not cover this in the 5th edition (some analysis in 4th ed., pp. 327-328, including Fig. 9). The purpose of this memo is to examine Case 2.

Case 2: Analysis of the Natural Monopoly Case: Output and Price Decisions, Monopoly Profits, Deadweight Losses, Regulatory Choices.

A. Natural Monopoly Case: Output and Price Decisions, Monopoly Profits, Deadweight Losses.

In the attached Figure 1, the natural monopoly's characteristic falling ATC curve and the low and constant MC curve are displayed. The monopolist faces the given Demand curve with its associated MR curve. The profit-maximizing output (Q^M) occurs where $MC=MR$ and the profit-maximizing price is found by tracing upward to point a, the price that the market will bear (P^M). The monopolist's profit is derived by finding the ATC at Q^M which is ATC^M . The monopolist's profit is thus $TR-TC$ or $[(P^M \times Q^M) - (ATC^M \times Q^M)]$ which is represented in the diagram as the rectangle labeled "Monopoly Profit."

Monopoly, of course represents a market failure, a sub-optimal outcome to society. Were a benevolent planner to choose the socially optimal output level, it would have to be Q^{OPT} . Why? Simply put, there are consumers on the demand curve between "a" and "b" who are willing to buy the monopolist's product and the product can be produced at a MC less than the P these consumers are willing to pay. This being the case society loses social benefits equal to the triangle "abd". This is labeled "Deadweight Loss." The deadweight loss represents the loss to society from the monopolist's restricting output to Q^M and charging a price above MC, P^M .



B. Analysis of the Natural Monopoly Case: Regulatory Choices.

What can society do about the deadweight losses from Case 2, the natural monopoly case? First, let us analyze in Figure 2 what would happen if a regulator decided to eliminate all of the deadweight loss. The regulator would tell the monopolist to produce at Q^{OPT} and price the output at its marginal cost which we will call P^{MC} . This scheme eliminates the deadweight loss because every customer on the demand curve between pts. "a" and "b" would be sold the output at $P = P^{MC}$.

Unfortunately, Q^{OPT} is produced at $ATC = ATC^{OPT}$ and our monopolist is subject to losses equal to the rectangle between pts. bdef. The monopolist will, of course, exit if the firm must bear these losses. So, one solution is for the government to subsidize the monopolists to the extent of the bdef losses. We will label this solution as Policy X. When New York State subsidizes rural electrification or the NYC subway system, it is pursuing Policy X.

But, suppose the legislature decides it does not want to subsidize the monopolist (and totally eliminate the deadweight loss). What are the choices for the government regulator? One choice is to regulate the monopolist to produce where the ATC curve crosses the demand curve at point "c". We will call this output level, Q^Z . The regulator will also tell the monopolist to price his product at ATC^Z . We will call this policy solution Policy Z. This eliminates some but not all of the deadweight loss. It eliminates the trapezoid "acjh" but leaves the triangle loss "cbj." It also means that the taxpayers are not subsidizing the monopolist and his customers for what that is politically worth. When New York State regulators have set telephone rates to cover "costs," they are pursuing Policy Z.

