

INDUSTRIAL ORGANIZATION
MONOPOLY AND REGULATION

There is a spectrum of industrial concentration that economists' are interested in, and enjoys delineating. The principal reason is that each market structure presents characteristics and consequently differing policy implications on account of the possibility of adverse effects on societal welfare. One possible spectrum being from Pure Monopoly \rightarrow dominant firm \rightarrow tight Oligopoly \rightarrow loose Oligopoly \rightarrow Monopolistic Competition \rightarrow Pure Competition. We will be dealing with the first and the last category first. But for much of the course, we will focus on the middle range dealing with Oligopolistic Competition, and we will bring some of what we learn in Game Theory, and Microeconomics to bear.

1 Monopoly

When we make reference to an industry having a Monopolistic Market Structure, we think of the market being dominated close to a 100% by one single firm, that is even if there was another firm(s), only one dominates in terms of market share. The most common example being utility companies.

As you should recall, we assume that sell a quantity of goods, q , to consumers by pricing it based on a downward sloping inverse demand that it faces, $P(q)$ (Typically, we call demand by the function $D(P)$, here $P(q)$ is just the inverse of the first function. That is since $D(P) = q \Rightarrow P = D^{-1}(q) \equiv P(q)$). Technically, we can do this because quantity demanded is typically assumed to be monotonically decreasing in prices.). In choosing producing those said quantities to the consumers, they of course incur a cost of production which is increasing in the quantity they produce, $C(q)$. However, since we, economists think of there being a one to one relationship between prices and quantity, it makes no difference whether we have the firm optimize on their profit by choosing prices or quantity, consequently we will maintain that tradition (for good or bad), and optimize by choosing quantity.

You should recall that the above choice of the monopoly is as follows;

$$P \left(1 - \frac{1}{|\epsilon|} \right) = MC$$

$$\Rightarrow \frac{P - MC}{P} = \frac{1}{|\epsilon|}$$

where as usual, ϵ , is the elasticity of demand. The last equality is usually referred to as the **Elasticity Rule**. And as we have noted, the significance of this equation is that it says:

A monopolist should set a price-cost margin that is greater the lower is the price elasticity of demand.

1.1 Dominant Firms

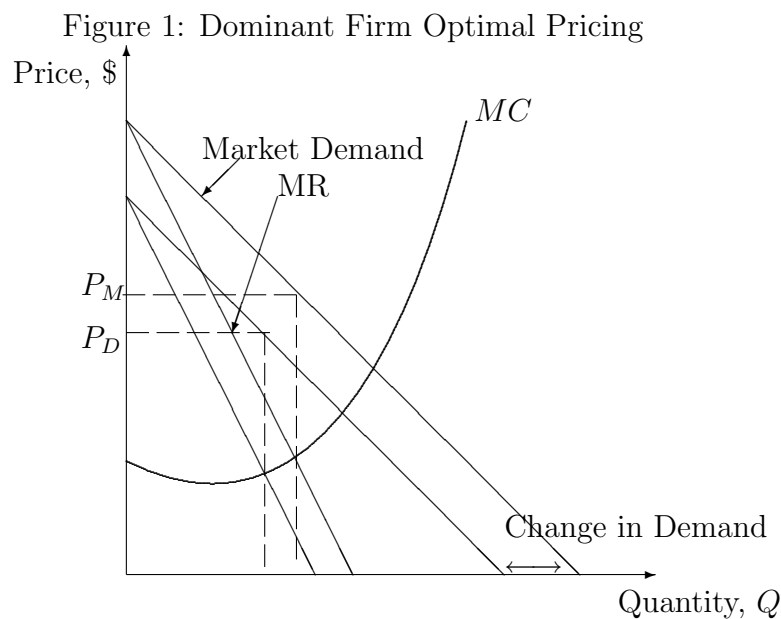
It is however far more likely that we find a **Dominant Firm(s)** within an industry than a pure monopoly. A say a firm is the dominant firm in an industry when it commands 50% or more share of the market. Making all other producers residual claimants to the market demand. On page 71 of your text, table 5.1, where we see data on prices set by AT&T versus MCI and Sprint over the years between 1987 to 1994. The pattern that you should see that that the latter two firms always lags in their pricing decision, while the former leads. However, former, being the larger incumbent firm (with a perceived advantage in service quality).

Considering the sequential pattern in the pricing timing, this appears to be nothing more than a sequential game where the first mover is AT&T, and the other two firms as the second mover. To better understand why even though AT&T is a first mover, it is still able to retain such a huge market share, its perceived and real advantage not withstanding, we can think of the equilibrium strategies and payoffs using backward induction.

By virtue that the other two firms are smaller, i.e. have a smaller capacity or network, they can only fulfil part of the demands of the market. Since they move after AT&T, they are faced with the residual demand left by the former. They will that set their prices, given their cost structure by choosing their optimal level of quantity. .

As a first mover, AT&T knows what the other two smaller firms would do, consequently would set their prices given their pricing strategy, or more accurately set their quantity given the quantities the other two sets. (We also think of the demand facing AT&T in this sense as being the residual demand as well.)

The crux of the matter is that as long as the drop in demand due to AT&T being the first mover, is small, the manner in which a dominant firm who faces a downward sloping demand will behave very similarly to that of a pure monopolist as may be discerned from figure 1 below.



1.2 Monopoly & Monopoly Power

Given that most developed nations are well into deregulation and privatization of state run monopolies, examples of this market structure is hard to come by these days anywhere (with the exception of power generating companies.) Does this then mean that monopoly power is extinct these days.

The answer is that it depends on how you define a market or industry to be. If

we deem the market for Unix based computers as one market, that assuredly Apple would seem to have a strangle hold on the market, and consequently has monopoly power just as AT&T does. But if we define the market more broadly, such as Apple being a part of the Personal Computers market, then Apple is but a small player, and in fact the industry seems to be competitive. This is the crux of the matter in any debate on Monopoly power, and in Antitrust cases. Take another example, if we examine the personal computer OS market in isolation, then it is true that Microsoft has a stranglehold over the market. But yet if we were to expand our definition of operating system to that of OS for private firms, then the market share of Microsoft falls drastically since the latter is largely Unix based.

If you were to take another step back, you might wonder why we want to care so much about market share in the first place when we are defining a monopoly. The idea behind why we think of monopolies as a bad is due its ability to price above its marginal cost. But the degree to which a firm can price above its marginal cost is a direct function of the elasticity of demand, which in turn is a function of the market share. Therefore, if we are really interested in market power, maybe what we should be more concerned with is the basis of its monopoly power, its elasticity of demand since its market share is but one element in the function of monopoly power. But yet, if you think even harder, the manner in which we define a market still defines the demand!

<p>The degree of monopoly power is inversely related to the demand elasticity faced by the firm.</p>

Further, the elasticity of demand, as you would have learned is dependent on factors both current, and the future, that is how the firm is behaving in relation to it competition, its plans for developing a product line, or to diversify, changes in preferences among consumers?

Public policy has also moved in the direction away from emphasis on market share, that is there is nothing wrong with having a large market share, but the government in protecting the constituents of a society deems the abuse of that power as abuse of that power, and it is that that public policy seeks to curb. This abuse is most typically cited as over pricing, i.e. pricing excessively higher than the firm's marginal cost, the

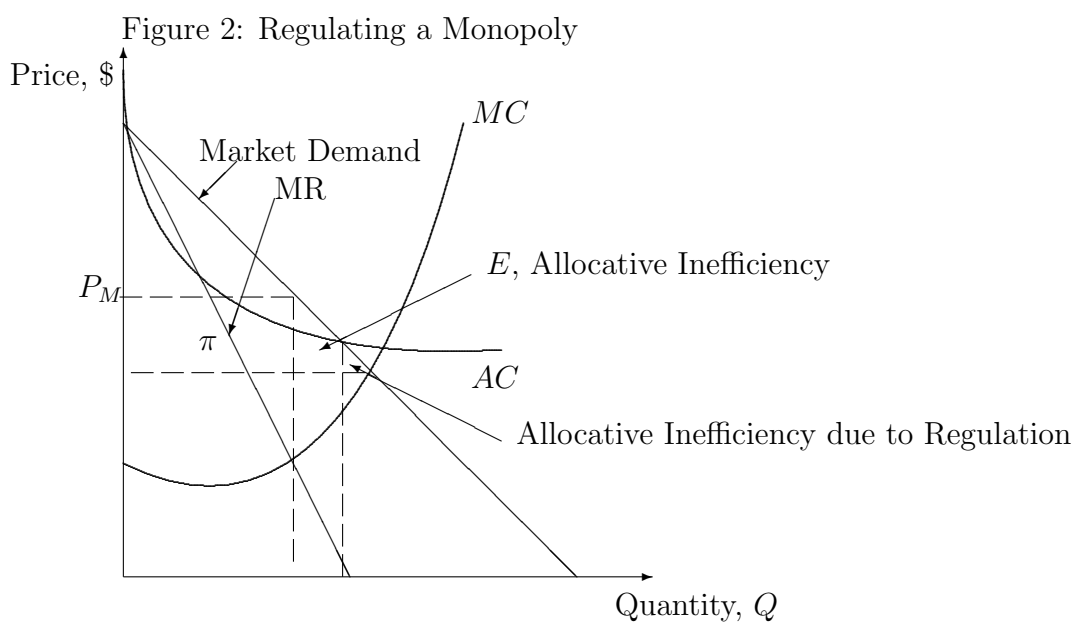
ability of a firm to do that being in turn dependent on the elasticity of demand that they face. **Read your text for a good discussion from pages 72 to 75.**

2 Regulation

You would have learned by now that the monopoly market structure is one that is synonymous with allocative inefficiency, where the primary indicator for this is the fact that they are able to price above their marginal cost. However, this is at best misleading taken literally since profiteering is not necessarily a bad. What is important however is that because prices are set above the firm's marginal cost, it means that the consumers' willingness to pay is greater than the cost it takes to manufacture or produce the additional unit of a good for consumption. The most typical solution bandied about would be to simply introduce competition into the economy. However, not all initiatives to "open" a market to greater competition is viable. Consider your typical utilities firms which requires a heavy initial outlay, a high fix cost of operation. This means that there is a significant **minimum efficient scale** of operation consequently allowing only one firm to be in existence in the market at any time, a **Natural Monopoly**. In such cases, the best way we can increase allocative efficiency is through regulation, which we will discuss now, but the solution is not as trivial as you might think.

Let a monopoly be faced with the following cost function, $C = F + c(q)q$, where F is the fixed capital cost, and $c(q)$ is the marginal cost of operation, which is not constant, but increasing in the level of output chosen (your text has the fixed MC case). Without regulation, we know a monopolist would charge the monopolist price, P_M , and earn profits $\pi = q_M(P_M - c(q_M))$, and they would get a net profit of $\pi - F$. This would result in an allocative loss represented by the triangle E in figure 2.

A possible solution would be to force the monopolist to produce at the competitive level where the MC intersects with the demand that the monopolist face, thereby having $P_C = MC(q_C)$, where q_C is the output level at this price, and maximum allocative efficiency is achieved, that is the area of the triangle $E = 0$. However, the problem with this solution is that if the average cost is sufficiently high such that the firm is not able to recover any part of its fixed cost, the monopolist would rather than choose



to exit from the market.

Of course you might suggest that the government could always subsidize for this lost through taxation of other markets or the general populace, particularly if the product produced by the monopolist is a necessity. However, you should realize that this may entail even more problems:

1. The efficiency lost from the tax may be greater than the allocative efficiency gained through forcing the monopolist to price at the competitive level.
2. The transfers from the government or regulatory authority to the monopolist which then consequently gives the government greater jurisdiction of the firm, and may in fact encourage the firm to invest resources into influencing the authority to the extent that the authority's objective changes from one of welfare maximization to profit maximization! This is typically termed as **Regulatory Capture**. This investment in time and energy would then constitute a misallocation of resources towards nonproductive activity, and it does not require that the regulators be indeed affected at all.

You might then consider, or might have been taught that the next best thing

might be best, that of pricing at the average cost, and thereby ensuring that the firm just meets its fixed costs. Diagrammatically, that would be where the $AC(q)$ curve intersects the demand the monopolist faces, i.e. $P_A = AC(q_A)$. This in fact has been the regulatory mechanism used in the United States, and is typically referred to as **Rate of Return Regulation**, and essentially allows the firm to earn a "fair" rate of return on the capital it invests in. However, as with all attempts at intervention, nothing ever comes without a cost.

Here's some cost to the Rate of Return Regulation:

1. This method of regulation fails to give the firm sufficient incentive to reduce costs since any reduction of cost, would be met with a reduction in price even though there will typically be a lag, what is typically referred to as a **Regulatory Lag**, so that the firm could make extraordinary profits in the interim, or what could be called transitory gains. Since we are not only concerned with static efficiency, but dynamic as well, the lack of incentive to reduce costs means that the regulatory technique is left wanting. This technique is also typically categorized as a **Low-Power Incentive Mechanism** since price varies at the same rate as cost.

Of course there is **High-Power Incentive Mechanisms**, characterized by prices being set prior and is fixed for specific number of periods, or what is typically called a **Price Cap Regulation**. If you consider this clearly, this is nothing but a Rate of Return Regulation with a pre-specified time lag, because at the end of a stipulated period when prices are fixed, there is no justification for a regulator not to reduce the fixed prices to account for the lowering in costs achieved. Which means that Price Caps is a balance between incentives to cost reduction, and raising allocative efficiency.

2. Because quality of service involves training of workforce, one of the first things that a regulated firm will slag on would be quality, thereby implicitly and effectively raising the price of the good to society.

A high-power regulation mechanism provides strong incentives for cost reduction but few incentives for quality provision. In addition, it implies a high degree of risk for the regulated firm and requires strong commitment on the regulator's part. The risk arises from the fact that prices will be fixed for the stipulated period and cost can always increase!

3 Essential Facilities and Access Pricing

The question then is when is an industry a Natural Monopoly. The definition indeed is subject of debate and interpretation as we had alluded to before during our introduction to Industrial Organization. It has been generally agreed that the network setup and maintenance of electric power is a natural monopoly, however what is contentious is that electric power generation itself is not. Note that one cannot do without the other. (Consider the power generation firms in Ontario which includes hydro electric and nuclear power firms, noting however the network is maintained by Toronto Hydro.

A problem is created when the **upstream** monopolist, the electric power network firm, selling their services to the downstream power generating firms, who in turn exists in a competitive environment. The Monopolist here is an upstream **bottleneck**, and their output is an **essential facility**. If you think about it, this setup is prevalent in plenty of industries, for example the telecommunications industry, the air travel industry etc. Consequently the regulation of this upstream bottlenecks shares similar problems as the natural monopoly discussion we had before.

An additional problem arises however when the upstream firm also operates a firm in the downstream sector which is supposed to be competitive. Where does the problems arise?

1. Upstream Monopolist uses its monopoly power to foreclose the downstream competitors from the market. This occurs when the monopolist is unable to extract all the rents from the downstream firms through higher prices due perhaps to regulation. These regulations can always be circumvented by using its relationship with the downstream firm it owns to shut off the market from its competition.

This possibility would assuredly lead to a reduction in consumer and social welfare.

2. Of course you may suggest that the upstream monopolist may be prevented to own any downstream operation at any stage of the production of the final good. Yet there are distinct efficiency gains from vertical integration given difficulties to contracting when investments are specific in nature to the economic relationship.
3. A particular solution to the first two points dealing with alternative solutions is the **Efficient Component Pricing Rule** which essentially attempts to regulate the prices that the downstream firms pay, the **access price**. This scheme essentially says that the upstream monopolist is not allowed to charge a price to its downstream competitors more than the difference between the price it charges its final good, and the marginal cost its downstream firm. To see what this means, let the integrated firm be firm 1, charging a price of P_1 . Let its downstream cost be c_1 , noting that the price or cost of the upstream firm is already captured in the downstream subsidiary's cost since the sale price between the two is nothing but a transfer price, and has no substantial meaning in an integrated firm. Then the regulation says that the price it charges its downstream competition must be such that $w_2 \leq P_1 - c_1$. Let the price of one downstream competitor be P_2 , then the margin of this firm 2 is;

$$P_2 - w_2 - c_2 = (P_2 - P_1) + (c_1 - c_2)$$

where the marginal cost besides the wholesale price from the upstream monopolist is c_2 . If the downstream market is indeed competitive, they will all price at the same price of $P_1 = P_2 = P$, in that case, the downstream competitive firm earns a profit if and only if its marginal cost is lower than that of the integrated firm, firm 1. You should now see the rationale of the regulation, because the policy ensures productive efficiency is maximized. All looks fine and dandy?

Think again. If the two downstream competitors has a similar cost structure, then $c_1 = c_2$, and all that firm 2 can do to survive is to charge P_1 , i.e. whatever the integrated firm charges, and the incentive of this monopolist upstream firm would be to charge the monopolist price, P_M (more accurately, the monopolistic

competitive price, why?), and get a margin of zero. This means that although the regulation might have solved the efficiency problem, monopolistic pricing still occurs, to the detriment of consumers (though is that necessarily bad). **Read your text for loads of real examples.**

***You should avail yourself of the details with chapter 6 on Perfect Competition, and Monopolistic Competition. We will now go into chapter 8 and examine Oligopolies. Your coming quiz will be upto chapter 6.