Title: Principles of Economics

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So in the previous chapter we looked at the supply in the perfectly competitive industry and we distinguished what happens in the level of firm and in the level of the industry.

And now let's look at the completely opposite case, when there's a only one producer in the industry: a monopolist.

In that case what happens, in the firm level will be the same as what happens at the level of the industry, and there will be a small difference between what a competitive producer would do and what a monopolistic producer does.

So in the perfectly competitive case, we implicitly, we assume that the price in the market place was given.

The producer didn't have to care, could not influence the price in the market place, and the decision of the producer was simple to choose its output level given the price in the market.

On the other hand, in the monopoly, the monopolistic industry, the producer chose both, its output level and the price for its product.

So as a numerical example, suppose that this is the demand schedule for the monopolist.

Where depending on the price that occurs in the market, consumers are willing to buy different amount of a product, water in this case.

Using this demand schedule, we can calculate how much revenue the monopolist could collect from charging a particular price and supplying particular amount of water in the market place.

And using this total revenue we can calculate average revenue simply by dividing this total revenue by output and marginal revenue as the additional revenue from producing one more unit of output.

We can see that average revenue is the same as the price for a monopolist assuming that all consumers are charged at the same price.

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So to obtain total revenue we simply multiplied quantity supplied times price.

And to obtain average revenue we divided total revenue by quantity.

So intuitively we should get the same value for average revenue as for price.

On the other hand, for marginal revenue, we get numbers which are strictly lower than price.

And the intuition here is that whenever the company produces one more unit of output, there are two effects on the revenues of the monopolist: the output effect and the price effect.

The output effect is that when the company sells one more unit of water it gets to collect one more price for the additional unit.

That's the output effect.

On the other hand there's a price effect because in order to sell, an additional unit of water the company has to decrease the price in the market. And it has to decrease the price for the all existing consumers.

So from producing the second unit of water, note is that the company cannot keep the price level to ten. It has to decrease price to nine.

And so the output effect of producing the second unit of water is the company can collect nine more dollars from the second consumer.

But the monopolist gives up one dollar from the first consumer of water.

Its additional revenue is only eight dollars rather than nine dollars which is the price.

So graphically we can summarize that the marginal revenues of the monopolists are strictly lower, strictly below the price line or the demand curve in the market.

To give you a little bit more, information here, if we have a linear demand curve, then the marginal revenue curve will also be linear, and it will be twice as steep.

So if we observe to that intercept of the demand curve occurred at the particular point of the graph then we would've find that marginal revenue curve intercept the horizontal axis and the exactly half of the output level.

And to understand this graph intuitively this graph tells us that for all these output levels, when the company produces them, total revenues increase.

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But as soon as the marginal revenue becomes negative producing additional units of output would decrease the output of the company.

So thinking about the output effect and the price effect of quantity monopolist chooses, you should think that for these units of the output, the output effect is more important than the price effect.

And for these output levels, the price effect becomes greater even though the monopolist produces more units of output, it has to lower prices so much that total revenues fall.

And additional piece of information, so as I said, the marginal revenue curve is twice as steep as the demand curve which means that there's a difference between units of output on this side of the demand curve, and the units of output on this side of the demand curve.

Here, this discussion should remind you of chapter five when we said that for a perfectly linear demand curve price elasticity of demand in the middle of the demand curve is exactly one or minus one with the correct sign.

On this side of demand curve, the demand curve is elastic. And on this side of demand curve, the demand is inelastic.

And we said that when the demand curve is elastic, when the company produces more output and lowers its price its total revenue is increase.

And for these units of output when the demand curve is inelastic, selling more units at lower prices decreases the total revenues of the producer.

And that's exactly what we observe when we draw the marginal revenue curve for the monopolist.

For all of these units, total revenues increase. For these units, total revenues decrease as more is produced.

Using the same graphs, as in the previous chapter, that means that total revenue curve in an inverse u shape now. Right?

That's different from perfectly competitive markets when total revenues were strictly increasing in the output produced.

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Now we would say that total revenues are maximized at the level where marginal revenues are zero.

And total revenues would be increasing for previous units of output and decreasing for all following units of output.

And we have the same on the supply side we can assume the same cost structure as for perfectly competitive firms.

So there's nothing new on the supply side. The only difference comes from the

revenue side for the monopolists.

Okay? And again we can observe that there are ranges of output, when total profits are negative. When total profits are positive that happens when total revenue is greater than total cost.

We can say that as long as total revenues are steeper than total cost, profits are increasing.

When total revenues become flatter or negatively sloped, and when the total cost curve is relatively steep, total profits are decreasing.

And we can summarize that total profits are maximized when the difference between total revenues and total costs is maximized.

And in other words that happens when the slope of the total revenue curve is the same as the slope of the total cost curve.

So just like in the previous chapter, we can say that the profit maximizing decision is for the monopolist to produce where marginal revenue is equal to marginal cost of production.

Drawing the same discussion on a graph with dollars per unit, we can draw the demand curve, marginal revenue curve and marginal cost curve of production.

And like we said a profit maximizing monopolist would choose output where marginal revenue is equal to marginal cost of production.

And so far we said that the company would stop, the monopolist would stop producing at this output level.

What will happen to the price in the market?

Well, you should think that if this limited amount of output is thrown into the market.

Notice that for this output level consumers are willing to pay high amount of money.

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So you can think that consumers in the market will beat up among themselves and will beat up with the price to this high level

And we would say that this point B is the market solution

So to summarize, we have found that profit maximizing output level for the monopolist by setting marginal cost equal to marginal revenue.

And then we let consumers bid among themselves to purchase this limited quantity.

And that means that monopoly price will happen at this level.

Oaky, and finally, we can look at the difference between this price which is the average revenue of the monopolists.

And the average total cost of the monopolists, to derive profits that the monopolists earns.

Okay? How does it compare to a perfectively competitive outcome.

Well in a perfectively competitive industry, we would say that this is the market outcome where marginal cost is equal to price or average revenue.

And looking at welfare that results in the market, we can conclude that between the competitive outcome and the monopolistic outcome, consumers will become worse off under monopoly.

Consumer surplus falls from this larger triangle to this smaller triangle. Consumers lose some area in their consumer surplus.

What happens to producer's surplus?

Producer surplus used to be this triangle in a competitive industry, and now producer surplus is a higher.

So this area for producer surplus becomes higher but slightly narrower.

So perhaps producer surplus increased in the case of monopoly.

But notably, this triangle here which used to go to consumers' and producers' as their surplus now doesn't go to anybody.

Now these units are not produced, so nobody gets welfare from them.

We can say that a dead way loss of monopoly results.

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As a small side note when we compare profits, you might be confused about the difference between the profit that monopoly earns the producer surplus.

Remember that the monopoly profit is the difference between total revenues variable costs and fixed costs of the production.
Producer surplus is the difference between revenues and variable costs of production.

Because the marginal cost curve only tells us the variable cost of production.

So if we drew producer surplus in this graph, we would get a little bit different amount than profit for the monopolists, because of the fixed cost production.

We can say that the difference between the profits and the producer surplus of the company is the fixed cost of production. Ok?

To summarize what has happened, when we move from the competitive industry to monopolistic industry, we see that consumers are made worse off and producer is made better off, because the producer earns greater surplus, greater profit.

But by trying to redistribute some surplus from consumers to himself, the monopolist created some inefficiency.

So in the effort of redistributing surplus to himself, some welfare in the market was lost.

We could say that this deadweight loss of monopoly is similar to the deadweight loss that we discussed for government intervention in the market.

Once again, if the government cares about efficiency in the market, maybe the government would want to intervene in a monopolistic market to correct for this newly created inefficiency (new inefficiency).

There are several possibilities that the government has.

One is to make monopolies more competitive. The government could encourage the entry into the market place.

The government sometimes splits large monopolists into several companies that would compete with each other.

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Another possibility is to regulate the behavior of monopolies.

Again from the previous discussions, you could think that the government could use the command and control policies or market based policies so that the government could regulate the prices that the monopolists charges, or regulate output level the government could dictate monopoly to produce large output level at the low enough prices.

Or the government could tax or subsidize the monopolists to achieve more efficient outcome. We will discuss that in the next few minutes.

Finally, some other possibilities are to turn private monopolies into public enterprises.

There are some issues with this solution as well.

The chapter in the textbook describes some issues with the publicly-owned companies.

Another possibility is to do nothing at all. If the deadweight loss is small enough, perhaps because market demand, market surplus curves are sufficiently inelastic,

the triangle for the deadweight loss could be narrow enough that the government might give upon reducing that inefficiency.

We will say, at the end, that one possibility would be to allow the monopolies to price discriminate.

Because we will say that if the monopolist can charge different prices to different consumers, he would face only the output effect in his decision to choose quantities, but no price effect.

When the monopolist decreases its price for additional consumers, it would not have to lower the prices of existing consumers.

So he would not face the price effect.

And he would not have an incentive to reduce quantity in the market as much as without price discrimination.

We will talk about that a little bit, OK?

Looking at the demand curve, marginal revenue curve, and marginal cost curve of the monopolists (and for now, please ignore the yellow lines), we need to think that one way to regulate monopolists would be to set a price gap or price ceiling that the monopolists can charge, or to regulate minimum output level that the monopolists can produce.

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And in this way, by using this command and control policy, the government could remove the inefficiency from the monopoly.

Well, how about market base policy, such as taxes?

What if we taxed the output of the monopolists? Well, this would not work, actually.

Remember that taxes on suppliers shift the supply cure upward, and so if we shifted the marginal cost curve or supply curve of the monopolists upward, the new intersection of marginal cost and marginal revenue curve would occur up and to the left to the original point

So the inefficiency in market would even increase

Even less output will be produced compared to the efficient level.

So, the taxation of output would not work to fix the inefficiency of the monopoly.

On the other hand, subsidy could work.

If we offered monopolists subsidy to produce output, the supply curve would

effectively fall, and the new intersection (it could happen that the new intersection) of the marginal cost curve and marginal revenue curve would occur exactly at the efficient level of output so that the inefficiency could be removed

Another type of taxation that the government might consider is taxing profit rather than output level.

If the government is only concerned with the redistribution of welfare between consumers and monopolists, but not about the inefficiency from the monopoly, we could show that the government could take some of the profits of the monopolist and wait, and maybe redistribute back to the consumers, without influencing the monopolists output decision.

So, using the marginal revenue and marginal cost curve, we can draw the marginal profit curve of the monopolist that's just the difference between those two.

And suppose that the government decides to tax, suppose twenty percent off monopoly profits.

In that case, the marginal profit curve would fall by twenty percent.

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Right? Affectively, every time the monopoly produces one unit of output and experiences some marginal profit these marginal profits would be smaller by twenty percent compared to the no tax situation.

But, because the tax of on profits is in terms of percentages of profits the marginal profit curve would still intersect the horizontal axis at the same output level.

So, we would still get the property that monopolies would want to produce all of these units of output and would not want to produce these additional units of output both without the tax on profits and with the tax on profits.

So, the conclusion from this this graph is that if the government is concerned about welfare consequences of monopoly.

The government could succeed in redistributing some of the surplus from the monopoly to consumers but using taxes on profits.

The government would not succeed and removing the inefficiency from monopoly.

Ok? Finally let's at the end of the chapter, there is a small discussion of natural monopolies and then, price discrimination by monopolies.

Natural monopoly is a, is an industry or company which has continuous falling average total cost curve either because of large fixed cost of operation or variable costs that are lower and lower per unit with the greater output levels.

We might observe this average total cost curve.

With this kind of company, we could again observe how much a competitive industry would produce, how much a monopolistic company produce and add what prices.

If we draw the demand curve in the market and the corresponding marginal revenue curve for a monopolist we would observe that a monopolist would want to produce this output level at this price.

Perfectly, competitive industry would compete the price down all the way to the level of marginal costs but the problem with the perfectly competitive outcome which we would say.

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It is the efficient outcome, is that at this output level.

Companies are not covering their total costs of production.

Note is that average revenues do not cover the entire average total cost of production.

If the government wanted to achieve this efficient output level, it would have to subsidize the providers in some way.

One way would be too offer per unit subsidy.

So effectively, the government could decrease the marginal costs faced by companies from this level by the amount of the subsidy to this lower level.

And if this of per unit subsidy is large enough the intersection of the monopolists, marginal revenue and marginal cost curve could occur exactly where exactly the efficient level of output.

But you may think that this could be very expensive program because in this case the government would have to offer this per unit subsidy times this output level.

So the cost of the subsidy would be this large rectangle here.

Alternatively, the, the government could impose a quota or command and control instrument.

The government could require the monopolist to produce this output level, and that the government could compensate for the losses that the monopolist would, would obtain.

So, indeed, the government could offer this lump sum subsidy to the monopoly. Just so that the monopolist would, would achieve zero profit.

Ok? Finally the third possible solution is that, maybe these government programs are not feasible, maybe taxpayers would not be willing to pay these subsidies to

monopolists.

Indeed, the government could find a compromise between the monopoly outcome and the perfectly efficient outcome.

For example, the average, average cost, pricing outcome.

Indeed, the government could required the monopolist to produce this output level at these prices where average revenue of the company is exactly equal to be average total cost of production.

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So, the producer achieves zero profits, and the producer would decide to stay in the market, and you can think that this outcome is not as bad as the unregulated monopoly outcome.

So, you may think that average cost pricing could be good compromise in real world situations when more efficient outcomes are too expensive or politically impossible.

In the final topic in this chapter is on price discrimination.

In general, you should think that prices don′t have to be constant in the marketplace.

Company scanner offers different prices to different consumers.

We can distinguish three kinds of price discrimination first degree or perfect price discrimination happens.

One every consumer can face a different price, or in general, when every unit of output that it sold in the market can be sold for different price.

I will give you a handout on this form of price discrimination along with examples when we observe this form of price discrimination in the real world.

Second-degree price discrimination, usually we say that happens when the producer offers quantity discounts, or quality premiums for certain consumers.

And then the producer allows consumers to self-select themselves into how much quantity or how much quality to purchase.

So, in that case the producer offers different bundles, different quantities, and different prices and consumers based on their willingness to pay and ability to pay choose whether they want to buy larger quantity at lower average prices, or smaller quantity at higher average prices.

Or consumers choose how much quality they want from their product they can choose higher quality products for higher prices or lower quality products for lower prices.

So the important property about second-degree price discrimination is that consumer's self-select.

There are these bundles available the provider doesn't force consumers to select any particular bundle, it lets consumers to choose.

Third-degree price discrimination is in a way similar to first-degree price discrimination.

It happens when there are easily identifiable different groups of consumers.

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And the monopolist can charge different groups of consumers different prices.

In the real world, you can think that there are sometimes men and women phase different prices. Children, adults phase different prices.

And these are situations when the monopolist can charge different prices to different consumers, based on consumer's different willingness to pay. Okay?

So let's look at the simple example of perfect price discrimination.

In that case, if the monopolist faces this market demand curve, the monopolist doesn't have to charge the same price to all consumers.

So if a consumer has very high willingness to pay, the monopolist can charge this consumer a price all the way up to the consumer's willingness to pay.

And for consumer with lower willingness to pay, the monopolist might charge him lower price to extract as much of consumer surplus as possible, and so the nice and the important property of a price discrimination is that the monopolist doesn't face the price effect when he chooses how much of the product to supply.

When the monopolist decides to cater to this marginal consumer, the monopolist doesn't have to lower prices faced by previous consumers. Right?

For the non-price discriminatory case, we said that the monopolist would stop producing at this output level, because the output effect was somehow balanced with the price effect the monopolist will spacing.

With price discrimination, the monopolist would find it profit maximizing to produce all of this output levels, because even for these output levels, consumer's willingness to pay is above the cost of a production.

And so the monopolist would only stop producing at this output level which turns out to be the perfectly competitive or efficient output level.

Talking about welfare, in that situation remember that without price discrimination, we would say that the producer surplus of the profit of the monopolist is this rectangle here.

Consumer surplus is this triangle here without price discrimination we had dead weight loss.

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Now with price discrimination, all of these units will be produced.

All of this area will be given to the monopolist as his profit, because the monopolist will charge prices equal to willingness to pay of each consumer.

And so you may think that the dead weight loss will disappear, there will not be any inefficiency anymore.

And all of the consumer's surplus will be converted to producer surplus.

So somewhat surprisingly we find that when the monopolist can price discriminate he not only increases his own profits but he also reduces or eliminates the inefficiency in a monopolistic market.

So in terms of welfare, we might be worried that in with price discrimination the monopolist gets more of the industry surplus for himself.

But from efficiency point of view, we might like price discrimination because there is no, there no resources wasted in the marketplace.