Lecture Note 4: Welfare Effects of Monopoly

Nobody likes monopolies. We all have an intuitive sense that monopolies are "bad". But what's the economic argument against monopolies, and what can we do about them?

In Lecture Note 3, we saw an equation for the monopoly's price markup:

$$\frac{p^* - MC}{MC} = -\frac{1}{1+\varepsilon}$$

As long as $\varepsilon \neq -\infty$, a monopolist charges a markup over marginal cost. Unlike a price-taking firm, a monopoly has **market power**—the ability to set a price above marginal cost without losing all of its customers.

When a monopolist exercises market power, society is worse off.

- By cutting back on output, a monopoly can drive up the price.
- Doing so is profit-maximizing, up to a certain point.
- We therefore see *higher prices* and *lower quantities* under monopoly than under perfect competition: $p_m > p_c$ and $Q_m < Q_c$.
- As a result, some socially desirable transactions don't happen. These missing trades are missed opportunities to expand the economic pie.

Defining **total surplus** as the sum of consumer and producer surplus, we'll see that *monopoly reduces total surplus*: producer surplus goes up, but consumer surplus falls by even more. This creates **deadweight loss**.

Note: in addition to "total surplus", I sometimes use the terms "social welfare" or "social surplus". All of these terms mean the same thing.

Also: whenever we have either taxes or subsidies, we redefine total surplus as the sum of consumer surplus, producer surplus, and the government's net budget surplus (tax revenue collected minus subsidies given out).

Example: welfare losses from monopoly

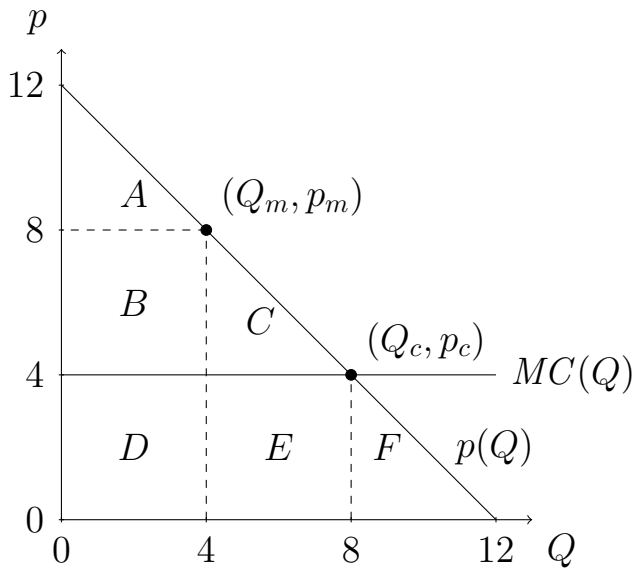
Let's take another look at a problem from Lecture Note 3:

- Demand curve: $p(Q) = 12 - Q$
- Cost function: $C(Q) = 4Q$

Comparing the monopoly outcome to the perfectly competitive outcome:

- Monopoly: $Q_m = 4$, $p_m = 8$
- Competitive: $p_c = C'(Q_c) \implies 12 - Q_c = 4 \implies Q_c = 8, p_c = 4$

How does monopoly affect total surplus?



Perfect competition:

- CS: $A + B + C$
- PS: 0
- DWL: 0

Monopoly:

- CS: A
- PS: B
- DWL: C

Total surplus falls by C. From $Q = 4$ to 8, consumers' willingness to pay (given by the demand curve) exceed the firm's marginal cost of production, so there are potential "gains from trade" here. But these trades don't happen: they are missed opportunities, and so we have deadweight loss.

The other areas in the graph have economic meaning, too. What are they?

- D: total production costs incurred under monopoly.
- E: additional production costs incurred under perfect competition.
- F: value of the good to consumers whose willingness to pay is < 4.

Transfers vs. deadweight losses

Relative to perfect competition, a monopoly entails both:

- a **transfer** from consumers to producers.
- the creation of **deadweight loss**.

What's the difference between a transfer and a deadweight loss?

	transfers	deadweight loss
what they mean	money is taken from somebody and given to somebody else	something of value is lost to society as a whole
why monopoly creates them	consumers pay more for each unit they buy, relative to what they'd pay under competition	some transactions don't occur even though the consumer's WTP exceeds the supplier's MC
why they matter	distributional reasons (how we divide the pie)	efficiency reasons (how big the pie is)
reduces total surplus?	no: gain in PS exactly offsets decrease in CS	total surplus shrinks

This distinction becomes very important when policymakers think about whether, and how, the government should intervene in the economy.

If a proposed policy creates a deadweight loss, there's nothing we can do. But if a policy results in some undesirable transfer between two parties—say from the poor to the rich—then (at least in principle) there's some way to reverse that transfer through carefully designed taxes or subsidies.[1]

[1] In practice, designing and implementing such "reverse transfers" is both economically tricky and politically challenging. For this reason, economists care a lot about the direct distributional impact of each public policy we consider, because those distributional impacts tend to "stick."

Policy options to deal with a monopoly

Monopolies are very costly for society:

- Overpriced coffee $\implies$ undercaffeinated professors (very tragic).
- Overpriced internet $\implies$ too many people with no or slow internet.
- Overpriced medicine $\implies$ unfilled prescriptions, skipped doses.

What can we do about them?

One approach: **encourage competition** to prevent or end the monopoly.

- Make it easier for new firms to enter the market.
- Block mergers that would reduce competition.
- Break up existing monopolies into smaller firms.

Another approach: **regulate the monopolist**.

- Sometimes we just have to learn to live with a monopoly.
- Example: natural monopolies (e.g., electrical utility), where there's no way for two or more firms to make $\pi \geq 0$ at the same time.
- In these cases, governments will often *regulate* the monopoly, with the goal of convincing the monopoly to choose the same price and quantity we would expect to see under perfect competition.

Since monopolies produce less output than is socially optimal, one possible policy solution is to pay the monopoly a subsidy for each unit it produces.

We will focus on a different regulation commonly used in the real world: a **price ceiling** (also called a **price cap**), which is a legal limitation on the maximum price that the monopoly is allowed to charge per unit.

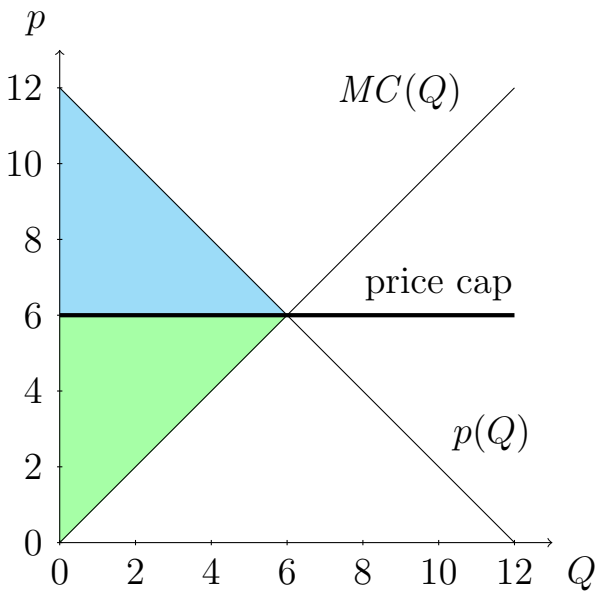
Imposing a price ceiling

Suppose that demand is $p(Q) = 12 - Q$ and costs are $C(Q) = \frac{1}{2}Q^2$.

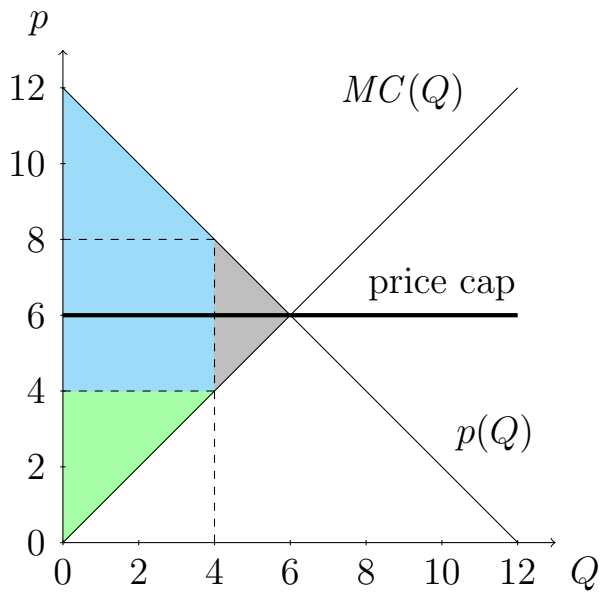
Competitive solution: $Q_c = 6$, $p_c = 6$. Monopoly: $Q_m = 4$, $p_m = 8$. (Exercise: check this.)

Suppose we pass a law requiring the monopolist to set a price $p_m \leq 6$. Under this new law, what price will the monopolist set?

If monopoly chooses $p_m = 6$:



If monopoly chooses $p_m = 4$:



- If the monopoly sets $p_m = 6$, it sells 6 units and makes \$18 in profits.
- If the monopoly sets $p_m <$ \$6—for example, $p_m = 4$—it *could* sell more than 6 units. But it wouldn't want to: instead, it would stop producing once $p_m = MC$, which in this example happens when $Q_m = 4$. Picking $p_m <$ \$6 always yields less than \$18 in profit.
- The profit-maximizing choice is $p_m = 6$ and $Q_m = 6$.

Do you see what just happened? We still have just one firm, but we've replicated the competitive outcome: $p_m = p_c$, $Q_m = Q_c$, and no DWL!

Why price ceilings can work

Here are three other ways of thinking about what's going on here:

1. The monopoly really wants to set $p_m = 8$. If we make $p_m = 8$ illegal, it will charge the highest price it is legally allowed to charge.
2. The reason monopolies produce too little is that they want to drive up the price. If we limit the price they can charge, that eliminates their incentive to keep their output low.
3. If the monopoly can't charge more than \$6 per unit, it doesn't have to lower its price to attract more customers (as long as $Q \leq 6$), since customers are already getting a good deal. The monopoly's MR is p—instead of $p(Q) + p'(Q)Q$—so it behaves like a competitive firm.

Practical challenges

Price caps are a perfect solution in theory, but hard to get right in practice.

- To pick the perfect price ceiling, policymakers need to know the demand curve and supply curve. Do you think they do?
- What if we set the cap too high (above the monopoly price p_m)? The monopoly will just ignore it and set $p_m = 8$ as before.
- What if we set the cap too low (below the competitive price p_c)? The monopoly won't be willing to produce enough to meet consumer demand. We'll end up with a shortage—in other words, DWL.

In markets with big fixed costs (e.g., electricity), a price cap set at p_c may leave the monopoly producer with $\pi < 0$—so it may never enter the market, or it may exit the market if its fixed costs are recoverable.

To avoid this, policymakers sometimes choose price ceilings that are below the monopoly price but above the competitive price, so that the monopoly can cover its fixed costs of production.

