Principles of Microeconomics : Chapter 5

Public Policies and Market Equilibria

I. A Short Review of the First 4 Chapters

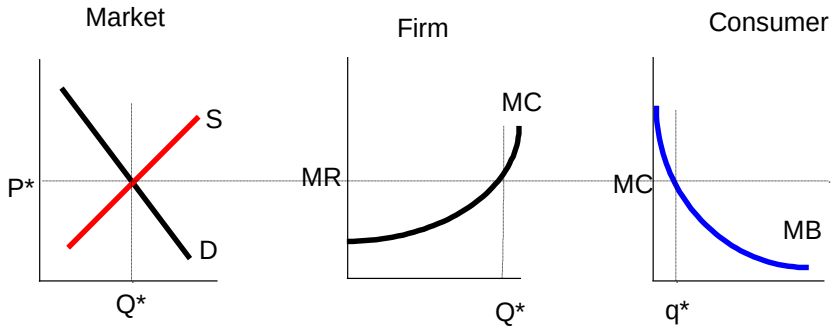
The first 4 chapters have shown that if people behave as "rational" net benefit maximizers, then demand curves tend to slope downwards and supply curves tend to slope upwards, and prices are a means through which all the millions of decisions between consumers, producers, and their suppliers can be coordinated.

The location of market demand curves is determined by individual marginal benefit curves. The location of market supply curves is determined by the marginal cost curves of the firms supply final goods to the market of interest. Anything that changes the location of (most) consumer marginal benefit curves or (most) marginal cost curves, thus, will cause market demand or market supply curves to shift.

Markets for inputs are driven by considerations that also can be represented as net benefits. Those that sell their labor do so because the value of the income received exceeds the opportunity cost of other uses of their time such as leisure (at least in their own minds). The demand for labor (and other inputs) varies with the marginal product of labor and with the value (price) of the output produced. Thus ,the demand for any input can be represented with a marginal revenue product curve, which simply the price that the firm's output can be sold for times the marginal product of the input being analyzed.

The link to output prices implies that as prices for a firm's ouput(s) increases, their demand for inputs do as well and thus more output is produced. If this increase in demand for inputs is sufficient, the prices paid for those inputs will tend to increase which attracts more of them to the industry of interest—as required to satisfy consumer demands for the product of interest.

Prices for final goods, in turn, gravitate toward the price that sets market demand equal to market supply. Prices change only when the circumstances of consumers or firms change—or, in some cases, when adjustments in patterns of consumption or methods of production, take place through time as consumers or firms adjust to new circumstances.



Not much of what we have covered was initially "intuitively obvious," which is why economics is a difficult subject for many students. However, the logic behind the above predictions about markets depends only on a simple form of rationality and the idea of diminishing marginal returns. These are not very strong assumptions about individual goals, but have many implications for how networks of exchange and production operate.

Most of the conclusions can be applied to essentially all markets, and by this time in the course, many of them should begin to seem natural—or intuitive, even if it was not at the start.

What we are doing in this course is developing logical foundations for a quite complete model of life in a commercial society. As discussed in the first lecture, this is also the main aim of positive microeconomics.

II. A Maximizing Social Net Benefits: Normative Microeconomics

Another strand of microeconomics attempts to judge the relative merits of different types of market outcomes. This is arguably outside the domain of science and in the domain of moral philosophy or political philosophy. It attempts to answer questions about whether market outcomes or "good" or not and the role of markets in "good" society—where the meaning of the term "good" in this case has to do with its desirability rather than simple as a shorthand for the things that get traded in markets (goods).

Positive research attempts to determine how markets operate. Normative research (a much smaller but still significant strand of economics) attempts to determine whether markets are generally ethically or morally good or not, and whether they can be improved on in some way.

One of the most common approaches to do so rests come from the field of philosophy called utilitarians. Utilitarians believe that the best society is one the maximizes the sum of lifetime happiness for its members. And if we use "net benefits" as an estimate of happiness, then we can use the sum of those net benefits (social net benefits) as an estimate of the sum of happiness in a given society.

It turns out that at the level of single markets, we can use some of results from the first four chapters to analyze the social net benefits realized in those markets. It turns out that in a long run competitive equilibrium, the sum of net benefits is maximized—and if one accepts the utilitarian norm and the use of net benefits to estimate happiness, then competitive markets in long run equilibrium are "good" in the utilitarian sense.

To see this, we need to go back to our derivations of individual demand and supply curves.

Marginal Demand Curves as Social Marginal Benefit Curves and Market Supply Curves as Social Marginal Cost Curves

Recall that an individual's demand curves go through the same points as his or her marginal benefit curve. Thus, the sum of the individual demand curves (in the Q dimension) goes through the same points as the sum of the individual marginal benefit curves. The sum of the individual demand curves is the market demand curve.

The sum of the individual marginal benefit curves is the social net benefit curve, whenever there are no other benefits from producing the good than those realized by consumers. In such cases, there are no "externalities" or no "external benefits." In those cases, a market demand curve (sum of individual demand curves) can be used as the social marginal benefit curve—in the absence of externalities. In such cases, all benefits are ultimately associated with consumer interests (although those benefits will normally be shared with firms at market equilibrium).

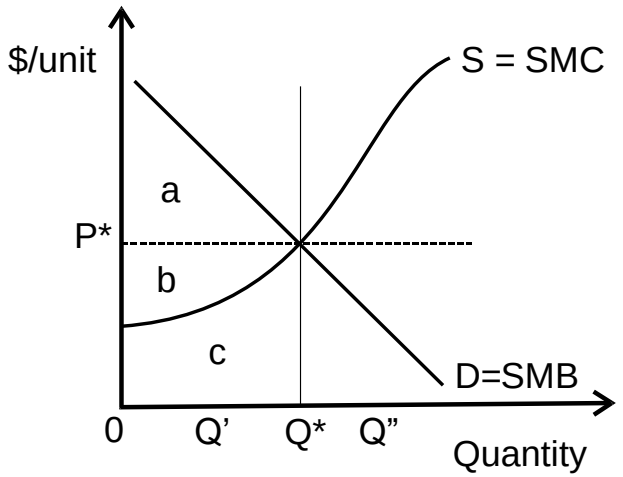
Likewise, recall that an individual firm's supply curves go through the same points as its marginal cost curve. Thus, the sum of the individual firm supply curves (in the Q dimension) goes through the same points as the sum of the individual firm's marginal cost curves. The sum of the firm supply curves is the market supply curve. The sum of the individual marginal curves is the social net cost curve whenever there are no other costs associated with producing the good or services of interest than those experienced by firms. In such cases, there are no "externalities" or "external costs." In such cases, all production costs are ultimately borne by firms.

Thus, a **market supply curve (sum of individual supply curves) can be used as the social marginal cost curve**—in the absence of externalities. It goes through the same (P,Q) points as the market supply curve. (This is true of both long and short run supply—but the costs and social costs differ in those cases for reasons that we discussed in chapter 3.)

Maximizing Social Net Benefits

Just as individual net benefits are maximized at quantities that set marginal benefits equal to marginal costs, social net benefits are maximized at quantities where social marginal benefits equal social marginal costs. Thus, social net benefits are maximized at the outputs produced in competitive markets (e.g. markets in which firms and consumers are all price takers).

Figure 5.2



- The market clearing price in figure 5.2 is P*. It induces the quantity demanded (Q*) to be equal to the quantity supplied (Q*) through the effects of that price on consumer net benefits and firm net benefits.
- To maximize social net benefits SMB(Q) should equal SMC(Q), which occurs at the same Q* in this case.
- Thus, social net benefits are maximized at the output generated by market adjustments when they reach equilibrium.
- The social surplus is divided between consumers and firms. Consumers jointly share area "a" and firms jointly share area "b".
- The social cost of the goods produced is indirectly paid for by consumers through their purchases of the goods sold (area c) although those costs are directly paid by the firms.
- The firms would not have borne those costs (temporarily) without the expectation that they would generate profits in the future.

Markets that can be characterized with demand and supply curves thus tend to produce outputs that maximize social net benefits.

They also--at both the level of single markets and an overall system of markets--tend to achieve **Pareto optimal outcomes**. (A Pareto optimal outcome is one from which no change is possible that can make at least one person better off without making anyone else worse off.) Note that any change in quantity away from Q* will tend to make firms and/or consumers worse off.

Both these normative results follow from our ability to use demand curve to represent consumer marginal benefits and to use supply curves as industry marginal costs—as long as there are no externalities, and we regard social net benefits to be useful estimates of social welfare.

The chapter 6 other less competitive market environments will be analyzed. That subfield of economics is normally called "Industrial Organization." It analyzes in somewhat more detail the characteristics do firms and consumers need to have if they are to behave more or less as price takers? And it explores what happens if those characteristics are lacking. In those markets—social net benefits are not always maximized in equilibrium, but the existence of such markets always adds social net benefits to those produced by other markets—as we will see.

III. Government Policies and Market Equilibria

Governments have played an implicit role in all the results that we have worked out to this point in the course. It has been assumed that individuals own various goods and services, can buy and sell them, and that contracts will be enforced. In most settings, it is governments that define "property rights," enforce contracts, and punish law breakers. Thus, a government that enforces a civil law code that supports or at least allows market transactions to take place has been assumed throughout the first four chapters and will be assumed for most of the rest of the course (and its associated set of web notes).

Such governmental activities are "productive" because they make markets work more efficiently (by reducing transactions costs) which tends to increase social net benefits for reasons that were partly developed in the previous section of this chapter.

However, not all government policies are productive in this sense—which is part of the reason that large-scale commercial societies failed to emerge in earlier times as was discussed and illustrated with some data in chapter 1.

The remainder of this chapter provides a short analysis of two public policies that can reduce the size and scope of markets and thus which tend to reduce social net benefits. Such policies may produce other benefits—at least in some cases—but their direct effects are to reduce those generated by the markets that are directly affected by them.

Price Controls

One of the simplest and most troublesome types of regulations that can be imposed by a government is price controls on competitive markets. A price control normally sets a maximum price at which a good or service can be provided. When the price is above the market clearing price, there is no problem, because markets can operate in their usual manner and prices will be able to adjust to clear markets. However, when price con-

trols are set at levels below market clearing prices, then that adjustment process cannot operate, and the quantity supplied tends to be "stuck" at levels below the quantity demanded. **As a result, shortages occur.**

[As an exercise draw a market in equilibrium, then draw a price control, as a price limit below the market clearing price. Note that demand is always higher than supply at such prices and not also the size of the shortage. The further below the equilibrium price the price control is set, the greater tends to be the shortage.]

This is the usual effect of, for example, rent controls applied by city governments.

During the 1970s there were petroleum "supply shocks" (partly political in nature) that reduced the supply of gasoline in the US and caused prices to rise to clear the markets.

The national government intervened with price controls on gasoline which—as predicted—led to shortages. Gasoline station ran our of gas and lines were long at gas stations that still had supplies. (The supply shock was reinforced by a short run increase in demand as consumers attempted to build inventories to weather the anticipated shortages.)

Numerous methods to ameliorate the shortage were tried including limiting purchases to every other day according to license plate numbers (Odd plates could only purchase on m, w, f, and even plates on t, th, sat) and so forth—which of course encouraged increases in inventories by consumers worsening the problem.

In the end, the government finally relented and released the price controls and the shortages quickly disappeared.

Barriers to Entry

Entry barriers limit the number of firms that are able to supply goods or services—usually in particular markets, but sometimes in many markets simultaneously.

For example, permits or licenses of some kind may be necessary to open up a store, factory, or to produce the service. The cost required to obtain the permits or licenses (both in money terms and opportunity cost terms) tends to reduce the net benefits realized by potential producers, which reduces the number of firms in the market of interest either in the long run or in both the long and short run.

In some cases, entry may be forbidden by law, because only one firm or a relatively small group of firms has the right to produce a particular good or service. (Such market privileges were common in Europe's Middle Ages before commercial societies emerged.)

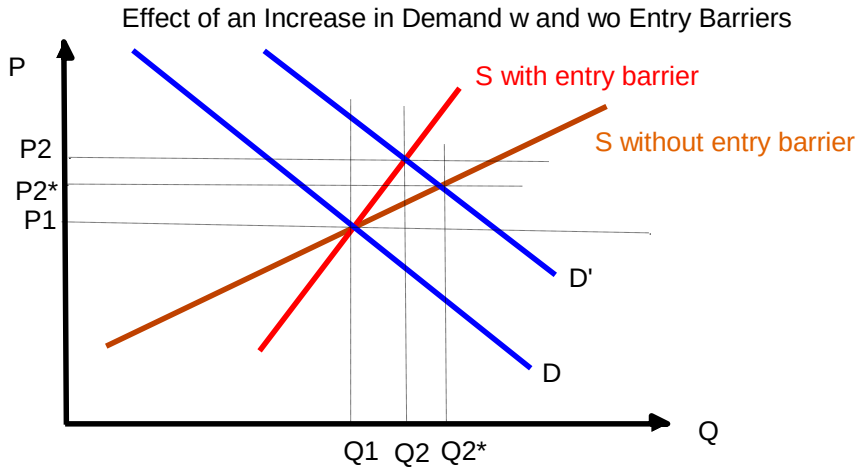
Entry barriers reduce long run supplies or both long and short run supplies in the market so regulated.

This, for reasons worked out in previous chapters tends to cause higher prices for consumers. It also tends to reduce overall social net benefits, although it tends to increase the profits of firms (and other service providers) that are permitted to produce the services of interest.

To illustrate this effect, suppose that a new law prevents entry (or significantly reduces entry) in a previously open and competitive market, but allows all current suppliers to continue producing and selling their goods or services.

- Such regulations tend to reduce the number of firms (number of suppliers) to levels below their long run equilibrium levels.
- For example, doctor salaries remain very high, well above other that of other graduate degrees requiring similar talents, partly because there are limits on the number of doctors that can be "produced" (e.g. Graduate from medical schools) every year. [The US has about 20% fewer doctors per capita than other Western countries.]
- Such effects may not be evident in the short run, but will be in the long run if, for example, market demand increases because of an increase in income or in the perceived value of the service of interest.

Public Policies and Market Equilibria



Note that as demand increases price rises more in the market with entry barriers than it would have in the absence of entry barrios (or smaller ones). This causes profits to be higher and consumer surplus to be lower. It also tends to reduce social net benefits to levels below those associated with the "open" market by reducing the scope for exchange (note that $Q_2<Q_2^*$).

The entry barrier for doctors (and nurses) tends to have this effect, but also tend to improve the quality of medical care to some degree—which arguably (but not necessarily) may yield benefits (increased longevity or health) that exceed their costs.

Whether social net benefits are increased or not requires those other benefits to be taken into account. However, it is important to note that not all such barriers to entry do so even when other benefits are realized (even in healthcare).

(European doctors, for example, have shorter training period, but Europeans live longer than Americans. This may imply that US barriers to entry are higher than they "should" be—which is to say that the mandated education of doctors may be greater than necessary to maximize longevity.)

[As an exercise, (1) redraw the above diagram and label all the net benefit areas. (2) Draw another where the effect on long run supply is larger and note differences in the effects on consumer surplus, profits, and social net benefits. (3) In which case are entry barriers more harmful?]

As the number of firms or consumers falls from hundreds or dozens to just a handful, it become more likely that a single firm's output decision will have a clear, observable, effect on market supply or demand. In those cases, it is not likely that firms will behave as price takers. They will understand that their supply or purchase decisions will affect market prices.

When the number of firms or consumers becomes so small that pricing-taking behavior on the part of firms (or other suppliers) becomes implausible, then we shift from "competitive" market models to other models of market behavior such as the monopoly (single firm), duopoly (two firms), and monopolistic competition (lots of firms selling similar but not identical products) models.

In those cases, markets still tend to clear, but by conscious decisions by firms, rather than as an unintended consequence of inventory adjustments.

We take up other "market structures" in lecture 6.

Policies that Raise Transactions Costs

Policies that clearly define property rights, enforce contracts, and penalize property crimes and fraud tend to reduce "transaction costs."

However, there are other policies that tend to raise transactions or information costs. For example, regulations on labelling may induce firms to produce more or less information about their products at the point of sale or may require the prices be clearly posted and apply to everyone or not.

Such rules tend to broaden the range of prices that firms can successfully sell their products at.

This price variation effect may occur because (a) consumers may not know where the lowest priced source of a good or service is, or (b) because consumers will take account of the cost of waiting in line at the lowest cost sources of the goods.

[In effect their true price is the "posted price" plus their search and transactions costs. These higher prices tend to reduce demand, other things being equal, which reduces consumer surplus, sales and the gains from trade realized in such markets.

IV. The Economic Effects of an Excise Tax

Government services are, of course, not fee. They require a variety of resources, and these are normally purchased from markets. Government employees are paid salaries, just as workers in the private sector are. The government buys computers and automobiles and even tanks and missiles from private suppliers.

In order to produce its various services and create and enforce laws resources have to shifted from the private sector to the governmental (or public) sector.

Because relatively few governmental services are sold or even when sold are sold at prices sufficient to pay for their production costs, the money to pay for the inputs required to produce those services normally comes from taxes of various kinds.

Taxes turn market transactions from ones that involve two parties (buyers and sellers) into transactions that involve three parties (buyers, sellers, and government).

In this subsection of chapter 5, we'll analyze the effects of relatively simple "flat" taxes on sales of particular products.

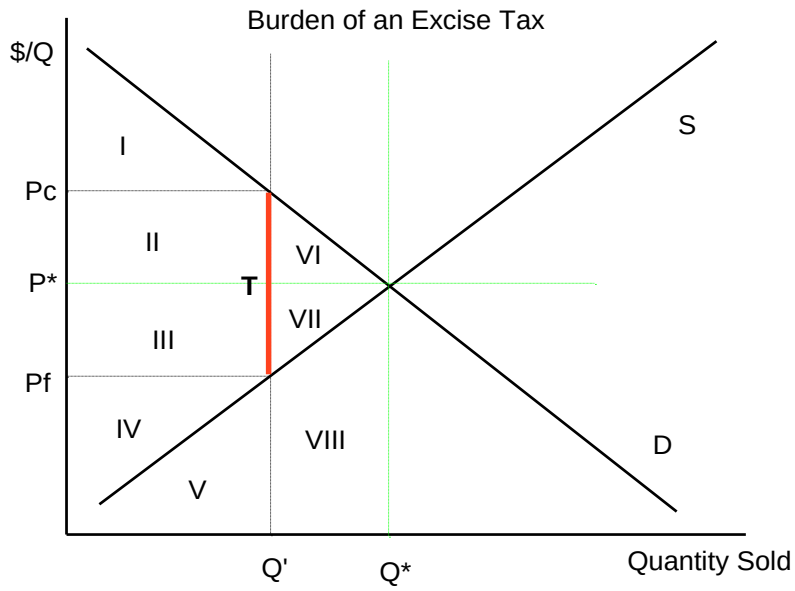
Such taxes are called excise taxes. They include various taxes on cell phones, tires, airfare, alcoholic beverages, and so on. In addition, the same or very similar models can be used to analyze some of the main effects of taxes on labor income and profits.

An Illustration

Suppose that a market is initially in an equilibrium without taxes, so that demand equal supply at P*. In this case, there is no "tax wedge" between the price paid by consumers, Pc, is the same as that received by firms, Pf; so, Pf=Pc=P*.

Now, suppose that an excise tax of **T** is imposed on each unit of the good sold in this market, as for example is done with tire sales in the US.

- After the tax is imposed, P* is no longer the market clearing price.
- If **T** is simply added to P* by firms, consumers will purchase too little at their new price (Pc = P* + T) to match supply, which would remain at Q*.
- If **T** is simply added to P* by firms, consumers will purchase too little at their new price (Pc = P* + T) to match supply, which would remain at Q*.
- On the other hand, if firms simply "ate" the tax, they would provide too little of the good to meet demand (at their after-tax price of Pf = P* - T). The quantity supplied would fall and demand would remain at Q* if Pc = P* and Ps = P* - T.



To clear the market, thus, firms have to receive less than P* per item sold, and consumers have to pay more than P*.

- At the new equilibrium output, the demand curve will be exactly T dollars above the supply curve, and Qd(Pf + T) = Qs(Pf).
- This equilibrium output is shown in the diagram. At Q', supply equals demand, if the price paid by consumers is exactly **T** dollars higher than the amount firms receive (Pf = Pc - T).
- Q' units of the good are sold, with Q'<Q*.
- At this equilibrium, there is a sense in which the tax has simply been passed onto consumers, because Pc = Pf + T.

However, there is another sense in which the **burden of taxation is shared** by firms and consumers, because both consumer surplus and profits have been diminished by the tax!

- **Consumer Surplus falls** from area I + II + VI (before the tax at Q*) to just area I after the tax is imposed and output falls to Q'.
- Similarly, **Profit falls** from III + IV+ VII (before the tax at Q*) to area IV (after the tax at Q').
- The burden on consumers is II + VI, and that on firms is III + VII.

Note that **this distribution of the loss of consumer and firm net benefits occurs regardless of who actually writes the check to the state or federal treasury. It is a product of market adjustments.**

- That is to say, the price adjustments necessary to clear the market of interest ultimately determine the actual division of burden between firms and consumers.
- If firms send in the check, their effective "payment" is reduced by the increase in price paid by consumers.
- If consumers write out the checks, their effective "payment" is reduced by the price decrease absorbed by firms.

The amount of revenue raised by the tax is **T***Q'.

- Q' units are sold and each unit generates a revenue equal to **T** dollars.
- The total tax revenue, **T**Q', can be represented in the diagram as the area of a rectangle, in particular, the area II + III.
- (Note that II + III is the area of a rectangle T tall and Q' wide.)

Notice that the tax revenue is smaller than the "surplus" lost by taxpayers (the firms and consumers) in the affected market.

- The reduced profit plus the reduced consumer surplus equals {II + VI} + {III + VII}.
- The total burden of this tax is VI + VII larger than the tax revenue.
    - This area of "excess burden" is sometimes referred to as the **deadweight loss of an excise tax**.

Both the extent of the deadweight loss and the distribution of the tax burden vary with the slopes of the supply and demand curves. **Generally, more of the burden falls on the side of the market with the least price sensitive curves.**

- If the demand curve is less price sensitive (less elastic) than the supply curve, more of the burden falls on consumers than on firms.
- In the extreme case in which market demand is completely inelastic or the industry supply curve is a horizontal line (completely elastic), all of the burden falls on consumers!
- On the other hand, if the demand curve is very elastic, because good substitutes exist, or the supply curve is relatively inelastic then more of the burden tends to fall on the firm.
- In the extreme case in which the market supply of the product of interest is completely insensitive to price (perfectly inelastic) or consumer demand is a horizontal line (perfectly elastic), all of the burden falls on suppliers.
- The excess burden of a tax tends to increase with the price sensitivity (slopes or elasticity) of the demand and supply curves.

Both supply and demand tend to be **more elastic in the long run than in the short run**, as developed in chapter 3. Thus, the excess burden of taxation tends to be larger in the long run than in the short run.

V. Some Practice Problems and Puzzles

1) Contrast the effects of a regulation that creates a barrier to entry (or exit) with one that imposes a cost increasing production technology (as often are associated with environmental regulations).
2) Many professions have licensing requirements of various kinds. All of these tend to create entry costs. Do they all have the same effects on supplier net income (profits) in the long run? Why or why not?
3) Countries often have rules and regulation that make it more difficult for foreign providers of goods and services to enter a nation's markets. Show how such regulations affect long run supply in Ricardian and Marshallian markets. It can be argued that this "supply" effect is often greater in Ricardian than in Marshallian markets--explain why.
4) To what extent are college education requirements simply an entry barrier?
5) Are college degrees simply a form of information that reduces search costs?
6) In addition to barriers to entry, regulations often reduce the range of prices and price adjustments that can take place in a particular market.
7) How do price controls (ceilings and floors) affect market equilibria in the short and long run?

[See your class notes for a wider variety of illustrating diagrams and realistic examples than covered in the web notes.]