

I. Positive and Normative Economics

- A. In areas dealing with public policy, it is often important to distinguish between the scientific problems of explanation and prediction and the ethical problems of evaluation and recommendation. While controversy may be associated with many of these problems, the scope for disagreement is larger for the latter than for the former.
- B. Many philosophers of science distinguish between normative and positive statements. (See for example Karl Popper's *the Logic of Scientific Discovery*.)
- A **Positive Statement** is a statement about what is, has been, or will be.
 - It is a statement about the world.
 - A **Normative Statement** attempts to evaluate the desirability of alternative states of the world or alternative public policies.
 - Generally, normative statements conclude that a particular policy is good or bad, is Pareto optimal or not, should be undertaken or not, etc. Confusion often occurs because reasoned normative statements often include a positive clause to support their conclusions. E.G. X is a bad policy because X increases unemployment.
 - Many normative statements include some positive statements as a fact base for their conclusions about what a good policy looks like.
 - A Keynesian macro economist might argue that deficits should be increased because it will reduce unemployment. That deficits increase employment is positive statement (which may be true or false) The conclusions that deficits are a good policy (or not) depends on whether you believe unemployment is a bad thing or not--even if you believe that the positive claim is true.)
 - Most positive statements are "operational." *Operational statements* are statements that can be tested to determine whether they are true or false.
 - Not all positive statements are testable, however, and some normative statements are testable in cases where normative theories refer to measurable indices of "the good" such as "social net benefits" !
 - Examples of statements that can be classified as positive (p) or normative (n):
 - The moon is made of green cheese. (p, but false)
 - Minimum wage laws always increase unemployment. (p, probably true)
 - Excise taxes always reduce sales of the product taxes. (p, probably true)

- Tariffs are a bad policy because they reduce consumer welfare. (n, probably true)
- Mass transit reduces air pollution. (p, probably true)
- Mass transit should be subsidized because it reduces air pollution. (n, possibly true)
- Global warming can only be reduced with a high carbon tax. (p, probably false)

C. Examples of well-developed normative theories

- The Pareto Criteria
- Utilitarian Social Welfare Criteria
- Cost Benefit Analysis / the Compensation Principle
- Contractarianism

D. Examples of somewhat less developed normative theories:

- "green" ideology
- conservative ideology
- most natural right theories
- many, but not all, religious based normative theories
- Any other theory or ideology that allows one to determine "the best or worst" policy, but where a good deal of intuition is required to apply the norm.

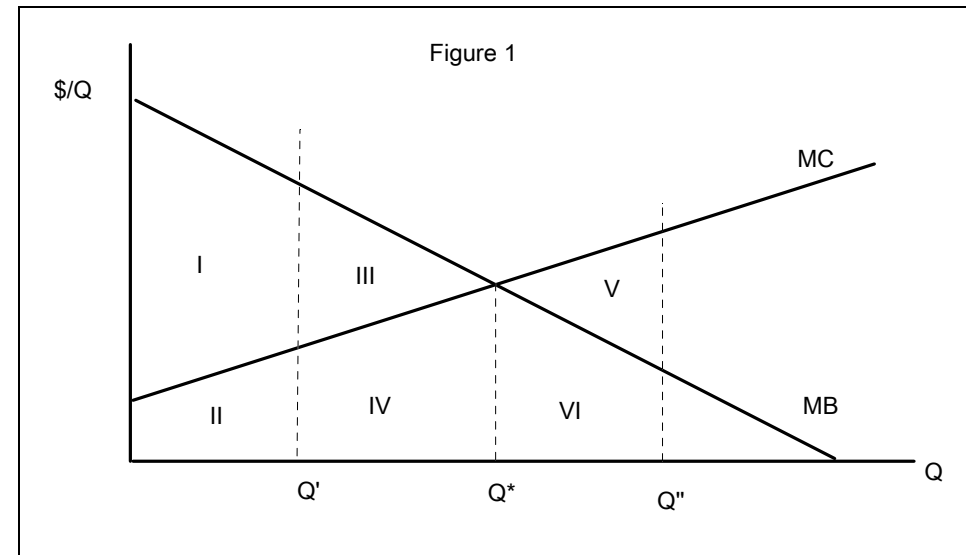
II. The Fundamental Geometry of Net Benefit Maximizing Choice

- A. Nearly all economic models can be developed from a fairly simple model of rational decision making that assume that individuals **maximize** their private **net benefits**.
- There are some specialized names that economists use for net benefits, but the logic (geometry) of choice is similar for all net-benefit maximizing choices.
 - Consumers maximize consumer surplus: the difference between what a thing is worth to them and what they have to pay for it. $CS(Q) = TB(Q) - TC(Q)$

- iii. Firms maximize their profit; the difference in what they receive in revenue from selling a product and its cost of production: $\Pi = TR(Q) - TC(Q)$
- B. The change in benefits, costs, etc. with respect to quantity consumed or produced is generally called Marginal benefit, Marginal cost, etc..
 - i. DEF: **Marginal "X"** is the change in 'Total "X"' caused by a one unit change in quantity. It is the slope of the Total "X" curve. "X" $\in$ {cost, benefit, profit, product, utility, revenue, etc.}
 - ii. *Important Geometric Property.* Total "X" can be calculated from a Marginal "X" curve by finding the area under the Marginal "X" curve over the range of interest (often from 0 to some quantity Q).
 - iii. This property allows us to determine consumer surplus and/or profit from a diagram of marginal cost and marginal revenue curves.
 - iv. It also will be used through out the course to calculate similar net benefits for industries, consumers, or society as a whole, and helps to make the logic of (normative) welfare economics clear.

C. Examples:

- i. Given the marginal cost and marginal benefit curves in Figure 1, it is possible to calculate the total cost of Q' and the total benefit of Q'.
- ii. The first step is normally to label the areas so that one can do some "area arithmetic." The relevant areas are those under the MB and MC curves in the range of interest.
- iii. In Figure 1, total cost is the area under the relevant actor's (consumer or firm's) marginal cost curve, here $TC(Q') = II$ and $TC(Q'') = II + IV$.
- iv. Total benefit is the area under the relevant actor's (consumer or firm) marginal benefit curve, here $TB(Q') = I + II$.
- v. Because net benefits are total benefits minus (less) total costs, one **can calculate the net benefits** by finding the actor's total benefit and total cost for the quantity or activity level of interest, and subtracting them.
- vi. Thus the net benefit of output Q' is $TB(Q') - TC(Q') = [I + II] - [II] = I$.



- vii. Use Figure 1 to determine the areas that correspond to the total benefit, cost and net benefit at outputs Q* and Q''.
- viii. Answers:
 - $TB(Q^*) = I + II + III + IV$, $TC(Q^*) = II + IV$, $NB(Q^*) = I + III$
 - $TB(Q'') = I + II + III + IV + VI$, $TC(Q'') = II + IV + V + VI$, $NB(Q'') = I + III - V$
- D. If one attempts to maximize net benefits, it turns out that generally he or she will want to consume or produce at the point where marginal cost equals marginal benefit (at least in cases where Q is very divisible).
 - i. There is a nice geometric proof of this. (The example above, C, nearly proves this. Note that $NB(Q^*) > NB(Q')$ and $NB(Q^*) > NB(Q'')$.)
 - ii. In the usual chase, a net-benefit maximizing decision maker chooses consumption levels (Q) such that their own marginal costs equal their own marginal benefits. They do this not because they care about "margins" but because **this is how they maximizes net benefits** in most common choice settings of interest to economists.
 - (Another common choice that maximizes net benefits is $Q^* = 0$. Why?)

- iii. This characterization of net benefit maximizing decisions is quite general, and can be used to model the behavior of both firms and consumers in a wide range of circumstances.
 - iv. Moreover, the same geometry can be used to characterize ideal policies if "all" relevant costs and benefits can be computed, and one wants to maximize *Social Net Benefits*.
- E. That each person maximizes their own net benefits does not imply that every person will agree about what the ideal level or output of a particular good or service might be.
- i. Most individuals will have different marginal benefit or marginal cost curves, and so will differ about ideal service levels.
 - ii. To the extent that these differences can be predicted, they can be used to model both private and political behavior:
 - (What types of persons will be most likely to lobby for subsidies for higher education?
 - What types of persons will prefer progressive taxation to regressive taxation?
 - What industries will prefer a carbon tax to a corporate income tax?)

III. Deriving Supply and Demand Curves using the Net Benefit Maximizing Model

- A. One can **use the consumer-surplus maximizing model to derive a consumer's demand curve** for any good or service (given their marginal benefit curves) using the following recipe:
- i. Choose a price, P_i .
 - ii. Finding the implied marginal cost curve for a consumer, MC_i .
 - iii. Use the MC_i and the consumer's MB to find the CS maximizing quantity of the good or service, Q_i^* .
 - iv. Plot the price, P_i , and the CS maximizing Q_i^* .
 - v. Repeat with other prices to trace out the individual's demand curve.
- B. Note that the individual's demand curve is a subset of the points on his or her MB curve.
- (We did this in class, but draw an easy MB curve and derive a demand curve using this method using a pencil and paper.)
- C. Similarly, one can use a profit maximizing model (another measure of net benefit) to derive a competitive firm's **short run** supply curve, given its marginal cost curve. The recipe is very similar:
- i. Chooses a price, P_i .

- ii. Find the implied MR (MB) curve for the firm. For a "price taking" this will be a horizontal line equal to the the price chosen.
 - iii. Finds the firm's profit maximizing output, Q_i^* ,
 - iv. Plot the price, P_i , and the associated output, Q_i^* .
 - v. Repeat with another price to trace out a supply curve.
- D. Note that the firm's supply curve is a subset of the points on its MC curve.
- E. Derivation of a firm's Long Run supply can be done in the same way, but using each firm's LR MC curve (which is useful for the derivation of the LR Ricardian Supply curve).
- F. (As an exercise draw some "strange" looking MB and MC curves and derive their associated demand and supply curves.)

IV. Markets, Externalities, and Social Net Benefits

- A. Market Demand can be determined by varying price and adding up the amounts that consumers want to buy at each price.
- i. **Market Demand** curves for ordinary private goods, thus, can be shown to be "horizontal" sums of individual demand curves
 - ii. Similarly, **Market Supply** (for an industry with a fixed number of firms) can be derived by varying price and adding up the amounts that each firm in the industry is willing to sell at each price.
 - iii. **Market Supply** curves for ordinary private goods can be shown to be "horizontal" sums of individual firm supply curves.
 - iv. In the short and medium run, the number of firms in the industry can be taken as fixed. If all firms are assumed to be different and the number of firms who may participate in a given industry is fixed, then one can derive the short, medium, and long run supply curves using the same geometry, but beginning with each firm's respective short, medium, or long run MC curve.
 - v. When long run MC curves are used, the result would be a Ricardian long run supply curve.
 - vi. However, supply in the "Marshallian" long run reflects entry and exit of firms from the industry.
 - vii. (The process of entry and exit can also be analyzed. Incentives for exit and entry end when profits fall to zero. This fact allows the equilibrium numbers of firms to be found in Marshallian industries using long run

average cost curves of firms. "Zero" profit output levels for a typical firm in the industry can be computed using MR and MC and/or AR and AR curves. In the long run, such firms and outputs are simply replicated until market demand is satisfied.)

B. Note that derived in this way, it is clear that:

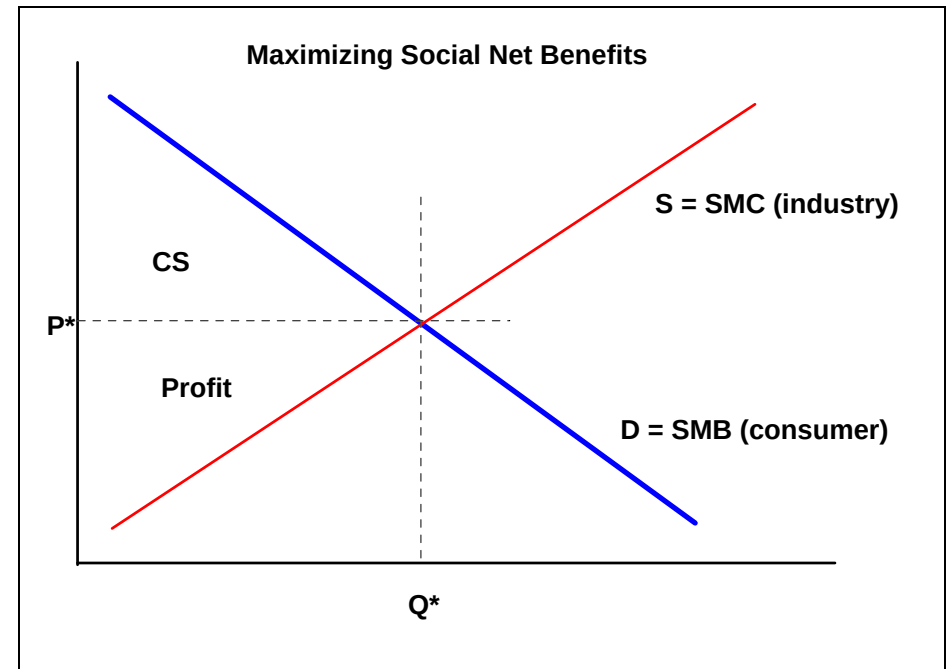
- i. Every market **demand curve is the sum of the marginal benefit** curves of the individual consumers, because each consumer's demand curve is essentially his or her MB curve.
- ii. Every short and middle run **market supply curve is the sum of the marginal cost** curves of the individual firms in the market, because each firm's supply curve is essentially its MC curve.
- iii. Consequently, market demand and supply curves can be used as social marginal benefit curves (for consumers) and marginal cost curves (for firms in the industry) to estimate the net benefits realized by all firms and consumers in a particular market.

C. In competitive markets, prices tend to move to "market clearing levels," that is to prices that set the total quantity supplied by all firms equal to the total amount demanded by consumers. (This defines equilibrium market P^* , and Q^* .)

- i. In competitive markets, this occurs where the supply and demand curve cross.
- ii. At any other price, there will either be surpluses (which tend to cause prices to fall) or shortages (which tend to cause prices to rise).
- iii. Note that this is, in principle, an entirely decentralized process requiring governments to do nothing more than enforce property rights and contracts.

D. In the absence of externalities or market concentration, **markets tend to produce social net benefit maximizing outcomes!**

- i. Note that the "market clearing" price causes markets to produce the **social net benefit maximizing** level of output (in cases where there are not externalities, e.g. relevant costs or benefits).
- ii. Q^* sets social marginal benefit (the demand curve) equal to social marginal cost (the supply curve).
- iii. This is one very widely used **normative** argument favoring markets as a method of social organization.



E. In cases where **external costs** exist, however, market outcomes will (often) fail to maximize social net benefits, because those costs will not be fully accounted for in the calculations of economic agents.

- i. In this case, either demand or supply will not include all marginal benefits or all marginal costs.
- ii. The existence of externality problems provides a **normative** basis for government policy (if one wants to maximize social net benefits).
- iii. In cases where significant external costs exist at the margin (at Q^*), markets will tend to **over produce** the output of interest relative to that which maximizes social net benefits.
- iv. In cases where significant external benefits exist at the margin (at Q^*), markets will **under produce** the service of interest relative to that which maximizes social net benefits.
- v. Governments might adopt policies to discourage production in the first case (perhaps with taxes) or encourage it (perhaps with subsidies) in the second case.

vi. (Tools for analyzing externality and public goods problems will be developed after the midterm.)