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 statement. (See for example Karl Popper.)

i. A **Positive Statement** is a statement about what is, has been or will be. It is a statement about the world.

ii. A **Normative Statement** attempts to evaluate the desirability of alternative states of the world or alternative public policies.

iii. 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.

iv. (X increases unemployment is a positive statement. The conclusions that X is a bad policy or not depends on whether you believe unemployment is a bad thing or not--even if you accept the positive claim.)

v. Most positive statements are also "operational." *Operational statements* are statements that can at 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" !

vi. Examples:

a. The moon is made of green cheese. (p, but false)
b. Minimum wage laws always increase unemployment. (p, probably true)
c. Tariffs are a bad policy because they reduce consumer welfare. (n, probably true)
d. Mass transit reduces air pollution. (p, probably true)
e. Mass transit should be subsidized because it reduces air pollution. (n, possibly true)
f. Global warming can only be reduced with a high carbon tax. (p. probably false)

C. Examples of Normative Theories

i. The Pareto Criteria

ii. Utilitarian Social Welfare Criteria

iii. Cost Benefit Analysis / the Compensation Principle

iv. Green Idealism

v. Contractarianism

vi. Any other theory or ideology that allows one to determine "the best or worst" policy

vii. In contrast, a positive theory is concerned with whether a claim is "true" or "false."

II. Some Fundmental 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**.

i. Consumers maximize consumer surplus: the difference between what a thing is worth to them and what they have to pay for it. $CS(Q) = TB(Q) - TC(Q)$

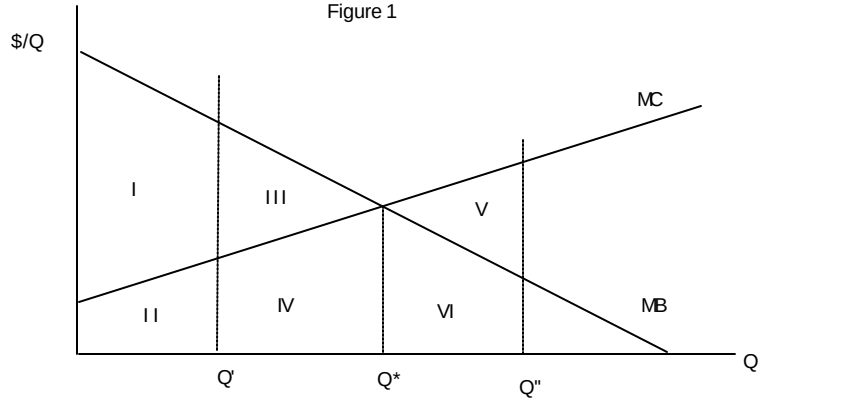
ii. Firms maximize their profit:, the difference in what they receive in revenue from selling a product and its cost of production: $\Pi = TR(Q) - TC(Q)$

B. The change in benefits, costs, etc. with respect to quantity consumed or produced is generally called Marginal benefit, or Marginal cost.

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 l "X" curve over the range of interest (often from 0 to some quantity Q). This property allows us to determine consumer surplus and/or profit from a diagram of marginal cost and marginal revenue curves.

Figure 1



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' . These can be represented geometrically as areas under the curves of interest. TC(Q') = II ; TB(Q') = I + II .

ii. Similarly, one **can calculate the net benefits** by finding total benefit and total cost for the quantity or activity level of interest, and subtracting them. Thus the net benefit of output Q' is TB(Q') - TC(Q') = [I + II] - [II] = I.

iii. Use Figure 1 to determine the areas that correspond to the total benefit, cost and net benefit at output Q* and Q".

iv. Answers:

a. TB(Q*) = I + II + III + IV , TC(Q*) = II + IV , NB(Q*) = I + III

b. 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 in most cases 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.

- 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 (as we will see later).*

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:

a. What types of persons will be most likely to lobby for subsidies for higher education?

b. What types of persons will prefer progressive taxation to regressive taxation?

c. What industries will prefer a carbon tax to a corporate income tax?

F. 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) by: (i) choosing a price, (ii) finding the implied marginal cost curve for a consumer, (iii) use MC and MB to find the CS maximizing quantity of the good or service, (iv) plot the price and the CS maximizing Q*, and (v) repeat with other prices to trace out the individual's demand curve.

G. 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.**

i. Again, one chooses a price (which is a price taking firm's MR curve),

ii. finds the profit maximizing output, and

iii. plots P and Q*,

iv. Repeat this process with another price to trace out a supply curve.

III. 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. Note that the fact that individual demand curves go through essentially the same points as their marginal benefit curves, also implies that market demand curves are approximately the same as the (social) marginal benefit curve for all consumers in the market.

B. 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.

i. **Market Supply** curves for ordinary private goods can be shown to be "horizontal" sums of individual firm supply curves.

ii. In the short and medium run, the number of firms in the industry can be taken as fixed.

iii. However, supply in the **"Marshallian" long run** reflects entry and exit of firms from the industry, which implies that long run supply is determined by the long run average total cost of an efficient sized firms and that rates of return are completely equalized across markets.

a. Supply in the **Ricardian long run sense** reflects natural resource quality variations, shipping costs, and other entry barriers that limit the number of firms that can potentially enter a market.

- In the Ricardian case, long run supply can be analyzed in **the same manner** as short run supply (see class notes), because the number of potential firms is fixed for given prices, rather than determined by the magnitude of market demand.
- (For most purposes in this class we will use Ricardian long run supply, which simplifies the geometry, although we will also be interested in Marshallian entry and exit effects in some cases.)

b. The Marshallian process of entry and exit imply that the number of efficient sized firms adjusts in each market until rates of return are equalized (profits converge on zero).

- This characterization of long run equilibrium 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.

C. 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 (industry marginal cost), 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 and marginal cost curves to estimate the net benefits realized by all firms and consumers in an industry.

D. 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.

- S(P*) = D(P*) defines equilibrium market price, P*, and output, Q*= S(P*)=D(P*).

i. In competitive markets, the equilibrium price and output are both characterized by the point at which supply and demand curves 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).

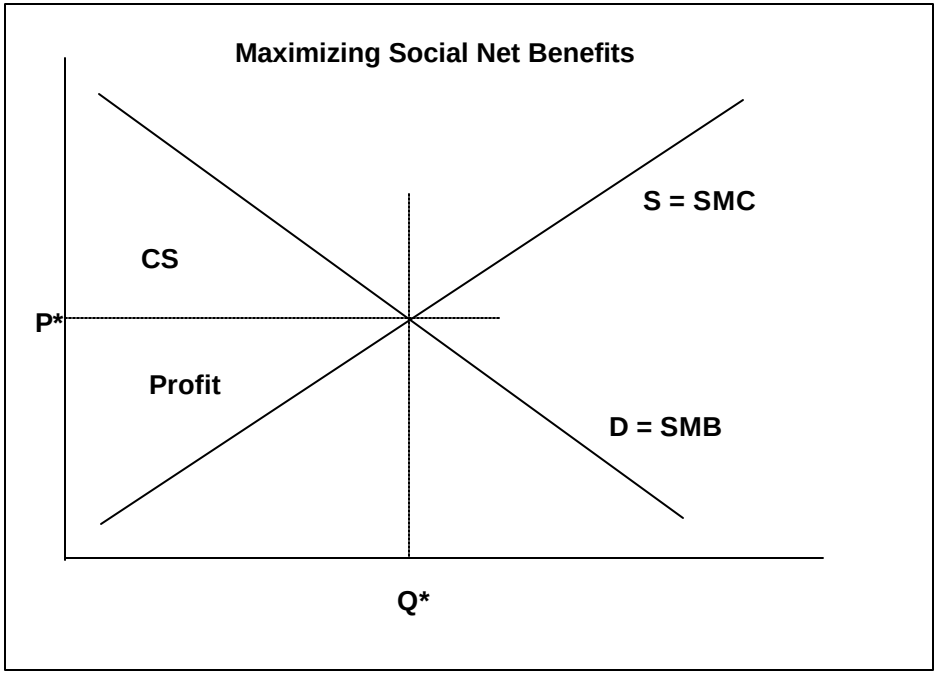
iii. In principle, competitive market equilibria are determined through an entirely decentralized process that requires governments to do nothing more than enforce property rights and contracts.

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

i. Social net benefits are (usually) maximized at the output level that sets social marginal benefit equal to social marginal cost.

ii. Since demand is approximately a social marginal benefit curve and supply is apprioximately a social marginal cost curve, the point at which supply equals demand sets SMB = SMC.

- Consequently, 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).
- That is to say, Q* sets social marginal benefit (the demand curve) equal to social marginal cost (the supply curve).
- This is one very widely used **normative** argument favoring markets as a method of social organization.



F. In cases in which monopoly power exists, or their are externalities, or in which public policies affectd costs or prices "at the margin," social net benefits may not be maximized by market outcomes.

G. For example, in cases where **external costs** exist, there are other costs or benefits imposed on persons outside the market of interest, and market outcomes will (often) fail to maximize social net benefits.

i. In this case, either demand or supply will not include all marginal benefits or all marginal costs.

ii. The existance of externality problems provides a **normative** basis for government policy (if one wants to maximize social net benefits).

- 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.
- 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.

iii. Governments might adopt policies to discourage production in the first case (perhaps with taxes) or encourage it (perhaps with subsidies) in the second case.

- (Tools for analyzing externality and public goods problems will be developed later in the course.)

H. Taxes that change relative prices also often produce market outcomes that do not necessarily maximize social net benefits.

- Such taxes are said to have a dead weight loss.
- (See the notes for the third lecture.)