ECO 300 – MICROECONOMIC THEORY

Essential prerequisites
   [1] ECO 100 – quickly refresh your memory; first half topics are similar but we go faster
       In second half we do new things – some game theory, information economics, ...
   [2] Math to the MAT 103 (? = 101 + 102) level: functions, their graphs, simple derivatives
       If you have MAT 200 or better, take ECO 310

Taxonomy of economics courses
   Understanding economic reasoning
     100-101 : Read WSJ, The Economist
   Doing your own economic reasoning and calculation
     300-302 : Read research surveys, start on your own research
     310-312 : Read research articles, do better thesis research

Basic ingredients of this course
        Meetings – 2 classes of 80 minutes each, 1 precept
        Materials – Textbook, Handouts, Overheads
        Assignments – 8 problem sets , in-class midterm, 3-hour final

Right now – Read instructions handout;
        return one signed and witnessed copy in Tuesday's class

Division of tasks:

Lectures, precepts, textbook, problem sets are a package
mutual complements, not substitutes
Simplest descriptive material – read from textbook
Harder analytical material – covered in lectures
Details, technical points, some applications – precepts

Work suggestions :

[1] Work in groups of 3 or 4, even on problem sets
Make good use of office hours, study hall for problem sets
[2] Read material before class
Stated dates are approximate but order will remain mostly the same
[3] Everything looks similar to ECO 100, but faster, deeper
Don't try to coast on your knowledge of 100
[4] Get clarifications early - in class, precept, office, study hall
Office hours are extensive, use them well
[5] Check Blackboard course web site regularly
Make sure your e-mail quota is not full; else you may miss important messages

THEMES AND OVERVIEW

Economics – Allocation and distribution of scarce resources to alternative ends
Microeconomics – Focuses on individual decision-making units and their interactions

Two basic concepts in microeconomics

CHOICE

By individual consumers and firms
Subject to constraints
Motivated by preferences or objectives
Textbook setting - rationality: constrained optimization
Qualifications and modifications of this – behavioral / psychological aspects

EQUILIBRIUM

Result of interaction of individual choices
Textbook setting - perfectly competitive market
Intersection of supply and demand curves
Other markets, auctions, contracts etc.
These need different concept of equilibrium – game theoretic (Nash)

Two modes of analysis

POSITIVE

Characterization of behavior and equilibrium
        and of effects of changing underlying condition and policy changes
Method – logical deduction from hypotheses or assumptions
Testing of these theories or models using observations and experiments
Some lab experiments, but also naturally occurring quasi-experiments
        for example birth-date lottery for draft during Vietnam period
        randomly sorted out population of young men into two groups
Key – to find a control group and a treatment group in the data
        You will find such situations extremely useful in your JP and senior thesis work

NORMATIVE

Evaluation of outcomes according to criteria of
        efficiency, equity etc. - value judgments
Evaluation of policies and recommendation for policy changes
        Uses positive analysis to calculate effects;
        Then adds value judgments to get evaluation / recommendation
   Important to recognize and make explicit
Will do some examples in this course; much more in later micro application
        courses (International Trade, Industrial Organization)

REMINDER OF ECO 100 TYPE ANALYSIS (P-R pp. 20-32)

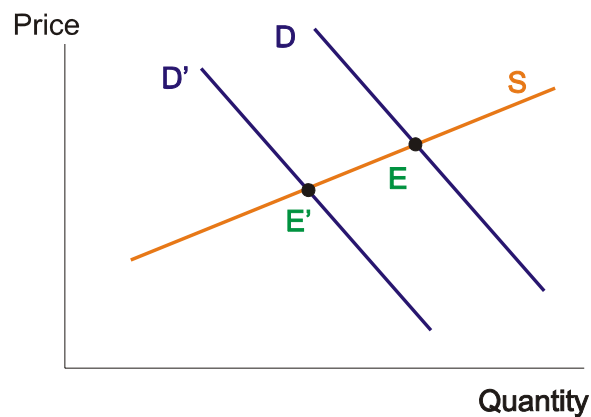a. Supply, demand, market equilibrium

Example - Automobile market

(S and D curves shown linear
        for sake of simplicity only;
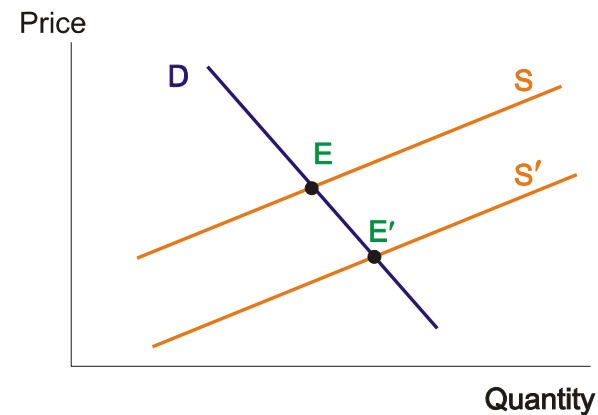   will do same throughout)

Price

D   S

E
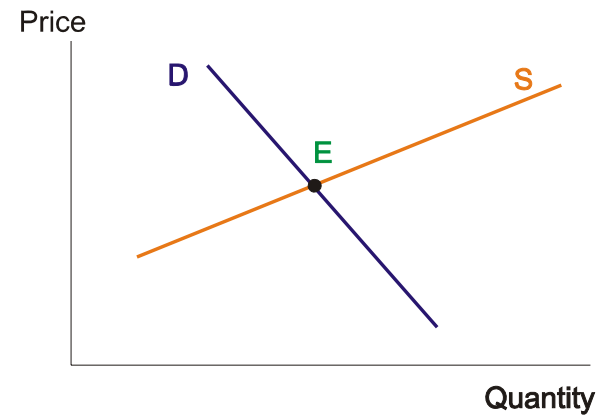
Quantity

b. Change in equilibrium –
        Shift of one curve, movement along the other curve

(i) Gas prices skyrocket

Price

D'   D

S

E'   E

Quantity

(ii) China becomes major producer

Price

D   S

E

S'

E'

Quantity

(iii) Both of the above changes occur –
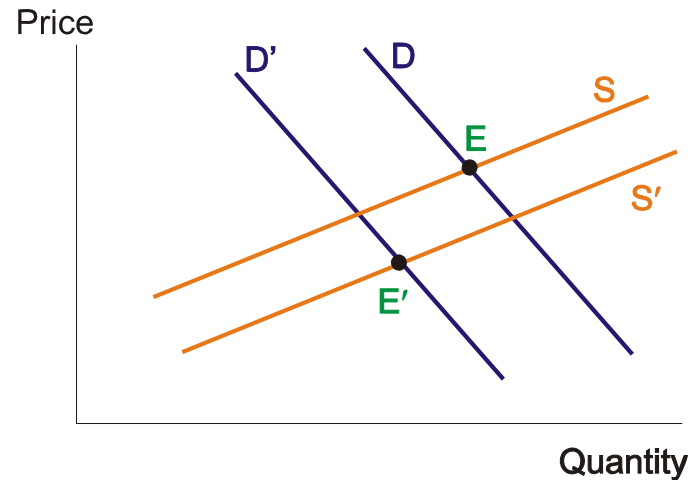
Price

Effect on price unambiguous
Effect on quantity ambiguous

In other situations the outcomes
   can change in different ways
Try out a couple, for example
   (1) US imposes import quota
   (2) public transport worsens

Quantity

But the example raises several questions:

0. WHERE DO SUPPLY AND DEMAND CURVES COME FROM?

Standard economic theory – rational choice by individuals
Consumers – preference maximization subject to budget constraint
Firms – profit maximization subject to technology constraint
We will elaborate this theory somewhat beyond the ECO 100 level
   and also examine more evidence bearing on it
   including some recent critiques from psychology and experimental economics

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1. SHAPES OF SUPPLY AND DEMAND CURVES

Why does demand curve slope downward?
  Each consumer buys more - substitution and income effect analysis
  Consumers enter or leave market
  Consumers advance or postpone purchases ...

Why does supply curve slope upward?
  Each firm produces more - overtime, shiftwork,
      new hiring, additions to equipment and plant, ...
  Firm may switch from other types of cars
  New firms enter market

Technically difficult aspects of theory focus on substitution-and-income-effect etc.
  But in applications must consider all the other reasons for quantity changes also

2. MARKET DEFINITION

  a. Type of car - sedan, sport, SUV, all? New, used, both?
  b. Area covered - world, US, Princeton?

Important for judging competition and in antitrust policy, but often non-obvious, ambiguous
General principle - ease of substitution in production/consumption, and arbitrage possibility
Ideally, if "one price" prevails, it is one market
But in practice, much arbitrariness in drawing borderlines,
  hence ambiguity and controversy in application

3. SHIFTS IN SUPPLY AND DEMAND CURVES

Causes – changes in other hidden variables that affect quantities supplied and demanded
   such as income, other prices, technology, government policies ...
But there may be feedbacks from this market to those other variables
   price here affects D and S of substitutes and complements, even income may change
Then must examine two or more markets simultaneously -
   multi-market or general equilibrium as opposed to single-market or partial equilibrium

4. DYNAMICS OF CHANGE

 Changes not instantaneous – some take longer than others
 Therefore when applying the analysis,
   need to consider dynamics of move to new equilibrium
 This can be a sequence of short-run equilibria evolving into a new long-run equilibrium
  Or periods of disequilibrium - shortages or surpluses etc.

5. VALIDITY OF PRICE-TAKING (PERFECT COMPETITION)

Many markets have 1 or few large sellers (De Beers, Microsoft, ...)
Intermediate goods markets may have large buyers (Auto firms buying steel)
In such monopoly, oligopoly, monopsony ... situations
   firms don't just choose quantities responding to given prices
   They also have price making power, and other strategies (advertising etc)
Study of such strategies and their interaction requires
   new concepts and techniques of analysis - game theory

6. UNCERTAINTY AND INFORMATION

Markets trade in not just goods and services, but also risks
  markets for insurance, gambling, assets of various return and risk characteristics, ...
Under perfect competition, each individual needs
  only very limited information, namely the market price
Under other arrangements, more information is needed
 When it is lacking or privately held, strategies of
  information manipulation – search, concealment,
    selective revelation, ... become important

7. OTHER INSTITUTIONS FOR ECONOMIC TRANSACTIONS

Even with monopoly or oligopoly, markets are
  not the only forums for carrying out exchanges
Other institutions or arrangements include
  auctions, reciprocity relationships, implicit contracts, ...

 In this course we will deepen our understanding
    of the basic theory of competitive markets,
    and acquire some understanding of these
    further issues and other institutions of exchange

IMPORTANT TECHNICAL CONCEPT – ELASTICITY (P-R pp. 32-38)

Figure shows a demand curve.
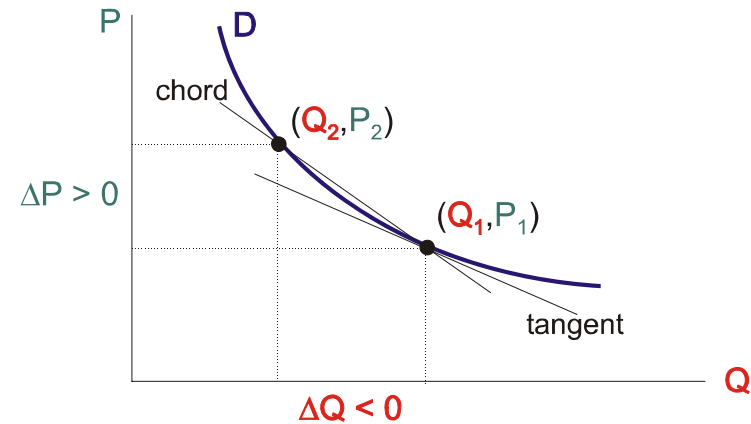Note peculiar economics convention –
 Independent variable (price) on vertical axis
 Dependent variable (quantity) on horizontal

Price rises from P_1 to P_2 ; change $\Delta P = P_2 - P_1 > 0$
Quantity demanded falls (not "demand falls")
 from Q_1 to Q_2 ; change $\Delta Q = Q_2 - Q_1 < 0$

Inverse of the geometric slope of chord joining (Q_1,P_1) to (Q_2,P_2), so conceptually correct ratio
 of change in dependent variable to that in independent variable, is $= \Delta Q/\Delta P$
For very small (infinitesimal) change, in the limit,
 "Inverse slope" of tangent = dQ/dP, derivative of demand function

Arc elasticity of demand $= \dfrac{\Delta Q / Q_m}{\Delta P / P_m} = \dfrac{P_m}{Q_m}\dfrac{\Delta Q}{\Delta P}$ where $P_m = (P_1 + P_2)/2$, $Q_m = (Q_1 + Q_2)/2$,

                                              are at the midpoint of the arc

Point elasticity of demand $= \dfrac{P}{Q}\dfrac{dQ}{dP}$ where P, Q are at the point where elasticity is to be found

Example: $Q = 1 / P = P^{-1}$; $dQ/dP = - P^{-2}$;

     point elasticity $= \dfrac{P}{Q}\ \dfrac{dQ}{dP} = - \dfrac{P}{P^{-1}}\ P^{-2} = - P^2\ P^{-2} = -1$

All these are negative numbers – demand curve slopes downward
  Sometimes we prefer to use their absolute or numerical values
  When reading, always check what is intended
  When writing, always state clearly what you intend

Why calculate and use elasticities?

  [1] Proportional changes in quantities, prices important
         e.g. growth rates, inflation rates
  [2] Don't depend on units in which prices, quantities are measured:
      If the good is cloth, and we switch to measuring lengths in feet instead of yards
      The length "Q yards" becomes "3Q feet", and the price "P $/yard" becomes "P/3 $/foot"
         then d(3Q)/d(P/3) = 9 dQ/dP, and

$$\text{elasticity} = \frac{P/3}{3Q}\frac{d(3Q)}{d(P/3)} = \frac{P}{9Q}\,9\frac{dQ}{dP} = \frac{P}{Q}\frac{dQ}{dP}$$

  [3] Better connection with changes in revenue: R = P Q, so

$$\frac{dR}{dP} = 1\,Q + P\frac{dQ}{dP} = Q\left[1 + \frac{P}{Q}\frac{dQ}{dP}\right]$$

    So whether increasing price will increase revenue depends on elasticity > or < -1