

8/18/05

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I. Course overview

Fill out card with your

- 1) Name
- 2) Mailing address
- 3) Phone number(s) with which you prefer to be contacted
- 4) E-mail address
- 5) Current or most recent job
- 6) Educational background

Things you will know at the end of this course:

- Determinants of prices
- What does cost really mean (Hint: you can't just look at invoices)
- Incentives within organizations
- Determinants of size, scope of a company
- What determines profitability

Some cold hard facts: There are tremendous differences in profitability across firms and industries.

ROI -- All industries	14.1
Pharmaceuticals	29.1
Beverages	25.6
Computer software	21.3
Computer hardware	21.1
Telecom	21.0
Food & drug stores	14.3
Health care	9.0
Entertainment	4.0

Within these sectors, wide variation in performance.

1989-99 return on investment: airlines

Southwest	26
UAL	10
AMR	9
Delta	5

Why? Strategic decisions based on economic fundamentals play a big role:

- protected markets where entry difficult
- sustainable advantage in product
- sustainable advantage in cost

IF EVERYONE ELSE CAN DO IT AS WELL AS YOU, YOU CAN'T MAKE MONEY ON IT!!!

This course will teach fundamentals about markets and firm behavior so that you can make decisions that will maximize the odds of getting superior performance!

- A. Intended audience (MBA students) and expected background (year of principles of econ)
- B. Objectives:
 1. Economic forces shaping external environment: Porter's 5 forces
 - # competitors
 - ease of entry/exit
 - substitute products (pain relief -- many/insulin -- zero)
 - buyer power (Walmart and clothing industry)
 - supplier power (DeBeers and jewelry manufacturers)Tech change, globalization also very important
 2. Day-to-day bus. decisions: production (e.g., John Deere and tractors need to understand MR vs. MC) and pricing (e.g., pricing for new antibiotic: need to understand product demand, elasticity)
 3. Strategic decisions: Toyota must take into account response of rivals before entry into new market, opening new capacity, designing new models. Same applies to R&D: before Glaxo makes major investment needs to consider what others are doing now and ease of replication
 4. Quant skills needed for MBA (sneak review of algebra, calculus)
 5. MBA emphasizes innovation/information so provide some basic models, e.g., value of networks (internet in 92 vs. 95 vs. today), lock-in w/hardware and software
 6. Public policies and business decisions, e.g., Microsoft situation, CP&L must make plans based on odds of deregulation of power industry AND changing environmental rules
- C. Assignments: participation (attendance, in-class, out-of-class); p sets; exams (no make-ups); presentation and paper
- D. Academic integrity/disabilities
- E. Texts

II. Laws of S&D

A. Laws of demand

Why demand curve slopes down:

- (1) incentives for substitution (Pepsi price down, quantity demanded of Pepsis goes up as people drink more beverages, less water, less Coke; gas prices up → people drive less or buy smaller cars)
- (2) price change affects disposable income (gas prices up, less disposable income, cut back on most goods including gas)

SHIFTERS OF DEMAND:

- price of other goods – substitutes (price of tea down, demand for soft drinks left) and complements (hard drive prices down, demand for memory shifts right)
- income: normal goods (income up, demand shifts right and vice versa; this is the case for most goods, e.g., meat, fine wine) and inferior goods (income up, demand shifts left, e.g., rice, beans)
- expected values of prices, income in future (Ex. Iraq invades Kuwait and crude oil went from \$21.54 to \$30.50/barrel immediately; if expect interest rates to rise, buy car or home now)
- population
- advertising and tastes (Ex. Station wagons down, minivans & SUVs up)

B. Laws of supply

Why supply slopes up:

- (1) law of increasing costs (attract more workers, use less efficient capacity, use less productive land)
- (2) incentives (greater reward → more effort)

SHIFTERS OF SUPPLY:

- Price of other goods (substitutes in production, e.g., SUVs vs. station wagons, flights to Boston vs. flights to Providence)
- Input prices (wages, equipment, structures, interest, rent, taxes/subsidies)
- Technology
- Government regulations
- Producer expectations (if expect higher crude prices, then raise gas price now instead of waiting for delivery truck to show up)
- Number of firms in market

C. Equilibrium, shortage and surplus

If $p > p^*$, then $S > D \rightarrow$ SURPLUS \rightarrow inventories piling up, phone not ringing, orders far below capacity \rightarrow cut price and output!

If $p < p^*$, then $D > S \rightarrow$ SHORTAGE \rightarrow inventories depleted, more orders than you can handle \rightarrow raise price and output!

If $p = p^*$, then $D = S \rightarrow$ EQUILIBRIUM \rightarrow no tendency to change P, Q in market

D. Algebraic formulation

$$\begin{array}{lll} \text{Demand:} & Q_D = a - bP & a, c \text{ horizontal intercepts} \\ \text{Supply:} & Q_S = c + dp & \\ \text{Equilibrium} & & \\ \text{Condition:} & Q_D = Q_S & \end{array}$$

$$\text{Solve for } P^*: P^* = (a-c)/(b+d)$$

(Aside: If $c > a$, then $p=0$, e.g., parking in Kmart lot, Western Blvd)

$$\begin{array}{ll} \text{Inverse demand:} & P = (a/b) - (1/b)Q_D \\ \text{Inverse supply:} & P = -(c/d) + (1/d)Q_S \end{array}$$

Vertical intercepts Slopes

$$\text{Solve for } Q^*: Q^* = (ad+bc)/(b+d)$$

(Aside: if $-(c/d) > (a/b)$, then good never produced, e.g., nonstop commercial flights from Raleigh to Sanford, or DVDs in 1990)

Example: Exercise 6, p. 59

$$Q_D = 160 - 8P \quad (Q \text{ in } 10,000\text{s, } P \text{ in } 100\text{s})$$

$$Q_S = 70 + 7P$$

- a. What is P^* , Q^* ? What if rent control sets $P = 3$? In practice, apartments vanish via no new construction, condo conversion, and bad maintenance. Other consequences: black market (buy furnishings, parking and other noncontrolled items), insiders or best risks get apartments whereas the poor get locked out. Larry Summers: other than cluster bombing, the best way to destroy a city
- b. What if "fair" return sets $P=9$?

E. Shifts of S, D

Example: Market for personal computers

- a. Lower prices for Pent IV
- b. Fire in large memory chip plant in Japan in 1994 closes down 50% capacity
- c. More universities require students to own computers
- d. Recession in Indonesia in 1997

F. Other examples/applications

Text, questions for review, p. 57-8, #2,8

III. Elasticity

A. Applications:

1. Price setting: If cut price for Rogaine, would extra sales generated offset the dollars per existing sale lost?
2. Impact of taxes/subsidies: If gas taxes increased to pay for highway construction, what will happen to P, Q?
3. Price forecasting: Brazilian orange freeze eliminates crop. How much will Minute Maid and Tropicana be able to charge now? (Will airline beverage carts run out of orange juice more frequently?)

B. Why use proportional/percentage approach?

Ex. American Airlines flies 7k passengers/week to DC with fare of \$500 and 4k passengers/week to Boston with fare of \$800. Suppose they cut price to DC by \$100 and gain 2k passengers. Would they get same 2k gain in Boston? (Answer: price cut is 20% of \$500 but 12.5% of \$800. Also passenger basis quite different. Makes more sense to project based on percentage. Get 28.5% increase in passengers in DC market, implying Q responds more than P.)

C. Definition

$$\begin{aligned}
 E_p &= \% \text{change in } Q_D / \% \text{change in } P \\
 &= (dQ_D/Q_D)/(dP/P) \\
 &= (dQ_D/dP)(P/Q)
 \end{aligned}$$

D. How to calculate

1. Linear demand curve

$$\text{Milk: } Q_D = 20 - 4P \rightarrow$$

$$E_p = (dQ_D/dP)(P/Q) = -4(P/Q) = -4(P/20-4P)$$

P	Q_D	TR	E_p	
5	0	0		Infinitely elastic
4	4	16	-4	Elastic
3	8	24	-1.5	Elastic
2.5	10	25	-1	Unit elastic
2	12	24	-0.67	Inelastic
1	16	16	-0.25	Inelastic
0	20	0	0	Completely inelastic

Note: maximize TR at P where demand is unit elastic. (Proof: $\max P(20-4P) = P20 - 4P^2$; $dTR/dP = 20-8P = 0$ when $P=2.5$; check second order conditions if you like.)

In practice, economists are usually not very comfortable using this approach. It is hard to believe that elasticity for the same good would vary so much across different price ranges. (Would gas demand really be more price sensitive at \$2/gallon than \$1/gallon?) Also, you get different estimates for the same price change, depending on whether you

start at higher or lower price. When price falls from 4 to 2, is the real elasticity -4 or -0.67 ? This suggests an alternative approach – use averages!

2. Arc formula (Formula 2.4, p. 35) uses average of initial and final P, Q; e.g., % change Q = $(2000/8000)*100 = 25.0$ and % change P = $(-100/450) = -22.2$. So $E_p = -1.1$.

THIS IS THE APPROACH YOU SHOULD ALWAYS USE TO CALCULATE ELASTICITIES WHEN ALL YOU KNOW ARE TWO POINTS ON THE SAME DEMAND CURVE!

3. For inquiring minds: Multiplicative demand curve (Y=income)

$$Q_D = 5P^{-1.5} Y^{0.75}$$

$$\ln Q_D = \ln 5 - 1.5 \ln P + 0.75 \ln Y$$

$$E_D = (d \ln Q_D) / (d \ln P) = (dQ_D/dP) (P/Q) = -1.5$$

Key property: Elasticity same at all points on demand curve!

Aside: This is the same thing as the isoelastic demand curve on p. 124 of text

E. Determinants:

substitutes Ex. Lamb & mutton -1.5 ; sugar -0.3
Time Ex. Gasoline in 1 year -0.11 vs -0.49 in 5 years

Possible exception: durable goods (e.g., cars) highly elastic in short run but not in long run because they have to be replaced; probably true in US but not in Third World

- F. Other elasticities of which you should be aware: income, cross-price (positive for substitutes, negative for complements), supply