Econ 101 Final Exam Prof. Dan Friedman
Managerial Economics Cheat Sheet Winter 2012

Present Value

PV=[x1/(1+i)^1]+[x2/(1+i)^2]+…+[xn/1+i)^n]; =x1/i if xi const and n=∞.

Elasticity

$$E_{Q,y} = \frac{\partial \ln Q}{\partial \ln y} = \frac{\partial Q}{\partial y}\frac{y}{Q} \approx \frac{\%\Delta Q}{\%\Delta y}$$

Own price elasticity: set $y = P_x$
Cross-price elasticity: set $y = P_y$
Income elasticity: set $y = I$
Log-linear Demand function:

$$\ln D_x = a + b\ln P_x + c\ln P_y + d\ln I$$

Production Process and Costs

Production Function: Q = F(K,L)
Marginal Product of Labor:
MP = ΔQ/ΔL
Average Product of Labor: APL = Q/L
Cost Function: C(Q) = VC + FC
Avg Cost: AC = C(Q)/Q= AVC + AFC
Marginal Cost (≈ Incremental Cost):
MC = ∂C/∂Q ≈ ΔC/ΔQ
Economies of Scope:
$C(Q_1,Q_2) < C(Q_1, 0) + C(0, Q_2)$
Cost Complementarity: $\partial MC_1 / \partial Q_2 < 0$.
Learning Curve: AC = a – b ln A, where A=accumulated output
Economies of Scale: $\partial AC / \partial Q < 0$.

Nature of Industry

Four-Firm Concentration Ratio:
$C4 = FFI = w_1 + w_2 + w_3 + w_4$
$HHI = 10{,}000 \times \Sigma w_i^2$
Rothschild Index: $R = E_I / E_F$
Lerner Index: L = (P - MC) / P
Markup Factor: P = (1/(1-L)) MC

Managing Markets

Perfect competitive firms max profits when MC = MR = P
Long run equilibrium: P=min AC
Multi-plant monopoly:
Q = Q1 + Q2
MR(Q1 + Q2) = MC1(Q1)
MR(Q1 + Q2) = MC2(Q2)

Optimal Ad budget

$A/R = -E_A / E_P$

Oligopoly

Given linear (inverse) demand:
$P=a-b(Q_1+Q_2)$, and
Constant MC w/zero FC:
$C_1(Q_1)=c_1Q_1$
$C_2(Q_2)=c_2Q_2$, the
Reaction function (Cournot) is:
$Q_1=r(Q_2)=(a-c_1)/2b-Q_2/2$; and the Stackelberg Leader's output is
$Q_1=a+c_2-2c_1/2b$.
In Bertrand Oligopoly with homogeneous goods, the price is driven down to the second lowest MC.
In Contestable markets, the price is driven down to the second lowest AC.

Simple Markup Rule

P = [E/(1+ E)] × MC
For **Cournot Oligopoly** with N firms, elasticity is $E = N\times E_M$, where E_M is the market elasticity.
For a **3rd degree price discriminator**, use different E for each segment, e.g.,
P1 = [E1/(1+ E1)] × MC
P2 = [E2/(1+ E2)] × MC
For basic **2-part pricing** set price = MC, compute consumer surplus, and set the fixed-fee equal to consumer surplus.

Transfer Pricing

$NMR_d = MR_d - MC_d = MC_u$

Mean= $E[x] = q_1 x_1 + q_2 x_2 + \ldots + q_n x_n$,
Variance $=\sigma^2 = Var[x] = q_1 (x_1- E[x])^2 + q_2(x_2- E[x])^2 + \ldots + q_n (x_n- E[x])^2$
Std dev= σ^2= sqrt of Var[x]
CE=E[x]- RP, where RP=(1/2) rVar[x]

Profit max in uncertainty

E[MR]=MC
Auctions- 1st price auction (or Dutch) with n bidders and uniformly distributed valuations above L: Optimal bid is B= v- ((v-L)/n).
Revenue comparisons: for IPV, risk-neutral English =1st price = 2nd Price = Dutch.
For Affiliated Values, English > 2nd Price > 1st price ≥ Dutch.

Limit Pricing is profitable if

$$\frac{(\Pi^L-\Pi^D)}{i} > \Pi^M-\Pi^L$$