1 Extra Problems

Wednesday, January 13, 2021 5:23 PM

t	π
1	-10
2	5
3	10
4	5
5	3

$r = 4\%$

$V_0 = -10/1.04 + 5/1.04^2 + 10/1.04^3 + 5/1.04^4 + 3/1.04^5 = 10.637$

i	π_i	f_i
1	-10	.4
2	4	.4
3	50	.2

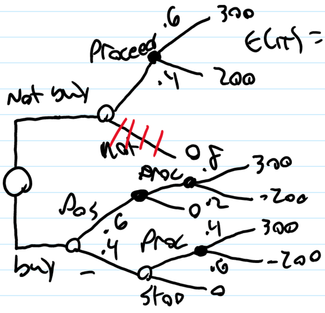
$E(\pi) = (.4 \cdot -10) + (.4 \cdot 4) + (.2 \cdot 50) = 7.6$

t=1		t=2		$r = 4\%$
i	f π	i	f π	
1	.4 -10	1	.3 -10	$EPV = (.4 \cdot -10)/1.04 + (.6 \cdot 10)/1.04 + (.7 \cdot -10)/1.04^2 + (.3 \cdot 50)/1.04^2 = -2.2189$
2	.6 10	2	.3 50	

Suppose a project returns 300 with probability 0.6 and loses 200 otherwise.

A test can be conducted to provide additional information about the probability of success. You think the probability of a positive result is 0.6. You think the probability of success with a positive test result is 0.8, and you think the probability of success with a negative test result is 0.4.

What, if anything, is the value of the information provided by the test?



$E(\pi) = .6 \cdot 300 - .4 \cdot 200 = 100$

$E(\pi) = .4 \cdot 300 - .6 \cdot 200 = 0$

Info =

A. Suppose inverse demand is p=1000-2q. Find the quantity that maximizes revenue, the corresponding price, and the maximum revenue.

B. Suppose cost is $1000+100q+0.5q^2$. Find the profit maximizing quantity, price, and the maximum profit.

C. Illustrate.

D. Explain why the price that maximizes revenue is too low. What is profit at that price?

a) Inverse demand: $0 = P = 1000 - 2q$ $\Rightarrow R = 1000q - 2q^2$

$2q = 1000 - P$ $dR = 1000 - 4q$

$q = 500 - 1/2P$

Revenue $= P \cdot q$

$= P \cdot (500 - 1/2P)$

$= 500P - 1/2P^2$

$P = 500$ $q = 250$

b) $\pi = P \times q - C$ $C = 1000 + 100q + 1/2q^2$

$(1000q - 2q^2) - (1000 + 100q + 1/2q^2) = -2.5q^2 + 1100q - 1000$

$\frac{d\pi}{dq} = -5q + 1100 \Rightarrow q = 220 \Rightarrow P = 560$

c)

1/27 Problems

$q_1 = 100P_1$ $\varepsilon_2^d = -2$

$C = 5 + 2q$ If $P_2 = 5$, $q_2 = 20$

1) $P_1^* = ?$ 2) $P_{2A}^* = ?$

3) $q_1^* = ?$ 4) $q_2^* = ?$

5) Constant ε^d approx for market 2

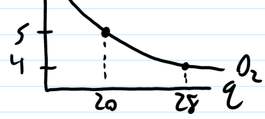
$MR = P(1 + 1/3)$

$MR = P(1 + 1/3) = 2 \Rightarrow P^* = 3/1+3 \cdot MC \rightarrow P_1 = 4/1 - 4 \cdot 2 = 2.67$

$P_2^* = -2/1 - 2 \cdot 2 = 4$

$q_1^* = 100/2.67^4 = 1.97$

$P_2 = 5 \rightarrow q_2 = 20$



$\%\Delta P = -20\%$

$\%\Delta q = 40\%$

$q_2 = AP_2^{-2}$ $20 = A/5^2 \rightarrow A = 20 \cdot 25 = 500$ $q_2 = 500/P^2$

$\frac{\Delta q}{\Delta P} \frac{P}{q}$