INFM 718A / LBSC 705
Information For Decision Making
Lecture 2

Decision-Making and Problem-Solving

» Define the problem
» Identify the alternatives
» Determine the criteria
» Evaluate the alternatives
» Choose an alternative
» Implement the decision
» Evaluate the results

Problem Solving

Decision Making

Modeling for Decision-Making

Uncontrollable Inputs
(Constraints, etc.)

Controlable Inputs
(Decision Variables)

Mathematical Model

Output
(Projected Results)

Break-even Analysis

• a: Revenue (income) per unit
• B: Total fixed costs
• c: Variable cost per unit
• Q: number of units produced at BE point

• A: Total revenue ($a \times Q$)
• C: Total cost ($c \times Q + B$

Break-even Analysis

$R = a \times Q$

$K = c \times Q + B$
**Break-even Analysis**

\[ R = K \]

\[ a \times Q = c \times Q + B \]

\[ a \times Q - c \times Q = B \]

\[ (a - c) \times Q = B \]

\[ Q = \frac{B}{(a - c)} \]

**Goes Beyond Sales**

- Alex has determined that his car delivers 24 miles per gallon. With a $100 tune up, the car can deliver 30 miles per gallon. The price of gas is $3/gal. Assume the gas price steady, and the benefits of the tune up permanent. When will Alex reach break-even, driving at a rate of 20 miles per day?

- 4000 miles
- 200 days
- $.5 savings per day
- $82.5 net savings at the end of year one
- $182.5 savings per year thereon

**If There is a Plan B**

- Alex’s friend Luca offers a partnership, which will bring 50% a year with an initial investment of $100. Is this a better plan than spending the money on the tune-up?

- (Is this a good way of posing the question?)

**Which Plan is Better?**

- Plan B is better with a one year horizon
- Plan A is better for years 2-5
- Plan B is better thereon
Project Analysis

- PV: Present Value
- FV: Future Value
- i: rate of return per period
- n: number of periods

\[
PV = \frac{FV}{(1+i)^n} \quad FV = PV \times (1+i)
\]