Sensitivity Analysis

Determining Sensitivity to Parameter estimates

- There is a general procedure that you can follow the steps are:

1- Determine which parameter of interest might vary from the most likely estimated value

2-Select the probable range and increment of variation for each parameter

3-Select the measure of worth to be calculated

4-Compute the results for each parameter using the measure of worth as a basis

5- To better interpret the results , graphically display the parameter versus the measure of worth.

Example:

- Investment cost =80,000 $

- Zero salvage value

- Before tax cash flow relation=27,000$- 2000t per year (t=1,2,.....,n).

- MARR varies from 10% to 25% per year for different types of asset investment.

- Economic life varies from 8 to 12 years

Evaluate of Pw and Aw sensitivity by varying:

A- The Parameter MARR, while n=10 years

B- Parameter n, while MARR is constant at 15% per year.

Solution

- a- Follow the procedure above

Step1. The MARR ,I, is the parameter of interest

Step2. Select increments to evaluate sensitivity to MARR, the range for I is 10% to 25%

Step3. The measures of worth are Pw and Aw

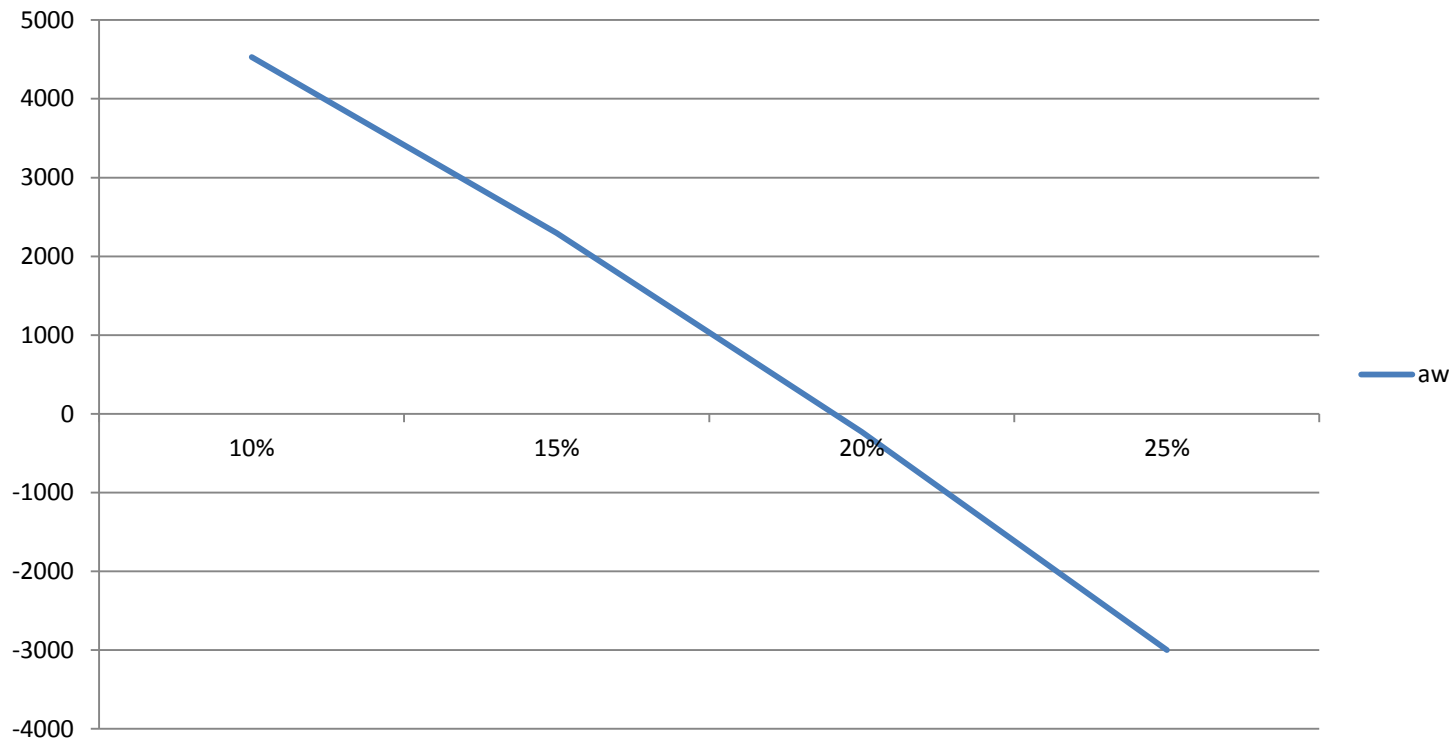Step4.Set up the Pw and Aw relations, for example ,at i= 10%

Solution Continue...

- Pw = - 80,000 + 25,000(P/A,10%,10)_ 2000(P/G,10%,10)= 27330 $

- Aw= P(A/P,10%,10)= 4527$

- The measures of worth for all four I values at 5% intervals are:

i	Pw	Aw
10%	27830 $	4529 $
15%	11512	2294
20%	_ 965	_ 229
25%	_ 10711	_ 3000

Solution Continue

- Step 5. A plot of MARR versus Aw

Solution continue….

- The steep negative slope indicates that the decision to accept the proposal based on Aw is quite sensitive to variations in the MARR. If the MARR is established at the upper end of the range , the investment is not attractive
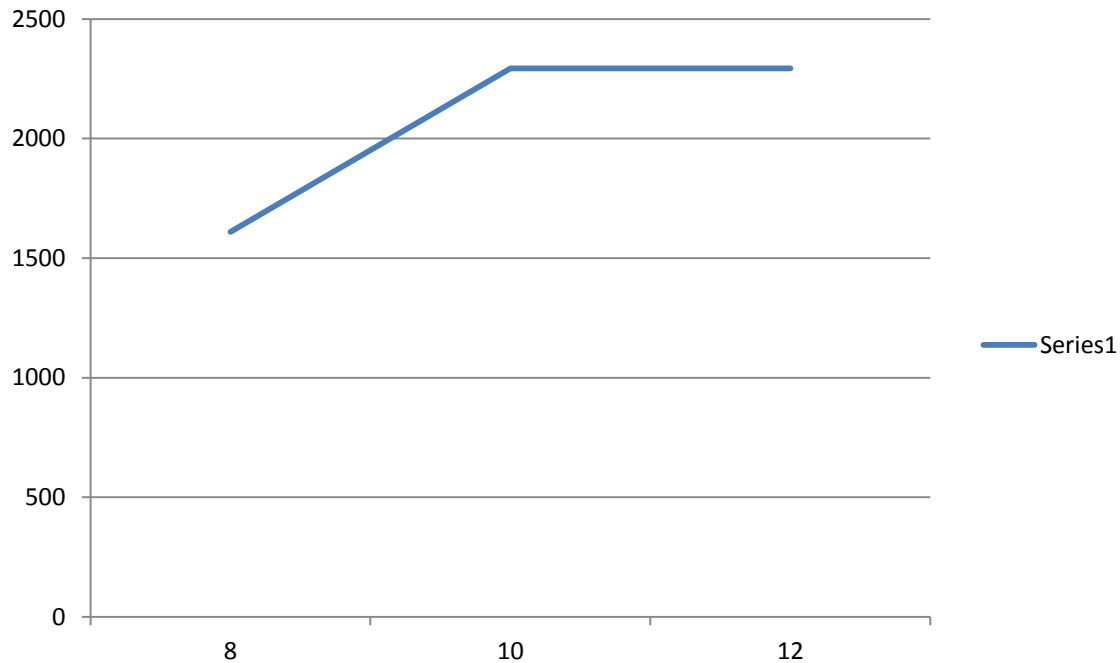
Solution

- B- Step1. Asset life n is the parameter

- Step2. Select 2 years increments to evaluate sensitivity to n over the range 8 to 12 years

- Step3. The measures of worth are Pw and Aw

- Step 4. Set up the same Pw and Aw relations as in part (a) for i=15%, measures of worth results are:

n	Pw	Aw
8	7221$	1609
10	11511$	2294

Solution continue….

- Step5. Plot Aw versus n

Solution Continue….

- This is a characteristic shape for sensitivity analysis of an n value. Since the Pw and Aw measures are positive for all values of n, the decision to invest is not materially affected by the estimated life.