

IDS420: Corporate Financial Planning

General Ford (GF) Auto Corporation is trying to determine the specific type of compact car to develop (designated as Car 1 & Car 2). In order to determine which compact car type should be built, the information for the following variables has been collected through the focus groups with the marketing and engineering departments.

- **Fixed Cost of Developing Car:** This cost is assumed to be incurred at the beginning of year 1 (or end of year 0) before any demand are recorded
- **Variable Production Cost:** The variable cost incurred in producing a car, and for simplicity, assume that the variable cost for each year's production is the same, i.e. ignore inflation.
- **Price:** The price per car is assumed to be \$10,000 for each car type
- **Demand:** For simplicity, we will assume that demand occurs at the end of each year.
- **Interest Rate:** It is assumed that cash flows are discounted at 10%. This means that a cash outflow of 1\$ at the beginning of year 1 is equivalent to a cash outflow of \$1.10 at the end of Year 1.

Fixed cost, variable cost and annual demand are unknown. The views of marketing and engineering about these quantities are summarized below:

Fixed cost for Car 1		Fixed cost for Car 2	
Value	Probability	Value	Probability
\$6,000,000,000	0.5	\$4,000,000,000	0.25
\$8,000,000,000	0.5	\$5,000,000,000	0.5
		\$16,000,000,000	0.25
Variable Cost for Car 1		Variable Cost for Car 2	
Value	Probability	Value	Probability
\$4,600	0.5	\$2,000	0.5
\$5,400	0.5	\$6,000	0.5
Demand (Year0) for Car 1 (Number of cars)		Demand (Year0) for car 2 (Number of cars)	
Value	Probability	Value	Probability
230,000	0.25	80,000	0.25
250,000	0.5	220,000	0.5
270,000	0.25	390,000	0.25

Use the following 3 regression models to estimate the demand in year t.

MODEL/APPROACH 1: based on year 0 demand

Demand (Year t) = Demand (Year 0) + Error Term

MODEL/APPROACH 2: based on previous year demand

Demand (Year t) = Demand Year (t-1) + Error Term

MODEL/APPROACH 3: Assumes demand grows by 5% annually

Demand (Year t) = 1.05* Demand Year (t-1) + Error Term

Assume that errors are normally distributed random number with mean 0 and standard deviation 20,000

Generate 50 samples using the distributions given above. Compare the solutions obtained from each model based upon the mean, standard deviation, lower & upper bounds of 90% confidence interval of the net present value. Which car type is to be more profitable?

Excel workbook:

Fixed costs, variable costs, and demand projections are given in worksheet called as “simulation” in the workbook “Corporate Financial Planning”. We’ll build 3 simulation models for the Net Present Value (NPV) for this project.

1. Open the workbook, in each tab study data in A1:B16. [Data in C1:D16 is for HW5]

1. Generate 50 random samples of Fixed Cost into A20:A69
Generate 50 random samples of Variable Cost into B20:B69.
Generate 50 random samples of Year0 Sales into M20:M69

2. Simulation models to compare:

Model 1: Demand (Year t) = Demand (Year 0) + Year-to-Year Correction

Model 2: Demand (Year t) = Demand (Year t-1) + Year-to-Year Correction

Model 3: Demand (Year t) = 1.05 * Demand (Year t-1) + Year-to-Year Correction

where the last term (i.e. errors) is NORMAL[0, 20000]

Generate 50 random samples of Y-to-Y Corrections for 10 years into C20:L69

3. Simulate sales for 10 years in cells N20:W69

4. Compute the Net Cash Flow (NCF) for each year.
The Fixed Cost is charged to Year 0, so $X_{20} \leftarrow -A_{20}$.

For Year 1, 2, ..., 10: $NCF = (PRICE - VARIABLE\ COST) * SALES$
Complete Y20:AH69

5. For each sample, Net Present Value = $NCF (Year\ 0) + NPV[Year\ 1\ to\ Year\ 10\ NCF]$
Use the Excel function NPV(Interest Rate, Range of Values).
Divide the results by 1000 to present NPV in Million Dollars in AI20:AI69
6. Compute MEAN and STDEV for NPV for the simulation of 50 samples.
7. Compute 90% Confidence Interval for NPV.