

POLS 360, Dr. Belt

Cost-Benefit Practice Problem #2

You are Governor Linda Lingle. Aloha Airlines has gone out of business. Your options are to either intervene at a cost of \$1,000,000, or do nothing (no cost). The potential outcomes are that Aloha Airlines will either go under (go out of business forever) or be restructured and resume business in a month.

If you do nothing, there is a 90% chance that Aloha Airlines will go under (10% chance that it will be restructured). If you intervene, there is a 50% chance that Aloha will go under (50% chance that it will be restructured).

If Aloha goes under, 1,800 jobs will be lost for a total of \$1,800,000 lost in tax revenue. If Aloha is restructured, there will be only \$200,000 in lost tax revenue. If you intervene and Aloha is restructured, there is a 50% chance that the business climate will stimulate an additional \$500,000 in tax revenue.

What will you do?

Table Method

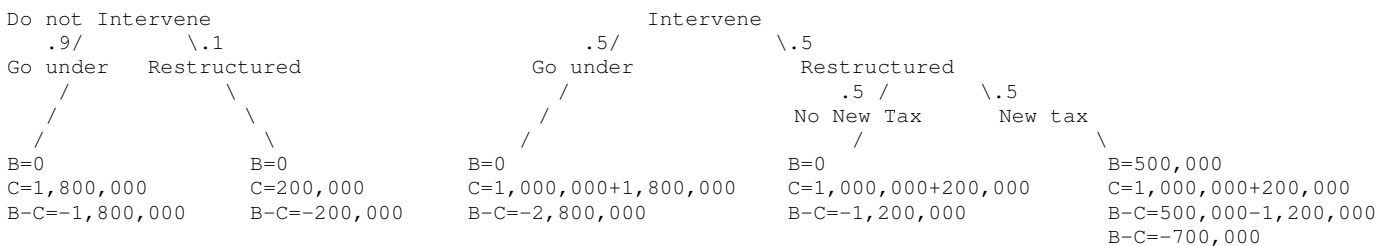
Create a table with outcomes in rows and decisions in columns (you can reverse the tables and columns if you wish, in that case your totals will add across instead of down). Calculate the predicted benefits and the costs for each cell in the table (which may have probabilities of their own), then subtract the costs from the benefits. Next, compute the decision results by adding the benefits and costs for each column (decision option), weighted by (multiplied by the probability of) each outcome.

Outcomes	Options	
	<i>Do not Intervene</i>	<i>Intervene</i>
<i>Goes under</i>	90% chance B = 0 C = 1,800,000 B-C = -1,800,000	50% chance B = 0 C = 1,000,000 + 1,800,000 B-C = -2,800,000
<i>Restructured</i>	10% chance B = 0 C = 200,000 B-C = -200,000	50% chance B = .5(500,000) = 250,000 C = 1,000,000 - 200,000 = 1,200,000 B-C = .250,000 - 1,200,000 = -950,000
Total Decision Result	=.9(-1,800,000) +.1(-200,000) = -1,620,000 - 20,000 = -1,640,000	= .5(-2,800,000) + .5(-950,000) = -1,400,000 - 475,000 = -1,875,000

The expected benefits – costs for not intervening is -1,640,000, for intervening it is -1,875,000. This means that the expected net benefit is higher for not intervening, which is the best option.

Decision Tree Method

Do a separate tree for each option, and make the branches each possible outcome and sub-outcome (Hobo sighting). Then, figure out the Benefits-Cost for each branch. Then, multiply all of the probabilities associated with each branch and add them up for each decision option.



$$\begin{aligned} \text{Do not Intervene} &= [(P \text{ go under}) (B-C)] + [(P \text{ restructure}) (B-C)] \\ \text{Do not Intervene} &= [(.9) (-1,800,000)] + [(.1) (-200,000)] \\ \text{Do not Intervene} &= -1,620,000 - 20,000 \\ \text{Do not Intervene} &= -1,640,000 \end{aligned}$$

$$\begin{aligned} \text{Intervene} &= [(P \text{ go under}) (B-C)] + \{[(P \text{ restructured}) (P \text{ no new tax}) (B-C)] + [(P \text{ restructured}) (P \text{ new tax}) (B-C)]\} \\ \text{Intervene} &= [(.5) (-2,800,000)] + \{[(.5) (.5) (-1,200,000)] + [(.5) (.5) (-750,000)]\} \\ \text{Intervene} &= -1,400,000 - 300,000 - 175,000 \\ \text{Intervene} &= -1,875,000 \end{aligned}$$