Project Risk Analysis

[Name of Student]

[Name of Institute]

[Date]

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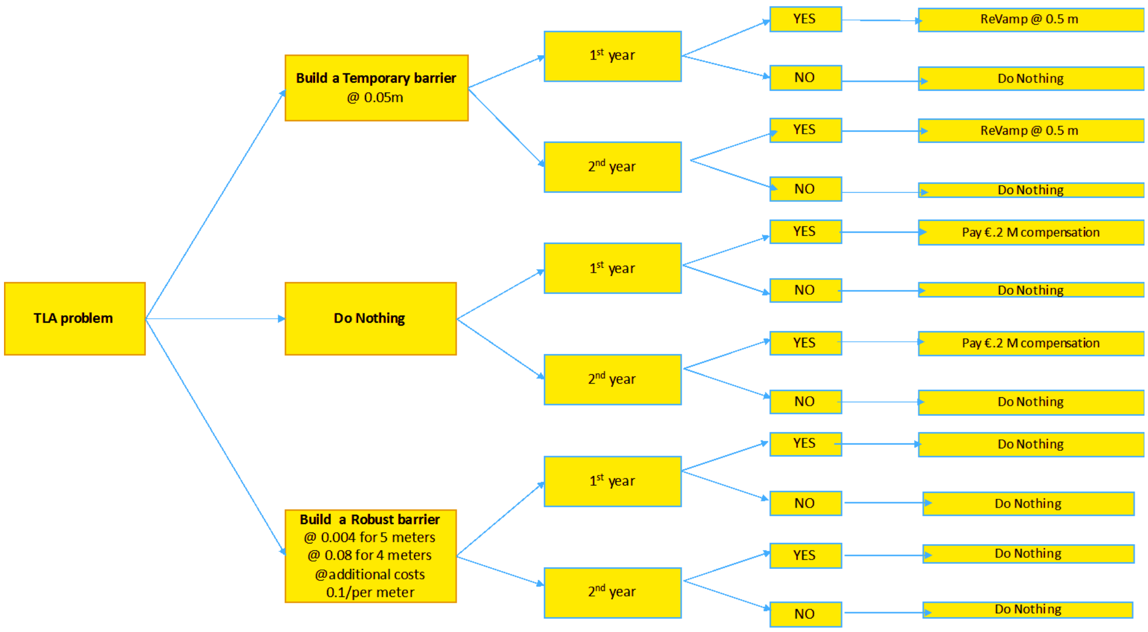
PROJECT RISK MANAGEMENT ASSIGNMENT: PROJECT RISK ANALYSIS

Question One

(a) Draw a decision tree to represent TLA's problem?

Answer:



(b) Determine the optimal policy for TLA i.e. [1], [2] or [3] (

Answer:

In determining the optimal policy for TLA as to whether option one, two or three is the best for the TLA, the above table provides a detailed view of the decision's outcome. Meanwhile, it could be seen that the options available are analysed using a Decision tree model. Whereas, if TLA chooses option [1] that is DO Nothing, TLA would have to pay out a compensation amount of €2 million due to the damages caused by the flooding.

On the contrary, if TLA chooses option [2] to build a temporary barrier at the height of 4 meters, it would cost them €0.5 million. If there is heavy rainfall, the flooding may cross the 4 meter height of the barrier, thereby causing ample damage to the barrier, which in the second year would cost an additional €0.5 million to repair the barrier, which in turn would round up to €1 million as EMV.

Whereas, if the rainfall does not happen as expected in terms of the option [2], which is to build a temporary barrier, TLA could be left with a profit of

€2 million - €0.5 million = €1.5 million x 0.09 = €0.135m as the EMV.

Meanwhile, if the rainfall does happen as expected in terms of the option [2], which is to build a temporary barrier, TLA could be left with a profit of

€2 million - €1 million = €1 million x 0.09 = €0.09m as the EMV.

However, if the rainfall does happen as expected in terms of option [3]a that is, if TLA chooses to build a more robust barrier, TLA could be left with a profit of
€2 million - €0.8 million + additional €0.5 million for (5m) = €0.7 million as the EMV.

Meanwhile, if the rainfall does happen as expected, TLA could be left with a profit of

€2 million - €1 million = €1 million x 0.09 = 0.09 as the EMV.

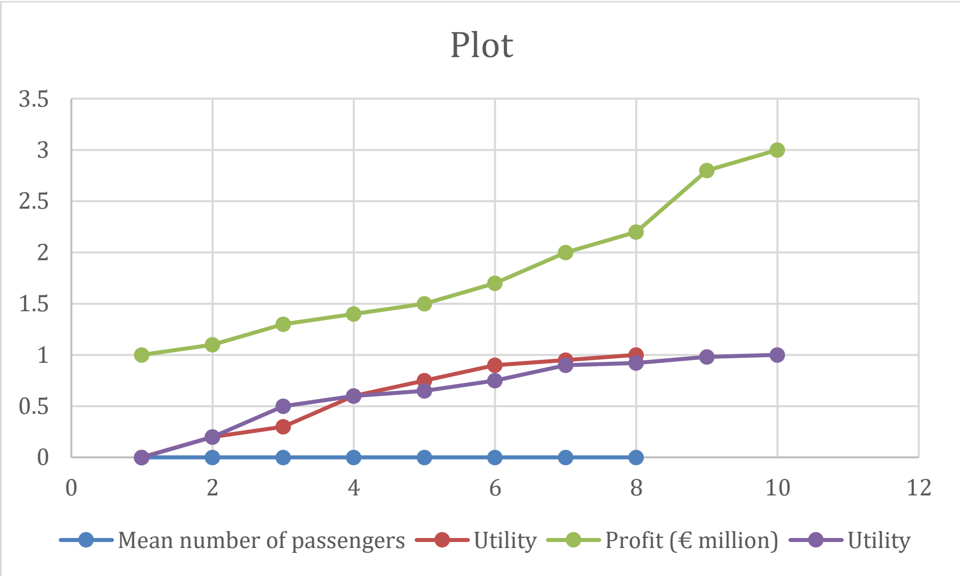
Whereas, in terms of option 3[b], this would change the probability of the river's height exceeding (in any one year) 5m the EMV would be €0.0028 m while for 4m, the EMV would be €0.096m.

Therefore, the best optimal option for TLA is to build a temporary barrier at the height of 4 meters @ €0.5m whereas, even if the flooding exceeds the height of the barrier at 4 meters, TLA would still benefit as the barrier could be repaired at an additional cost of €0.5m leaving behind ample funds of €1m.

Question Two

(a) Utility functions for the mean numbers of passengers carried and the profit have been obtained from the rail operator's Chief Executive Officer (CEO), as below.

Answer:



Plot the above utility functions (5 marks)

(b) An elicitation session* revealed that, for the CEO, the mean number of passengers and profit are mutually utility independent.

Given the above utilities, [i] determine the policy that the rail operators should undertake; and [ii] say why this the best policy

Question Three

Answer:

3(a) For each of (i) to (v), which option should they choose and why

i. Maximin Rule

As a general rule, we must compare other worst-performing methods to all other options and choose the method that maximises the worst results. This rule applies in certain circumstances.

The maximum rule allowed is to choose an option to maximise the minimum price that can be achieved. The investor examines the problem of the poorest supply and then selects the largest. Thus, decision-making chooses a guarantee for the result to minimise losses.

ii. Maximax Rule

The Maximax strategy is a strategy of game theory in which the player facing uncertainty makes a decision that produces the best of the best. All decisions have costs and benefits, and the maximax strategy looks for where the greatest benefits can be found. The Maximax decision rule is used when a manager wants the opportunity to get the highest possible profit. It is called Maximax because the manager finds a solution option that MAXI minimises each option's maximum gain.

iii. Hurwicz Rule (index = 0.3)

The Hurwicz criterion is one of the rules of the common decision-making, which is used to make a tool under uncertainty, which can be used to find the best clean teaching for division and confused perspectives. Confidence arises when the decision-maker knows the portion of the reward to be paid for each choice and all the values of the area are likely to occur (the distribution continues uncertainty in disasters is occurs when the outcome of a decision in the natural state that subsequently occurs and the number of six natural states known and limited (the distribution of payments is different).In some special cases, the use of the Hurwicz criterion in uncertain situations can lead to uncomfortable and unpredictable outcomes.

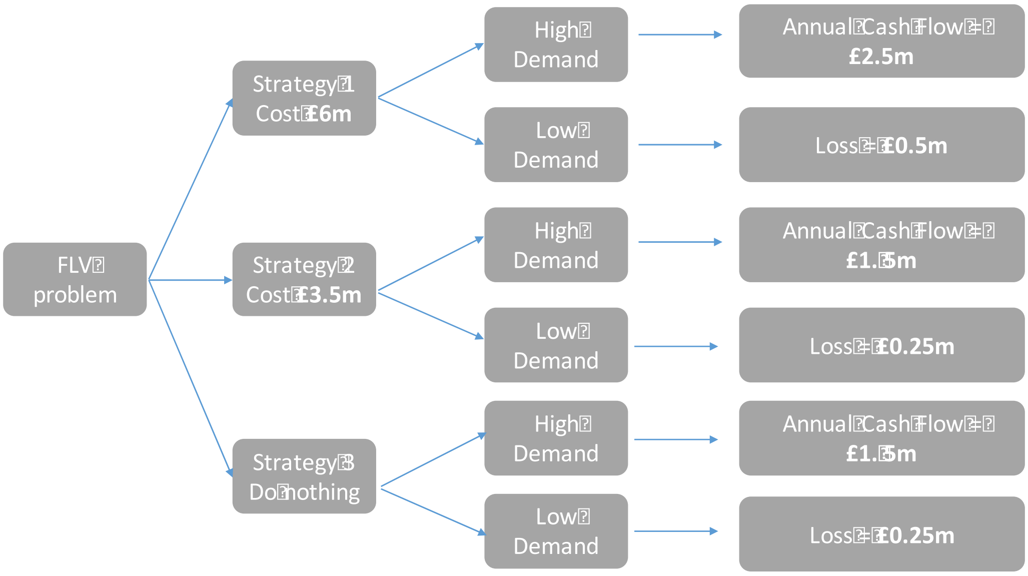
3 (b) Which option is insensitive to changes in economic outlook? (1 mark)

3 (c) Plot a sensitivity analysis “spider diagram” for Options B, C & L (3 marks)

Question Four

(a) Draw a decision tree to represent all the courses of action open to the company.

Answer



Decision Tree for Forward-Looking Ventures plc. (FLV)

(b) Determine the expected return for each possible course of action.

Strategy A: Build a large plant (estimated cost of £6m).

Since this strategy deals with two types of market conditions - high demand 0.7 or low demand and 0.3, if demand is high, the company can expect to generate 2.5m for each of the next five years. If demand for cash flows were low, it would include a loss of £ 0.5m annually due to multiple price adjustments and inefficiency. Therefore, the expected return is calculated below, given the given scenario.

ANSWER

High demand

£6m + £2.5m = £8.5m x 0.7 = £5.95m (Expected Return)

Low demand

£6m - £0.5m = £5.5m x 0.3 = £1.65m (Expected Return)

Strategy B: Build a small plant (estimated cost of £3.5m).

This strategy also faces two types of market conditions - high demand with a probability of 0.7 or a low demand with a probability of 0.3. Five-year cash flow for a small factory is £ 0.25 million if demand is low and £ 1.5 million if demand is high. Therefore, the calculation of strategy B is appended below:

ANSWER

High demand

£3.5m + £1.5m = £5m x 0.7 = £3.5m (Expected Return)

Low demand

£3.5m - £0.25m = £3.25m x 0.3 = £0.975m (Expected Return)

Strategy C: Do not build a plant initially.

Strategy C involves filing the decision for 12 months, while some information is collected. The data results can be positive or negative with the proper calculation of the 0.8 and 0.2 range. At the end of the day, the FLV management may decide to build a large house or a treehouse at the same price as the current data is good. If the information result is poor, management will choose not to build an entire organism. The data are well defined as six and high and low change requirements in the 0.9 and 0.1 range, regardless of which building is built. The annual financial flow for each plant species' remaining four years is the same as that given in plans A and B. Therefore, the calculations for this strategy is also appended below:

ANSWER

High demand

£6m + £2.5m = £8.5m x 0.8 = £6.8m (Expected Return)

Low demand

£6m - £0.5m = £5.5m x 0.2 = £1.1m (Expected Return)

High demand

£3.5m + £1.5m = £5m x 0.9 = £4.5m (Expected Return)

Low demand

£3.5m - £0.25m = £3.25m x 0.1 = £0.325m (Expected Return)

Therefore, the best course of action for FLV management the expected returns for each possible course of action is already elaborated. Hence, the results demonstrate that the best policy is to follow strategy B since following this strategy would ensure that if the demand is high, FLV will earn £3.5m as the Expected Return while spending £3.5m on the costs, which means that the costs of the plant would be reversed. Whereas if the demand is low, FLV would still recover with an expected return of £0.975m. Hence, strategy B is the best strategy for FLV.