HOMEWORK 3A

Southern Film Company (SFC) is preparing to make a bid for the rights to produce a cartoon version of the upcoming Star Wars movie “Solo”. SFC is trying to decide whether to place a high bid of $21 million or a low bid of $11 million. SFC expects to be bidding against their major competitor, Northern Film Company (NFC) and predicts NFC to place a bid of $14 million with a probability of 0.3 or a bid of $10 million with a probability of 0.7. Advance ticket sales and pre-screening results for “Solo” suggest a 0.2 probability of the cartoon version being a blockbuster hit, a 0.35 probability of attendance for the cartoon version being average, and a 0.45 probability of the cartoon version being a flop. A blockbuster or average film would most likely represent net earnings of $120 million or $28 million, respectively, after all production and distribution costs are paid (except the cost of the movie rights). A flop will cover its direct production costs only (but not the cost of the movie rights). The company that wins the bid will be required to spend an additional $5 million to promote the Star Wars franchise, whether or not their movie is successful.

1. Draw and solve a decision tree for SFC’s decision problem.



1. What should SFC do based on expected value? What could happen? What outcomes might they experience given your decision?

Based on expected value, SFC should set the bid price at $11 million. The expected value of a bid at $11 million surpasses the expected value of a bid of $21 million by $4.66 million. However, the resulting outcomes are different than the expected value. If SFC set the bid price at $11 million, there are 4 different outcomes; If NFC bids $10 million, SFC has a 20% chance to make $104 million, 35% chance to make $12 million, and a 45% chance to lose $16 million. These numbers are a net of the earnings from the movie, the bid and the promotion fees. If NFC decides to bid at $14 million, SFC will lose the bid, and will not make or lose any money. The total possibilities are as follows; 14% chance to make $104 million, 24.5% chance to make $12 million, 30% chance to neither make or lose money, and 31.5% chance to lose $16 million.

1. Draw a sensitivity graph, showing expected value of each alternative as a function of the probability of NFC bidding $10 million.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bid $11 million | |  | Bid $20 million | |
| P(NFC bid $10 million) | EV |  | P(NFC bid $10 million) | EV |
| 0 | 0 |  | 0 | 7.8 |
| 0.1 | 1.78 |  | 0.1 | 7.8 |
| 0.2 | 3.56 |  | 0.2 | 7.8 |
| 0.3 | 5.34 |  | 0.3 | 7.8 |
| 0.4 | 7.12 |  | 0.4 | 7.8 |
| 0.5 | 8.9 |  | 0.5 | 7.8 |
| 0.6 | 10.68 |  | 0.6 | 7.8 |
| 0.7 | 12.46 |  | 0.7 | 7.8 |
| 0.8 | 14.24 |  | 0.8 | 7.8 |
| 0.9 | 16.02 |  | 0.9 | 7.8 |
| 1 | 17.8 |  | 1 | 7.8 |

1. Compute the probability at which the decision changes.

*EV(Bid @ $11 million) = EV(Bid @ $20 million)*

*P((104\*.2)+(12\*.35)+(-16\*.45) = 8.8*

*P(17.8) = 8.8*

*P = 0.4944 = 49.44%*

1. Compute the value of perfect information regarding the size of NFC’s bid.

*EV w/ PI = (0.7\*((0.2\*104)+(0.35\*12)+(0.45\*-16)))+(0.3\*((0.2\*95)+(0.35\*3)+(0.45\*-25)))*

*EV w/ PI = 15.1*

*EV w/o PI = 12.46, 7.38*

because the company wants to limit the losses by taking on new research information, we will choose the lesser of the two potential VOPI’s

*i.e. VOPI = the lesser of; 15.1 – 12.46, 15.1 – 7.38*

*VOPI = the lesser of; 2.64, 7.3*

*VOPI = $2.64 million*

1. SFC is being offered an analysis by film critic Roger Ebert regarding the bidding intentions of NFC. The seller wants $1.5 million for the study. Should you: (a) snatch it up because the price is below the value of perfect information, (b) draw and solve a value of sample information tree to determine how much the information is really worth in light of its accuracy since the price is below the value of perfect information, or (c) laugh in their face because the price is more than the value of perfect information and the offer is therefore overpriced.

In the case you are offered an analysis, you must redraw the decision tree with an additional sample information tree, since the sample information is being offered for less than the VOPI. This will allow SFC to determine whether the new data will shed light and make the decision-making process more accurate or whether the information provided will not be worth the money. The final expected values will help determine whether the data can prove to be useful in the decision-making process.