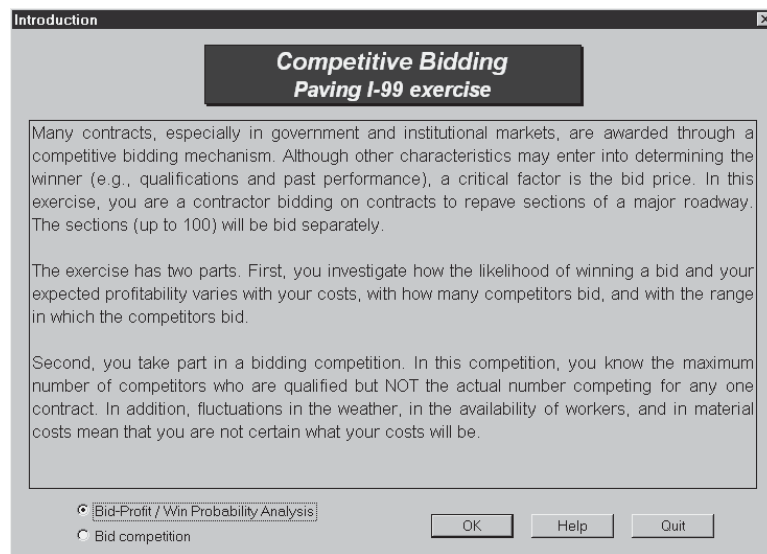


24. TUTORIAL FOR COMPETITIVE BIDDING (bid.xls)

CASE: PAVING I-99, P. 453

The BID spreadsheet has two elements. The first part calculates the probability of winning a bid against a known number of competitors whose bids follow the probability distribution you specify, and it then develops the optimal bidding strategy in such a situation with known costs. The second part of the spreadsheet is designed to accompany the Paving I-99 exercise; it simulates the results of a bidding competition with an unknown number of competitors and uncertain costs.

On the **Model** menu, select **Competitive Bidding** to see the **Introduction** screen.



Select **Bid Profit/Win Probability Analysis** and click **OK** to get the following dialog box for specifying the parameters of the probability graph.

Bid-Prof / Win Probability Analysis

Maximum Bid Accepted (\$) : 50

Competitors' Minimum Bid (\$) : 25

Number of Competitors : 4

Your Cost (\$) : 22

Graph Parameters (15 pts. in total)

Starting point (\$) : 20

Step (\$) : 2

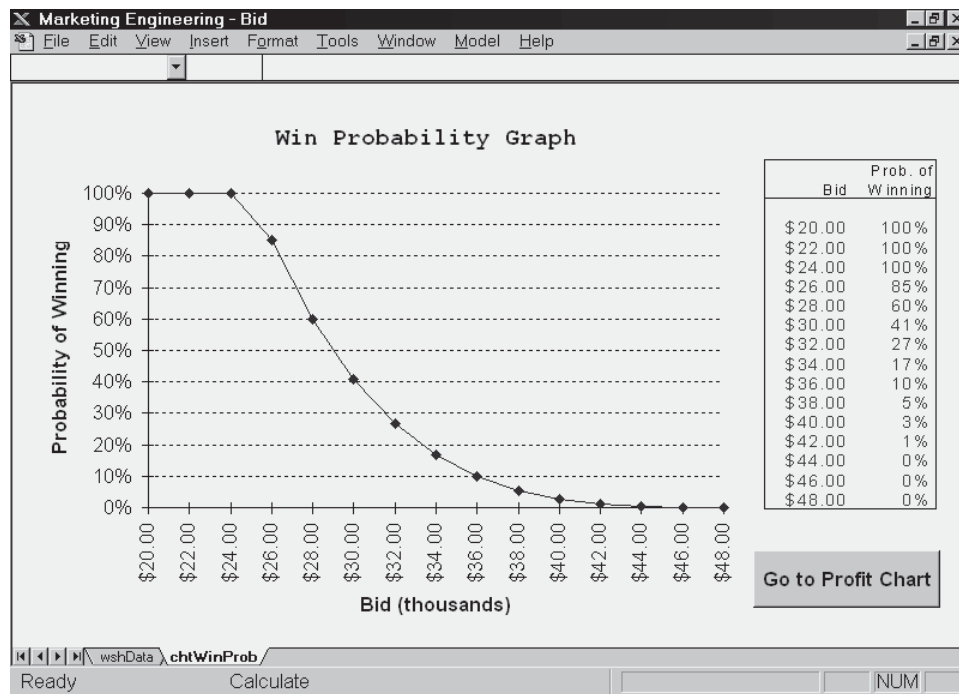
Chart

Help

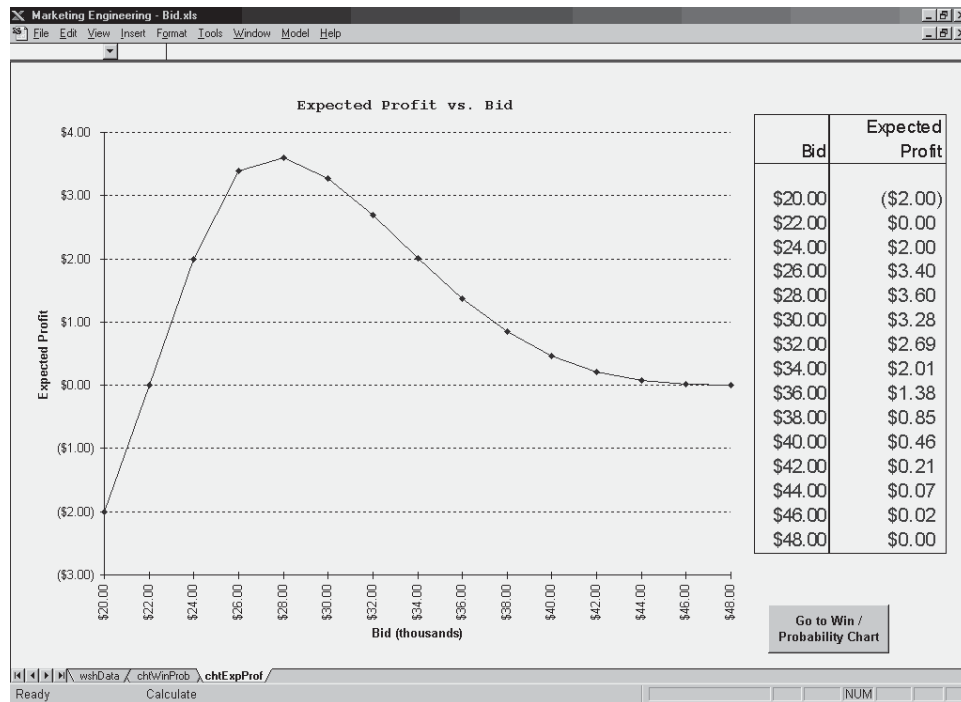
Cancel

Note: All \$ amounts are in thousands.

You must specify the characteristics of the bidding competition (maximum allowable bid, minimum competitive bid, number of competitors, and your costs). You also set the starting point and the step size for your graph. Click **Chart** to see a chart showing your probability of winning the first bid.



Click **Go To Profit Chart** to see how your expected profit varies with your bid.



To go to the bid competition, select **Model, Main Menu**, and then **Bid Competition** and click **OK**. The bid competition dialog box asks for

- The number of bid periods
- The maximum number of competitors
- Your bid (your decision variable set at the same level each period)
- Your cost-range (minimum to maximum to complete the contract)
- Valid bid range (minimum to maximum) for you and for your competition

When you have entered those inputs, click **Run** to run the competition and see the results for each of the periods. You will also see how many times you win, your total profit across all competitors, your average profit (total profit divided by number of times you won) and your expected profit (total profit divided by number of bid periods).

Note: The models in both parts of this software assume that the likelihood of a competitor bidding a specific value is uniformly distributed between U (the upper bid limit) and L (the lower bid limit).

Your probability of winning a competition with n competitors when bidding b is

$$[(U - b) / (U - L)]^n$$

Your expected profit with a bid of b is equal to

win probability (b - cost).

Bid Competition

Number of Bid Periods : (100 periods Max)

Max # of Competitors :

Your Bid (\$) :

Your Cost Ranges From (\$) : To:

Valid Bid Ranges From (\$) : To:

Note: All (\$) amounts are in thousands. # of Wins:

Bid #	Your bid	Competes	Min Bid	Cost	Profit
1	\$25.00	3	\$23.58	\$20.98	0
2	\$25.00	4	\$20.69	\$13.38	0
3	\$25.00	4	\$23.01	\$24.60	0
4	\$25.00	1	\$25.92	\$25.82	(\$.82)
5	\$25.00	1	\$23.33	\$16.38	0
6	\$25.00	0		\$19.35	\$5.65
7	\$25.00	4	\$22.07	\$24.72	0
8	\$25.00	1	\$22.18	\$20.52	0
9	\$25.00	3	\$22.35	\$21.92	0
10	\$25.00	1	\$21.90	\$15.49	0

Average Profit Expect Profit (\$) Total Profit (\$)

Clicking **Cancel** at any time will send you back to the Main Menu.

Because the bid competition is a simulation, you can click **Run** repeatedly to get different results (costs and actual number of competitors vary with each simulation).