Cow-Calf Risk Analysis

An Effective Combination
Partial Budgeting and Sensitivity Analysis

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Many decisions and strategies present themselves to ranchers each year. A few examples might be: Should I sell calves or yearlings? Should I retain ownership on my heifers? What should I do with my cull cows? Should I buy hay or put up my own? Each of these decisions can affect the overall ranch budget and profitability picture, which can sometimes be difficult to quantify. However, the essential question is "Will I be better or worse off for implementing a decision?". A relatively simple an effective approach for answering this question is utilizing the combination of a partial budget and sensitivity analysis.

Whether it is on the back of a napkin or on the barn wall, business men and ranchers alike have for ages put a "pencil" to many management scenarios. Partial budgeting is a simple tool that helps to put a framework around those calculations and improve the accuracy of one's findings. A partial budget only looks at the costs and returns that will change with the proposed scenario and results in an estimate of the positive or negative dollar value impact. Partial budgeting accomplishes this by asking four essential questions in a systematic way. The four questions are: 1. What new or additional costs will be incurred? 2. What current income will be lost or reduced? 3. What new or additional income will be received? 4. What current costs will be reduced or eliminated?

Figure 1 is blank partial budgeting template. Figure 2 is an example of a partial budget using yearling steer strategy. In order to better understand the process we will look at each of the four essential questions. Keep in mind that some items may fit under more than one question. The key is to account for all of the essential elements of the decision in at least one of the four categories, making sure not to double count any one element.

1. What new or additional costs will be incurred?

Include all direct costs associated with the proposed change. Examples would include; feed, fuel, transportation, maintenance and repairs, veterinary fees, interest, death loss, etc. Labor may or may not be an additional cost that would be incurred. If the proposed change would require additional labor to be hired than it would be an additional cost. However, if like many ranches the work force would just shift, or increase, their efforts than it would not be appropriate to add in labor as a cost.

2. What current income will be lost or reduced?

This section accounts for the current income that we are receiving before the proposed change. This is often the receipts from the sale of livestock or crops. Since we are often delaying our income

opportunities in many proposed changes we also need to consider the interest from the sale of the livestock or crop.

3. What new or additional income will be received?

This section accounts for the receipts from the sale of livestock or crops directly associated with the proposed change. This is often a very straight forward section to fill out.

4. What current costs will be reduced or eliminated?

This section usually takes some extra thought to identify these costs, but often there are costs that will be eliminated because of the change. Some examples of the costs are; If we change from selling calves at the auction barn to selling yearlings off the ranch, we will no longer have a transportation cost for the calves to the auction. If we purchase hay instead of raise our own costs such as fuel, equipment maintenance and possibly labor would be reduced or eliminated.

To finish the partial budget sections one and two are added together and subtracted from the total of sections three and four. This calculation results in a positive or negative return. The decision to implement the change still depends on the individual and is influenced by cash flow, risk tolerance and the confidence in the analysis.

Now that a positive or negative return has been calculated sensitivity analysis provides a framework to visualize the risk of less accurate numbers. This is done by calculating a worst, most likely, and best case scenario on both the cost side and the return side of the partial budget. Once the calculations are made they are then put in a grid format. Examples of this analysis can be seen at the bottom of figure 1 and figure 2. The worst, most likely and best case figures can be calculated using a general error factor rate of say 10%, or by adjusting the item that is most likely to fluctuate. An example of this second approach may be calf and yearling prices.

The end result of the sensitivity analysis is a grid of possible returns from the proposed change. This can be very helpful in not only convincing yourself, but convincing others involved in the decision making process. It is a very good tool to take to your loan officer if funding is needed for the proposed change.

The combination of partial budgeting and sensitivity analysis is robust enough to handle many of the questions that ranchers deal with each year. Additionally the method is simple and reliable enough for any rancher to utilize. Cattle ranchers deal with a significant amount of uncertainty every day. From not knowing what the weather will be like this year to wondering if market prices will increase or decrease tomorrow, agricultural producers are forced to make decisions based on imperfect information. This uncertainty creates the possibility of financial loss and of financial gain. While uncertainty can lead to both positive and negative outcomes, we normally think of risk as the possibility of adverse outcomes due to uncertainty and imperfect knowledge in decision making. For example, a severe storm during calving season may increase calf death loss or drought may reduce forage resources for the cow herd. A government mandate on the use of corn for ethanol may increase the price of corn and decrease the price of calves.

Figure 1. Blank Partial Budget Template with Sensitivity Analysis

Proposed Change

Additional Costs

Description	Number of Units	Price/ Cost	Total

Additional Income

Description	Number of Units	Price/ Cost	Total

Reduced Income

Description	Number of Units	Price/ Cost	Total

Reduced Costs

Description	Number of Units	Price/ Cost	Total

Total Additional Costs and Reduced Income	

Total Additional Income and Reduced Costs	
Net Income or Loss	

Sensitivity Analysis

		Revenue		
		Worst	Likely	Best
Cost				
Worst				
Likely				
Best				

Figure 2. Example Partial Budget with Sensitivity Analysis

Proposed Change	Retain 100 Steers Through Summer Grass

Additional Costs

Description	Number of Units	Price/ Cost	Total
Feed – Head Days	21500	$0.65	$13,975
Pasture – AU's	450	$16.00	$7,200
Trans – 200 miles	400	$3.75	$1,500
Vet – Per Head	100	$2.50	$250
Fuel/Repairs			$700
Misc.			$250

Additional Income

Description	Number of Units	Price/ Cost	Total
9 wt Steers - 97	87300	$1.10	$96,030
Death loss=3			

Reduced Income

Description	Number of Units	Price/ Cost	Total
5 wt Steers	50000	$1.30	$65,000
Interest at 8%	365 days		$5,200

Reduced Costs

Description	Number of Units	Price/ Cost	Total
Trans-Calves	200	$3.75	$750

Total Additional Costs and Reduced Income	$94,075
Total Additional Income and Reduced Costs	$96,780
Net Income or Loss	$2,705

Sensitivity Analysis

		Revenue		
	10% General Factor	Worst	Likely	Best
Cost		$87,102	$96,780	$106,458
Worst	$103,482.50	-$16,381	-$6,703	$2,976
Likely	$94,075	-$6,973	$2,705	$12,383
Best	$84,667.50	$2,435	$12,113	$21,791

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