

ECONOMICS: PARTIAL BUDGETING



BASICS

OVERVIEW

- Partial budgeting is an approach used to estimate the effect management decisions may have on a dairy operation's profitability.
- Another term used for partial budgeting is marginal analysis
- When developing a partial budget, only the changes in revenues and the changes in expense items related to the management decision(s) are considered. Fixed costs are ignored. If the net changes in revenues exceed the net changes in costs, the decision is considered to be lucrative.
- The partial budget format consists of several essential steps. The first step is to describe the proposed change and identify the associated elements of the decision. One should identify what revenues might increase (more milk, higher components) as well as what revenues will decrease (decreased cull cow income, reduced milk sales). Similarly, on the costs side, one should identify what costs increase (input cost associated with the opportunity, increased feed cost, interest costs) as well as what cost might decrease (less input costs, less labor). If the net sum of these changes is positive, the decision is considered to be potentially lucrative. Sensitivity analysis should be performed to evaluate what are the critical elements influencing the observed outcome. Additionally, non-economic factors (safety, animal welfare, environmental impact) must be evaluated as well before the proposed change is implemented.

STEPS TO PARTIAL BUDGETING

1. State the proposed economic change(s)
2. Identify the added returns (revenues)
3. Identify the reduced returns (revenues)
4. Identify the increased costs
5. Identify the reduced costs
6. Summarize the net effects: net benefit of the alternative
7. Perform a sensitivity analysis on the outcome
8. Evaluate and list the non-economic considerations; use a "best-case" and "worst-case" scenario.

EXAMPLE PROBLEM

- 1) Statement of the problem and elements: A producer is considering going from 2 x to 3 x milking. It is expected that milk yield per cow will increase by 10%. However, the parlor capacity will have to be increased by 2 additional stalls that will involve a capital expense of \$10,000 that can be financed at 5% over 7 years.
- 2) Additional revenues (+): The additional milk produced by milking the entire herd 3x will be 10% of the current average annual production per cow. (Note it is assumed that the milk components will remain at current percentile levels).
- 3) Reduced revenues (-): None

- 4) Increased costs (-): The parlor will be used an additional time per day and thus there will be additional labor, electrical costs (pumps, heat), inflations, teat dip, towels, gloves, increased pump depreciation. Most of these costs can be estimated from the herd's current expenditures for 2 x milking. The additional labor cost might result in overtime hours and thus on a marginal basis the cost/unit of labor might increase. Additional feed will be required for the 10% increase in yield. This should be the marginal feed cost/lbs. of additional milk rather than the average feed cost/lbs. of milk.
- 5) Decreased costs (+): The additional milking might result in a reduced milking time for the other milking periods, however this is expected to be small. Perhaps the prevalence of mastitis might be decreased by more frequent milk outs and increased teat dip use, and more frequent visual assessment of the cow's udders and milk.
- 6) Sum items 2,3,4,5 (note the signs). If positive than the decision to move to 3x milking appears lucrative.
- 7) Sensitivity analysis. In this problem the percent milk yield is a critical factor influencing the outcome and thus the analysis should be repeated at varying levels (5-10%) to see if there is a level at which the partial budget goes to zero. Excel has a table command that can allow for multiway sensitivity analysis within a spreadsheet. Tornado graphs where all the inputs to the analysis are varied +/- by 10% or by +/- 1 standard deviation can be used to show the relative impact of changes in the driving elements of the problem. This is a function available in the BASECOW.XLA add in to Excel.
- 8) Non-economic considerations. The additional milking will require additional management and coordination of schedules.

SUMMARY

Partial budgeting is a financial decision tool that is used to estimate the effect that management decisions may have on a farm operational profitability. It is the most basic approach to evaluate a given decision. It requires the decision maker to identify the key elements of the decision. It is important that only costs (marginal costs) associated with the decision at hand are considered. It allows for the identification of the key influential factors that are critical to the outcome decision.



MISCELLANEOUS

SEE ALSO

- Dairy Economics (www.fiveminutevet.com/ruminant)
- Economics: Net Present Value (www.fiveminutevet.com/ruminant)
- Economics: Partial Budgeting (www.fiveminutevet.com/ruminant)

ABBREVIATIONS

Lbs = pounds

Suggested Reading

Galligan D.: Economic assessment of animal health performance. [Review] [41 refs] *Vet Clin North Am Food Anim Pract* 22(1): 207-27, Mar 2006.

Erb, H.N. 1988. The benefit-cost analysis of disease control programs. *Vet Clin North Am Food Anim Pract*. Mar; 4(1):169-81.

- Humble, J.A. 1997. Improving the ability of food animal veterinarians to make management decisions. *J Am Vet Med Assoc.* Dec 15; 211(12):1506–8.
- MacKay, R.D. 1981. The economics of herd health programs. *Vet Clin North Am Large Anim Pract.* Nov; 3(2):347–74.
- Marsh, W. 1999. The economics of animal health in farmed livestock at the herd level. *Rev Sci Tech.* Aug; 18(2):357–66.
- Morris, R.S. 1999. The application of economics in animal health programmes: a practical guide. *Rev Sci Tech.* Aug; 18(2): 305–14.
- Seegers, H., Fourichon, C., Malher, X., L’Hostis, M. 1994. A framework for animal health management. *Vet Res.*; 25(2–3): 165–73.

Author David Galligan

Consulting Editor Christopher C.L. Chase

Acknowledgment The author and editors acknowledge the prior contribution of Grant A. Dewell.