Using A Partial Budget To Analyze Changes in Your Farm Operation

By

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When considering making a change in your business, you need to estimate how that change will affect your net income. What will be the impact on your financial performance? A partial budget can help answer this question.

Most changes in an operation directly affect only a particular enterprise within the business. Therefore, a partial budget analysis can often be used. Although it is still important to develop a complete annual whole-farm analysis, it is not necessary to re-create this budget for every potential change you may be considering for your business. A partial budget is a simple, timesaving tool that can help you evaluate changes in your operation that will affect only a portion of your business.

There are four possible effects on a budget due to a change in the business operations:

A) Items that add to net income

1) Added revenues

- 2) Reduced expenses
- B) Items that reduce net income
 - 3) Reduced revenues
 - 4) Added expenses

It is important to include all revenue and expense items that will be changed by your actions. For example if yields are expected to increase, then the revenues will be increased, or if fewer chemicals are going to be used then the chemical cost might be reduced. One last essential point is to use realistic estimates and assumptions to evaluate the change.

Let's examine the following situation. A cotton farmer is interested in a new tillage implement. The new tillage implement is called a stock stuffer and it is used after harvest to plow under the crop stocks and prep the field for re-planting, thereby, replacing both a plowing operation and a disking operation. The stock stuffer sells for \$34,646 and the farmer is not sure if it will pay for itself and if it will how long will it take? Look at the decision evaluation using a partial budget.

In this example, the farmer knows that he can purchase the stock stuffer for \$34,646. The farmer is also able to make a down payment of 20% or \$6,929, thereby reducing the total amount needed to be financed to \$27,146. Interest rate for the loan will be 10% for a five-year period. He currently has a sufficient size of tractor to pull the new implement, so he will not have to upgrade to a more powerful tractor. An additional piece of equipment required to properly operate the stock stuffer is a three-point guidance system that sells for \$7,000. However, the guidance system will be used for other operations so the costs must be spread across all operations. A few other assumptions are needed before beginning the analysis.

- No yield increase/decrease is expected.
- Straight-Line depreciation was used to determine the yearly deprecation on the stock stuffer. The salvage value used is equal to 25% of the original cost.
- The marginal tax rate is 36%. This is the rate at which the change in income will be taxed.
- Operational costs for plowing, disking, and the stock stuffer are taken from the Arizona Field Crop Budgets, Gram County, 1999. See Table 2 for cost and number of times the operation is counted.
- Taxes, Insurance & Housing (T,I,H) costs for the stock stuffer were taken from the Arizona Farm Machinery Costs bulletin, 1998/99.
- The disk and plow will still be housed on the farm so T,I,H costs will still be charged to each piece of equipment.
- Fuel, Oil and Repair (F, O, & Rep.) were calculated for each operation using the Arizona Field Crop Budget Program.
- All table values calculated for 1000 acres.

Table 1

Description of Change:									
	6 Row Stock Stuffer Vs Current Tillage System (Own Equipment) Cotton to—Cotton Rotation 1000 Acres								
	Positive Effects (\$ per Year)				Negative Effects (\$ per Year)				
	Added Revenues	Profitability	Cash Flow		Added Expenses	Profitability	Cash Flow		
1				1	Stock Stuffer Depreciation	\$3,248.00			
2				2	Stock Stuffer Interest	\$1,524.00	\$952.00		
3				3	Stock Stuffer T, I, H	\$311.00	\$311.00		
4				4	Stock Stuffer F, O & Rep.	\$3,100.00	\$3,100.00		
5				5	Stock Stuffer Labor	\$2,270.00	\$2,270.00		
6				6	Guidance System	\$48.00	\$48.00		
7				7					
8				8					
	Total Added Revenues	\$0.00	\$0.00		Total Added Expenses	\$10,501.00	\$6,681.00		
	[[
	Reduced Expenses	Profitability	Cash Flow		Reduced Revenues	Profitability	Cash Flow		
1	Plow F, O & Rep.	\$15,720.00	\$15,720.00	1	Interest Forgone	\$692.90	\$692.90		
2	Plow Labor	\$8,190.00	\$8,190.00	2					
3	Disking F, O & Rep.	\$3,930.00	\$3.930.00	3					
4	Disking Labor	\$2,700.00	\$2,700.00	4					
5				5					
6				6					
7				7					
8				8					
	Total Reduced Expenses	\$30,540.00	\$30,540.00		Total Reduced Revenues	\$692.90	\$692.90		
	Total Positive Effects	\$30,540.00	\$30,540.00		Total Negative Effects	\$11,193.90	\$7,373.90		

Partial Budget Example

Table 2								
Labor	<u>F, O & Rep</u>	Operation	Number of Times	Note: Operation costs are taken from the Arizona. Field Crop Budgets 1999				
\$8.19	\$15.72	Plowing	1					
\$2.70	\$3.93	Disking	1					
\$2.27	\$3.10	Stock Stuffer	1					

Does it Cash Flow?

In the example, the farmer is maintaining his current cotton-to-cotton rotation and replacing two operations with one implement. Table 1 shows how the change can be evaluated. All items that either add to revenue or reduce cost are placed under the positive column. No added revenues are expected from this change, however because two operations are being replaced, the savings from not performing the operations are entered under the reduced expense column for a total positive effect of \$30,540.00. Added expenses will be incurred for the new piece of equipment and its operation note that deprecation is charged but only under the profitability column. Deprecation is a non-cash expense and therefore only charged in the profitability column not the flow column. Interest forgone represents the amount of interest which could have been earned had the \$6,929 down payment been used to reduce other outstanding debt. The total negative effects equaled \$11,193.90 under the profitability column and \$7,373.90 under the cash flow column. Now by subtracting the total negative effects from the total positive effect the net change in profit is \$19,346.10 and the cash flow is \$23,166.10. At first glance this appears to be a smart move, however a few questions still need to be answered to give a complete picture. Further financial analysis is needed to determine whether the investment is truly a profit making decision. Looking strictly at the cash flow will only provide half of the answers. Remember that money has been borrowed to pay for the investment and the money comes at a cost of 10% per year for the next five years and must be covered. To help answer the second half of the equation, is it a profitable investment, the Average Annual Rate of Return needs to be analyzed and finally tax issues which may also change the final outcome will have to be considered as well as telling us what is left for debt reduction.

Is it Profitable?

To effectively address the last two concerns profitability and tax implications, We will continue from the net change in profits and work our way through Table 3. The first order of business is to determine the Average Annual Rate of Return. The annual rate of return is another measure of profitability showing how well the investment performs. If the rate of return is greater than the cost of the money used to finance the new piece of equipment then it is a profitable venture. In this example the annual rate of return is 62% while the cost of borrowed money is 10% making the decision a good choice. For a quick comparison of this investment to others types of investments, the average annual return on farm assets in the U. S. averaged 4.24% from 1990 through 1999 (ERS 1999).

The next two items to consider are the after tax cash availability and length of loan payoff. As mentioned in our assumptions, the marginal tax rate of 36% is used for this example and is multiplied by the total change in cash flow profits, which yields the repayment capacity for the investment. The repayment capacity shows the ability of a business to produce a return above costs. In other words, the ability of a business to repay money borrowed for that business. The repayment capacity, in this example \$16,210.50 (see table 3 #3), can then be used to determine the amount of time needed to repay the total amount invested. By taking the total amount invested \$27,146 and dividing by the repayment capacity of \$16,201.50, we see that it will take 1.7 years to repay all outstanding debit on this investment.

Table 3

		Financi	al Analysis	;				
1 Change in annu	al profit:							
Total P	ositive Effect (Profit C	Column)		\$30,540.00	Α			
Minus:								
Total N	egative Effect (Profit	Column)		\$11,193.90	в	(A-B)	\$19,346.10	#1
2 Average Annua	Rate of Return on In	vestment:						
Annual	Profit or (Loss) From	#1		\$19,346.10	С			
Plus:								
Interes	Cost (ON INVESTM	ENTS) From Profit Column		\$2,217	D			
Divideo	By:							
Dollars	Invested			\$34,646.00	Е	((C+D)/E) x 100=%	62%	#2
3 After-tax Cash A	vailable for Annual R	etirement of Principal:						
Total P	ositive Effect (Cash F	Flow Column)		\$30,540.00	F			
Minus:								
Total N	egative Effect (Cash	Flow Column)		\$7,373.90	G			
Minus:								
Change	e in Profit			\$19,346.10	н			
Times:								
Margin	al Tax Rate (Combine	ed State and Federal)		36%	I	[(F-G)-(H x I)]	\$16,201.50	#3
4 Years to Recover	er Debt:							
Loan A	mount	\$27,146.00 Divided by	Line #3	\$16,201.50		Equals:	1.7	#4

Summary of Results

In this simple exercise, we see that the investment in the stock stuffer is a sound financial move. By eliminating one plowing and one disking operation the farmer was able to increase his profits by utilizing the new piece of equipment. A word of caution is in order, the costs of the operations being replaced are key to the success of this example. By changing the assumptions made at the beginning of this example, and changing the cost of plowing and disking to equal to the cost of the operation of the stalk stuffer the investment no longer becomes a profitable investment (-\$453.90). The underlying assumptions used in any analysis are key to the accuracy of the analysis. The information used must be as reliable and as realistic as possible, otherwise the answers obtained will be of little use. Every option is different and while a partial budget will help you find the better of the two choices (see above), it is not a guarantee that the alternative will be the optimal choice.

Other types of changes in the farm business that a partial budget can help analyze are the following:

- Substituting some or all of one enterprise for another. Increasing or decreasing the size of the enterprise (adding cows, adding crop land etc.)
- 3) Increasing or decreasing the amount of one or more inputs (as in the feed example above)
- 4) Adopting a new technology.
- 5) Making new capital improvements.
- 6) Using different types or sizes of machinery or using custom operator instead of owning the machinery.

Partial budgeting is a useful tool for fine tuning your current basic plan of operation and for checking to see if, over time, any changes need to be made due to changes in technology, prices, yields, or other factors affecting your operation. Remember that when using a partial budget, you are limited to comparing the existing situation and the proposed change for a given enterprise.

	Description of Change:								
	Positive Effec	cts (\$ per Year)			Negative Effects (\$ per Year)				
	Added Revenues	Profitability	Cash Flow		Added Expenses	Profitability	Cash Flow		
1				1					
2				2					
3				3					
4				4					
5				5					
6				6					
7				7					
8				8					
9				9					
10				10					
	Total Added Revenues	\$0.00	\$0.00		Total Added Expenses	\$0.00	\$0.00		
	Reduced Expenses	Profitability	Cash Flow		Reduced Revenues	Profitability	Cash Flow		
1				1					
2				2					
3				3					
4				4					
5				5					
6				6					
7				7					
8				8					
9				9					
10				10					
	Total Reduced Expenses	\$0.00	\$0.00		Total Reduced Revenues	\$0.00	\$0.00		
	Total Positive Effects	\$0.00	\$0.00		Total Negative Effects	\$0.00	\$0.00		

Partial Budget Blank Example

Partial Budget Blank Financial Example

Financial Ana	lysis		
1 Change in annual profit:			
Total Positive Effect (Profit Column)	\$0.00	A	
Minus:			
Total Negative Effect (Profit Column)	\$0.00	З (А-В)	\$0.00 #1
2 Average Annual Rate of Return on Investment:			
Annual Profit or (Loss) From Line #1	\$0.00	C	
Plus:	· · · · · · · · · · · · · · · · · · ·		
Interest Cost (ON INVESTMENTS) From Profit Column	\$0.00	ט	
Divided By:			
Dollars Invested	\$0.00	E ((C+D)/E) x 100=%	0% #2
3 After-tax Cash Available for Annual Retirement of Principal:			
Total Positive Effect (Cash Flow Column)	\$0.00	F	
Minus:			
Total Negative Effect (Cash Flow Column)	\$0.00	3	
Minus:			
Change in Profit	\$0.00	4	
Times:			
Marginal Tax Rate (Combined State and Federal)	0%	l [(F-G)-(H x l)]	\$0.00 #3
4 Years to Recover Debt:			
Loan Amount \$0.00 Divided by Line #	3 \$0.00	Equals:	0.0 #4

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