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## Teaching the Budgeting Process Using a Spreadsheet Template

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### **Abstract**

The purpose of this article is to demonstrate how to use a template to teach the budgeting process and how to use the same template to do a sensitivity analysis once the budget process is completed. The template can be used as-is by non-accounting majors. They just have to fill in all of their assumptions by replacing the red numbers. The template can be locked so that students cannot modify the formulas by mistake. Just lock the worksheet and students will be able to only change the assumptions. Accounting majors are shown how to build their own template by using formulas. This requires a good understanding of Excel and of the budgeting process. Once the template is constructed, making modifications to the assumptions is very easy and students can see the results immediately.

### **Introduction**

Most textbooks in accounting or in entrepreneurship use tables to explain what the budget is all about. The textbooks usually explain one equation at a time and students rapidly learn that creating a budget by hand is a very long process. In explaining a business plan, many entrepreneurship books have a special business plan appendix, but most of their examples are based on the acquisition of an existing company (Kuratko, 2009). By using Excel, many professors have reduced the amount of time spent doing calculations. However, most accounting professors continue to use Excel as a calculator and do not develop a spreadsheet that would allow a rapid analysis of “what if” situations. This paper demonstrates how to create a template that allows students to change one or many of their assumptions and see the impact on the budget immediately. Unlike most examples used in books, this template also incorporates income taxes.

This template was developed at the request of the organizers of the Connecticut Business Plan Competition: The Entrepreneurship Foundation. The competition started more than ten years ago. It involves mostly graduate students, and all colleges and universities in Connecticut can send teams to the competition. The biggest difficulty that students have had was doing a budgetary analysis. Most students were enrolled in an Entrepreneurship class and were not accounting majors. They understood the concept of a budget but were unable to do the analysis themselves. The Foundation features this template in their student guide (The Entrepreneurship Foundation, 2009).

After a long discussion with the Foundation, we decided that the template would have a section for assumptions, a cash budget, an income statement, and a balance sheet. The assumptions would allow students to input their data in on worksheet and then see the results immediately in

the budget. The current template has more sections. One section is used for the assumption, one for each budget, one for cash flows and one for each financial statement.

## Description of the Template

The first screen students see is the Assumptions Sheet.

Figure 1:  
Budget Assumptions

	A	B	C	D	E	F	G	H
1	<b>Fill the Red Numbers with your information</b>							
2	<b>Company XYZ</b>		Q1	Q2	Q3	Q4	Q5	
3	Selling price per unit	\$ 25.00						
4	Total market per year	1,000,000						
5	Market share	10%						
6	Annual Growth	5%						
7	Percentage of sales per quarter		10%	30%	40%	20%		
8	Sales per quarter		10,000	30,000	40,000	20,000		
9	Cash receipts same quarter	70%						
10	Ending inventory finished goods	25%	next quarter sales					
11	Raw material per unit	15	pounds per unit					
12	Raw material inventory	20%	next quarter purchases					
13	Cost of raw materials	\$ 0.25	per pound					
14	Cash payments same quarter	80%						
15	Direct labor per unit	0.80	hours					
16	Labor cost per hour	\$ 7.50						
17	Variable overhead	\$ 2.00	per hour of direct labor					
18	Fixed overhead		\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000		
19	Depreciation - manufacturing		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		
20	Variable sales cost	\$ 1.80						
21	Advertising		\$ -	\$ 20,000	\$ -	\$ 20,000		
22	Executive salaries		\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000		
23	Insurance			\$ 20,000		\$ 35,000		
24	Property taxes					\$ 17,500		
25	Depreciation - selling		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		
26	Equipment purchases		\$ 30,000	\$ 45,000	\$ 22,500	\$ 18,000		
27	Useful life	5	years					
28	Percentage used for manufacturing	50%						
29	Total depreciation		\$ 6,000	\$ 9,000	\$ 4,500	\$ 3,600		
30	Dividends		\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000		

The red numbers in Figure 1 are the assumptions that students must change for their new product. As shown in Figure 2, they also need some information about the beginning balance sheet, borrowing, minimum cash level, the tax rate, and the amount of quarterly income taxes payments.

**Figure 2:  
The Beginning Balance Sheet**

	A	B	C	D	E	F	G	H
32	<b>Beginning Balance Sheet</b>							
33	<b>Current Assets</b>							
34	Cash					\$ 10,000		
35	Accounts receivable					\$ -		
36	Raw materials		0 Pounds		\$0.25	\$ -		
37	Finished products		0 Units		\$11.35	\$ -		\$10,000
38	<b>Long-term assets</b>							
39	Land					\$ -		
40	Plant and equipment				\$ -	\$ -		
41	Accumulated Depreciation				\$ -	\$ -		\$ -
42	Total assets							\$10,000
43								
44	<b>Liabilities and Equity</b>							
45	<b>Liabilities</b>							
46	Accounts payable							\$ -
47	Bank Borrowing							\$ -
48								\$ -
49	<b>Equity</b>							
50	Common Stock							\$ 10,000
51	Retained earnings							\$ -
52								\$ 10,000
53								\$ 10,000
54	Minimum cash required	\$ 40,000.00						
55	Borrowing by multiples of	\$ 1,000.00						
56	Interest	10%						
57	Quarterly tax Payments	\$ 30,000.00						
58	Tax Rate	35%						

For accounting students, the same template is used. Students are told to fill in the information from the example in the book that we are currently using for the graduate or undergraduate course (Garrison, Noreen, & Brewer, 2008) or (Hansen & Mowen, 2007).

### How to use a template to teach the budget process

The first element of the budget process is to calculate revenues and cash inflows. Revenues are the product of quantity sold and the price per unit. Students are informed that there are many ways to determine the price and that once the price is set the quantities can be obtained from the marketing department. Students must also understand that the cash might not be received at the same time as the sale.

One can determine, using cells B4:B5 in Figure 1, that because the company has a market share of 10% of a total market of 1,000,000 units, it is selling 100,000 units. Because of an annual growth of 5%, the company is expecting sales of 105,000 next year. This number will be used with some calculations. However, this number is confusing for most non-accounting majors and the numbers are hidden. In the first quarter, the firm will have 10% of its sales which will be 10,000 units. The formula used in C8 is the following: =B\$4\*B\$5\*C7. This formula is copied to D8:F8.

Before moving to the next step, students should be told about lines 18, 25 and 29. Line 28 is calculated first. Total depreciation is calculated using the depreciation method used for income taxes (double declining balance with the half year rule). The net book value at the beginning of the year (E40 – E41) is depreciated at twice the depreciation rate (2/B27). The additions for the

quarter (C26) are depreciated at half that rate (1/2 of 2/B27 = B27). The formula is  $=(((\$E\$40-\$E\$41)*2/(\$B\$27)/4)+(C26/(\$B\$27))$ . The depreciation is then allocated to manufacturing costs (line 18) or administrative cost (line 25) based on the percentage of use by manufacturing (B24).

The next step is to create the sales budget as shown in Figure :

**Figure 3**  
**The Sales Budget**

	A	B	C	D	E	F	G	H
1	Company XYZ		Year X Quarters					
2	Sales		1	2	3	4		Year
3	Budgeted sales in units		10,000	30,000	40,000	20,000		100,000
4	Selling price per unit		\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00		\$ 25.00
5	Sales		250,000	750,000	1,000,000	500,000		\$2,500,000

First quarter unit sales in C3 are determined by referencing the assumed amount with the formula:  $=\text{Assumptions!C8}$ . This formula is copied for each quarter, and the quantity for the year is the sum of the four quarters. In C4, the formula for selling price per unit is  $=\text{Assumptions!B\$3}$ . Finally, the formula for total sales is:  $=C3*C4$ .

From this table, the cash inflows can be calculated. As assumed in cell B9, seventy percent (70%) of first quarter sales will be collected in the first quarter ( $\$250,000 \times 70\%$ ). The accounts receivable from the previous quarter will also be received in the first quarter. At the end of the fourth quarter, 30% of the sales of that quarter are still receivable. The information is summarized in the next table:

**Figure 4**  
**Cash Collections**

	A	B	C	D	E	F	H
7	Cash Collections						
8	Accounts receivable		\$ -				\$ -
9	Same Quarter sales		\$ 175,000	\$ 525,000	\$ 700,000	\$ 350,000	\$ 1,750,000
10	Previous Quarter Sales			\$ 75,000	\$ 225,000	\$ 300,000	\$ 600,000
11	Cash Collections		\$ 175,000	\$ 600,000	\$ 925,000	\$ 650,000	\$ 2,350,000
12							
13	Accounts receivable at the end					\$ 150,000	\$ 150,000

Cell C8 is calculated as  $=\text{Assumptions!F32}$ . It represents the amount of accounts receivable at the beginning of the year, this would be the first amount received. Cell C9 is calculated by multiplying the amount of sales for the first quarter by the percentage of cash receipts the same quarter. The formula is  $=C5*\text{Assumptions!B\$9}$ . The remaining amount not received the same quarter will be received the following quarter. The formula in D10 is  $=C5 - C9$ .

The next step is to look at the manufacturing process. The number of units to manufacture must be calculated. Because units must be fabricated before they are sold, we also have to calculate how many units are needed as a “buffer.” This is usually a percentage of the sales of the next quarter. The necessary information is in B10:B19, as shown in Figure :

**Figure 5**  
**Production Assumptions**

	A	B	C	D	E	F	G	H
10	Ending inventory finished goods	25%	next quarter sales					
11	Raw material per unit	15	pounds per unit					
12	Raw material inventory	20%	next quarter purchases					
13	Cost of raw materials	\$ 0.25	per pound					
14	Cash payments same quarter	80%						
15	Direct labor per unit	0.80	hours					
16	Labor cost per hour	\$ 7.50						
17	Variable overhead	\$ 2.00	per hour of direct labor					
18	Fixed overhead		\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000		
19	Depreciation - manufacturing		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		

In the first quarter, the company needs not only to manufacture the 10,000 units, but also needs a buffer of 25% on the second quarter sales (30,000 x 25%), which means they need to manufacture a total of 17,500 units. Figure shows the production budget. The budgeted sales come from line 3. The desired ending inventory is calculated with the following formula:  

$$= \text{Sales} \times \text{Assumptions} \times 10$$
This means that is the percentage specified in B10 (Figure 1) multiplied by the sales of next quarter. The beginning inventory in C6 is the amount in cell C34 in Figure 2, the number of units in the beginning inventory for the year. For all other quarters, the beginning inventory in a quarter is the ending inventory in the previous quarter.

**Figure 6**  
**The Production Budget**

	A	B	C	D	E	F	G	H
1	<b>Company XYZ</b>		<b>Year X Quarters</b>					
2	<b>Production budget</b>		1	2	3	4		Year
3	Budgeted sales		10,000	30,000	40,000	20,000		100,000
4	Ending inventory		7,500	10,000	5,000	2,625		2,625
5	Total needs		17,500	40,000	45,000	22,625		102,625
6	Beginning Inventory		-	7,500	10,000	5,000		-
7	Production in units		17,500	32,500	35,000	17,625		102,625

Students are told that the security buffer for the fourth quarter was calculated as 2,625, which is 25% of 10,500 units. Students must remember that because growth was 5%, sales for the first quarter of next year would be 10,000 plus 5%, for a total of 10,500 units. Since this will be the required production for the first quarter of year 2, the company needs 25% of this amount at the end of quarter 4 of year 1. Students should notice that the ending inventory for the year (H4) is not the sum of quarterly ending inventory but the ending inventory at the end of the fourth quarter (F4). Similarly, the beginning inventory for the year (H6) is the beginning inventory for the first quarter (C6).

The first element of the manufacturing cost is the cost of raw materials. Since 15 pounds are needed for each unit, we would need 17,500 units at 15 pounds each for a total of 262,500 pounds of raw materials. However, raw materials have to be purchased in advance and a security

“buffer” is also needed. In this case, it represents 20% of the purchase of the next quarter. Students are told to be careful about beginning and ending inventories. After the quantities have been determined, the cost is calculated by multiplying the pounds by the cost per pounds. The results are as follows:

Figure 7  
The Materials Budget

	A	B	C	D	E	F	G	H
1	Company XYZ		Year X Quarters					
2	<b>Direct Materials Budget</b>		1	2	3	4		Year
3	Required Production		17,500	32,500	35,000	17,625		102,625
4	Raw Materials per unit		15.00	15.00	15.00	15.00		15.00
5	Raw materials needed		262,500	487,500	525,000	264,375		1,539,375
6	Ending inventory		97,500	105,000	52,875	47,250		
7	Total needs		360,000	592,500	577,875	311,625		1,539,375
8	Beginning Inventory		-	97,500	105,000	52,875		-
9	Purchases		360,000	495,000	472,875	258,750		1,586,625
10	Cost per pound		\$ 0.25	\$ 0.25	\$ 0.25	\$ 0.25		\$ 0.25
11	Cost of raw materials		\$90,000	\$123,750	\$118,219	\$64,688		\$ 396,656

The calculations for the materials budget are summarized in Figure 8:

Figure 8  
Formulas for the Materials Budget

	A	C	D	E	F	H
1	=Assumptions!A2	Year X Quarters				
2	<b>Direct Materials Budget</b>	1	2	3	4	Year
3	Required Production	=Production!C7	=Production!D7	=Production!E7	=Production!F7	=Production!H7
4	Raw Materials per unit	=Assumptions!\$B\$11	=Assumptions!\$B\$11	=Assumptions!\$B\$11	=Assumptions!\$B\$11	=Assumptions!\$B\$11
5	Raw materials needed	=C4*C3	=D4*D3	=E4*E3	=F4*F3	=H4*H3
6	Ending inventory	=D5*Assumptions!\$B\$12	=E5*Assumptions!\$B\$12	=F5*Assumptions!\$B\$12	=G5*Assumptions!\$B\$12	
7	Total needs	=SUM(C5:C6)	=SUM(D5:D6)	=SUM(E5:E6)	=SUM(F5:F6)	=SUM(H5:H6)
8	Beginning Inventory	=Assumptions!C36	=C6	=D6	=E6	=C8
9	Purchases	=C7-C8	=D7-D8	=E7-E8	=F7-F8	=SUM(C9:F9)
10	Cost per pound	=Assumptions!\$B\$13	=Assumptions!\$B\$13	=Assumptions!\$B\$13	=Assumptions!\$B\$13	=Assumptions!\$B\$13
11	Cost of raw materials	=C9*C10	=D9*D10	=E9*E10	=F9*F10	=H9*H10

Because the cash outflow for each semester is only 80% (as specified in Assumption B14) of the purchases of the quarter, outflows need to be calculated in the following table.

Figure 9  
Cash Outflows

	A	B	C	D	E	F	G	H
13	<b>Cash output</b>							
14	Accounts payable beginning		\$ -					\$ -
15	Same Quarter		\$ 72,000	\$ 99,000	\$ 94,575	\$ 51,750		\$ 317,325
16	Next Quarter			\$ 18,000	\$ 24,750	\$ 23,644		\$ 66,394
17	Cash Output		\$ 72,000	\$ 117,000	\$ 119,325	\$ 75,394		\$ 383,719
18								
19	Account payable at the end					\$ 12,938		\$ 12,938

Students should be told to notice that the formulas used here are very similar to the formulas used in for the cash inflows (see Figure ).

The other elements of the manufacturing process are easier to determine than the direct materials cost because neither direct labor nor overhead need a buffer. Unlike raw materials, you cannot buy labor in advance and store it to be used later. The calculations for direct labor and overhead are straightforward and are shown in Figure 3. Students are also reminded that because depreciation is not a cash outflow, it has to be taken out of the expenses to determine the cash outflows.

Figure 3  
The Direct Labor and Overhead Budgets

	A	B	C	D	E	F	G	H
1	Company XYZ		Year X Quarters					
2	<b>Direct Labor Budget</b>		1	2	3	4		Year
3	Required Production		17,500	32,500	35,000	17,625		102,625
4	Direct labor time per unit		0.80	0.80	0.80	0.80		0.80
5	Total hours needed		14,000	26,000	28,000	14,100		82,100
6	Labor cost per hour		\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50		\$ 7.50
7	Total Labor Cost		\$ 105,000	\$ 195,000	\$ 210,000	\$ 105,750		\$ 615,750
8	Pay as you go							
	A	B	C	D	E	F	G	H
1	Company XYZ		Year X Quarters					
2	<b>Overhead Budget</b>		1	2	3	4		Year
3	Direct Labor Hours		14,000	26,000	28,000	14,100		82,100
4	Variable Overhead Rate		\$ 2.00	\$ 2.00	\$ 2.00	\$ 2.00		\$ 2.00
5	Variable Overhead		\$ 28,000	\$ 52,000	\$ 56,000	\$ 28,200		\$ 164,200
6	Fixed Overhead		\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000		\$ 240,000
7	Total Overhead		\$ 88,000	\$ 112,000	\$ 116,000	\$ 88,200		\$ 404,200
8	Less depreciation included above		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		\$ 11,550
9	Total Overhead Disbursement		\$ 85,000	\$ 107,500	\$ 113,750	\$ 86,400		\$ 392,650

The numbers in Figure 3 were calculated using the formulas shown in :



**Figure 4**  
**Formulas for the Labor and Overhead Budgets**

	A	C	D	E	F	H
1	=Assumptions!A2	Year X Quarters				
2	<b>Direct Labor Budget</b>	1	2	3	4	Year
3	Required Production	=Production!C7	=Production!D7	=Production!E7	=Production!F7	=Production!H7
4	Direct labor time per unit	=Assumptions!\$B\$15	=Assumptions!\$B\$15	=Assumptions!\$B\$15	=Assumptions!\$B\$15	=Assumptions!\$B\$15
5	Total hours needed	=C4*C3	=D4*D3	=E4*E3	=F4*F3	=H4*H3
6	Labor cost per hour	=Assumptions!\$B\$16	=Assumptions!\$B\$16	=Assumptions!\$B\$16	=Assumptions!\$B\$16	=Assumptions!\$B\$16
7	Total Labor Cost	=C5*C6	=D5*D6	=E5*E6	=F5*F6	=H5*H6
8	Pay as you go					

  

	A	C	D	E	F	H
1	=Assumptions!A2	Year X Quarters				
2	<b>Overhead Budget</b>	1	2	3	4	Year
3	Direct Labor Hours	=Direct Labor!C5	=Direct Labor!D5	=Direct Labor!E5	=Direct Labor!F5	=Direct Labor!H5
4	Variable Overhead Rate	=Assumptions!\$B\$17	=Assumptions!\$B\$17	=Assumptions!\$B\$17	=Assumptions!\$B\$17	=Assumptions!\$B\$17
5	Variable Overhead	=C4*C3	=D4*D3	=E4*E3	=F4*F3	=H4*H3
6	Fixed Overhead	=Assumptions!C18	=Assumptions!D18	=Assumptions!E18	=Assumptions!F18	=SUM(C6:F6)
7	Total Overhead	=C5+C6	=D5+D6	=E5+E6	=F5+F6	=H5+H6
8	Less depreciation included above	=Assumptions!C19	=Assumptions!D19	=Assumptions!E19	=Assumptions!F19	=SUM(C8:F8)
9	Total Overhead Disbursement	=C7-C8	=D7-D8	=E7-E8	=F7-F8	=H7-H8

The next step in the budget process is to add the selling and administrative expenses.

For this step, students must remember that variable selling costs are per unit sold, not per unit manufactured. The other selling and administrative costs are a fixed determined amount per quarter and are easy to calculate. Again, we have to add back depreciation to determine the cash outflow.

**Figure 12**  
**The Selling and Administrative Expense Budget**

	A	B	C	D	E	F	G	H
1	Company XYZ		Year X Quarters					
2	<b>Selling and Administrative Expenses</b>		1	2	3	4		Year
3	Budgeted sales		10,000	30,000	40,000	20,000		100,000
4	Variable costs per unit		\$ 1.80	\$ 1.80	\$ 1.80	\$ 1.80		\$ 1.80
5	Total Variable costs		\$18,000.00	\$54,000.00	\$72,000.00	\$36,000.00		\$180,000
6	Fixed costs							
7	Advertising		\$ -	\$ 20,000	\$ -	\$ 20,000		\$ 40,000
8	Executive salaries		\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000		\$200,000
9	Insurance		\$ -	\$ 20,000	\$ -	\$ 35,000		\$ 55,000
10	Property taxes		\$ -	\$ -	\$ -	\$ 17,500		\$ 17,500
11	Depreciation - selling		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		\$ 11,550
12	Total fixed		\$ 53,000	\$ 94,500	\$ 52,250	\$ 124,300		\$324,050
13	Total selling and administrative		\$ 71,000	\$ 148,500	\$ 124,250	\$ 160,300		\$504,050
14	Less depreciation		\$ 3,000	\$ 4,500	\$ 2,250	\$ 1,800		\$ 11,550
15	Selling & Administrative Disbursement		\$ 68,000	\$ 144,000	\$ 122,000	\$ 158,500		\$492,500

As shown in Figure , the variable costs are calculated while the fixed costs are just taken from the assumption section.

**Figure 13**  
Formulas for the Selling and Administrative Expense Budget

	A	C	D	E	F	H
1	=Assumptions!A2	Year X Quarters				
2	<b>Selling and Administrative Expenses</b>	1	2	3	4	Year
3	Budgeted sales	=Production!C3	=Production!D3	=Production!E3	=Production!F3	=Production!H3
4	Variable costs per unit	=Assumptions!\$B\$20	=Assumptions!\$B\$20	=Assumptions!\$B\$20	=Assumptions!\$B\$20	=Assumptions!\$B\$20
5	Total Variable costs	=C3*C4	=D3*D4	=E3*E4	=F3*F4	=H3*H4
6	Fixed costs					
7	=Assumptions!A21	=Assumptions!C21	=Assumptions!D21	=Assumptions!E21	=Assumptions!F21	=SUM(C7:F7)
8	=Assumptions!A22	=Assumptions!C22	=Assumptions!D22	=Assumptions!E22	=Assumptions!F22	=SUM(C8:F8)
9	=Assumptions!A23	=Assumptions!C23	=Assumptions!D23	=Assumptions!E23	=Assumptions!F23	=SUM(C9:F9)
10	=Assumptions!A24	=Assumptions!C24	=Assumptions!D24	=Assumptions!E24	=Assumptions!F24	=SUM(C10:F10)
11	=Assumptions!A25	=Assumptions!C25	=Assumptions!D25	=Assumptions!E25	=Assumptions!F25	=SUM(C11:F11)
12	Total fixed	=SUM(C7:C11)	=SUM(D7:D11)	=SUM(E7:E11)	=SUM(F7:F11)	=SUM(H7:H11)
13	Total selling and administrative	=C12+C5	=D12+D5	=E12+E5	=F12+F5	=H12+H5
14	Less depreciation	=C11	=D11	=E11	=F11	=H11
15	Selling & Administrative Disbursement	=C13-C14	=D13-D14	=E13-E14	=F13-F14	=H13-H14

### Creating the Cash Budget

Now is the time to calculate the Cash Budget (see the Financials worksheet). The first element is to look at the beginning balance of the cash and add the cash inflows from the sales budget. The beginning cash plus cash receipts is the total available.

The next step is to look at all of the cash disbursements from purchases, the direct labor budget, the overhead budget and the selling and administrative budget. Two more disbursements are also taken into account: equipment purchases and dividends (see C26:F27 in Figure 1). These are added to the disbursements. We also add one more line for interest that we will need to calculate.

**Figure 14**  
The Cash Budget

	A	B	C	D	E	F
1	Company XYZ					
2	<b>Cash Budget</b>	Year X Quarters				
3		1	2	3	4	Year
4	Cash Beginning	\$ 10,000	\$ 40,000	\$ 40,363	\$ 311,613	\$ 10,000
5	Cash receipts	\$ 175,000	\$ 600,000	\$ 925,000	\$ 650,000	\$ 2,350,000
6	Total available	\$ 185,000	\$ 640,000	\$ 965,363	\$ 961,613	\$ 2,360,000
7						
8	Cash disbursement					
9	Purchases	\$ 72,000	\$ 117,000	\$ 119,325	\$ 75,394	\$ 383,719
10	Direct labor	\$ 105,000	\$ 195,000	\$ 210,000	\$ 105,750	\$ 615,750
11	Overhead	\$ 85,000	\$ 107,500	\$ 113,750	\$ 86,400	\$ 392,650
12	Selling and Administrative	\$ 68,000	\$ 144,000	\$ 122,000	\$ 158,500	\$ 492,500
13	Equipment purchases	\$ 30,000	\$ 45,000	\$ 22,500	\$ 18,000	\$ 115,500
14	Dividends	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 32,000
15	Interest payments		\$ 22,138	\$ 28,175	\$ 28,175	\$ 78,488
16	Estimated Income Taxes Payments	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 120,000
17	Total disbursements	\$ 398,000	\$ 668,638	\$ 653,750	\$ 510,219	\$ 2,230,606
18	Excess (Deficit) cash	\$ (213,000)	\$ (28,638)	\$ 311,613	\$ 451,394	\$ 129,394

The difference between the total available and the total disbursements will determine the excess (or deficit) of cash in row 18. As can be seen below, all numbers used here come from numbers calculated in the Budget section of the template.

We now need to determine the amount to borrow and when it will be reimbursed. Two important assumptions are made here: Borrowing is always done on the first day of a quarter and repayment is always made on the last day of a quarter. Additionally, we make another assumption about the amount borrowed and how to round it up. Finally an assumption is made about the tax rate and the quarterly payments made throughout the year.

**Figure 15**  
**Borrowing and Taxes Assumptions**

	A	B
51	Minimum cash required	<b>\$ 40,000.00</b>
52	Borrowing by multiples of	<b>\$ 1,000.00</b>
53	Interest	<b>10%</b>
54	Quarterly tax Payments	<b>\$ 30,000.00</b>
55	Tax Rate	<b>35%</b>

In the example above, we have a deficit of \$213,000 and since we need a minimum of \$40,000 (B51) in cash, we must borrow \$253,000, which is a multiple of \$1,000 (B52). The amount is calculated the following way:

$$=IF(B18<Assumptions!\$B\$54,ROUNDUP(-B18+Assumptions!\$B\$54,-3),0)$$

This means that if the excess or deficit of cash is less than the amount specified in the assumptions, you round up the sum of the deficit cash plus the desired amount. The roundup is to the third number to the left of the decimal, which means rounded up to the next thousand.

This amount will appear on the line labeled Borrowings, as follows (C21):

**Figure 16**  
**Borrowing and Interest Payments**

	A	B	C	D	E	F
15	Interest payments		\$ 22,138	\$ 28,175	\$ 28,175	\$ 78,488
16	Estimated Income Taxes Payments	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 120,000
17	Total disbursements	\$ 398,000	\$ 668,638	\$ 653,750	\$ 510,219	\$ 2,230,606
18	Excess (Deficit) cash	\$ (213,000)	\$ (28,638)	\$ 311,613	\$ 180,394	\$ 129,394
19	Financing					
20	Borrowing (first day)	\$ 253,000	\$ 69,000	\$ -	\$ -	\$ 322,000
21	Repayment (last day)		\$ -	\$ (271,000)	\$ (51,000)	\$ (322,000)
22	Adjustment to repayment			\$ -	\$ -	\$ -
23	Accrued Interest	\$ 22,138	\$ 28,175	\$ 28,175	\$ 4,463	\$ 82,950
24	Interest				\$ -	\$ -
25	Adjustment to interest			\$ -	\$ -	\$ -
26	Total financing	\$ 253,000	\$ 69,000	\$ (271,000)	\$ (51,000)	\$ -
27						
28	Cash at the end	\$ 40,000	\$ 40,363	\$ 40,613	\$ 129,394	\$ 129,394

Accrued interest is next calculated in B23 using the formula =B20\*Assumptions!B55/4.

The interest is thus calculated as \$22,138 which will be paid the first day of the next quarter to avoid compound interest. This was indicated as line 15 of the disbursement of the next quarter (C15). Students are also told to note that Cash at the end of the first quarter (B28) will be the cash at the beginning of the second quarter (C4 in Figure 14).

The last step of the budget process is to prepare financial statements. The manufacturing cost and the income statement use revenues and expenses, not the inflows or outflows of cash. This is the Manufacturing Costs Statement is shown in Figure :

**Figure 17**  
**The Manufacturing Cost Statement**

	A	B	C	D
1	<b>Company XYZ</b>			
2	<b>Manufacturing Costs</b>			
3	<b>For Year X</b>			
4	Direct Materials			
5		Beginning Inventory	\$ -	
6		Plus purchases	\$ 396,656	
7		Less ending inventory	\$ (11,813)	\$ 384,844
8	Direct Labor			\$ 615,750
9	Overhead			\$ 404,200
10	Total Manufacturing Costs			<u>\$1,404,794</u>

The Manufacturing Costs Statement is just to determine how much it cost to produce the goods manufactured (or finished) during the year.

The Income Statement is shown next.

Figure 18  
The Income Statement

	A	B	C	D
1	<b>Company XYZ</b>			
2	<b><i>Income Statement and Retained Earnings</i></b>			
3	<b><i>For Year X</i></b>			
4	Sales			\$2,500,000
5	Cost of Goods Sold			
6	Beginning inventory		\$ -	
7	Plus Manufacturing Costs		1,404,794	
8	Less Ending Inventory		(29,794)	1,375,000
9	Gross margin			1,125,000
10	Selling and Administrative Expenses			504,050
11	Net Income before interest			620,950
12	Interest Expense			82,950
13	Net Income before taxes			538,000
14	Taxes			188,300
15	Net Income			349,700
16	Plus Retained Earnings at Beginning			0
17	Less Dividends			(32,000)
18	Retained Earnings at the End			<u>\$317,700</u>

In order to determine the Cost of Goods Sold, in the next statement, we need to add the beginning inventory of finished goods plus the manufacturing cost and subtract the ending inventory of finished goods. The balance sheet is prepared next.

Figure 19  
The Balance Sheet

	A	B	C	D
1	<b>Company XYZ</b>			
2	<b>Balance Sheet</b>			
3	<b>As of 12/31/xx</b>			
4	<b>Assets</b>			
5	<b>Current Assets</b>			
6	Cash			\$ 129,394
7	Accounts receivable			150,000
8	Raw materials			11,813
9	Finished products			29,794
10	Total Current Assets			<u>\$ 321,000</u>
11	<b>Long-term assets</b>			
12	Land			0
13	Plant and equipment		\$ 115,500	
14	Accumulated Depreciation		(23,100)	92,400
15	Total long term assets			92,400
16	Total Long Term Assets			<u>\$413,400</u>
17				
18	<b>Liabilities and Equity</b>			
19	<b>Liabilities</b>			
20	Accounts payable			\$ 12,938
21	Taxes payable			68,300
22	Bank Borrowing and accrued interests			4,463
23	Total Liabilities			<u>85,700</u>
24				
25	<b>Stockholders' Equity</b>			
26	Common Stock			10,000
27	Retained earnings			317,700
28	Total Equity			<u>327,700</u>
29				
30	Total Liabilities and Equity			<u>\$413,400</u>

The total of the Assets is equal to the total of Liabilities and Stockholders' Equity. Students can use the financial statements to do a ratio analysis or any other form of financial analysis. There is an amount to pay for income taxes because the amount paid each quarter (\$30,000 as per line 16 in Figure 14), were not enough to cover the real income tax expense (\$188,300 as per D14 in Figure 18) shown in the income statement. Explaining the process and doing the whole budget usually takes about three hours. The last Spreadsheet is the formal cash flows statement shown in Figure 20

Figure 20  
Cash Flows Statement

	A	B	C
1	<b>Company XYZ</b>		
2	<b>Cash Flows Statement</b>		
3	<b>For Year X</b>		
4	<b>Cash from Operations</b>		
5	Net Income		\$ 349,700
6	Plus depreciation of manufacturing assets		11,550
7	Plus depreciation of administrative assets		11,550
8	Less change in current assets		(191,606)
9	Plus change in current liabilities		85,700
10	Net Change from operations		266,894
11			
12	<b>Cash from Financing</b>		
13	Dividends		(32,000)
14	Net Change from financing		(32,000)
15			
16	<b>Cash from Investing</b>		
17	Acquisition of Assets		(115,500)
18	Net Change from investing		(115,500)
19	Total Change in Cash		119,394
20	Cash at beginning of Year		10,000
21	Cash at the end		\$129,394

### How to use the template to do a scenario analysis.

Imagine that your sales force told you that if you reduce the price by \$1 you could increase market share by 2%. Should you do it? It could take another 3 hours to answer if done by hand. This is when the spreadsheet is especially useful. Change the two assumptions and see the results immediately. Go to the Assumption sheet and change B3 from \$25 to \$24. Also change B5 from 10% to 12% and see the results in the Financials Sheet.

Figure 21  
New Assumptions

	A	B
1	<b>Fill the Red Numbers with your information</b>	
2		
3	Selling price per unit	\$ 24.00
4	Total market per year	1,000,000
5	Market share	12%

Net Income is now \$425,409 an improvement from the situation before. Note that every number of the income statement was recalculated automatically.

Figure 22  
The New Income Statement

	A	B	C	D
1	<b>Company XYZ</b>			
2	<b><i>Income Statement and Retained Earnings</i></b>			
3	<b><i>For Year X</i></b>			
4	Sales			\$2,880,000
5	Cost of Goods Sold			
6		Beginning inventory	\$ -	
7		Plus Manufacturing Costs	1,637,753	
8		Less Ending Inventory	(35,753)	1,602,000
9	Gross margin			1,278,000
10	Selling and Administrative Expenses			540,050
11	Net Income before interest			737,950
12	Interest Expense			83,475
13	Net Income before taxes			654,475
14	Taxes			229,066
15	Net Income			425,409
16	Plus Retained Earnings at Beginning			0
17	Less Dividends			(32,000)
18	Retained Earnings at the End			<u>\$393,409</u>

Also, since your financials are all there, you could calculate the impact on your ratios. You immediately get the results of any change in your assumptions. Any number in red can be changed and you will see the results immediately.

## Conclusion

By using a template with an assumptions sheet, you can very rapidly see the impact of a decision. This is very useful for both accountants and non-accountants. The advantage of a template is that the user does not have to know how to calculate all of the elements of the budget and can concentrate on the results.

Accounting majors should be shown step-by-step how they can construct such a template for their own needs. They are told that it is important to write the formulas correctly and to make a reference to a cell address (B3) instead of just using the amount \$25.

Students are also told that the approach used here is more realistic than the approach used in many books by looking at the total market and a specific market share for their business instead of just using quantities as most accounting books do. The depreciation method used is also the



same method used by the IRS. Most books just use an amount for depreciation instead of calculating the expense as we would usually do for a corporation.

It takes a lot more time to build the template but once it is built, people will save hundreds of hours every time they have to do a budget and every time they have to answer a simple question such as what happens if my raw materials cost is increased by 10%. With a flexible budget process, it is very easy to see the impact of some changes in a few key strokes instead of taking another three hours to recalculate everything.

## References

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