

## **Roberta Bell, “the more we sell the less we seem to earn!”**

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### **ABSTRACT**

This case uses managerial accounting techniques to support business decisions and facilitates a rapid understanding of those techniques in motivated students. It has been used successfully for years in a MBA accounting course<sup>1</sup>. The case takes a practical approach and progresses rapidly from defining key terminology through identifying and estimating variable versus fixed costs and performing cost-volume-profit analysis, both for the company and for each product line.

Keywords: Variable Costs, Fixed Costs, Contribution Margin, Break-Even Sales, Sensitivity Analysis, Target Profit, Cost/Volume/Profit.

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<sup>1</sup> An Excel file for use with the Roberta Bell case is available from Keith Richardson ([krichardson@bellarmine.edu](mailto:krichardson@bellarmine.edu)) or David Collins ([dcollins@bellarmine.edu](mailto:dcollins@bellarmine.edu)).

## INTRODUCTION

Roberta Bell has been working in her mother's business since graduating with a psychology degree from a very good liberal arts college three years ago. Bell's Gifts sells gift baskets on-line to customers all over the United States. The company had enjoyed significant growth in both sales and net income during its first four years of operation, however, for the past three years, while sales showed steady growth, net income showed a steady decline. Roberta was at a loss to explain this phenomenon but certainly hoped it was not due to her management of the company.

## BELL'S GIFTS

Roberta's mom, Nancy, started the company seven years ago to earn extra income to help with Roberta's tuition. For the first two years, Nancy ran the business out of the family's basement in Louisville, Kentucky. By year three, the business grew large enough that Nancy moved it to a suitable location in the industrial park. A major competitive advantage was, and is, the UPS hub at the Louisville International Airport. Bell's Gifts sold gourmet gift baskets on-line in a simple business model: Nancy purchased gourmet products from around the U.S., had them shipped to Louisville via UPS, packaged them in gift baskets, and delivered the baskets via UPS.

Due to Nancy's excellent gourmet taste, clever internet marketing, reasonable pricing, frugal operations, and attention to customer service, the business grew quickly. Revenues steadily increased each year, and generated increasing profits for the first four years, but profits have declined the last three years, as shown in Table 1 (Appendix).

Roberta worked hard the past three years and is very pleased with the increasing sales numbers. She is confident that this has been the result of continuing her mom's strong business practices combined with adding two additional products to the line of gift baskets. However, she cannot understand why income is decreasing; particularly with the continuing strong sales growth. Roberta is hopeful that profits will rise again when sales exceed \$400,000 in 2018. Roberta does take a salary of \$35,000 per year, but she replaced a \$35,000 per year general manager the company had employed in 2013 and 2014.

Because of the declining profits in the face of sales growth, it was decided that Roberta should enroll in a part-time MBA program at a local university. She, and Nancy, are hopeful that this formal business training will help them understand what is causing the problem, and more importantly, how to solve it.

## GAAP-BASED INCOME STATEMENTS

From her MBA studies, Roberta used her newly acquired accounting knowledge to prepare GAAP-based income statements for 2011 to 2017, as shown in Table 2 (Appendix). Then, Roberta used her new skills to prepare common-size income statements, as shown in Table 3 (Appendix).

- 1) Using tables 2 and 3, develop a list of possible explanations for the 2011 – 2017 results.
- 2) Prepare a list of questions about decisions and actions that have been taken over the years.
- 3) Prepare any suggestions for Roberta at this point.

## CONTRIBUTION MARGIN INCOME STATEMENTS

Roberta wants to know how sales are contributing to profitability. To do so she needs to reconfigure the GAAP-based statements into contribution margin statements. She knows that GAAP-based statements are appropriate for investors and creditors. But, Roberta has learned that contribution margin statements can be more useful for internal decisions making.

Contribution margin statements separate expenses into variable and fixed components, computes contribution margin by subtracting total variable costs from sales revenue, and then subtracts total fixed costs to arrive at net income. Roberta first used the GAAP-based income statements to identify the variable and fixed costs, as shown in Table 4 (Appendix). Roberta then prepared contribution margin income statements, as shown in Table 5 (Appendix), and a schedule of contribution margin percentages, as shown in Table 6 (Appendix).

- 4) What are the advantages of a contribution margin income statement?
- 5) From tables 5 and 6, revise the list of explanations for the results from 2011 – 2017.
- 6) Revise the list of questions about decisions and actions that have been taken over the years.
- 7) Are there any new suggestions for Roberta at this point?

## BREAK-EVEN ANALYSIS

An advantage of the contribution margin approach is that we can quickly and easily estimate breakeven sales. Breakeven is simply the amount of sales required to generate a net income of zero; i.e.: to exactly cover total costs (both variable and fixed). Sales above breakeven will generate a profit and sales below breakeven will generate a loss.

For example: for 2011, fixed costs were \$5,000 and the contribution margin was 43.75% (see table 6). For every dollar sold, fifty-six cents of variable costs are incurred, resulting in a forty-four-cent contribution to fixed costs. Therefore, the \$5,000 fixed costs divided by 43.75% results in breakeven sales of \$11,428.57. Note that every dollar sold over breakeven will generate forty-four cents of profit and every dollar less than breakeven will generate forty-four cents of loss.

$$\begin{aligned} \text{Total Fixed Costs} / \text{Contribution Margin Percentage} &= \text{Breakeven Sales} \\ \$5,000 / 43.75\% &= \$11,428.57 \end{aligned}$$

- 8) Using Table 7 (Appendix) as a guide, perform a breakeven analysis for 2012 through 2017.
- 9) What impact did changes in breakeven sales have on company profitability?
- 10) Are there any new questions or suggestions for Roberta at this point?

## SENSITIVITY TO CHANGES IN SALES ANALYSIS

Another advantage of the contribution margin approach is that we can quickly and easily estimate net income at any level of sales, within the relevant range. This allows a “sensitivity to changes in sales” analysis. A quick way to calculate income at various levels of sales is to subtract breakeven sales from the projected sales and multiply the excess by the contribution margin percent.

For example: Actual sales for 2011 were \$24,000 (table 5). If sales had been 60% higher, then sales would have been \$24,000 times 160% = \$38,400, which would have resulted in sales of \$26,971.43 over breakeven sales (\$38,400 - \$11,428.57 from table 7). \$26,971.43 times the 43.75% contribution margin (table 7) would result in net income of \$11,800. Thus, a 60% increase in sales would have resulted in a 115% increase in income (from \$5,500 to \$11,800).

$$\begin{aligned} \text{Projected Sales} - \text{Breakeven Sales} &= \text{Sales Over Breakeven} \\ \$38,400.00 - \$11,428.57 &= \$26,971.43 \end{aligned}$$

$$\begin{aligned} \text{Sales Over Breakeven} * \text{Contribution Margin } \% &= \text{Projected Net Income} \\ \$26,971.43 * 43.75\% &= \$11,800.00 \text{ Net Income} \end{aligned}$$

Alternatively, if 2011 sales had been 60% lower than actual sales (\$24,000.00 times 40% = \$9,600.00), that would be \$1,828.57 (\$9,600.00 - \$11,428.57) below breakeven sales and resulted in a loss of \$800 (\$1,828.57 times 43.75%). Thus, a 60% decrease in sales (from 2011 actual sales) would have resulted in 115% decrease in profit (from \$5,500 to a loss of \$800).

$$\begin{aligned} \text{Projected Sales} - \text{Breakeven Sales} &= \text{Sales Over Breakeven} \\ \$9,600.00 - \$11,428.57 &= \$(1,828.57) \end{aligned}$$

$$\begin{aligned} \text{Sales Over Breakeven} * \text{Contribution Margin } \% &= \text{Projected Net Income} \\ \$(1,828.57) * 43.75\% &= \$(800.00) \text{ Net Loss} \end{aligned}$$

11. Using Table 8 (Appendix) as a guide, prepare a sensitivity analysis for 2012 through 2017. Assuming a 60% increase in sales and a 60% decrease in sales for each year.
12. How should Roberta use sensitivity analysis to better understand the company's profitability?
13. Are there any new questions or suggestions for Roberta at this point?

### **TARGET SALES REQUIRED TO ACHIEVE TARGET NET INCOME**

Contribution margin also can be used to estimate the target sales necessary to achieve a target (desired) profit. This is accomplished by first dividing the target income by the contribution margin percentage. This calculates the sales dollars required in excess of breakeven sales. Next breakeven sales are added to this amount to determine the sales dollars needed to achieve the target income. For example, assume Roberta would like to know how many sales dollars would be required to achieve a 10% and a 20% increase in profitability.

For 2011, a 10% increase in net income equals actual net income of \$5,500 (table 5) times 110% which results in target net income of \$6,050. Target net income \$6,050 divided by the 43.75% contribution margin (table 6) results in \$13,828.57 sales over breakeven. Adding breakeven sales of \$11,428.57 to the \$13,828 sales over breakeven equals target sales of \$25,257.14; a 5% increase in sales for a 10% increase in net income.

Alternatively, for 2011, a 20% increase in net income equals actual net income of \$5,500 (table 5) times 120% which results in target net income of \$6,600. Target net income \$6,600 divided by the 43.75% contribution margin (table 6) results in \$15,085.71 sales over breakeven. Adding breakeven sales of \$11,428.57 equals target sales of \$26,514.28; a 10% increase in sales for a 20% increase in net income.

14. Using Table 9 (Appendix) as a guide, calculate target sales for 2012 through 2017 to achieve 10% more income and 20% more income.
15. How should Roberta use target income analysis to better understand company profitability?
16. Are there any new questions or suggestions for Roberta at this point?

### **CONTRIBUTION MARGIN ANALYSIS FOR THE FIVE PRODUCTS**

Roberta thinks the analysis so far is very useful, but it would be even more helpful to know how much profit each of the five products provides and whether there are differences across the five products that impacts the company's overall profitability.

Luckily, Roberta and Nancy tracked sales by product over the years. The Coffee Lover's gift basket was introduced in 2011. The Baked Goodness Basket was added in 2012, followed by the Chocolate Lover's Basket in 2014, the Wine & Cheese Lover's Basket in 2015, and the Ultimate Gourmet Basket in 2016.

Table 10 (Appendix) reflects the total units sold and the sales price for each of the five gift baskets from 2011 through 2017. Tables 11 and 12 (Appendix) reflect the estimated total cost of goods sold and the estimated total selling and distribution costs, by product, for 2011 through 2017. Using this information, it is possible to prepare a contribution margin analyses for each product, by year. Tables 13, 14a, and 14b (Appendix) provide a contribution margin analysis per unit and in total for 2011 (Coffee Lover's Basket) and for 2012 (Coffee Lover's Basket and Baked Goodness Basket).

17. Prepare similar product analysis tables for 2013 through 2017.
18. Based on these results, revise the list of explanations for the results from 2011 – 2017.
19. Are there any new questions or suggestions for Roberta at this point?

Based on the analysis in this case:

20. How does Roberta fix her problem of rising sales and declining profits?

## APPENDIX

Table 1: Sales Revenue, Net Income, and Number of Products: 2011 – 2017

Year	Sales Revenue	Percent Change	Net Income	Percent Change	Number Products
2011	\$24,000		\$5,500		1
2012	\$82,000	+242%	\$19,000	+245%	2
2013	\$194,000	+137%	\$37,000	+95%	2
2014	\$270,000	+39%	\$63,000	+70%	3
2015	\$303,000	+12%	\$62,000	-2%	4
2016	\$340,000	+12%	\$59,000	-5%	5
2017	\$376,000	+11%	\$56,000	-5%	5

Table 2: GAAP Income Statements: 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	\$24,000	\$82,000	\$194,000	\$270,000	\$303,000	\$340,000	\$376,000
Cost of Goods	\$11,000	\$39,000	\$93,000	\$130,000	\$152,000	\$187,000	\$221,000
Gross Profit	\$13,000	\$43,000	\$101,000	\$140,000	\$151,000	\$153,000	\$155,000
Distribution	\$2,500	\$8,000	\$19,000	\$27,000	\$39,000	\$44,000	\$49,000
Administrative	\$5,000	\$16,000	\$45,000	\$50,000	\$50,000	\$50,000	\$50,000
Total Expenses	\$7,500	\$24,000	\$64,000	\$77,000	\$89,000	\$94,000	\$99,000
Net Income	\$5,500	\$19,000	\$37,000	\$63,000	\$62,000	\$59,000	\$56,000

Table 3: GAAP Common Size Income Statements: 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	100%	100%	100%	100%	100%	100%	100%
Cost of Goods	46%	48%	48%	48%	50%	55%	59%
Gross Profit	54%	52%	52%	52%	50%	45%	41%
Distribution	10%	10%	10%	10%	13%	13%	13%
Administrative	21%	20%	23%	19%	17%	15%	13%
Total Expenses	31%	29%	33%	29%	29%	28%	26%
Net Income	23%	23%	19%	23%	20%	17%	15%

Table 4: Variable and Fixed Costs Identified in GAAP-Based Statements: 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	\$24,000	\$82,000	\$194,000	\$270,000	\$303,000	\$340,000	\$376,000
Cost of Goods (Variable Cost)	\$11,000	\$39,000	\$93,000	\$130,000	\$152,000	\$187,000	221,000
Gross Profit	\$13,000	\$43,000	\$101,000	\$140,000	\$151,000	\$153,000	\$155,000
Distribution (Variable Cost)	\$2,500	\$8,000	\$19,000	\$27,000	\$39,000	\$44,000	\$49,000
Administrative (Fixed Cost)	\$5,000	\$16,000	\$45,000	\$50,000	\$50,000	\$50,000	\$50,000
Total Expenses	\$7,500	\$24,000	\$64,000	\$77,000	\$89,000	\$94,000	\$99,000
Net Income	\$5,500	\$19,000	\$37,000	\$63,000	\$62,000	\$59,000	\$56,000

Table 5: Contribution Margin Income Statements: 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	\$24,000	\$82,000	\$194,000	\$270,000	\$303,000	\$340,000	\$376,000
Variable Costs:							
Cost of Goods	\$11,000	\$39,000	\$ 93,000	\$130,000	\$152,000	\$187,000	\$221,000
Distribution	\$2,500	\$8,000	\$19,000	\$27,000	\$39,000	\$44,000	\$49,000
Total Variable	\$13,500	\$47,000	\$112,000	\$157,000	\$191,000	\$231,000	\$270,000
Cont. Margin	\$10,500	\$35,000	\$ 82,000	\$113,000	\$112,000	\$109,000	\$106,000
Fixed Costs:							
Administrative	\$5,000	\$16,000	\$45,000	\$50,000	\$50,000	\$50,000	\$50,000
Net Income	\$5,500	\$19,000	\$37,000	\$63,000	\$62,000	\$59,000	\$56,000

Table 6: Contribution Margin Percentages and Total Fixed Cost: 2011 – 2017

	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Variable Costs:							
Cost of Goods	45.83%	47.56%	47.94%	48.15%	50.17%	55.00%	58.78%
Distribution	10.42%	9.76%	9.79%	10.00%	12.87%	12.94%	13.03%
Total Variable	56.25%	57.32%	57.73%	58.15%	63.04%	67.94%	71.81%
Cont. Margin	43.75%	42.68%	42.27%	41.85%	36.96%	32.06%	28.19%
Total Fixed Cost	\$5,000	\$16,000	\$45,000	\$50,000	\$50,000	\$50,000	\$50,000

Table 7: Breakeven Analysis – 2011

Sales Revenue	100.00%	\$11,428.57
Variable Costs	56.25	\$6,428.57
Contribution Margin	43.75%	\$5,000.00
Fixed Cost		\$5,000.00
Net Income		\$ 0.00

Table 8: Sensitivity to Changes in Sales Analysis – 2011

60% Increase in Sales (160% of Actual)		60% Decrease in Sales (40% of Actual)	
Sales Revenue	\$38,400.00	Sales Revenue	\$9,600.00
Variable Costs	\$21,600.00	Variable Costs	\$5,400.00
Contribution Margin	\$16,800.00	Contribution Margin	\$4,200.00
Fixed Costs	\$5,000.00	Fixed Costs	\$5,000.00
Net Income	\$11,800.00	Net Income	\$(800.00)

Table 9: Target Sales Required to Achieve Target Net Income – 2011

10% Increase in Net Income		20% Increase in Net income	
	\$25,		
Target Sales Revenue	\$257.14	Target Sales Revenue	\$26,514.28
Variable Costs	\$14,207.14	Variable Costs	\$14,914.28
Contribution Margin	\$11,050.00	Contribution Margin	\$11,600.00
Fixed Costs	\$5,000.00	Fixed Costs	\$5,000.00
Target Net Income	\$6,050.00	Target Net Income	\$6,600.00

Table 10: Units Sold and Sales Prices: 2011 – 2017

Year	Coffee Lover's		Baked Goodness		Chocolate Lover's		Wine & Cheese		Ultimate Gourmet	
	Units	Price	Units	Price	Units	Price	Units	Price	Units	Price
2011	925	\$25.95								
2012	2,017	\$26.95	748	\$36.95						
2013	3,651	\$27.95	2,423	\$37.95						
2014	3,643	\$28.95	2,625	\$38.95	1,299	\$47.95				
2015	3,454	\$28.95	2,370	\$38.95	1,324	\$47.95	762	\$61.96		
2016	3,200	\$27.95	2,021	\$37.95	1,296	\$46.95	1,354	\$60.95	418	\$72.95
2017	3,402	\$27.95	2,316	\$37.95	1,155	\$46.95	1,444	\$59.95	670	\$77.95

Table 11: Cost of Goods Sold: 2011 – 2017

Year	Coffee Lover's	Baked Goodness	Chocolate Lover's	Wine & Cheese	Ultimate Gourmet	Total
2011	\$11,002					\$11,002
2012	\$25,213	\$13,793				\$39,006
2013	\$47,500	\$45,504				\$93,004
2014	\$48,962	\$50,033	\$31,007			\$130,002
2015	\$46,836	\$45,362	\$32,120	\$27,684		\$152,002
2016	\$43,040	\$37,510	\$30,158	\$47,336	\$28,959	\$187,003
2017	\$46,131	\$44,421	\$28,482	\$52,143	\$49,821	\$220,998

Table 12: Selling &amp; Distribution Costs: 2011 – 2017

Year	Coffee Lover's	Baked Goodness	Chocolate Lover's	Wine & Cheese	Ultimate Gourmet	Total
2011	\$2,500					\$2,500
2012	\$5,829	\$2,162				\$7,991
2013	\$11,428	\$7,600				\$18,988
2014	\$11,730	\$8,453	\$6,807			\$26,990
2015	\$12,642	\$8,674	\$7,772	\$9,913		\$39,001
2016	\$11,264	\$7,114	\$7,063	\$15,828	\$2,730	\$43,999
2017	\$12,349	\$8,407	\$6,618	\$16,866	\$4,764	\$49,004

Table 13: Contribution Margin Analysis by Product – 2011

Coffee Lover's Basket (the only product sold in 2011)					
Number of Units Sold	925				
Sales Price per Unit	\$25.95	100.0%	Sales Revenue		\$24,004
Variable Costs per Unit			Variable Costs		
Cost of Goods	\$11.90	45.9%	Cost of Goods		\$11,008
Distribution	\$2.70	10.4%	Distribution		\$2,497
Total Variable Costs per Unit	\$14.60	56.3%	Total Variable Costs		\$13,505
Contribution Margin	\$11.35	43.7%	Contribution Margin		\$10,499

Table 14a: Contribution Margin Analysis by Product – 2012

	Coffee Lover's Basket		Baked Goodness Basket	
Number of Units Sold	2,017		748	
Sales Price	\$ 26.95	100.00%	\$36.95	100.00%
Variable Costs per Unit				
Cost of Goods	\$12.50	46.38%	\$18.44	49.91%
Distribution	\$2.89	10.72%	\$2.89	7.82%
Total Variable Costs per Unit	\$15.39	57.11%	\$21.33	57.73%
Contribution Margin	\$11.56	42.89%	\$15.62	42.27%

Table 14b: Contribution Margin Analysis by Product – 2012

	Coffee Lover's	Baked Goodness	Total
Sales Revenue	\$54,358.15	\$27,638.60	\$81,996.75
Variable Costs			
Cost of Goods	\$25,212.50	\$13,793.12	\$39,005.62
Distribution	\$5,829.13	\$2,161.72	\$7,990.85
Total Variable Costs	\$31,041.63	\$15,954.84	\$46,996.47
Contribution Margin	\$23,316.52	\$11,683.76	\$35,000.28

