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Forecasting Demand: Sensitivity Analysis of Financial Assumptions Using MS Excel

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Abstract - According to research on entrepreneurship education, the creation of a business plan is the most popular teaching method (Solomon, 2007). Textbooks in the field will often have a chapter devoted to the contents of the business plan and separate chapters about important elements of a business plan such as marketing, finance, and operations. Instructors must prepare their students for arduous task of writing all of the parts of the business plan within a team.

One of the most challenging aspects of a business plan is the financial projections. Clearly, if an entrepreneurial team intends to present their plan to a group of investors or to compete in the many business plan competitions in the country, they must be able to explain the numbers. The challenge of creating financial projections is compounded by the fact that many non-business students are enrolling in entrepreneurship courses (Katz, 2003). What should they learn about forecasting?

A sales forecasts must be developed as part of the market analysis. The sales forecast becomes the basis for financial projections in the finance section of the business plan. There are different ways to estimate sales, but regardless of which one is used, the entrepreneur must be able to justify the basis for their forecasts. Thus, the sales forecast is subject to the assumptions that were made when estimating sales for the new venture. These assumptions are critical because investors typically study assumption sheets (Barringer and Ireland, 2011).

This study describes an unique cash budget exercise that requires students to conduct sensitivity analysis of the assumptions in their sales forecast. The focus of the exercise is not on how to convert credit sales estimates to cash receipts as is typical in many textbooks. It requires the students to make a connection between their sales estimates and the financial statements they create. The Smoothie Doozie exercise described in this study pushes the learning down to the individual student level and provides a fast track approach

to grading the exercise in large class sections that does not overwhelm the teaching faculty member.

Key Words - Entrepreneurship, Forecasting, Cash Flow, Financial Assumptions

Relevance to Marketing Educators, Researchers and/or Practitioners –

Textbooks often focus on cash flow implications of sales forecasts, especially as they relate to credit sales. The actual process of forecasting sales and the underlying assumptions upon which the forecast are based are often times forgotten. This study shows instructors an exercise that teaches students how to justify the assumptions made as part of a forecast. Then, it challenges the students to use sensitivity analysis to test changes to those assumptions.

Introduction

A typical course in entrepreneurship requires students to write a business plan or conduct a feasibility study. The business plan is comprised of several major sections which include things such as marketing, operations, market analysis, and financial forecasts (Timmons and Spinelli, 2009). One of the most important sections of a business plan is sales forecast made by the entrepreneur (Barringer and Ireland, 2011). The sales forecast is highly dependent upon financial assumptions. Clearly, if an entrepreneurial team intends to present their plan to a group of investors or to compete in the many business plan competitions in the country, they must be able to explain the numbers. This research describes a two-week project in an entrepreneurship course. The students are required to develop an annual monthly pro-forma cash budget. They are then asked to incorporate several changes to their initial assumptions. The instructor has over 30 different versions of the assignment available to ensure learning occurs on an individual basis before the students embark on the arduous task of writing a business plan.

Most entrepreneurship textbooks discuss making financial projections, but they do not include exercises that do anything other than to create a one or two-year pro forma cash flow statement or income statement. In these exercises, all of the students are given the same data. The final “deliverable” to the instructor is likely an Excel or similar spreadsheet. Once the assignment is submitted and graded there may be little feedback or an effort to go beyond the obvious benefit of a cash flow exercise. The Smoothie Doozie exercise goes beyond the creation of a cash flow exercise. It provides an instructor with multiple sets of data with corresponding solutions for each data set.

Smoothie Doozie forces the students to think about the impact of changes in their assumptions. They must consider best case, worst case and most likely case scenarios as they plan the creation of a new business enterprise. The assignment forces them to develop several worksheets in MS Excel to include their cash flow budget as well as graphs and worksheets that test their assumptions. This assignment can be modified for use in quite a number of courses including, but not limited to, Small Business Management, Strategic Management, Principles of Management, Marketing Research, and Financial Management. It takes advantage of students' familiarity with technology and the increasing use of technology in entrepreneurship education (Solomon, 2007).

Entrepreneurship Course

The course in which this project was assigned was Entrepreneurship, which is one of ten required courses in an on-line MBA program accredited by AACSB International. Like many entrepreneurship courses, student teams are required to write a business plan. A portion of the business plan must include financial forecasts based upon what the students believe will be achieved once the new venture is started.

The Assignment

The students are provided one page of directions about exactly what is to be done. Each student is given different values to ensure all of them get the most out of the assignment.

What If Analysis

The real advantage of having students complete Smoothie Doozie goes well beyond simply projecting the cash budget for the first year of the new business. Entrepreneurship is a process that requires the entrepreneur to balance a variety of skill sets. As pointed out by Kim and Fish (2010), opportunity recognition is one of the most important activities. Without a viable opportunity, there is no reason to move beyond the planning stages. Another major part of the entrepreneurship process is to evaluate the financial feasibility of the idea (Barringer and Ireland, 2011). If the new business cannot generate a profit, then it is simply not worth pursuing (Spinelli and Adams, 2012). Yet, financial projections must be based upon assumptions. There is a great deal of uncertainty about a new venture. What is the best price to charge? What will demand be for the product(s)? What about monthly expenses?

In the Smoothie Doozie assignment, the students must construct the first year's cash budget based upon the initial assumptions they are given. Next, they must adjust the initial cash budget to reflect what they need to borrow. This step yields a pro forma cash budget that is based upon the assumptions each student is given. At this point, the students are challenged to adjust their assumptions. It is not simply that they are challenged to do so. They are challenged to do so using specific features in MS Excel. The idea is to create a single document in MS Excel with several work sheets that all reference values in the Assumptions Sheet. If the student is asked to change their price, they may do so on the Assumptions Sheet to quickly see how the change affects everything else. They should not have to make more than one entry if they have set up the formulas correctly in the Cash Budget worksheet.

Grading

While there is general agreement that spreadsheet skills and pro forma financial projections are important abilities that a student interested in entrepreneurship needs to master, there are several obstacles to implementing these objectives in a typical undergraduate or graduate course. First, there is the matter of large classes and the time it takes to explain the exercise or assignment. Secondly, the amount of time needed to review and grade student work is a serious constraint.

Most classes tend to cover this material and evaluate the results through the use of group projects. Students certainly learn from each other, and peer teaching is widely used and accepted in the academy. Unfortunately from our experience, what usually happens is that the pro forma portion of a business plan is assigned to one student in the team for completion, and this student is usually the most experienced with spreadsheet skills. Often there is very little transfer of knowledge. Group assignments do reduce the amount of detailed grading, but at the expense of broad learning.

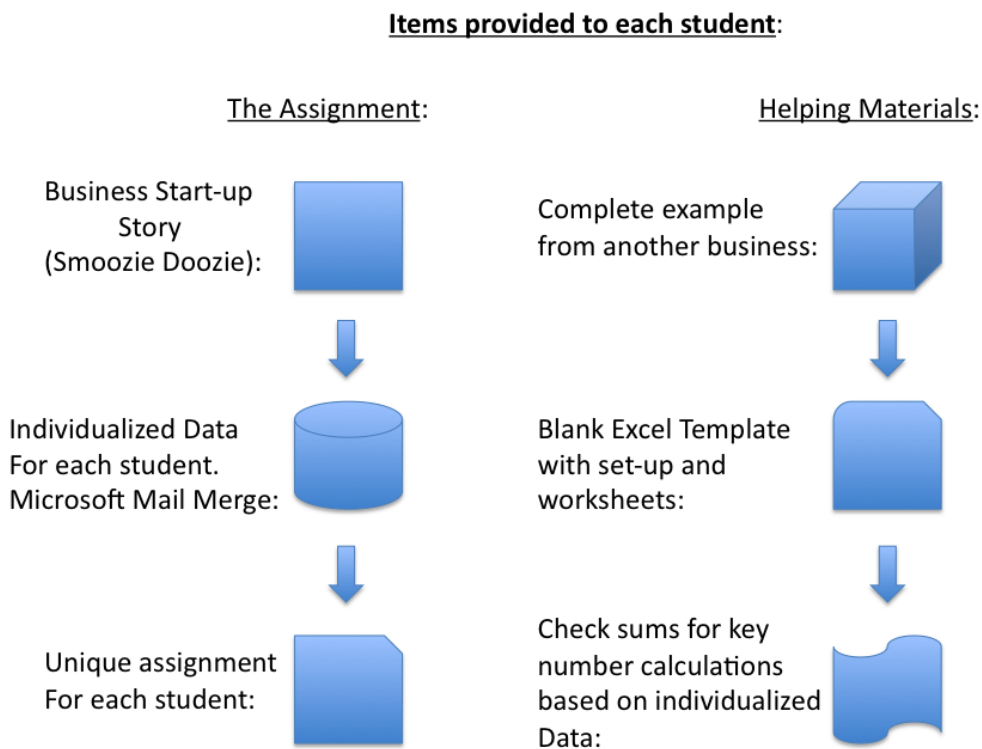
We believe that our approach both pushes the learning down to the individual student level, and provides a fast track approach to grading that does not overwhelm the teaching faculty member. Three key components allow us to provide each student with individualized assignments (differing numbers), and a speedy grading feedback and grading process.

1. The original information is based upon a master spreadsheet that contains reasonable variations for all of the important numbers related to the business start up. Microsoft Word and Excel's "Mail Merge" function is used to create an individual assignment. Each student is provided very different numbers which essentially eliminate the age-old

problem of students copying another’s work. (See reference to (a) SmoothieRawData.xlsx, (b) Smoothie Instructions.docx, (c) 1.docx and (d) Smothie Assignment Letters.zip. (a) contains the raw data for 30 student assignments; (b) contains the assignment instructions; (c) is an example of one student assignment letter; and (d) is a zipped file that contains 30 individual assignments based on the contents of (a).

- Students are provided with a blank Excel template to guide them in the initial set up of the assignment. While the template does restrict creativity is does help to insure that submissions are standardized. A second method of insuring standardization is the use of check numbers. These are posted on a timely basis to make sure that students are not drifting too far off track. Only the numbers are provided – the underlying calculations still remain the responsibility of each student.

Figure 1: Items Provided to Each Student.



The next figure shows the check figures for each student. This information both provides an interim guideline for the student to be used prior to continuing on (prevents the compounding of errors), and also serves as a coaching step for those who are having troubles with the set-up calculations (Excel formulae). Revenue cells for the first month are provided for each student based upon the unique numbers that that student has been given in the assignment letter.

Figure 2: Revenue Check Figures for Students

Letter	Revenue	B6 Smoothies	B7 Health Food	B9 TOTAL
1		\$9,676.80	\$3,225.60	\$12,902.40
2		\$10,145.52	\$3,477.75	\$13,623.27
3		\$8,332.80	\$2,935.30	\$11,268.10
4		\$10,478.16	\$3,790.43	\$14,268.59
5		\$10,321.92	\$3,483.65	\$13,805.57
6		\$11,793.60	\$4,091.47	\$15,885.07
7		\$9,757.44	\$3,104.64	\$12,862.08
8		\$10,130.40	\$3,315.82	\$13,446.22
9		\$10,053.12	\$3,075.07	\$13,128.19
10		\$12,519.36	\$3,942.69	\$16,462.05
11		\$11,289.60	\$3,657.83	\$14,947.43
12		\$11,476.08	\$3,933.47	\$15,409.55
13		\$9,139.20	\$2,688.00	\$11,827.20
14		\$11,143.44	\$3,477.75	\$14,621.19
15		\$10,644.48	\$3,522.36	\$14,166.84
16		\$11,793.60	\$4,135.02	\$15,928.62
17		\$9,461.76	\$3,193.34	\$12,655.10
18		\$9,525.60	\$3,409.56	\$12,935.16
19		\$9,166.08	\$3,104.64	\$12,270.72
20		\$11,067.84	\$3,978.98	\$15,046.82
21		\$9,676.80	\$3,354.62	\$13,031.42
22		\$9,812.88	\$3,614.13	\$13,427.01
23		\$7,795.20	\$3,048.19	\$10,843.39
24		\$9,480.24	\$3,933.47	\$13,413.71
25		\$9,676.80	\$3,225.60	\$12,902.40
26		\$11,067.84	\$3,793.91	\$14,861.75
27		\$9,166.08	\$3,228.83	\$12,394.91
28		\$9,525.60	\$3,445.85	\$12,971.45
29		\$9,461.76	\$3,193.34	\$12,655.10
30		\$11,793.60	\$4,091.47	\$15,885.07
<p>Rows 4,5,6,7 and 9 are copied directly from the Template that I've asked you to work with. I've posted the absolute values of the figures that each of you should be coming up with for cells B6, B7 and B9. Yesterday's posting showed how to set up these three cells to refer back to numbers on the assumptions page -- price, hours open, number of customers. If you are having troubles coming up with these exact numbers, then ask some questions here in the discussion forum.</p> <p>In other words use these numbers to check your work and set up. If these are off then subsequent work on the proform will be really off from the school solution (my answers).</p>				

Additional check figures are provided for the wages, salaries, loan payment, total expenses, net income, and taxes. Again this provided interim check-points that avoid set-up and compounding errors in the final submission. Please note that none of the underlying Excel formulae are provided with these numbers.

Figure 3: Expenses Check Figures for Students

Letter	Revenue	B6 Smoothies	B7 Health Food	B9 TOTAL
1		\$9,676.80	\$3,225.60	\$12,902.40
2		\$10,145.52	\$3,477.75	\$13,623.27
3		\$8,332.80	\$2,935.30	\$11,268.10
4		\$10,478.16	\$3,790.43	\$14,268.59
5		\$10,321.92	\$3,483.65	\$13,805.57
6		\$11,793.60	\$4,091.47	\$15,885.07
7		\$9,757.44	\$3,104.64	\$12,862.08
8		\$10,130.40	\$3,315.82	\$13,446.22
9		\$10,053.12	\$3,075.07	\$13,128.19
10		\$12,519.36	\$3,942.69	\$16,462.05
11		\$11,289.60	\$3,657.83	\$14,947.43
12		\$11,476.08	\$3,933.47	\$15,409.55
13		\$9,139.20	\$2,688.00	\$11,827.20
14		\$11,143.44	\$3,477.75	\$14,621.19
15		\$10,644.48	\$3,522.36	\$14,166.84
16		\$11,793.60	\$4,135.02	\$15,928.62
17		\$9,461.76	\$3,193.34	\$12,655.10
18		\$9,525.60	\$3,409.56	\$12,935.16
19		\$9,166.08	\$3,104.64	\$12,270.72
20		\$11,067.84	\$3,978.98	\$15,046.82
21		\$9,676.80	\$3,354.62	\$13,031.42
22		\$9,812.88	\$3,614.13	\$13,427.01
23		\$7,795.20	\$3,048.19	\$10,843.39
24		\$9,480.24	\$3,933.47	\$13,413.71
25		\$9,676.80	\$3,225.60	\$12,902.40
26		\$11,067.84	\$3,793.91	\$14,861.75
27		\$9,166.08	\$3,228.83	\$12,394.91
28		\$9,525.60	\$3,445.85	\$12,971.45
29		\$9,461.76	\$3,193.34	\$12,655.10
30		\$11,793.60	\$4,091.47	\$15,885.07
<p>Rows 4,5,6,7 and 9 are copied directly from the Template that I've asked you to work with. I've posted the absolute values of the figures that each of you should be coming up with for cells B6, B7 and B9. Yesterday's posting showed how to set up these three cells to refer back to numbers on the assumptions page -- price, hours open, number of customers. If you are having troubles coming up with these exact numbers, then ask some questions here in the discussion forum.</p> <p>In other words use these numbers to check your work and set up. If these are off then subsequent work on the proform will be really off from the school solution (my answers).</p>				

The final component is the grading worksheet that contains all of the key spreadsheet numbers for each of the 30 student assignments. While at first this appears to be an overwhelming document, our experience is that it actually expedites the grading of the individual student submissions. This document is NOT provided to the student, but is used by the instructor as the actual scoring key to evaluate the final student submissions.

Figure 4: Grading Worksheet for all 30 Student Assignments

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Letter			Revenue	Smoothies	Health Food		TOTAL		Expenses	CGS		Rent	Phone	Electricity	Insurance	Advertising		Wages	Salaries	Loan Amount	Loan Payment
2	1	Anderson	Candice	\$9,676.80	\$3,225.60			\$12,902.40			\$4,838.40	\$1,600.00	\$50.00	\$120.00	\$80.00	\$1,200.00	\$2,419.20	\$3,666.67	\$18,880.00			\$382.82
3	2	Cao	Bao	\$10,145.52	\$3,477.75			\$13,623.27			\$4,816.15	\$1,650.00	\$55.00	\$125.00	\$90.00	\$1,250.00	\$2,402.40	\$3,666.67	\$19,790.00			\$391.87
4	3	Chakrabarti	Dipankar	\$8,332.80	\$2,935.30			\$11,268.10			\$3,964.09	\$1,700.00	\$60.00	\$130.00	\$100.00	\$1,300.00	\$2,352.00	\$3,666.67	\$20,700.00			\$400.19
5	4	D'Souza	Roshan	\$10,478.16	\$3,790.43			\$14,268.59			\$5,055.30	\$1,750.00	\$65.00	\$135.00	\$110.00	\$1,200.00	\$2,772.00	\$3,833.33	\$21,410.00			\$404.03
6	5	Dawkins	Derek	\$10,321.92	\$3,483.65			\$13,805.57			\$4,884.48	\$1,800.00	\$70.00	\$140.00	\$120.00	\$1,250.00	\$3,124.80	\$3,833.33	\$21,920.00			\$423.78
7	6	Fargher	Matt	\$11,793.60	\$4,091.47			\$15,885.07			\$5,963.65	\$1,850.00	\$75.00	\$145.00	\$130.00	\$1,300.00	\$3,225.60	\$3,833.33	\$20,530.00			\$406.52
8	7	Field	Angel	\$9,757.44	\$3,104.64			\$12,862.08			\$4,804.80	\$1,600.00	\$80.00	\$150.00	\$140.00	\$1,200.00	\$3,326.40	\$3,833.33	\$17,240.00			\$349.57
9	8	Gulier	Douglas	\$10,130.40	\$3,315.82			\$13,446.22			\$5,056.56	\$1,650.00	\$85.00	\$120.00	\$150.00	\$1,250.00	\$2,604.00	\$3,666.67	\$17,950.00			\$372.61
10	9	Hall	Andrea	\$10,053.12	\$3,075.07			\$13,128.19			\$5,166.62	\$1,700.00	\$90.00	\$125.00	\$80.00	\$1,300.00	\$2,772.00	\$3,666.67	\$18,480.00			\$374.71
11	10	Hossea	Russell	\$12,519.36	\$3,942.69			\$16,462.05			\$6,507.35	\$1,750.00	\$95.00	\$130.00	\$90.00	\$1,200.00	\$2,822.40	\$3,666.67	\$20,090.00			\$397.81
12	11	Hussey	Daniel	\$11,289.60	\$3,657.83			\$14,947.43			\$4,967.42	\$1,800.00	\$100.00	\$135.00	\$100.00	\$1,250.00	\$2,620.80	\$3,833.33	\$22,800.00			\$440.79
13	12	Jenkins	Tiffany	\$11,476.08	\$3,933.47			\$15,409.55			\$5,230.33	\$1,850.00	\$50.00	\$140.00	\$110.00	\$1,300.00	\$2,217.60	\$3,833.33	\$24,460.00			\$461.59
14	13	Johnson	Artis	\$9,139.20	\$2,688.00			\$11,827.20			\$3,763.20	\$1,600.00	\$55.00	\$145.00	\$120.00	\$1,200.00	\$2,016.00	\$3,833.33	\$21,270.00			\$411.21
15	14	Maddux	Brent	\$11,143.44	\$3,477.75			\$14,621.19			\$4,816.15	\$1,650.00	\$60.00	\$150.00	\$130.00	\$1,250.00	\$2,402.40	\$3,833.33	\$21,780.00			\$431.27
16	15	Martin	Sloan	\$10,644.48	\$3,522.56			\$14,166.84			\$5,079.47	\$1,700.00	\$65.00	\$120.00	\$140.00	\$1,300.00	\$2,822.40	\$3,666.67	\$20,390.00			\$413.44

Grading Steps

Grading is a straightforward process. Most students use the template so there's a great deal of commonality in the format of the submissions. Four things need to be evaluated: proper set-up, accuracy, correct use of Excel functions and calculations, and integrative thinking.

Proper set-up is easily evaluated by a quick look at the worksheets and the overall format. Are all parts of the assignment in the submission? Does the magnitude of the numbers make sense?

We use the grading worksheet to check accuracy. A quick look at the revenue totals, the cost of goods sold, the loan amount, and the net income (essentially all of the items in the check sums provided at the beginning of the assignment).

Correct use of Excel functions is important. We check specific cells to make sure that no "hard" numbers are used and that all references go back to the assumptions and/or start up worksheets. The second month growth rate is checked to make sure that it is done correctly. Both the loan and tax functions are checked to see if they are set up correctly. Cash flow is double checked to make sure that it is done logically and that it makes sense.

Finally the answers to the "Double" question and the recommendations need to be evaluated. Did the student make use of the model developed in the

assignment to answer these questions? Did the student use good business sense and justify the recommendations. Are the recommendations more than trivial?

Suggested Grading Rubrics

All information cells are referenced back to the assumption page and set up correctly.....	30 points
Loan payment is calculated using a function.....	10 points
Recommendations are based on spread sheet what if analysis.....	10 points
The double advertising question is answered.....	20 points
The chart is present and reflects worksheet content.....	10 points
Taxes are calculated correctly using Boolean logic.....	10 points
Twelve months are presented and an annual total is given.....	10 points

Here are some examples of common comments made to students after grading their Smoothie Doozie assignment:

- Cell B6 is supposed to be a calculated cell – you’ve simply pasted the number in there. There’s no way for you to do any sensitivity analysis.
 - Cell C6 is set up wrong -- $=B6+(B6*0.07)$ The .07 should refer back to a number on your assumptions page – suppose I asked you what would a 9% growth rate look like – you have no way of doing this except changing every cell – that’s not how I told you to set this up.
 - Cost of goods sold is not calculated. Impossible to do a “what if” analysis.
 - Where did you do these calculations? You’ve not shown your work and I certainly hope you did not copy them from the check sums.
 - No function is used for the loan.
 - Your taxes are not done correctly.
 - Net income is not correct.
 - The Cash Flow is missing

Lessons Learned

We have determined that our grading workload is simplified if we provided certain concepts and calculations to the students “up-front.” These can either be covered in a class setting or virtually. Since both of the authors have used this extensively in graduate on-line classes, we’ve found it easiest to simply make these “suggestions” available at the beginning of the assignment. The next few

paragraphs provide examples of feedback to students to assist them in completing the assignment.

* If you submit early and it's not an A, then I'll return it and let you fix it. I may do a bit of this even on the due date, if my other classes don't overwhelm me with grading. Much has to do with how much time I have to grade. Surest bet is to submit a day or so early. Even better -- ask specific questions as you go -- I'm going to continue to parse out the check sum sheets over the next few days.

* A request -- please stick to the template that I've provided. It just makes it easier for me to give you feed back. And it is a generally accepted format for a Pro forma. I can live with modest departures, but some of the items I'm seeing are really hard to follow the logic, so any thing you do to ease the grading works to your benefit.

*Don't forget -- no hard numbers on the proforma worksheet. The idea is that you change a number on the assumptions page and it should change every item on your entire workbook -- that very powerful for changes and "what-if" analysis.

* Cost of Goods Sold Calculations:

$$=((\text{Assumptions!C3}/ \text{Assumptions!B3}) * \text{C3}) + (((\text{Assumptions!R3}) / (1 + (\text{Assumptions!J3}))) / \text{Assumptions!R3}) * \text{D3}$$

Here is how I do the Cost of Goods Sold:

Price of Smoothie	\$3.05	Assumptions!B3
CGS of the Smoothie	\$0.95	Assumptions!C3
Price of Health Food	\$2.05	Assumptions!R3
Mark up Health Food	110%	Assumptions!J3

(Note that your cells locations will be different and reference your assumptions page)

The $(\text{Assumptions!C3}/ \text{Assumptions!B3})$ is the percentage of the smoothie cost of goods sold: for example $\$.95/\3.05 or 31%

The calculation of the Health Food CGS is a bit more complicated because I gave you a percentage mark up. What you need to do is to figure out the

starting price when you are given the markup. So my approach is that I took the Selling Price of the Health Food (Assumptions!R3) and divided it by

This is based on the algebra: What is the original price (X) of the health food if I sell it for Y with a markup of Z?

$$Y = (X * Z) + X$$

[I always do this in my head with 1 and 2's. So if I sell something for \$2 and it's marked up 100% then what was the original price? I know it is \$1 so how do I obtain that algebraically?

$$\$2 = (\$1 * 100\%) + \$1$$

Once I do this then I solve for X:

$$Y = (X * Z) + X$$

$$Y = X (Z + 1)$$

$$Y / (Z + 1) = X$$

$$X = Y / (Z + 1)$$

Remember you know Y (Price of the health food) and you know Z (the markup) so it's a simple setup once you figure it out:

(Assumptions!R3) / (1 + (Assumptions!J3)) is the original price.

The next step is to calculate the percentage of the sales price that is the cost of goods sold: Divide the original price by the sales price.

The final step in the process is to multiply the smoothie revenue by the cost of sales percentage AND the health food revenue by the cost of sales percentage AND add them together to obtain the TOTAL CGS for that month.

*Loan: A couple of things about the loan. It's based primarily upon your startup costs and the difference between what you have on hand and what it will take to start the business.

Use the PMT Function to calculate a monthly payment.

Reminder that you will need to divide the annual interest rate by 12 and multiply the year by 12 to get a monthly payment.

=PMT (N17/12,N20*12,N18)*-1

will be the form where N17 is the assumption sheet interest rate and N20 is the assumption sheet term in years. N18 is, of course, the total that you'll want to borrow. The -1 simply turns this into a positive number for your proforma.

The only item of judgment is the cash reserve figure. I recommend that you put in a plug figure and construct your proforma. Then take a look at the lowest point in your cash flow and then round that DOWN to the nearest thousand, and go back and change the number on the assumptions page and your spread sheet will pick it right up. It just shows that there's some judgement to constructing

your pro forma. If you want another figure -- put a text box to justify your figure and I'll use your figure.

By the way, PMT is a very very useful Function in MS Excel – such as for buying a car or a house. It let's you play with all the variables.

Wages. If you are having trouble conceptualizing the wages -- here's the approach. In this case the wage rate was \$7.75.

$$(((\$7.75)*1*12)*4)+((\$7.75)*2*12)*2).4.2 = \$3124.80.$$

Note that we do the first 4 days and the the second 2 days.

In the Pro forma you would not have the \$7.75, but would have a cell reference back to the assumptions worksheet to the cell with that figure in it.

Tax. There is some discussion as to whether the tax calculation is a true boolean calculation or not. That discussion is beyond the scope of this class. ;-)

However you should use the IF function to calculate whether to pay tax and how much to pay.

IF net income is 0 or less than 0, THEN you should pay 0 tax. IF the first statement is NOT TRUE, THEN you should pay the Tax rate TIMES the Net Income. Ta Da!

This is what it looks like:

=IF(X2>0,X2*Assumptions!AH2,0)

where X2 is the NET INCOME and Assumptions!AH2 is the tax rate.

Frequently Asked Questions

We've found it useful to publish these FAQs at the beginning of the assignment.

Q: For the cash reserves I'm stuck trying to calculate the amount needed as the payment amount is required to generate the cash flow(s)...but can not generate payment amount unless we have the reserve amount to put into the loan amount..probably something simple I'm overlooking / don't quite understand.

I thought maybe the break-even would help, but that requires total fixed cost as well.

A: This is a judgment call on your part -- you sort of need to see how negative your cash flow goes before it starts to rise. For example -- if you have -\$3800 in your cash flow, then you'll need to add roughly \$4000 to your cash reserve in the loan. If you only go down -\$1500 then you can add that amount to your cash reserve. Some of you start out profitable in month 1 and will not need any cash reserves. Others are not that fortunate and need to borrow enough money so that they don't run out. I've used the number \$4000 as my standard figure for all situations -- you should feel free to adjust it on the assumptions/start up page. However, if you do this right, and I change your loan reserves to \$4000 your spread sheet should match my check sums. BTW Break even is very clear once you chart the revenue and net income. When that net income line crosses the 0 then that's, by definition, break even.

Q: After looking at the assignment I had one question. You mention a monthly growth rate and also a projected number of customers. Is the projected number of customers the initial projected number of customers increasing each month by the grow rate? or should we assume that they will hit this number of customers in X months with the increase from the start up month being 6% per month? Any guidance would be appreciated.

A: Good question. The way I vision you doing this is to set up the first month based on customers and then grow the revenue and variable cost by 10%*. If you set it up right, the only 10%* increment would be the revenue figure increase in subsequent months. I recommend setting up CGS and other variable cost as a % of revenue for the first month, then subsequent months will reflect the 10%* growth. (* growth rates vary from individual to individual).

Let me amplify my comments about the best way to show the growth. I'm going to refer to the cells on the template that I provided.

Most of your thinking-work will be in constructing the income for the smoothies and the health food bars. Cells B6 and B7 should refer to numbers that are on your assumption worksheet and be based upon the information provided by your friend.

The simple formula is:

$\text{Price} * \text{customers} * \text{hours} * \# \text{days done for M-Th and again for Friday and Saturday.}$

This gives you the weekly sales revenue for each type of item, which you multiply by 4.2 to make it a monthly figure (that's the number accountants use).

Your questions involve moving to Month 2 and the growth that I've asked you to calculate. Here is what I recommended yesterday, spelled out in more detail:

Smoothie sales for month 2 can be calculated with the formula:

$=B6 * (1 + \text{AssumptionsXN})$ where AssumptionsXN is the cell on the Assumptions Worksheet that has the growth rate percentage. You simply click on that cell when you are constructing the formula.

Health Food would be:

$=B7 * (1 + \text{AssumptionsXN})$

Both will give you a percentage increase for the second month.

NOW -- since I simply want to paste this same formula for the remaining 10 months there are a couple of changes I need to make:

I need to keep the interest as an absolute reference so I put \$ in front of the XN -- making it \$X\$N. That way it will always go back to the same cell in the Assumptions worksheet that has the interest.

I want my formula to refer to the previous month, so there's nothing else I need to do since when I paste this formula into month three: cells D6 and D7 the formula will automatically change to:

=C6*(1+Assumptions\$X\$N)

=C7*(1+Assumptions\$X\$N)

I paste this all the way across the rows 6 and 7 for the months. Each month increases by the percentage increase specified in the assumptions page.

By the way-- I'm all set to begin to do "what if" analysis by changing my percentage growth rate if I want to.

Let me know if you need any clarification.

Q: I apologize if this email seems a little naive. I have read the 1st chapter of our text and glanced through the 2nd. However, I do not see any data in the text that pertains nor illustrates anything similar to our "Smoothie Doozie" assignment. The first chapter explored in-depth many of the characteristics and the evolution of the entrepreneurial spirit/ characteristics and from what I have seen the 2nd chapter seems similar. Am I missing something? Which chapter

deals with pro-forma budgets, startup costs, etc. and the overall Excel files that we have been given for this assignment?

A: Thanks for your question. You will notice in Chapter 8 and several of the cases that the business plans all have financial data. This data needs to come from somewhere and this assignment is my addition to the class to insure a couple of things (1) that everyone knows how to develop a business (\$) model of a start up idea, (2) that everyone's Excel skills are brought up to speed*, and (3) that you have a tool that helps you get started on your own business plan.

For example any business plan that goes to a bank for funding will need to have exactly this type of pro forma forecast of profits.

I've had good experience starting the Entrepreneurship course with this "numbers" assignment as it reminds us that business is about making a profit. I can also think of a number of previous grad students who now are making

money via this same approach to business modeling via consulting either full-time or part-time.

Not everyone in the class is interested in a new venture start up, but everyone with an MBA should have the skills to help someone get a business started, and the Smoothie exercise is one of these competencies. A potential entrepreneur should write his/her own plan, but sadly (and fortunately) quite a few do not. The SBDC is always looking for someone to help a client write a plan to take to the bank. Now, I want you to memorize this sentence: "Sure, I can write a business plan to take to the bank for you, but my hourly rate is \$100 an hour and I have a minimum of 100 hours." ;-) Some of you may like this stuff and find ways to make money with it!

Your textbook authors have written a conceptual book that sometimes flies at 50,000 feet. My job is to make sure we cover the low level issues too.

Acceptance into the MBA program assumes a level of competence with Excel equal to what most BBA programs teach. Those of you who had the prereqs may recall that the Stat/Quant class required some Excel work. OR As a business major in a Junior level class you've had to take the Business Core which includes teaching a level of competence with Excel that exceeds what's required in this assignment.

Summary

The Smoothie Doozie assignment is used to teach students how to create financial projections that are designed to test the sensitivity of their financial assumptions on the success of the firm. It overcomes some of the weaknesses of other cash flow exercises in textbooks that focus on the cash implications while overlooking the rationale for the forecast. For example, what if the price of the product is increased from \$3.00 to \$3.35? What if the business plans to be open on seven days per week rather than only six? What if the business operates without an assistant manager?

The Smoothie Doozie exercise is designed to let an instructor assign over thirty combinations of numbers. The data set that accompanies the assignment allows the instructor to easily grade such a large combination of numbers through a series of check figures as well as a master worksheet. More importantly, the large combination of numbers ensures that each student will have an unique learning experience when completing the Smoothie Doozie assignment.

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Appendix

Smoothie Doozie Assignment*

Store fixtures (counter, chairs, tables etc.) - \$8,000.00.

Licenses - \$400.00

Rent Deposit - \$1,600.00

Fist Insurance Payment - \$100.00

Your friend has \$18,000.00 and plans to borrow the rest from the bank with a five year loan at 5% interest.

Assume that sales will grow at 5% per month.

1. Construct a monthly pro-forma cash budget for your friend for the first year of operations.

- a. Place all your assumptions on one worksheet. Name the worksheet "Assumptions"
- b. Place your start up costs on a second worksheet named "Startup Costs"
- c. Place the cash proforma on another worksheet named Cash Pro-forma Budget"

2. How much money should your friend borrow? Explain your reasoning. Include your loan calculations.

3. What is the dollar breakeven point?

4. Graph the Revenue and the Net Income after Taxes. Name this worksheet "Graph"

5. Double the marketing and advertising. Assume this increases the growth rate to 8%. Would this be a good business decision? Why or why not? Name your worksheet "Double"

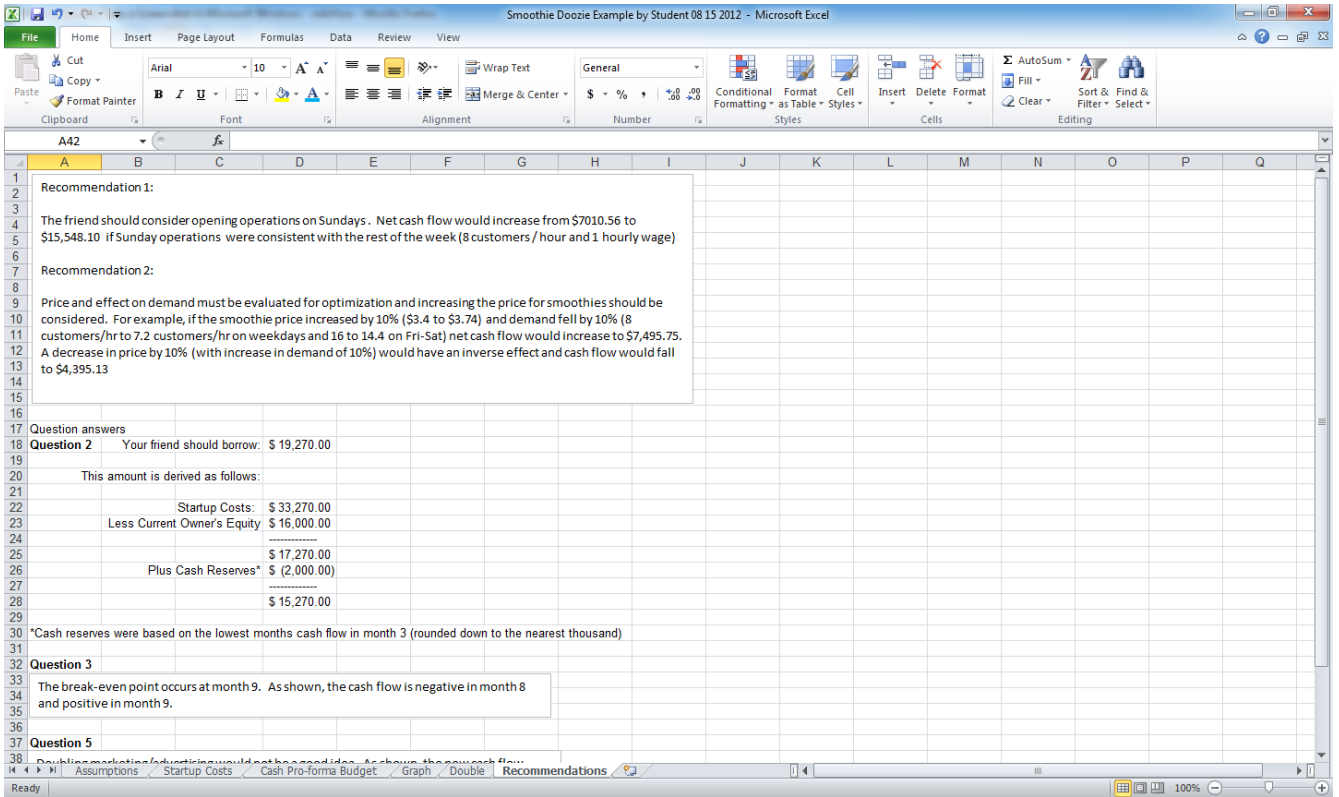
6. Suggest two reasonable business recommendations to your friend. Show your friend how these recommendations would effect the cash budget. Use a text box to explain your changes. Name the worksheet "Recommendations"

No constant numbers should be used on the worksheets.

Assume a 4.2 week month.

Assume a tax rate of 30%.

Note that all the numbers in this letter are different for each student who receives the assignment.



	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Total
Revenue													
Smoothies	\$9,139.20	\$9,596.16	\$10,075.97	\$10,579.77	\$11,108.75	\$11,664.19	\$12,247.40	\$12,859.77	\$13,502.76	\$14,177.90	\$14,886.79	\$15,631.13	\$1
Health Food	\$2,688.00	\$2,822.40	\$2,963.52	\$3,111.70	\$3,267.28	\$3,430.64	\$3,602.18	\$3,782.29	\$3,971.40	\$4,169.97	\$4,378.47	\$4,597.39	\$
TOTAL	\$11,827.20	\$12,418.56	\$13,039.49	\$13,691.46	\$14,376.04	\$15,094.84	\$15,849.58	\$16,642.06	\$17,474.16	\$18,347.87	\$19,265.26	\$20,228.53	\$1
Expenses													
CGS	\$3,763.20	\$3,951.36	\$4,148.93	\$4,356.37	\$4,574.19	\$4,802.90	\$5,043.05	\$5,295.20	\$5,559.96	\$5,837.96	\$6,129.86	\$6,436.35	\$
Rent	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$1,600.00	\$
Phone	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00	\$
Electricity	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$145.00	\$
Insurance	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$120.00	\$
Advertising	\$1,200.00	\$1,200.00	\$1,200.00	\$1,200.00	\$1,200.00	\$1,660.43	\$1,743.45	\$1,830.63	\$1,922.16	\$2,018.27	\$2,119.18	\$2,225.14	\$
Wages	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$2,016.00	\$
Salaries	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$3,833.33	\$
Loan Payment	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$372.54	\$
TOTAL EXPENSES	\$13,105.08	\$13,293.24	\$13,490.80	\$13,698.25	\$13,916.07	\$14,605.21	\$14,928.38	\$15,267.70	\$15,623.99	\$15,998.10	\$16,390.91	\$16,803.36	\$1
Net Income Before Tax	-\$1,277.88	-\$874.68	-\$451.32	-\$6.79	\$459.97	\$489.63	\$921.20	\$1,374.35	\$1,850.17	\$2,349.77	\$2,874.35	\$3,425.16	\$
Tax	\$0.00	\$0.00	\$0.00	\$0.00	\$137.99	\$146.89	\$276.36	\$412.31	\$555.05	\$704.93	\$862.31	\$1,027.55	\$
Net Income	-\$1,277.88	-\$874.68	-\$451.32	-\$6.79	\$321.98	\$342.74	\$644.84	\$962.05	\$1,295.12	\$1,644.84	\$2,012.05	\$2,397.61	\$

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