Exercise

Allegro • Smart Sheet

By Arnaud De Bruyn



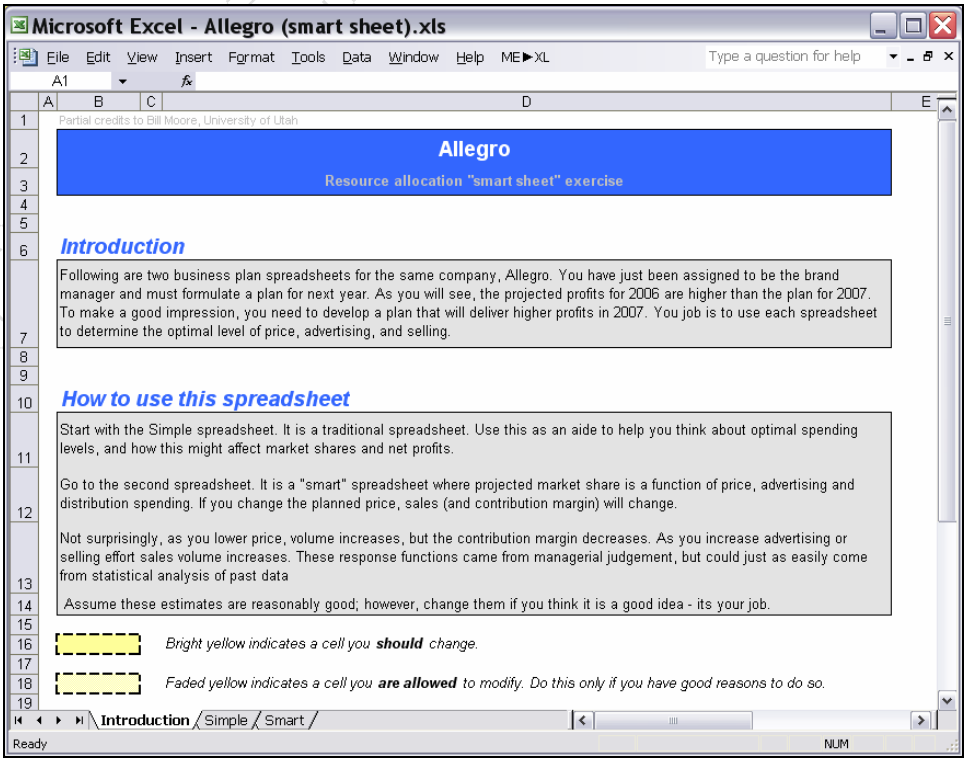
The *Allegro Smart Sheet* exercise is a standalone spreadsheet with preset formulas and result displays. To use it, simply open the file "*Allegro Data (Smart Sheet).xls*". By default, the file installs in "*My Documents/My Marketing Engineering/*".

Overview

The Allegro exercise is useful for showing the difference between classical Excel spreadsheets, extensively used by managers, and "smart," model-driven spreadsheets.

Getting Started

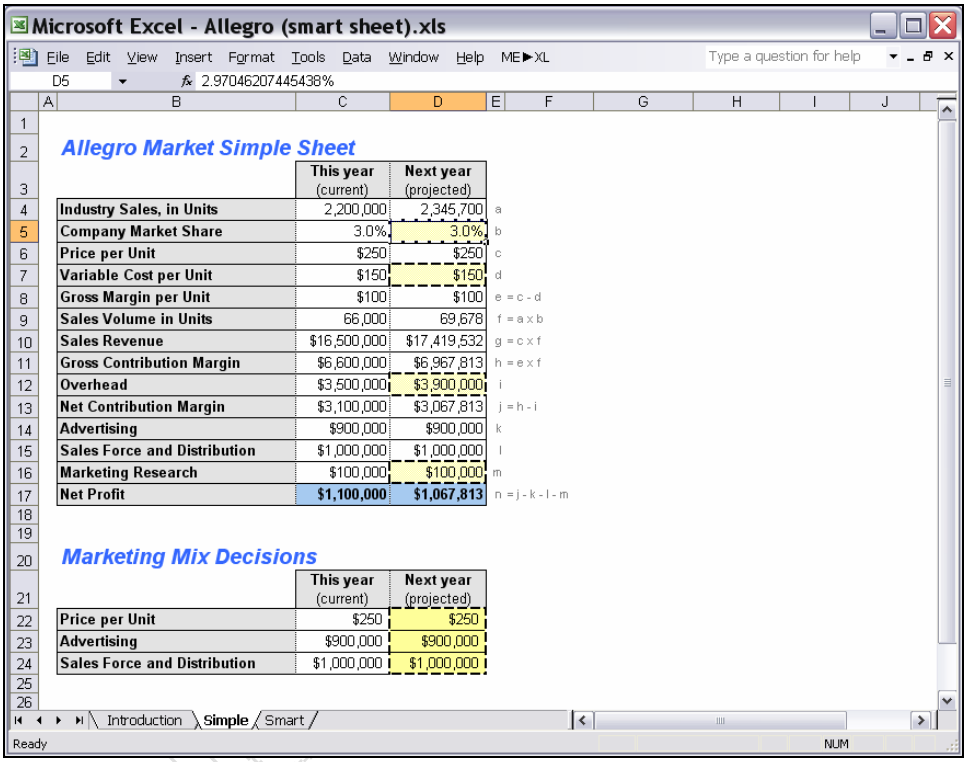
Open the file "*Allegro Data (Smart Sheet).xls*" in "*My Documents/My Marketing Engineering/*".



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Step 1 Using the simple sheet

In Excel, click on the *Simple* sheet. This sheet contains a simple business model spreadsheet that eventually leads to estimations of net profits for this year and the next.



Allegro Market Simple Sheet

	This year (current)	Next year (projected)	
Industry Sales, in Units	2,200,000	2,345,700	a
Company Market Share	3.0%	3.0%	b
Price per Unit	$250	$250	c
Variable Cost per Unit	$150	$150	d
Gross Margin per Unit	$100	$100	e = c - d
Sales Volume in Units	66,000	69,678	f = a x b
Sales Revenue	$16,500,000	$17,419,532	g = c x f
Gross Contribution Margin	$6,600,000	$6,967,813	h = e x f
Overhead	$3,500,000	$3,900,000	i
Net Contribution Margin	$3,100,000	$3,067,813	j = h - i
Advertising	$900,000	$900,000	k
Sales Force and Distribution	$1,000,000	$1,000,000	l
Marketing Research	$100,000	$100,000	m
Net Profit	$1,100,000	$1,067,813	n = j - k - l - m

Marketing Mix Decisions

	This year (current)	Next year (projected)
Price per Unit	$250	$250
Advertising	$900,000	$900,000
Sales Force and Distribution	$1,000,000	$1,000,000

The *Simple* sheet contains three types of cells:

- **Bright yellow** cells relate to the marketing-mix decisions you must make about price, advertising budget, and sales force and distribution spending.
- **Faded yellow** cells can be modified, but these changes require careful justification. For example, if you increase advertising by 0.5 million dollars, you might argue that this increase in advertising will drive market share to 3.2% and thus change it accordingly.
- **White cells** contain data that cannot be modified. These data are either a given or the result of a protected formula.

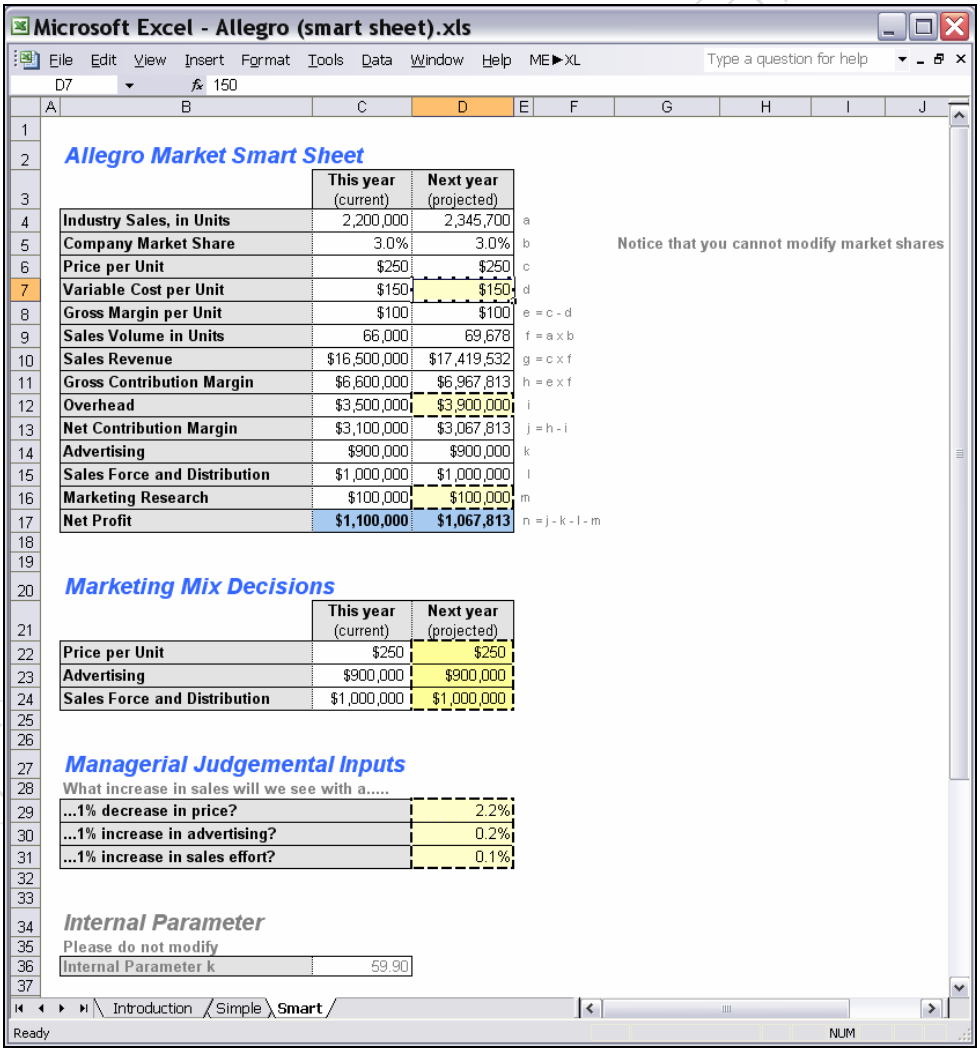
DO NOT

Step 2 Using the smart sheet

In Excel, click on the *Smart* sheet. This sheet is similar to the *simple* sheet, except that projected market share is a function of price, advertising, and distribution spending. If you change the planned price, sales (and the contribution margin) will change accordingly.

Not surprisingly, as you lower price, volume increases, but the contribution margin decreases. As you increase advertising or selling efforts, sales volume increases, but you must support higher costs.

These response functions emerge from managerial judgment but could just as easily come from a statistical analysis of prior data.



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	This year (current)	Next year (projected)
Price per Unit	$250	$250
Advertising	$900,000	$900,000
Sales Force and Distribution	$1,000,000	$1,000,000

...1% decrease in price?	2.2%
...1% increase in advertising?	0.2%
...1% increase in sales effort?	0.1%

Internal Parameter k	59.90

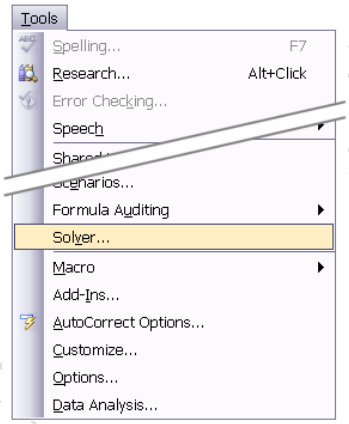
Step 3 Using Excel Solver with the smart sheet

Microsoft Excel provides a tool, named *Solver*, that allows users to find automatically the best values to plug into certain cells to optimize (e.g., maximize or minimize) the content of a target cell in a spreadsheet.

You can use this tool to find the optimal spending levels (price, advertising, sales force) that optimize net profits.

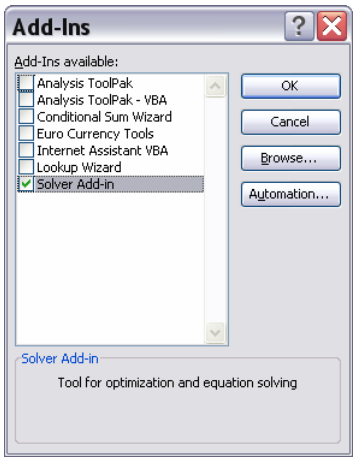
Checking that Solver is installed

Solver is shipped with all versions of Excel but might not be installed yet. Verify that Solver is installed by opening the *Tools* menu in Excel. If Solver appears as one of the options, skip the next step.



Installing Solver

In Excel, select the menu option TOOLS → ADD-INS. A dialog box appears. Check the Solver option, and click OK. Solver will install automatically.



DO NOT COPY

Using Solver

Now that you have verified Solver is installed, you can use it to find the optimal values of price, advertising, and distribution that maximize net profits.



The Allegro spreadsheet is protected by default, so users cannot modify or erase formulas by mistake. When protected, only those cells in yellow can be manually modified.

To use Solver on this spreadsheet, manually **unprotect** the spreadsheet. Select the smart sheet, and in the Excel menu, click on TOOLS → PROTECTION → UNPROTECT SHEET...

In Excel, select the menu option TOOLS → SOLVER. The Solver dialog box appears.



Make sure the Solver dialog box contains exactly these options:

- The **target cell** is cell D17. Try to optimize net profits.
- The objective is to **maximize** the content of that cell.
- Maximizing the content requires **changing cells** D22–D24 (price, advertising, and distribution).
- The **constraints** state that price, advertising, and distribution must be positive (you cannot spend less than zero, nor can you sell a product for less than nothing).

Click Solve. The software will recommend a solution that maximizes profits.

Questions



1. Using the Simple Sheet, what happens when Allegro cuts advertising and selling effort to 0$ and raises price to $500/unit? Comment.
2. Repeat exercise 1 using the Smart Sheet.
3. Using the Smart Sheet, what is the profit maximizing level of advertising, selling effort and price? (Hint: Requires Solver) Would you recommend the firm implement this policy? Why or why not?
4. What if the firm's goal was not to maximize profit, but to maximize market share while maintaining profit at no lower than last year's level. (Hint: Requires Solver—and be sure to start with a feasible level of profit). Compare this policy to the one you found in question
5. Comment on the strengths and limitations of a response function approach (Smart sheet) like this in practice.

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