Exercise

OfficeStar Ink Cartridge • Trial-Repeat



The *Trial–Repeat* exercise is a standalone spreadsheet with preset formulas and result displays. To use it, simply open the file "*OfficeStar Ink Cartridge (trial-repeat).xls*". By default, the file installs in "*My Documents/My Marketing Engineering/.*"

Overview

The Trial–Repeat spreadsheet is useful to understand the interacting roles of advertising, free sample distributions, and repeat purchase ratios on short- and long-term market shares for frequently purchased products.

Background

OfficeStar, a regional chain of office supply stores, has decided to launch its own ink cartridge line of products. The goal of the company is to compete with the usual actors in the market by offering a lower-priced product to its core customers, with which it hopes to capture significant market share in that business.

The **key figures** for this market are as follows:

- The **market** for ink cartridges in the region is approximately 2.3 million units sold every quarter (to simplify, we assume 2.3 million customers buy one ink cartridge each).
- The **production cost** of an ink cartridge is $6.50; it is sold at a **price** of $19.95 in stores, leading to a **gross margin** of $13.45.
- OfficeStar has a **house list** of 500,000 identified potential customers, to whom the company could send samples if that were deemed profitable.
- Sending a **sample** costs $3 in shipping and handling.

Just before launching the product line, OfficeStar hired a market research company to perform simulations and forecast the future market share of the product. Results were disappointing. The market research company has identified two key issues:

- Prospective customers are unwilling to try this product, and most appear likely to remain loyal to their current provider (usually, the printer manufacturer).
- Even for those customers willing to try the product, market research pretests show a low level of satisfaction with the product, leading to a low level of repeat sales. Apparently, many customers are unsatisfied with the quality of the product, and significant research and development might be

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required to make sure the product achieves the quality expected by OfficeStar's customers.

Consequently, top management has decided to invest an additional $1.5 million in research and development to improve the product quality, in the hope that doing so will increase the repeat purchase rate to satisfactory levels, though the forecasts remain worrisome.

Exercise

As the new product manager of the OfficeStar ink cartridge product line, you will supervise the product launch marketing campaign. You need to ensure any investment gets recouped within the next two years (eight quarters); otherwise, top management might drop the product line altogether.

You have three key decisions to make:

- The launch campaign **advertising budget** for regional television and radio ads. Advertising increases customers' awareness about the product, as well as their willingness to try.
- The **sampling strategy**. OfficeStar has a house list of 500,000 potential customers, and sending free samples to potential customers is an effective (though expensive) way to induce trial.
- Recommendations about the **investments** required to improve product quality. The quality levels will affect repeat-purchase rates, a key element in predicting long-term market share.

Questions



Question 1. Using Solver, identify the optimal level of advertising budget and quantity of free samples to distribute. What long-term market share can OfficeStar expect?

Tip: The target cell you want to maximize is cell M32.



Question 2. Suppose top management refuses to invest any additional money to improve product quality and wants to launch the product line as is. Using Solver, identify the new optimal level of advertising budget and quantity of free samples to distribute. Given these circumstances, what would you recommend?



Question 3. You are now allowed to make recommendations about further investments in product quality. What is the optimal mix of advertising spending, number of samples, and investments in product quality? What long-term market share can OfficeStar expect? What key elements differentiate your answer from the one you gave to Question 1?

Getting Started

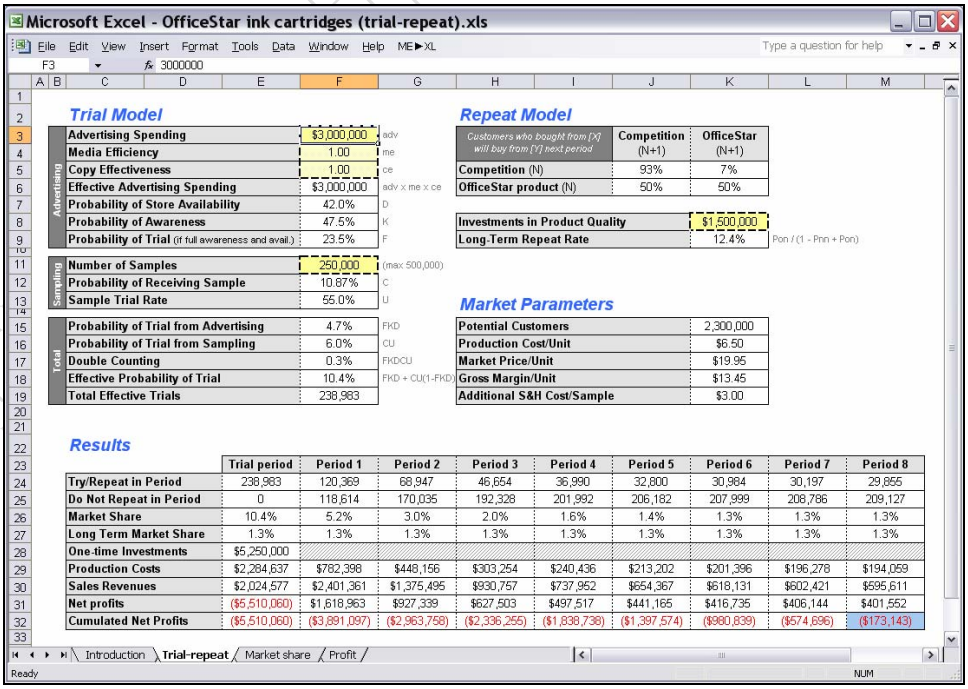
Open the file "*OfficeStar ink cartridge (trial-repeat).xls*" in "*My Documents/My Marketing Engineering/*."

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Step 1 Understanding the trial model

In Excel, click on the *Trial–repeat* sheet. This sheet contains the trial–repeat model, parameters, and results.



The *trial model* part of the sheet contains three sections. The first is related to the product trials generated by **advertising**.

- **Advertising spending** is the total advertising budget you must determine.
- **Media efficiency** and **copy effectiveness** are relative multiplicative ratios compared with an average campaign for the company. If media efficiency or copy effectiveness were to increase or decrease, each advertising dollar would become more or less effective.
- **Effective advertising spending** is the product of the three preceding terms.
- **Product availability** (*D*) is the long-run probability that the product will be available where the customers shop (in this case, the probability that an OfficeStar store is within reach of an average customer). It is based on managerial judgement.
- **Awareness** (*K*) is the long-run probability of awareness, estimated on the basis of managerial judgement and the projected advertising plan.
- **Trial** (*F*) is the long-run probability of trial, given unlimited distribution and total awareness of the new product within the target segment.

Note that if advertising spending, media efficiency, or copy effectiveness were modified, both **awareness** and **trial** would be modified, according to the formula-based estimation.

The second part of the trial model relates to trials generated by free sample distribution.

- **Number of samples** is the number of samples distributed to customers. In this exercise, you can only distribute samples to the 500,000 customers listed in the house list.
- **Probability of receiving sample** (*C*) is the probability that a customer in the target segment will receive a sample. It equals the *number of samples* divided by *total market size*.
- **Sample trial rate** (*U*) is the probability that a customer who receives a sample will use it, estimated on the basis of past experiences and managerial judgement.

The third part of the trial model combines both advertising and sampling effects to predict the total number of trials.

- **Probability of trial from advertising** equals product availability × awareness × trial, or FKD.
- **Probability of trial from sampling** equal the probability of a customer receiving a sample × sample trial rate, or CU.
- Some people may have received and tried a sample but would also have tried the product because of its advertising. Hence, this line estimates how many customers fall in that category to avoid **double counting** them (FKDCU).
- **Effective probability of trial** is the long-run probability that a customer will try the product, because of either advertising or sampling, but avoiding double counting (FKD + CU – FKDCU).
- **Total effective trials** represent how many customers in the target segment effectively try the product in the long run.

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Step 2 Understanding the repeat model

Once a customer decides to try the new product in one purchase occasion, he or she might decide to buy that new product again during the next purchase occasion (i.e., **repeat** purchase) or switch back to a competitor's product. Likewise, those who switch back might decide to repurchase the new product during a future occasion. The repeat model summarizes these transition probabilities in a **switching matrix**:

- The **competition** line represents those customers who tried the OfficeStar product but decided to switch back to a competitor's product. In the base case scenario, only 7% decide to buy from OfficeStar on the next purchase occasion.
- The **OfficeStar product** line represents those customers who bought an OfficeStar ink cartridge during the last purchase occasion. At the next purchase occasion, only 50% of them might remain loyal to the brand, and 50% will switch back to competition.

Two other items are displayed:

- **Investments in product quality** represent how much additional money OfficeStar top executives are willing to invest into improving product quality. Increasing investments in this domain will increase repurchase rate probabilities.
- **Long-term repeat rate** indicates what proportion of the customers who bought the new product at some period (t) would buy the new product in the next period (t + 1) if the pattern embedded in the matrix is repeated period after period, indefinitely—that is, what would be the equilibrium repeat rate?

Step 3 Interpreting the results

Market parameters

The market parameters section contains key figures required to estimate profit and market share, such as market size, product margins, and additional costs.

Results

The results displayed are as follows:

- **Try/repeat in period** are those customers who try the product in the first period (because of advertising or sampling), and among those, the customers who repeat in subsequent periods.
- **Do not repeat in period** are customers who *tried* the product but switched back to a competitor's product for that period.
- **Market share** is the current market share of OfficeStar in that market, whereas **long-term market share** represents the long-run equilibrium toward which the model will converge.

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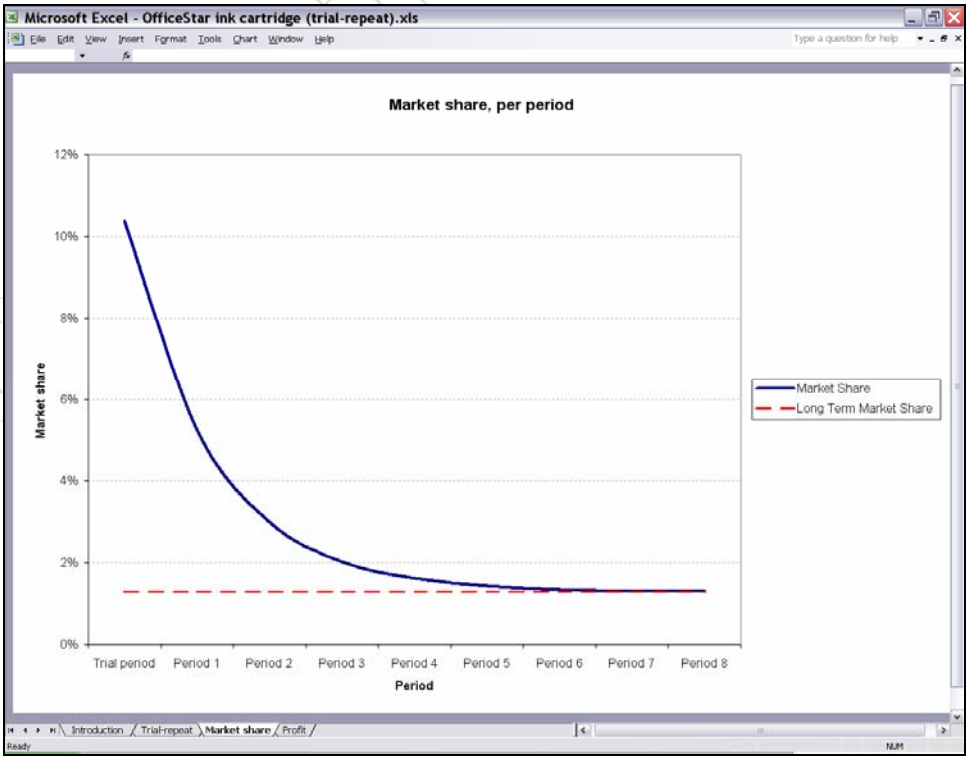
The **long-run market share** is equal to **probability of trial** (from the trial model) × **long-term repeat rate** (from the repeat model). That is, the trial–repeat model attempts to answer two fundamental questions:

- How many customers will try the product?
- Among those who try, how many will remain loyal customers?

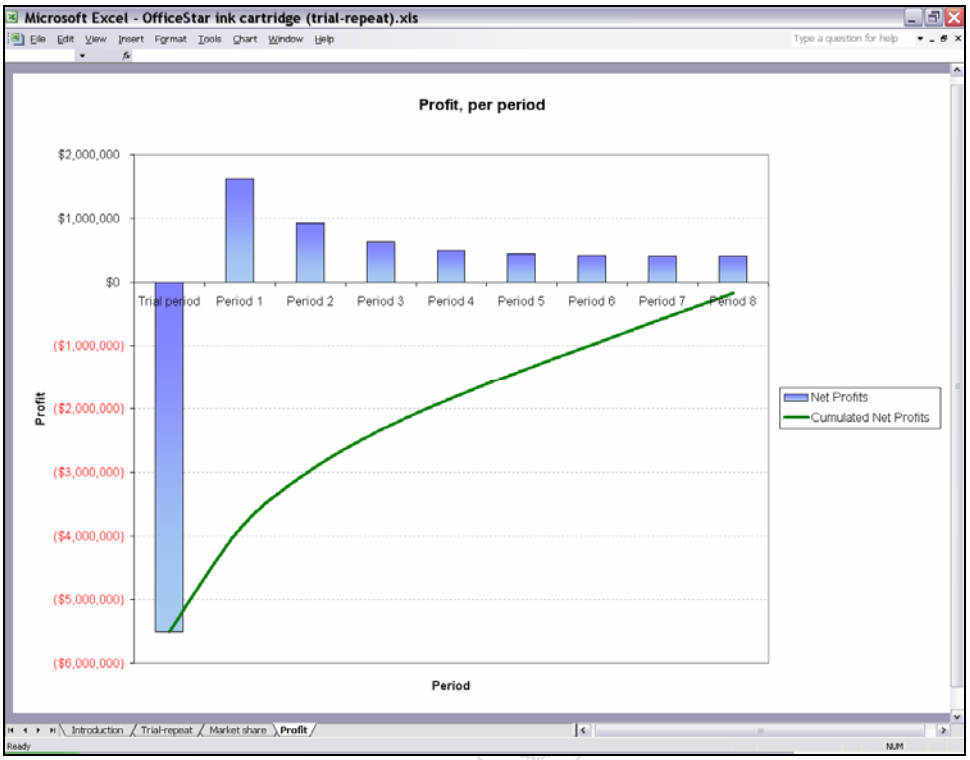
- **One-time investments** represent all investments made before and during the product launch campaign, namely (a) advertising budget; (b) the costs of producing, shipping, and handling the samples; and (c) investments in product quality.
- **Production costs** represent the costs of producing the units sold in stores. It excludes the production costs of the free samples and avoids double counting those who would have bought in a store but received a free sample during the trial period.
- **Sales revenues** are revenues generated from regular sales of the products in stores.
- **Net profits** and **cumulated net profits** equal revenues minus costs, during the period and cumulative over all periods, respectively.

Charts

Key results are displayed in two charts:



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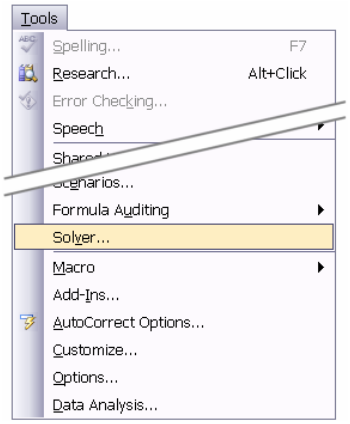
Step 4 Using Excel solver

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 advertising budget, number of free samples to distribute, and investments in product quality that optimize the net profits.

Checking that Solver is installed

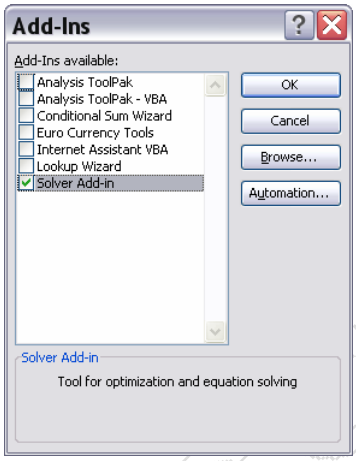
Solver is shipped with all versions of Excel but might not be installed by default. Verify that Solver is installed by opening the *Tools* menu in Excel. If Solver appears as one of the options, skip the next step.



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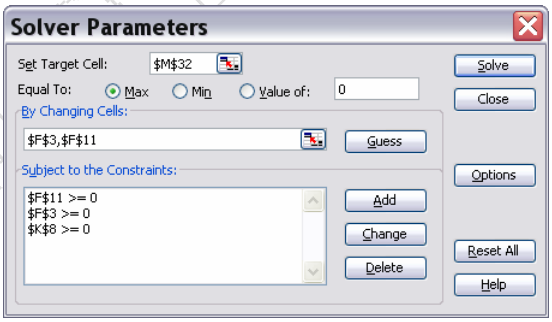
Installing Solver

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



Using Solver

In Excel, select the trail–repeat sheet, and go to the menu option TOOLS → SOLVER. The Solver dialog box appears.



Ensure the Solver dialog box contains these options:

- The **target cell** is cell M32. Try to optimize cumulated net profits after two years, or eight quarters.
- The objective is to **maximize** the content of that cell.
- Maximizing the content requires **changing cells** F3 (advertising) and F11 (free samples). To answer one of the questions, you also must add cell K8 (investments in product quality)
- The **constraints** state that all amounts must be greater than or equal to zero.

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

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