HW6T – Team Case
Syntex Laboratories (A)[1]

1. Reading the Case

There is a lot of interesting detail in the Syntax Laboratories (A) case, but not all of it is vital to our purposes. I suggest you skim the paragraphs between "Company Background" and "Sales Management at Syntex Labs." The information in "Sales Force Strategy Model" and subsequent sections is important for understanding how modeling was actually applied at Syntex, but you should focus more on the inputs and outputs than on the specific algorithm used to solve the model. Your model will use a more modern solution method than the one described in the case.

2. Building the Model

The analysts at Syntex actually built two models, one for allocating sales reps to physician specialties, the other for allocating sales reps to products. We will build just one of these: allocating reps to the seven Syntex products.

The first task is to build *sales response functions* for each of the seven products. These functions must be consistent with the judgmental estimates provided by Syntex management (see the top panel of Exhibit 5, where you may assume that saturation occurs at a level of 300% of the base level). These functions will indicate the dollar sales for a product based on the number of sales reps assigned to that product. The independent/explanator variable should be the proposed number of sales reps as a percentage of the current level. The dependent variable should be the predicted dollar value of sales as a percentage of the current level. See Figure 1 for an illustration.

A useful family of functions that can produce plausible S-shaped response functions has the form

$$\text{Sales} = b + (a - b)\left(\text{Effort}^c \big/ \left(d + \text{Effort}^c\right)\right)$$

where

> Sales is dollar sales (percent relative to base level),
> Effort is the number of sales reps (percent relative to base level), and
> a, b, c, and d, are parameters chosen to fit the function to the given data.

Note that good starting points for the four parameters are helpful in achieving a good fit. It helps to realize that the parameter b represents the lowest level of the function and a represents its highest level.

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[1] Used by permission of the author, Stephen Powell, The Amos Tuck School, Dartmouth College.

Once you have all seven sales response functions, the remaining task is to build a model that calculates total net profit over the seven products for any assignments of sales reps to each product. Here are the detailed elements that should be included in your model:

Current reps	data from top of Exhibit 9
Planned reps	these are the decision variables
Reps as % of current	calculated from the values above
Current sales	data from top of Exhibit 9
Forecast sales	calculated using the sales response functions
Contribution margin	data from bottom of Exhibit 4
Gross Profit	Sales*Contribution margin for each product
Net Profit	Gross profit – Labor cost (about $63,000 per rep)

3. Deliverables

Along with a well designed and organized spreadsheet model, prepare a brief presentation to Syntex management on the two key questions: how many reps should be hired and how should they be allocated to products? Technical details should not occupy a major part of your presentation, but be prepared to explain and defend your analysis to Syntex analysts. Each member of the group should be prepared to present.
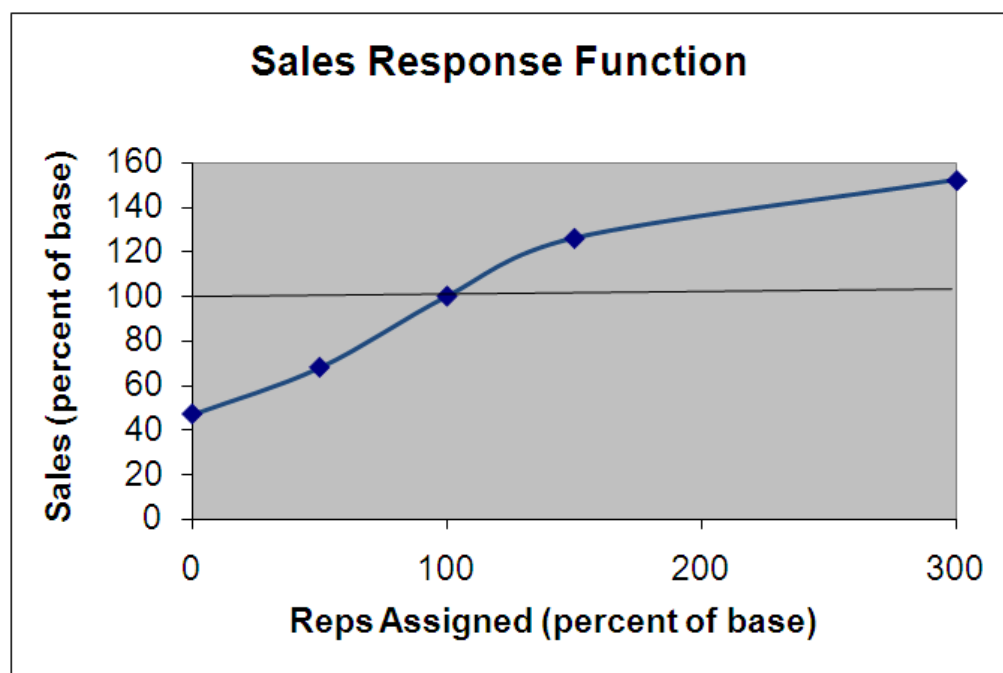

Figure 1: Sample Sales Response Function