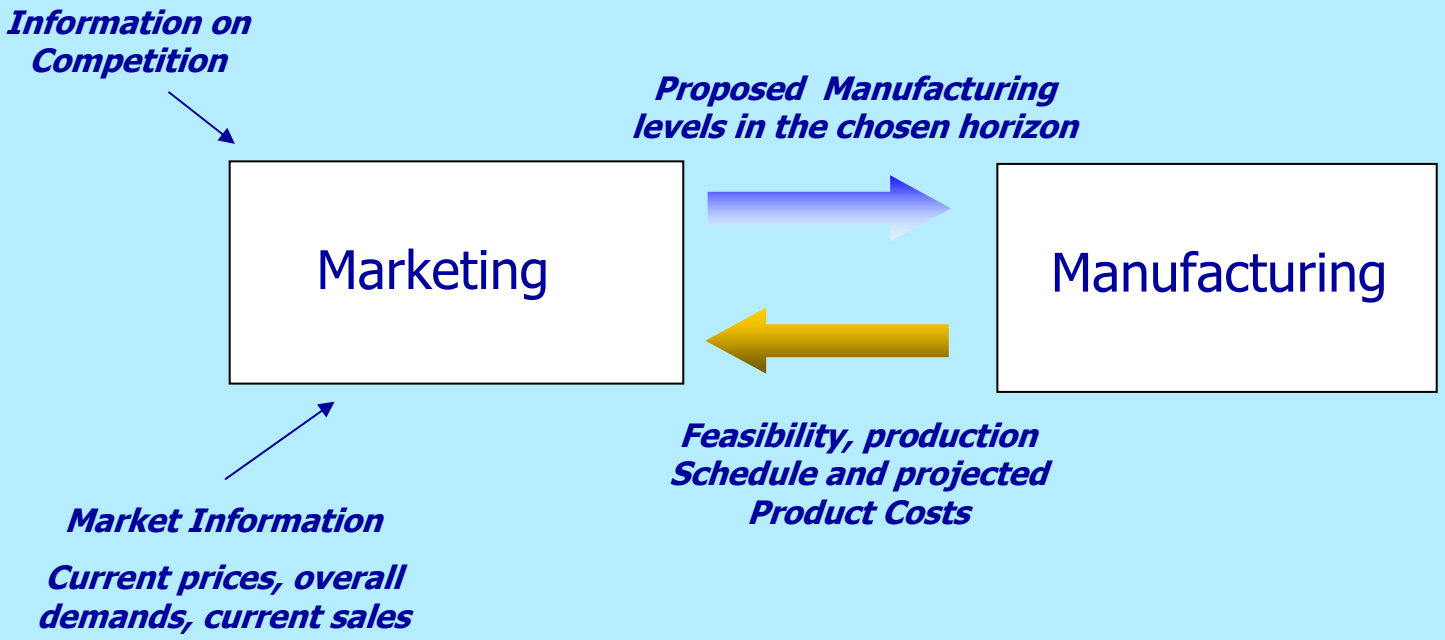
Pricing of Consumer Products

Pricing of Existing Products as Currently Done

Marketing constructs a Sales/Price relationship



New Products

In this case Pricing is more difficult because:

a) Consumer profiles need to be chosen

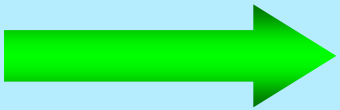
b) The actual product may need to be changed in composition or structure to improve profits

c) The choice of markets also changes profit distribution

d) The existing manufacturing process and the associated Supply Chain may need adaptation, or be built from scratch.

e) Advertising means and intensity play a bigger role and need to be decided.

All are so intertwined that decisions on each item affect directly all the rest.



AN INTEGRATED MODEL IS A MUST

Pricing Model

We resort to the following formula from Micro-economics

$$p_1 d_1 = p_2 d_2$$

where

p_1 = new product price

d_1 = new product demand

p_2 = competition's product price

d_2 = competition product demand

When no competition exists, then we use

$p_1 d_1$ = constant

We use the above formula for conceptual reasons. In reality we use a slightly more complex one.

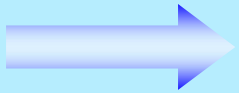
Pricing Model

Explanation

$$p_1 d_1 = p_2 d_2$$

When the prices are equal $p_1 = p_2$

$d_1 = d_2$



Market is split equally

This is true only when

a) Products are of equal quality (consumer is indifferent when prices are equal)
b) Consumer has equal knowledge about existence of both products

Pricing Model

We therefore introduce two parameters α and β

$$\beta p_1 d_1 = p_2 d_2 \alpha$$

β: is a positive coefficient that is a measure of how much more appealing to the consumer the new product will be, given equal prices.

α: is a positive coefficient that is a measure of how much the consumer knows about the existence of the new product.

Not the formula we use in class

Pricing Model

Assume that β=0.5, that is, the consumer will like the new product twice as much as the competition.

Also assume that a=1, that is, the consumer knows both products perfectly well.

Then, when the prices are equal $p_1 = p_2$

$d_1 = 2d_2$

Market share is 2/3

We calculate β as a function of the ratio of "happiness" both products give the customer

$\hat{\sigma}_i = \hat{\sigma}_i + \hat{o}_i$

Pricing Model

In fact β can change throughout time. Too.

We propose $\beta = H_2/H_1$ That is, the ratio of "preferences".

We use $H_i = \Sigma\, w_i y_i$

w_i= weights
y_i= Normalized scores (0-1) of consumer attributes
(color, taste, smoothness, size, functionality, etc)

Connect y_i to physical properties or product structure

Pricing Model

Assume that β=1, that is, the consumer prefers the new product as much as the competition.

Also assume that $a=0.5$, that is, half of consumers know about the product

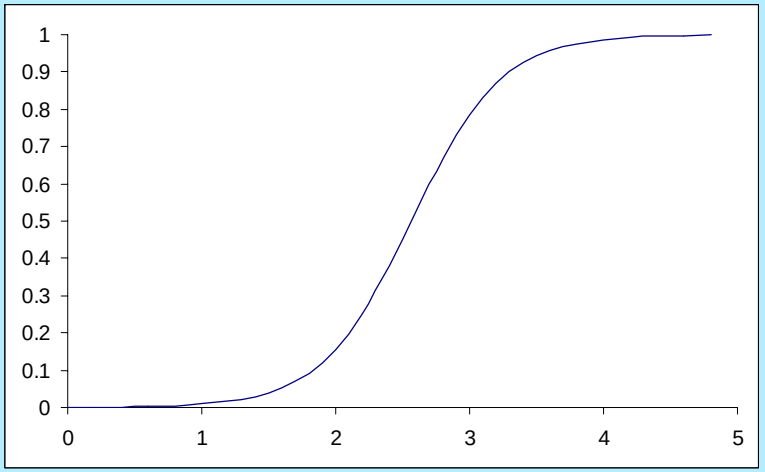
Then, when the prices are equal $p_1 = p_2$

$d_1 = 0.5\, d_2$

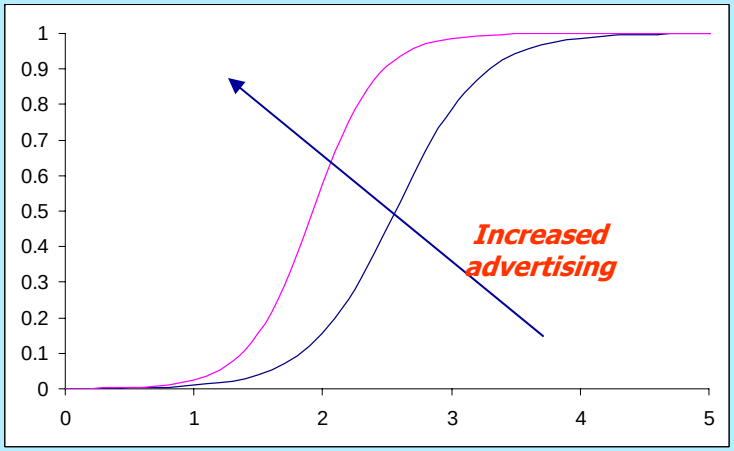
Market share is 1/3

Pricing Model

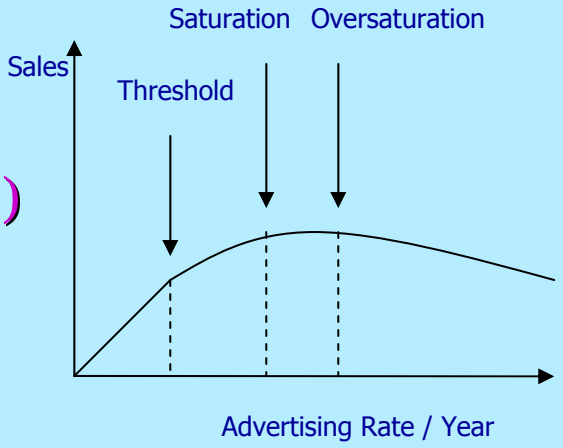
In fact α is a function of time



Which can be altered by advertisement



(which has a cost)



$\hat{a}_i = \hat{\sigma}_i + \hat{o}_i$

Integrated Pricing Model

Find (SIMULTANEOUSLY)

product composition/Structure
Market and consumer profile
Price
Corresponding Manufacturing
Corresponding Supply Chain

SUCH THAT

***Net Present value* is maximum**

Subject to:

Maximum Capital Investment
Logistic and resource constraints

$\hat{a}_i = \hat{\sigma}_i + \hat{o}_i$

Example

Consider an over-the-counter skin moisturizing lotion for ichthyosis patients

Ichthyosis Vulgaris

This requires the usual ingredients of a moisturizing lotion
(occlusives, Emollients, Humectants)
active ingredients to promote desquamation
(exfoliants)
Additional ingredients
(emulsifying agents, preservatives, thickeners, PH adjustors and antioxidants)

Example

Perfect product : Lotion that give MAXIMUM HAPPINESSS

Pre-Shower Lotion Formulation		
Ingredient	**Percent (%)**	**Function**
Water	60	Solvent
Ammonium Lactate	10	Desquamation
Retinyl Palmitate	8	Antioxidant
Jojoba Oil	8	Emollient
PEG-4	8	Emollient/Liposome Formation
Cetyl Alcohol	2.9	Emulsifier
Octyldodecanol	2.9	Thickener
Phenoxyethanol	0.196	Preservative
Maleic Acid	0.004	pH Adjuster

Example

Shower Gel Formulation		
Ingredient	**Percent %**	**Function**
Water	52	Solvent
Polysorbate-20	20	Surfactant
Cocoamidopropyl Betaine	5	Surfactant
Lactic Acid	4	Exfollient/NMF
Urea	4	NMF
Sodium PCA	3	NMF
Urocanic Acid	3	NMF
Citric Acid	3	NMF
Oleic Acid	3	Emollient/Thickener
Cetyl Alcohol	2.796	Emulsifier
Phenolxyethanol	0.2	Preservative
Maleic Acid	0.004	pH Adjustor

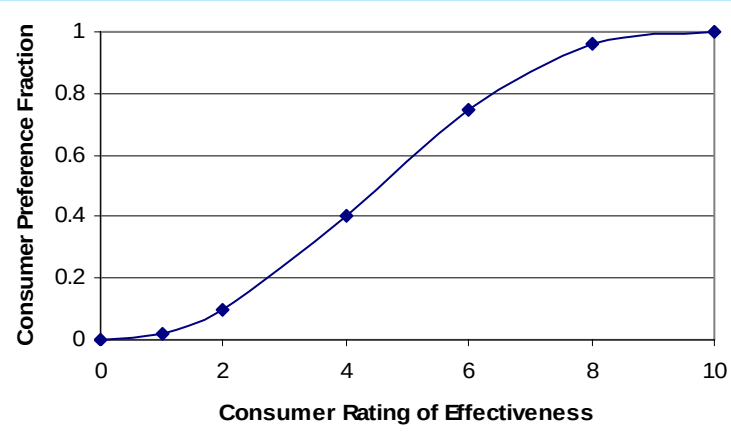
Example

After-Shower Lotion Formulation		
Ingredient	**Percent %**	**Function**
Water	60	Solvent
Dimethicone	10	Humectant
Lanolin	8	Humectant
PEG-4	6.996	Emollient/Liposome Formation
Cetyl Alcohol	5	Emulsifier
Ceramide	3	SC Lipid/Humectant
Isostearic Acid	2.8	Thickener
Palm Oil	2	Emollient
γ-Linoleic Acid	1	SC Lipid
Cholesterol	1	SC Lipid
Phenoxyethanol	0.2	Preservative
Maleic Acid	0.004	pH Adjustor

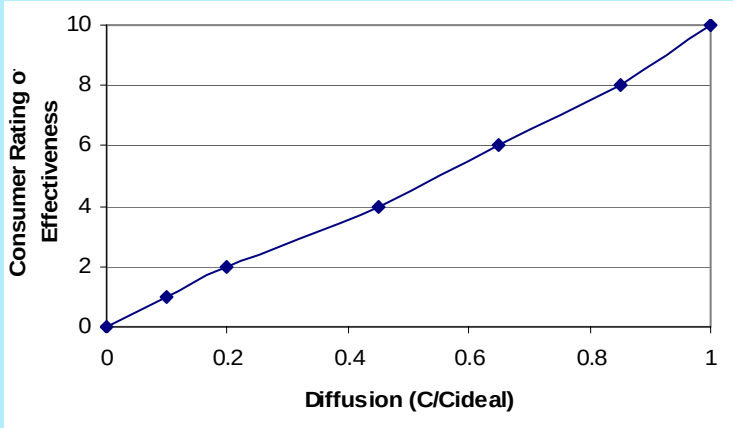
Example

How is preference constructed?

Consumer Satisfaction vs rating



Consumer rating vs Physical property



Example

Unfortunately, a loosing money proposition at average market prices

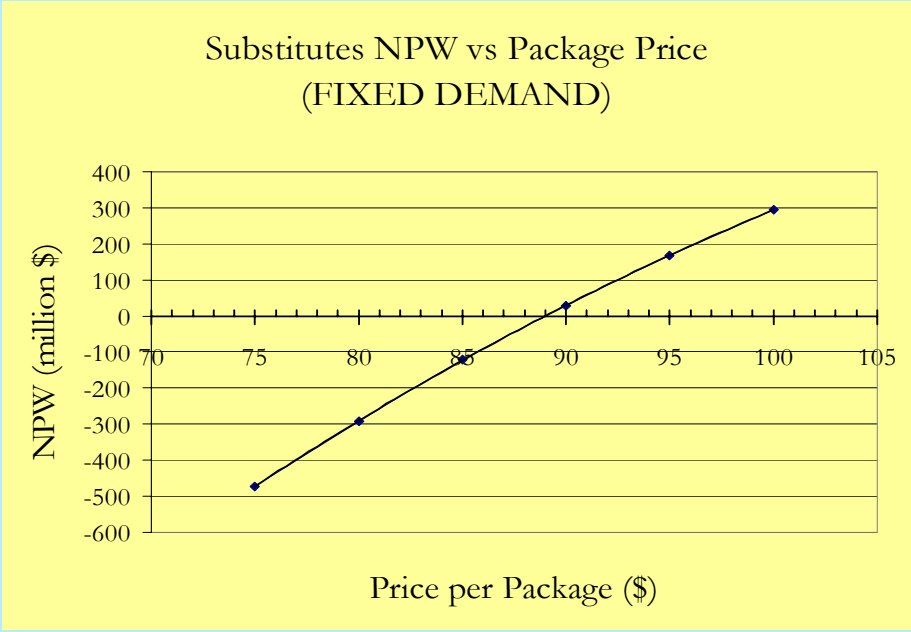
	Cost (million $)
Raw Material Cost/yr	51.62
Total Product Cost/yr	58
Annual Product Revenue/yr	16.2
NPW	**-125.54**

Substitute ingredients are needed

Example

Happiness model illustrated for Pre-Shower Lotion:

Relative proportions of Water, Ammonium Lactate, Jojoba Oil where changed to give a relative happiness value of β=0.78, and with it, the product sold as the three lotions has competitive prices.



Next step: Conduct a full optimization using the happiness model and the pricing formulas to also allow demand vary