

NAP's Product Line Pricing

Impacts of Free Browsing and
Bundling

Results from Normative and
Empirical Modeling



Heterogeneous Customers

SEGMENT 1

Customers who
Prefer Print;
View Product
Forms as Perfect
Substitutes

SEGMENT 3

Customers who
Prefer Print;
View Product
Forms as Imperfect
Substitutes or
Even Complements

SEGMENT 4

Customers who
Prefer PDF;
View Product
Forms as Imperfect
Substitutes or
Even Complements

SEGMENT 2

Customers who
Prefer PDF;
View Product
Forms as Perfect
Substitutes

Customer Preferences are functions of the fit of the book to their needs (Theta) and Quality of the Product Forms (Deltas – Delta1 for Print, Delta2 for PDF And Delta3 for the Bundle, Delta0 (reverse) for the free sample)

Managerial Issues Examined

- When should NAP offer free browsing? How do model parameters affect this decision?
- How does pricing change with the presence of free browsing?
- How does market penetration change with the presence of free browsing?
- When should NAP offer a special bundle pricing and how does this decision depend on the provision of free browsing?



Normative Model

- Let the parameters of the model vary in all probable manner. Determine the profits under the different conditions and generalize results based on the simulation runs
- Theta (degree of fit) was distributed as Beta distribution, Delta3 as an exponential distribution and Weibull distribution. These forms can accommodate very different shapes for the distributions.



Impact of free browsing

- Under conditions of low marginal costs, offering samples is always less profitable ($\text{cost-Print} > \text{cost-PDF}$)
- Profitability under free browsing increases as costs increase, size of customer segments preferring Print increases, browse quality decreases, and perceptions of complementarity increases.
- As perceptions of PDF quality increase, conditions with free browsing become less profitable.
- Mean prices of Print and PDF are lower with free browsing



Impact of free browsing

- The average unit sales of all the products are lower with free browsing (substitution effect of free browsing)
- However, when providing free browsing is more profitable, then sales of both forms are higher with free browsing – these are conditions of high costs relative to preference parameters.



Other Results

- Under free browsing there is less need to offer special bundle pricing
- As perceptions of complementarity increases need for special bundle pricing lower
- As costs increase relative preference parameters, higher need for special bundle pricing



Implications

- Free browsing is providing effective penetration of 100%. NAP is already giving up profits to increase customer welfare.
- Any increase in the quality of the free browsing will only increase the substitution effect and lead to lower revenues.
- As costs decrease and preference for PDF increase, optimal prices will be lower and profits will also be lower, and purchase penetration will increase.

Empirical Analysis

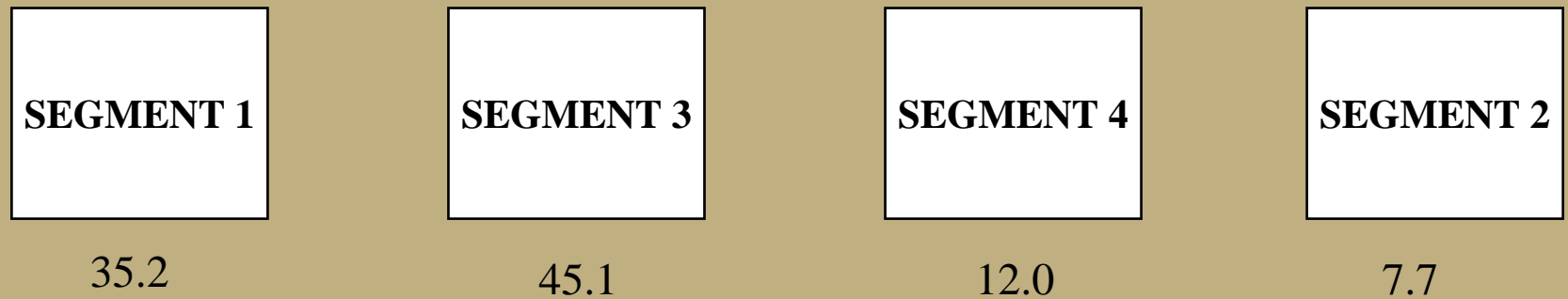
- Based on choice data from customers in Segments A, B and C.
- Latent segment sizes and the parameters estimated on the basis of choice data and degree of fit data.



Empirical Results

SEE ATTACHED TABLE

The perception of free browse quality only marginally lower than the base product quality



Bundling PDF with Print

The relative segment sizes indicate the potential for bundling forms

SEGMENT 1

Customers who Prefer Print; View Product Forms as Perfect Substitutes

35.2%

SEGMENT 3

Customers who Prefer Print; View Product Forms as Imperfect Substitutes or Even Complements

45.1%

SEGMENT 4

Customers who Prefer PDF; View Product Forms as Imperfect Substitutes or Even Complements

12.0%

SEGMENT 2

Customers who Prefer PDF; View Product Forms as Perfect Substitutes

7.7%



Bundling PDF with Print

- Customers in segments 3 and 4 —those who view PDF and Print as somewhat complementary— have slightly larger delta values (measure of preference for the complementary bundle) than those in segments 1 and 2.
- We can conclude that these customers will be willing to pay a bit more for both formats than for just one format—perhaps 120% of the print price for both formats.



Empirical Result

Table 7: Optimal Prices using the Pricing Model

c_1	Print, PDF, and Bundle (1)	PDF and Bundle (2)	PDF only (3)	One Segment Solution (4)
6.36	$p_1^* = 23.47$ $p_2^* = 13.28$ $p_3^* = 27.28$ $\Pi = 8.94$	$p_1 = 23$ (fixed) $p_2^* = 13.28$ $p_3^* = 27.28$ $\Pi = 8.93$	$p_1^* = 23$ (fixed) $p_2^* = 4.87$ $\Pi = 8.29$	$p_1^* = 31.90$ $p_2^* = 6.81$ $p_3^* = 37.54$ $\Pi = 6.78$
9.79	$p_1^* = 25.18$ $p_2^* = 13.28$ $p_3^* = 29.00$ $\Pi = 7.67$	$p_1 = 25$ (fixed) $p_2^* = 13.28$ $p_3^* = 29.00$ $\Pi = 7.67$	$p_1^* = 23$ (fixed) $p_2^* = 4.87$ $\Pi = 7.05$	$p_1^* = 33.26$ $p_2^* = 7.10$ $p_3^* = 39.14$ $\Pi = 5.63$
12.73	$p_1^* = 26.65$ $p_2^* = 13.28$ $p_3^* = 30.47$ $\Pi = 6.68$	$p_1 = 29$ (fixed) $p_2^* = 13.28$ $p_3^* = 30.47$ $\Pi = 6.62$	$p_1^* = 29$ (fixed) $p_2^* = 5.45$ $\Pi = 5.94$	$p_1^* = 34.39$ $p_2^* = 7.34$ $p_3^* = 40.47$ $\Pi = 4.74$
19.58	$p_1^* = 30.08$ $p_2^* = 13.28$ $p_3^* = 33.89$ $\Pi = 4.70$	$p_1 = 39$ (fixed) $p_2^* = 13.28$ $p_3^* = 39.00$ $\Pi = 3.65$	$p_1^* = 39$ (fixed) $p_2^* = 4.83$ $\Pi = 2.29$	$p_1^* = 38.04$ $p_2^* = 8.10$ $p_3^* = 44.77$ $\Pi = 2.62$

