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Copa Cruises Price Optimization Analysis Report

1a.

The optimal price per person is $101.99, the expected revenue is W(p) * $p_{optimal}$ which is $71.78, and the expected revenue per event is $3,589.11. This was calculated using the logistic regression method by –

First conducting maximum likelihood estimation:

				Logit model	-4.24165	0.033102323		
	WINS	LOSSES		W(p)	1-W(p)	Likelihood	LN (likelihood)	
Price ($)	in=1,Lose	in=0,Lose=1						Maximum log likelihood
103	0	1		0.696801228	0.303199	0.303198772	-1.193366676	-4013.613798
102	1	0		0.703748837	0.296251	0.703748837	-0.351333752	
141	0	1		0.395135272	0.604865	0.604864728	-0.502750436	
193	0	1		0.104602767	0.895397	0.895397233	-0.110487823	
141	1	0		0.395135272	0.604865	0.395135272	-0.928527112	
141	0	1		0.395135272	0.604865	0.604864728	-0.502750436	
199	0	1		0.087407258	0.912593	0.912592742	-0.091465564	
128	1	0		0.501138378	0.498862	0.501138378	-0.690873013	

Figure 1

Next, using Solver to arrive at the optimal price:

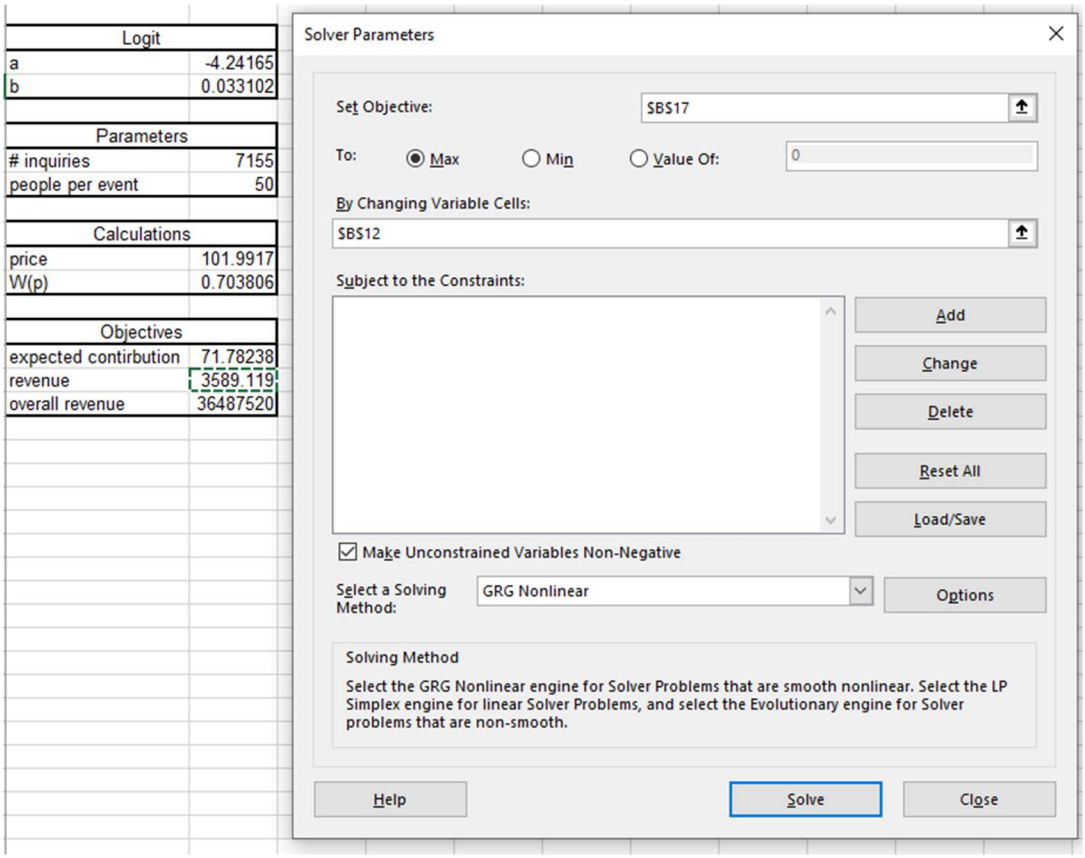


Figure 2

1b.

The optimized revenue is expected revenue per event multiplied by number of inquiries: $25,680,141.79

The total revenue originally earned was $16,927,650.00. Thus, an increase of $8,752,491.79

2a.

For our segmentation criterion, we chose to choose a variable that displayed the highest variance in proportion. Proportions for event type and location were very close at 33% and 10% respectively. Instead, we binned the days into four criteria: last minute (1-65 days), premium (66-110 days), standard (111-155 days), and early bird (156-200 days). This segmentation presented the highest variance of the three:

	Variance
Day binning	1.007E-05
Event type	3.047E-06
Location	7.324E-06

Figure 3

In addition, the rationale behind this price segmentation is that planners who are scheduling events long before the event date would expect a discount while those scheduling very close to the date would pay a higher relative rate for the booking.

2b.

The analysis was repeated as shown in *Figure 1 & 2* to arrive at the optimal price and expected revenues for each segment:

Segment	Price*	Expected revenue per event
Last minute	$121.66	$4,865.29
Premium	$102.72	$3,754.06
Standard	$90.06	$3,080.90
Early bird	$91.38	$2,987.65

As can be seen, the original rationale stands for all but the standard/early bird price difference. However, compared to the rest, this is relatively minute and therefore negligible.

2c.

Segment	Expected revenue per event
Last minute	$8,796,452.46
Premium	$6,749,798.86
Standard	$5,410,068.76
Early bird	$5,356,864.70
Total	$26,313,184.98

The original revenue was $16,927,650.00 and expected revenue from (1b) was $25,680,141.79. Thus, +$9,385,534.98 and +$633,043.19 were the differences respectively.

3a.

Yes, these prices would indeed be different. A revenue maximization analysis ignores costs completely and would be synonymous to a profit maximization with fixed cost. However, the case is that costs are variable for each contract. For analysis purposes, we would now be working with a distribution of costs meaning that the optimal price that maximizes pure revenues would no longer maximize profit which depends on this new variation.

3b.

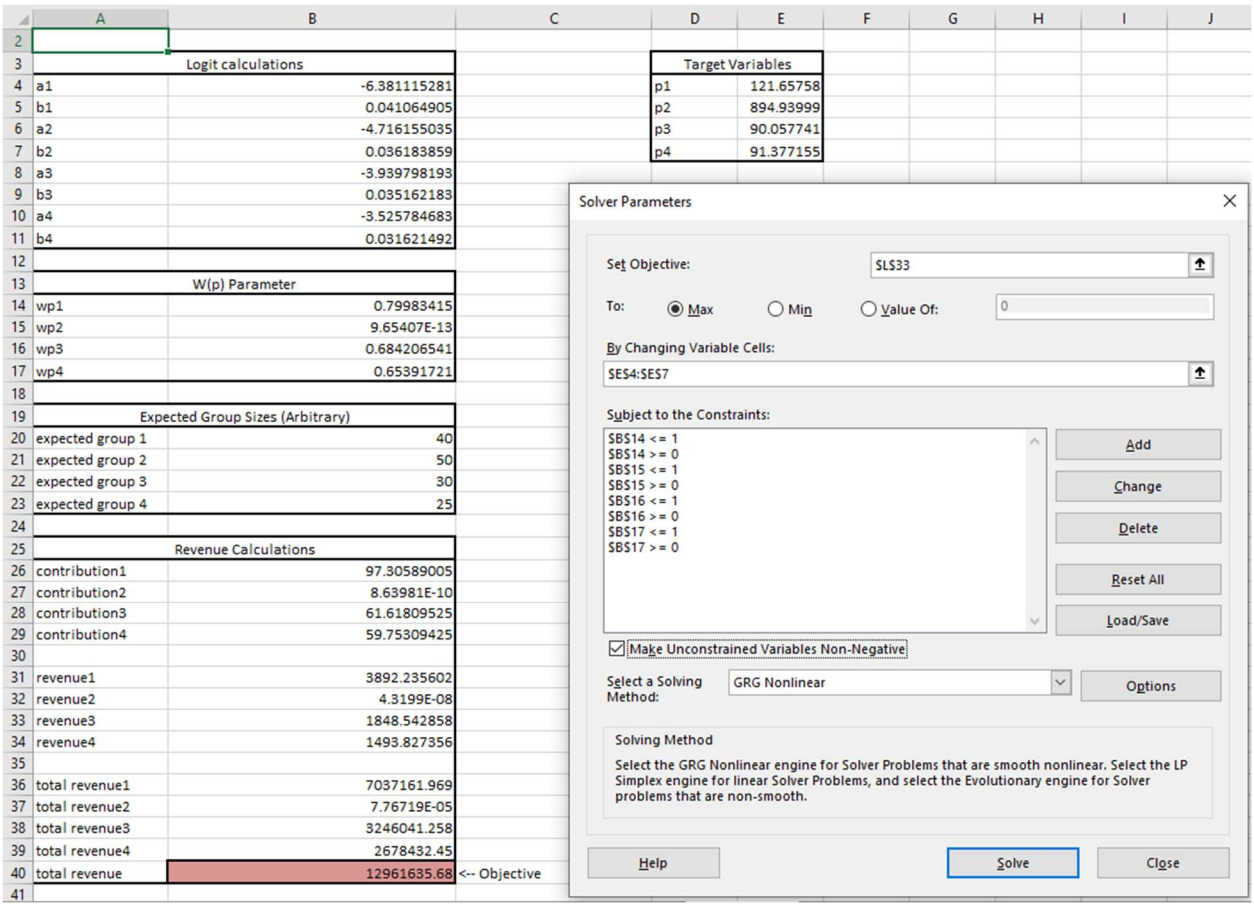
Yes, because the current segmentation criterion was based on which kind of segmentation had the most differentiated proportion. The proportion of event types and location were all very similar. Out of these, the days booked before event bins provided the highest variance.

Now, since a new variable of cost is introduced, it may be the case that this may be more differentiated than the previous criteria and would prove to be a more appropriate segmentation type for the analysis.

4.

For (1), the revenue equation is now changed to $p_1*g_1 + p_2*g_2 + \ldots + p_{7155}*g_{7155}$ where p is the price per person and g is the group size. Therefore, revenue maximization would have to consider a distribution of group sizes rather than a constant one. One method to approach this would be to calculate expected groups size based on the criteria given such as location and event type. Then, the maximization target, revenue, would be calculated using the expected group size for each criterion.

For (2), analysis would change similar to how it did in (3b). It may be the case group size is a better variable for segmentation. However, this could be approached differently as well. Given the group size data, the expected group size could be calculated for each of our previous day bins. Then, the revenue maximization process could include this additional factor when optimizing price as follows:



Logit calculations	
a1	-6.381115281
b1	0.041064905
a2	-4.716155035
b2	0.036183859
a3	-3.939798193
b3	0.035162183
a4	-3.525784683
b4	0.031621492

W(p) Parameter	
wp1	0.79983415
wp2	9.65407E-13
wp3	0.684206541
wp4	0.65391721

Expected Group Sizes (Arbitrary)	
expected group 1	40
expected group 2	50
expected group 3	30
expected group 4	25

Revenue Calculations		
contribution1	97.30589005	
contribution2	8.63981E-10	
contribution3	61.61809525	
contribution4	59.75309425	
revenue1	3892.235602	
revenue2	4.3199E-08	
revenue3	1848.542858	
revenue4	1493.827356	
total revenue1	7037161.969	
total revenue2	7.76719E-05	
total revenue3	3246041.258	
total revenue4	2678432.45	
total revenue	12961635.68	<-- Objective

Target Variables	
p1	121.65758
p2	894.93999
p3	90.057741
p4	91.377155

5a.

While screening is an adequate way to ensure no scheduling clashes occur and keeps customer satisfaction in mind, it may not necessarily be optimal for profits/revenues. However, it is also not the case that Copa should overbook days without hesitation or reason.

Weddings especially are on a fixed schedule and that is non-negotiable but if there are clashing dates for other event types, Copa could give a flexibility discount to planners who are willing to switch their dates. While this may reduce revenues from a single event, it adds another one completely.

This strategy could also be used for last minute bookers – since their event is more impromptu and less planned, they may be more willing to move. In addition, the strategy would also help diminish losses from cancellations that are bound to occur.

5b.

Besides the obvious use of some sort of price optimization as seen in (1a), there are three suggestions we would make to Copa:

The first is to approach their group size and days before booking matters differently. Larger group sizes should be given lower price per person since overall, this would yield higher revenues. In cases where an event is booked for a very small group, there should be an option to

share the cruise with another small group. To incentivize this, discounts should be given in those cases. In terms of days before booking, as seen from our analysis in (2), it would be prudent to have a tiered price structure that promotes earlier booking and charges a premium to last minute ones.

The second is to have a bidding process for high demand days such as holidays and popular weekends. It is likely, given the popularity and success of the company, that people may want to hold events on the same high demand days. In those cases, the bidding process would ensure that Capo gets the highest possible rates.

The third is to take into consideration seasonality (which was not included in this analysis). It is undoubtably true that cruises are more popular and have higher demand in warmer, summer months. Prices should reflect that by being higher in those popular seasons thus increasing revenues from that time period. Vice versa, winter months should be discounted to increase event reservations when demand is likely lower.