Marketing Analytics
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Lecture 24
Pricing (contd.)

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Hello everybody, welcome to Marketing Analytics course, this is Professor Swagato Chatterjee from VGSOM, IIT Kharagpur who is taking this course for you and in this week we are discussing about pricing, various kinds of pricing problems and we were discussing about powered blocked pricing and in this particular slide we are actually stopped here and I will go ahead with the next I would say file or page.

In this context the pricing there everything remains same, whatever was there in the last problem things remain same but the only thing is that if you, if the price is low then the charges is high price, if the consumption is low then the charges are high price but the moment the consumption goes up the prices also comes down and you actually pay for the whole consumption the lower price.

To give an example, let us say in this particular case the cut off has been set as 8 that mean up to 8 units of consumption you will pay 5 dollars per unit that means 40 dollars, but for, if you by chance consume 9 units you will pay 9×3= 27 dollars, so for the whole 9 unit not the one which is above your payment is like that.

So, slightly different situation, what is different in my case? Only thing that is different is that here it is F3×D6 rather than that the cumbersome formula it is just F3×D6 this is what you

just check, you are paying this F3 for whole demand if by chance the demand is higher than your cut off value. So, that is something that is different from the previous one and how much is the surplus? The surplus is basically as usual this - this, this much is my surplus, the maximum surplus is maximum of this one and the units brought is this one and what is the revenue?

If units bought is >0, then the revenue is basically the same thing so revenue is units bought actually I would say this one, vlookup only, vlookup of this particular thing in the same I would say this particular and then 4, DEFG so 4, false. And otherwise if by chance it is not grater 0, then 0 so that is something that I get and the production cost was as usual 9 × 2 this one 18 and what is the profit? Profit is nothing but my revenue - my production cost and I will do the same optimization once more.
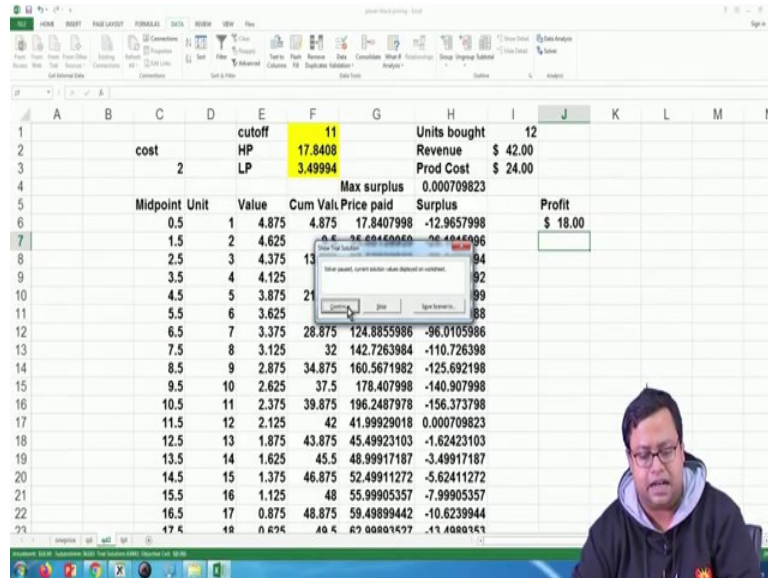
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Midpoint	Unit	Value	Cum Val	Price paid	Surplus	Profit
cutoff		11		Units bought	12	
cost	HP	17.8408		Revenue	$ 42.00	
2	LP	3.49994		Prod Cost	$ 24.00	
				Max surplus	0.000709823	
0.5	1	4.875	4.875	17.8407998	-12.9657998	$ 18.00
1.5	2	4.625				
2.5	3	4.375	13			
3.5	4	4.125				
4.5	5	3.875	21			
5.5	6	3.625				
6.5	7	3.375	28.875	124.8855986	-96.0105986	
7.5	8	3.125	32	142.7263984	-110.726398	
8.5	9	2.875	34.875	160.5671982	-125.692198	
9.5	10	2.625	37.5	178.407998	-140.907998	
10.5	11	2.375	39.875	196.2487978	-156.373798	
11.5	12	2.125	42	41.99929018	0.000709823	
12.5	13	1.875	43.875	45.49923103	-1.62423103	
13.5	14	1.625	45.5	48.99917187	-3.49917187	
14.5	15	1.375	46.875	52.49911272	-5.62411272	
15.5	16	1.125	48	55.99905357	-7.99905357	
16.5	17	0.875	48.875	59.49899442	-10.6239944	
17.5	18	0.625	49.5	62.99893527	-13.4989353	

So, if I run the optimization once more I go to solver and you will see that I am maximizing J6, I am maximizing J6 means this one and by changing got F1, F2, F3 same thing F1 is an integer the cut off is an integer that is what I am saying and I am saying F2 and F3 are between 0 and 20 if you can check carefully this cannot be probably made broader I do not know and then F1 and F1 has to be between 1 to 20.

So, that is the same thing that I have done in the previous case as well but here I have not put that high price and low price has to be different. So, I will just try to solve this and it will again run and ok so it has give me some result and I can probably continue a little bit more. So, 17.98, 17.99 I can further continue and let see what else do I get?

So, it is giving me some price 18 dollars and 3.5 dollars which make sense which is but that is something that I will check. So, I can press an escape if its running longer period of time as I told you before, so I can press and escape and this is something that I am getting so you can also put HP and LP as integers and that might try to solve quickly.

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	price	$3.50	
	demand	6	Demand=20-4xPrice
	unit cost	$2.00	Price = 5 - 0.25 x Demand
	profit	$9.00	

			cutoff	11		Units bought	12	
	cost		HP	17.8408		Revenue	$ 42.00	
		2	LP	3.49994		Prod Cost	$ 24.00	
					Max surplus	0.000709823		
	Midpoint	Unit	Value	Cum Valt	Price paid	Surplus		Profit
	0.5	1	4.875	4.875	17.8407998	-12.9657998		$ 18.00
	1.5	2	4.625	9.5	35.68159959	-26.1815996		
	2.5	3	4.375	13.875	53.52239939	-39.6473994		
	3.5	4	4.125	18	71.36319918	-53.3631992		
	4.5	5	3.875	21.875	89.20399898	-67.328999		
	5.5	6	3.625	25.5	107.0447988	-81.5447988		
	6.5	7	3.375	28.875	124.8855986	-96.0105986		
	7.5	8	3.125	32	142.7263984	-110.726398		
	8.5	9	2.875	34.875	160.5671982	-125.692198		
	9.5	10	2.625	37.5	178.407998	-140.907998		
	10.5	11	2.375	39.875	196.2487978	-156.373798		
	11.5	12	2.125	42	41.99929018	0.000709823		
	12.5	13	1.875	43.875	45.49923103	-1.62423103		
	13.5	14	1.625	45.5	48.99917187	-3.49917187		
	14.5	15	1.375	46.875	52.49911272	-5.62411272		
	15.5	16	1.125	48	55.99905357	-7.99905357		
	16.5	17	0.875	48.875	59.49899442	-10.6239944		
	17.5	18	0.625	49.5	62.99893527	-13.4989353		

So, I will stop it now and it is also giving me 18 dollars, so I will press ok and it is giving me 18 dollars. So, what I wanted to show here is still here also the price is the profit is 18 dollars where the one price is basically 9 dollars when I have only one price so irrespective of if you go for a part wise pricing incomes of the unit price or part wise pricing for the whole units consumed the total cumulative consumption you can have a higher price and a lower price for that or for every extra additional price which was the first case in the last video where every extra additional you were charging lower whatever you do you are getting better profits.

So, often times that profit maximization coming up with one single pricing is not something that is most profit generating and that is something that all these utility companies understand.

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			Units bought	8
cost	Fixed	5	Revenue	$ 29.00
2	var	3	Prod Cost	$ 16.00
		Max surplus	3	

Midpoint	Unit	Value	Cum Value	Price paid	Surplus	Profit
0.5	1	4.875	4.875	8	-3.125	$ 13.00
1.5	2	4.625	9.5	11	-1.5	
2.5	3	4.375	13.875	14	-0.125	
3.5	4	4.125	18	17	1	
4.5	5	3.875	21.875	20	1.875	
5.5	6	3.625	25.5	23	2.5	
6.5	7	3.375	28.875	26	2.875	
7.5	8	3.125	32	29	3	
8.5	9	2.875	34.875	32	2.875	
9.5	10	2.625	37.5	35	2.5	
10.5	11	2.375	39.875	38	1.875	
11.5	12	2.125	42	41	1	
12.5	13	1.875	43.875	44	-0.125	
13.5	14	1.625	45.5	47	-1.5	
14.5	15	1.375	46.875	50	-3.125	
15.5	16	1.125	48	53	-5	

$100 \rightarrow \$400$

$Additional \rightarrow \$2/unit$

$400 + 2 \times (c - 100)$

$2 \times c + 200$

Then the last type which you, which is also very common is called two part tariff, now what is two part tariff? The same thing everything remains same, I have changed nothing but here there is no cut off value the cut off is 0 that is why the cut off is 0. See, and the price is basically(F2 + D6 × F3)- F2 is the fixed component whatever you consume you have to pay that and D6×F3 is the variable component.

Now, in some places that the variable component is also a little bit subsidized, for example, there might be, you might have to pay for let say is this very common I will give an example that you might have to pay for the first 100 units is fixed, for first 100 units you pay, for first 100 units you pay let us say 100 dollars and then for every additional unit you pay 2 dollar per unit, so something like that.

So, if that is the case then what is the pricing? The pricing pattern is basically that so $(100+2×(C-100))$ something like that. So, basically $(2×C-100)$, fair enough? So,-100 is your fixed cost or let say if this by chance 400 then this becomes 400 and this become 300 or sorry 400 - 200 that is 200. So, then this 200 is your fixed cost and 2 × consumption becomes your additional cost, so something like that is what I have written here as well.

So, in this particular case my fix cost is 5 dollars let us say and for every extra consumption I am doing paying 3 dollar and the price is giving here. Then what is the surplus? The surplus is nothing but your cumulative value - the price and that is the surplus and the rest of the formula we will just copy from here there is nothing new to say that is your maximum surplus this thing and this is also I will probably copy and paste and that is the revenue and

the production cost and the profit is nothing but the revenue - the production cost, so it is 13 dollars.

Now, the same thing that we have done previously, I will try to optimize this 13 dollars actually maximize this 13 dollars by changing this 5. Now, there is no cut off business so by changing with the 5 and 3.

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	C	D	E	F	G	H	I	J	K	L	M
1			cutoff	1		Units bought	12				
2	cost		HP	19		Revenue	$ 41.00				
3		2	LP	2		Prod Cost	$ 24.00				
4					Max surplus	1					
5	Midpoint	Unit	Value	Cum Valu	Price paid	Surplus		Profit			
6	0.5	1	4.875	4.875	19	-14.125		$ 17.00			
7	1.5	2	4.625	9.5	21	-11.5					
8	2.5	3	4.375	13.875	23	-9.125					
9	3.5	4	4.125	18	25	-7					
10	4.5	5	3.875	21.875	27	-5.125					
11	5.5	6	3.625	25.5	29	-3.5					
12	6.5	7	3.375	28.875	31	-2.125					
13	7.5	8	3.125	32	33	-1					
14	8.5	9	2.875	34.875	35	-0.125					
15	9.5	10	2.625	37.5	37	0.5					
16	10.5	11	2.375	39.875	39	0.875					
17	11.5	12	2.125	42	41	1					
18	12.5	13	1.875	43.875	43	0.875					

So, maximize J6 were changing F2 and F3 where F2 and F3 I have put between 0 to 10 you can also if you want to put, if you can put you can put a, that F2 and F3 are integers so I will try to solve this quickly it is trying to solve and it has got me some result. I will ask you to continue a little bit more, so that I get a little bit better result and let see whether it comes up to something it is also trying to converge to 18 dollars, this is something which is also interesting.

And in all the three cases, if there is only one this thing it will try to converge to the same place and there are reasons for that there are actually the revisions for that whether you go for two part tariff, or whether you go for two different kinds of these things it will converge at the same place.

So, ok, I will stop here and the prices are coming actually 18 dollars and the 16 is your fix cots and 2 dollar is your variable cost, the fixed cost is always high, the variable portion is lower. So, in all these three situations, in case of utility as I have shown you that it is not suggested that you were for one single price.

It is often suggested that you should go for multiple price and if you further it if you further break this things, you might get further bigger more prices, more profits and you have to check that. So, let say high price, medium price and low price and there are two cut off, you can create the excel file accordingly and you can check that whether this thing is giving you better results or not.

So, that is all for utility pricing, we have a small video on this particular thing utility pricing and in the next video we will talk about other pricing models like bonding model, markdown

pricing, sales promotion and etc. Thank you for being with me I will see you in the next video.