Hamptonshire express

Arjun R. Sabhaya Production 529 Hamptonshire Express October 16, 2012 PROBLEM #1 A. The simulated function given in the Excel spreadsheet " Hamptonshire Express: Problem_#1" allows the user to find the optimal quantity of newspapers to be stocked at the newly formed Hamptonshire Express Daily Newspaper. Anna Sheen estimated the daily demand of newspapers to be on a normal standard distribution; stating that daily demand will have a mean of 500 newspapers per day with a standard deviation of 100 newspapers per day.

Using the function provided, the optimal stocking quantity, which maximizes expected profit, is determined to be approximately 584 newspapers. If 584 newspapers were to be ordered, Hamptonshire Express will net an expected profit of $331. 436 per day with an expected fill rate of 98%. Any inventory ordered above 584 will produce a loss of profit due to stocking inventory over expected demand causing an imbalance between the gains and losses due to the respective overage and underage costs. The table below outlines the optimal amount of daily expected profit.

Profits rise until the 584 newspaper mark; any potential increase in quantity stocked will decrease daily expected profit for every newspaper ordered above 584.

Stocking Quantity	Daily Expected Profit
575 newspapers	331. 323

576 newspapers	331. 347
577 newspapers	331. 369
578 newspapers	331. 387
579 newspapers	331. 403
580 newspapers	331. 415
581 newspapers	331. 425
582 newspapers	331. 431
583 newspapers	331. 435
584 newspapers	331. 436

585 newspapers	331. 435
586 newspapers	331. 430
587 newspapers	331. 423
588 newspapers	331. 413
589 newspapers	331. 400
590 newspapers	331. 385

Calculations: Cr= cu/cu+co where Cr= critical ratio. Cu= 1-0. 2=. 8 Co= 0. 2 Therefore, Cr= . 8/. 8+. 2=. 8 which is equal to . 84 (z value) on the standard normal distribution function table. To find the optimal stocking quantity that maximizes expected profit, we will use mean and standard deviation in formula shown: Q= mean +z*(SD): 500+. 84*100= 584. B. Using the Newsvendor Formula given, Q=? +? -1(Cu/Cu+Co)? , where: Q= optimal quantity ?= mean of expected demand ?= standard distribution of expected demand -1= the inverse of the standard normal distribution function Cu= underage costs (Sale price – cost), or ($1. 00-$0. 20) Co= overage costs (cost – salvage value), or ($0. 20 - $0), We can estimate the optimal stock quantity. The values allow us to input the z statistic, and the overage/underage costs in the given equation to derive the equation and answer shown below. The output of the Newsvendor equation, while different than the excel function (due to rounding error), is consistent with the optimal stocking quantity found by the Excel model. Q= 500+ (. 8601)-1*(. 80/. 80 + . 20) * 100 = 593. 1244 PROBLEM #2 A. The given simulation model in the Excel spreadsheet “ Hamptonshire Express: Problem_#2” allows the user to find the optimal number of hours per day to be invested into creating the profile section to maximize expected profits for the Hamptonshire Express Daily Newspaper. Looking at the table below, Anna can spend 4 hours, where (H= 4),

Hours Spent (H)	Optimal Expected Profit
2. 00	$367. 91
2. 25	$368. 84
2. 50	$369. 58
2. 75	$370. 17
3. 00	$370. 61
3. 25	$370. 94
3. 50	$371. 16

3. 75	$371. 29
4. 00	$371. 33
4. 25	$371. 29
4. 50	$371. 18
4. 75	$371. 01
5. 0	$370. 77

Anna Sheen's choice of effort is at the point where the marginal cost of spending the extra time to develop the profile section = marginal benefit of spending the extra time to develop the profile section; or the point where profit is maximized. If she spends the extra time to develop the profile section past where marginal cost = marginal benefit, she won't be able to create enough demand for her newspaper, but if she spends less time than where marginal cost = marginal benefit, she won't have a quality newspaper and misses out on additional sales, which leads to increased profits.

To find the optimal profit level, you would set $10 = to the marginal benefit, or: $10= ((0. 8 *50) / (2h)) and solve for H which = 4 hours. C. Using a table to compare the difference between problem #1 and problem #2, respectively, we can see the obvious differences between the optimal stocking quantity and daily expected profit figures.

The stocking quantity and expected profits are higher in the second scenario because of the extra time spent to improve the quality of profile section.

By spending the extra time to improve the profile section, Anna Sheen increased the overall quality of her newspaper, which will, most likely, lead to an increased probability of demand for her newspaper around the area. This increased demand will raise Anna Sheen's stocking quantity and the daily expected profits that are associated with that individual stocking quantity. Problem #3 A. Assuming the number of hours Anna Sheen will spend developing the profile section will = 4; Ralph Armentrout's optimal stocking quantity is 516, as portrayed in the table below:

Stocking Quantity	Daily Expected Profit
513	62. 131
14	62. 139
515	62. 143
516	62. 145
517	62. 144
518	62. 140
519	62. 133
520	62. 124

Ralph Armentrout's optimal stocking quantity is less than Anna Sheen's in Problem #2 due to the retailing extension of the supply chain. Armentrout's overage cost ($0. 80; as he purchases them from Sheen minus $0 of salvage value) is higher than his underage cost ($0. 20; $1 sale price minus $0. 80 purchasing cost). Due to this, Armentrout has less room than Sheen for a profit margin making it a higher risk for him to carry a greater amount of inventory, which ultimately affects the fill rate of the supply chain.

C. The optimal time spent to improve the quality of the profile section is determined by the table below: The profit Sheen will stand to make in the combined supply chain is optimal at 2. 25 hours spent per day. Sheen's profit rises with each 15 minute interval until 2 hours and 15 minutes is reached. The marginal benefit, from the additional time spent to improve the paper, will increase expected demand of newspaper, however, if too much time is spent, the marginal costs, associated with the additional time, will outweigh the associated marginal benefits.

Expected demand is more resistant to high levels of time spent, basically, Sheen is hurting profits above 2. 25 hours spent per day on improvements. Sheen's optimal amount of hours spent is lower, in this differentiated channel, as compared to Problem #2, due to Sheen's lower marginal benefit being received due to the split supply chain. It wouldn't make sense for Sheen to spend more time to improve her newspaper if she has to split a percentage of the profits with Armentrout. Due to this, she will put less effort in and get more expectation of demand.

Due to the increase of Armentrout's profit margin, he would tend to stock more newspapers, which would increase the supply chain's fill rate. However, this, in turn, would cause Sheen's profits, from the deal, to decrease and would ultimately lower hermotivationto improve the newspaper, which leads to a decrease in expected demand and loss of potential profits. E. Efforts and stocking levels will be lower in a differentiated channel than in an integrated firm due to the multiple entities that are present in the supply chain.

The multiple retailing and manufacturing entities, in the supply chain, allow the profits to be split by percentage rather than totaled to one firm who does both functions. Problem #4 A. The optimal stocking quantity for Armentrout, in this scenario, was determined to be 409 newspapers as shown by the table below: The optimal stocking quantity is lower at 409, in this scenario, as compared to 516 in Problem #3a. The optimal stocking quantity is lower, because Armentrout has an alternative to The Express with Ralph's Private Eye.

B. The stocking quantity mainly differs from Problem #1, #2, and #3, because Armentrout underage costs have decreased, in this scenario, due to the consumer's alternative to purchase Private when Express has a stock out to consumers. However, there are major differences that one should consider. The first two problems use an integrated point of view, as related to the supply chain, which allows for a higher optimal stocking quantity. On the other hand, Problems 3 and 4 use a differentiated channel.

However, In Problem 3, while Armentrout tried to keep risk low by ordering a lower optimal stocking quantity, which was fueled by his low expected margins (due to his imbalanced underage and overage costs), Armentrout's optimal stocking quantity changes when Private is introduced into the mix. In Problem 4, Armentrout makes more profit on Private, but there is a lower expectation of demand for Private. Due to this, he must still stock Express to maximize profits. To demonstrate this phenomenon, which will ultimately decrease optimal stocking quantity, the new overage cost would have to be set. In the Problem 4 scenario, Co= $0. 0 – 40% * $0. 40 = $0. 16. The Newsvendor model will also allow one to arrive at these conclusions. C. Armentrout's overage cost would increase by $. 03 to $. 83, while his underage costs would be $. 01. (New Express profit; $. 17 – New Private profit; $. 16) The imbalance would reduce the critical ratio, which would lead to a reduction of the optimal stocking quantity to a decently lower amount. Problem #5 A. The buy-back price initiative allows Sheen to drop Armentrout's overage costs, which leads to an increase in his optimal stocking quantity and a win-win situation for Sheen and Armentrout.

If Sheen would set the buy-back price at $. 75, this would maximize the total supply chain's profits as shown in the table below. At $. 75, Armentrout's optimal stocking quantity would be 659 newspapers. B. The combination of buy-back price and transfer price is roughly $1. 02 and $1. 025, respectively, as shown in the table below. The optimal level of expected profit is maximized when Sheen, the manufacturer, in this scenario, has a high expected profit margin, while Armentrout, the retailer, has a negative expected profit.

Armentrout is basically a non-factor in this supply chain and allows this scenario to act as one integrated chain although technically it is differentiated. C. The fixed franchise fee would not be factored into Armentrout's overage and underage costs, so it wouldn't have an effect on his stocking decisions. If Sheen were able to impose a franchise fee to Armentrout, however, she would not have a reason to sell newspapers at all, since her profits would be coming from franchising rather than newspaper sales.

Problem #6 A. The “ VMI” plan would allow Sheen to be able to establish the optimal levels of effort and allow her to set the optimal stocking quantity in relation to her maximizing the difference between her marginal benefits and her marginal costs; basically she is in control of the stocking decision rights of the Express to maximize total profits. Since she has control over stocking quantity, Armentrout could not make much of a profit using a differentiated supply chain model.

However, due to proposed slotting allowance, Armentrout has the ability to make more of a profit than he would have battling against Sheen for stocking rights of the Express, if he would go for more of an integrated model and allow Sheen to control the Express. B. Since Armentrout would not care about sales directly (due to him collecting a slotting fee regardless of a sale or not), under the VMI plan versus the differentiated model, Armentrout might lose potential sales he might have gotten if he had a say in the daily stocking quantity of the Express.

If Armentrout had the chance to make a potential profit off of the consumers, he might try harder to pay attention to demand. Because of this reality of manufacturer versus retailer, Sheen might not understand the local demand of the area as well as Armentrout, due to him being the “ ground level retailer” and witnessing the subtle changes in daily demand.