Sport Obermeyer, Ltd. Case Study

Problem summary

Sport Obermeyer, a fashion skiwear manufacturer, must commit each year to specific production quantities for each skiwear item it would sell in the coming year. This decision must be taken in advance as late deliveries to retailers would reduce the exposure consumers would have of the company's products.

In November 1992, Obermeyer must submit their desired production quantities for the 1993-1994 line even though the company has not even clear indication about how end-consumers were responding to the current 1992-1993 line and would not receive any feedback from the retailers on the 1993-1994 line until March 1993 for the Las Vegas trade show.

Accurate forecasts are then required and Wally Obermeyer, vice president of Sport Obermeyer, asked six key Obermeyer managers to forecast independently retailer demand for each product.

Exhibit 10 Sample Buying Committee Forecasts, 10 Styles of Women's Parkas

Style	Price[a]	Individual Forecasts						Average Forecast	Standard Deviation	2 x Std. Deviation
		Laura	Carolyn	Greg	Wendy	Tom	Wally			
Gail	$110	900	1,000	900	1,300	800	1,200	1,017	194	388
Isis	$99	800	700	1,000	1,600	950	1,200	1,042	323	646
Entice	$80	1,200	1,600	1,500	1,550	950	1,350	1,358	248	496
Assault	$90	2,500	1,900	2,700	2,450	2,800	2,800	2,525	340	680
Teri	$123	800	900	1,000	1,100	950	1,850	1,100	381	762
Electra	$173	2,500	1,900	1,900	2,800	1,800	2,000	2,150	404	807
Stephanie	$133	600	900	1,000	1,100	950	2,125	1,113	524	1,048
Seduced	$73	4,600	4,300	3,900	4,000	4,300	3,000	4,017	556	1,113
Anita	$93	4,400	3,300	3,500	1,500	4,200	2,875	3,296	1,047	2,094
Daphne	$148	1,700	3,500	2,600	2,600	2,300	1,600	2,383	697	1,394
Totals		20,000	20,000	20,000	20,000	20,000	20,000	20,000		

[a]Obermeyer's wholesale price

Notes

Laura Kornashiewicz was marketing director
Carolyn Gray was customer service manager
Greg Hunter was production manager

Wendy Hemphill was production coordinator
Tom Tweed was a sales representative
Wally Obermeyer was vice president

Thanks to the data given in Exhibit 10 below, we will give a recommendation of how many units of each style Wally Obermeyer should order during the initial phase of production.

Why the newsvendor model?

To determine the inventory capacity to acquire in the face of uncertainty, the newsvendor model seems particularly well suited to Wally's problem. With forecasts following a normal distribution, this model can help balance the cost of ordering too little versus the cost of ordering too much to maximize profit.

The model is known to shine in situations where the product is a perishable one-time order. Fashion trends imposed on Obermeyer make its' products perishable and although Obermeyer plans to place another order (once its' demand forecast converges after the show in Las Vegas), the orders are still large enough and placed well in advance for the model to remain applicable. Not to mention that we disregard any inventory holding cost in our problem. It is assumed to be included in the figures chosen in the following section.

Assumptions

We decided to weight equally the forecast of each member since Wally has great taste in choosing his associates.

We address a reduced version of the problem Wally faces but given the assumptions he makes; we believe our approach could be extended and scaled to the entire product line.

We then computed, for one and two standard deviations, the best quantities to order based on the newsvendor model.

Results

Our approach to the problem is to abstract from any detailed estimations of the underage and overage costs. Following the *'Production Planning'* section of the case study [1] we take the underage cost to be 24% of the wholesale price (lost profit due to unavailability) and overage cost to be 8% of the wholesale price (expected loss if left unsold). These values are averaged over all of Obermeyer's products over the 1993-94 season. Inherently, these percentages include any holding, transportation or production cost during that year and would remain very similar. We consider them as robust enough to compensate for our lack of data. The mean and standard deviations of the demand forecast are also sourced from people of believable knowledge (and adapted by Wally to better fit historical data). Put together, we have everything needed to apply the model.

Based on the details and the 'useful result' presented in [2] we created a custom spreadsheet [3] and applied the newsvendor model to every article presented in Exhibit 10. We thus obtain the optimal order quantity of every item in Wally's simplified problem, see Figure 1. Then, linearly scale these values to the 10'000 units he would like to order before going to Las Vegas (where he can refine his demand forecasts and subsequently complete the rest of the orders). Finally, because the Hong Kong factory requires a minimum order of 600 units per style, we round up those orders that did not meet the criteria, ultimately leaving us with a total order of 10'154 items. This latest addition is negligible to Wally's large order and should not penalize him for the next one since he expects to order even more next time.

Style	Unit Price	Mean	Std	Overage Cost	Underage Cost	Order Quantity	Adjust to 10k	Min. Order
Gail	110	1,017	388	8.80	26.40	1,279	485	600
Isis	99	1,042	646	7.92	23.76	1,478	561	600
Entice	80	1,358	496	6.40	19.20	1,693	642	642
Assault	90	2,525	680	7.20	21.60	2,984	1,132	1,132
Teri	123	1,100	762	9.84	29.52	1,614	612	612
Electra	173	2,150	807	13.84	41.52	2,694	1,022	1,022
Stephanie	133	1,113	1,048	10.64	31.92	1,820	690	690
Seduced	73	4,017	1,113	5.84	17.52	4,768	1,809	1,809
Anita	93	3,296	2,094	7.44	22.32	4,708	1,786	1,786
Daphne	148	2,383	1,394	11.84	35.52	3,323	1,261	1,261
Totals		**20,001**				**26,360**	**10,000**	**10,154**

Figure 1: Newsvendor model applied to Exhibit 10 with the total optimal order quantity to meet the season's demand and the quantity to order before going to Las Vegas where forecasts can be refined.

This last point is interesting to us since if Wally can refine his forecasts and halve the current standard deviation, as per the newsvendor model, he might want to order close to 10% fewer products (in this already scaled down problem), as shown by comparing Figure 1 and Figure 2. All in all, his strategy to divide the orders could potentially save him a lot of money while meeting his production deadlines.

Style	Unit Price	Mean	Std	Overage Cost	Underage Cost	Order Quantity	Adjust to 10k	Min. Order
Gail	110	1,017	194	8.80	26.40	1,148	495	600
Isis	99	1,042	323	7.92	23.76	1,260	543	600
Entice	80	1,358	248	6.40	19.20	1,525	658	658
Assault	90	2,525	340	7.20	21.60	2,754	1,188	1,188
Teri	123	1,100	381	9.84	29.52	1,357	585	600
Electra	173	2,150	404	13.84	41.52	2,422	1,045	1,045
Stephanie	133	1,113	524	10.64	31.92	1,466	633	633
Seduced	73	4,017	557	5.84	17.52	4,392	1,895	1,895
Anita	93	3,296	1,047	7.44	22.32	4,002	1,727	1,727
Daphne	148	2,383	697	11.84	35.52	2,853	1,231	1,231
Totals		**20,001**				**23,181**	**10,000**	**10,176**

Figure 2: Newsvendor model applied to Exhibit 10 with half the standard deviation as presented in Figure 1. We notice a reduced optimal order quantity, which is expected since the forecast accuracy was virtually increased.

Conclusion

The most objectionable point in our case is the absence of holding cost. Indeed, ordering too much will certainly affect our results by decreasing the quantities order on each product. We can still however imagine that ordering too much is still preferable to ordering too little based on the *'Shipment to Retail'* section of the case where it is says that Obermeyer has a variety of methods to liquidate inventory, like selling large shipping containers of garments in South America or engaging in barter trade.

We can also say that for this smaller version of about 10% of Obermeyer total demand with a cutting and sewing capacity of only 3'000 units per month, the Hong Kong facility is a good choice given the low volume order of most of the different styles. Of course, with the complete demand, the China facility could be a better choice as the cost per unit produce is lower but come with other aspects too, like a lower quality of the product and a higher repair rate.

Sources

[1] Harvard Business School - Sport Obermeyer, Ltd. Case Study 9-695-022

[2] MIT OCW - Newsvendor Model

[3] Custom Spreadsheet for Calculations