

# Executive Summary for Fashion Star Corporation

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May 15, 2016

Fashion Star Corporation is preparing for its fall line of clothes. The firm has already produced designs for a full lineup and has exhibited the new clothing items in fashion shows in New York, Paris, and Milan. Proceeding to the production phase, Fashion Star would like to know what quantities of clothing items will maximize its profit for the upcoming season. The firm has compiled an exhaustive list of the factors for each clothing item (e.g., materials required, labor costs, and machine costs), along with the prices it plans to set for them. It has also provided the maximum available supply for each raw material used in production. Finally, the firm has categorized its designs into a professional line and a casual line. Fashion Star's market research team has provided estimates for the expected demand of a number of items on its lines, but the firm's core business is its professional line. To foster and maintain customer loyalty, Fashion Star wants to guarantee a basic quantity of product in this line for the fall.

In order to create a useful model of the fall production line, we have to make a few assumptions. We assume that all of the firm's material constraints, material, labor costs, machine costs, and demand forecasts are accurate.

We model Fashion Star's profit problem as a linear program parameterized by the information provided above. The linear program is solved by interior point methods and rounded to give interpretable results.

Equipped with the model, we can answer a number of questions posed by Fashion Star. In the basic case, we predict that the fall line of clothes will generate \$2.4 million if the firm produces according to Table 1b. If Fashion Star has spent a combined \$500,000 on Velvet shirts, it makes sense to produce the 6,000 called for in Table 1b because they generate \$132,000 in profit, and losing \$368,000 is preferable to losing \$500,000. If Fashion Star has not yet spent the \$500,000, it should not produce Velvet shirts.

The concerns about the supply of Velvet boil down to a simple question: does the risk negotiations pose to supply-chain relationships outweigh a 1.2% guaranteed cut in profit by losing Velvet refunds? In this case, we anticipate an additional overhead of \$27,700 if Velvet cannot be refunded.

There is a larger concern if Wool blazer costs are underestimated by \$80. In this case, profit is reduced by 14%. As this constitutes a substantial drop, management should prioritize obtaining a better estimate on Wool blazer unit costs, along with any other suspicious items.

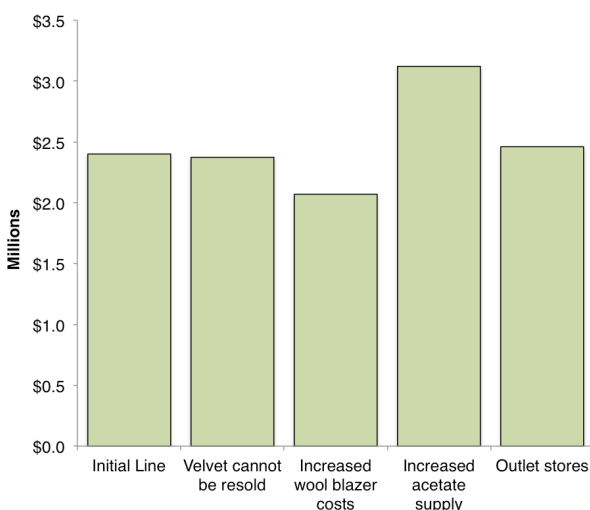
Expanding acetate supply could be a potential boon to the firm. If our assumptions hold, increasing supply by 10,000 units improves profits by 30%. We also suspect similar gains

from expanding supply for cashmere and cotton material.

Fashion Star could do to drop its outlet stores. It is highly likely that the only clothing item that sells profitably in outlet stores are cashmere sweaters. Even these only improve profit by 2.4%. The value of the Fashion Star brand will likely stay in better esteem by avoiding the outlet store problem altogether, at the expense of a mild profit increase.

The quantity of Tailored skirts and Cotton miniskirts that our solution calls for producing may be infeasible at 8,066 and 60,000. With higher acetate supply, the Tailored skirts increase to 14,733 units. If so, it is critical that Fashion Star acquire demand estimates for these items.

This calls into question a greater weakness of our model. By believing that “supply creates its own demand,” we don’t account for fluctuations in consumer demand. For clothing items with no forecasted levels of demand, this means we are advocating for huge amounts of product when in reality little will sell. By providing better estimates of demand, the model would improve its predictive power dramatically. It would become as reliable as the demand estimates and likely give a clearer picture for production expectations in the fall line.



(a) Expected profit for each case

Clothing item	Quantity
Tailored wool slacks	4,200
Cashmere sweater	4,000
Silk blouse	7,000
Silk camisole	15,000
Tailored skirt	8,066
Wool blazer	5,000
Velvet pants	0
Cotton sweater	0
Cotton miniskirt	60,000
Velvet shirt	6,000
Button-down blouse	9,245
Profit	\$2,402,291.00

(b) Initial production line.