12 Pricing Policy for Semi-perishable Goods

THE PROBLEM

The classical way of defining semi-perishables is as goods that lose some of their value after a certain time. In the case of certain foodstuffs, for example, fresh stocks are delivered at given time intervals; and if at any one time stock is left over from the previous period, it is likely to fetch a lower price than fresh stock.

The problem in question is concerned with a commodity held in stock for two periods. During the first period each unit fetches its full price $p_1$. At the end of the period, fresh stock arrives, the left-overs from the first period are labelled as 'old' or 'second class' goods and can be sold at a lower price $p_2$.

There are a number of problems which management is anxious to solve, such as: What issuing policy should be adopted (fresh goods first or old goods first)? How should a pricing policy be defined for the two classes of goods? What quantity of fresh goods should be specified for stock replenishment?

We are now on the threshold of a new period (called period 1), so that the stock consists of two piles:

- $Q_1$ units of fresh goods, which have just arrived, each unit capable of fetching a price $p_1$, if sold;
- $Q_2$ units of old goods, which are leftovers from the previous period, each unit to be sold at $p_2$.

This particular product will be withdrawn from the market, so that the stock will not be replenished at the end of period 1; if $x_1$ fresh units and $y$ old units are sold during that period, we shall have at the beginning of period 2:

- $Q_1 - x_1$ leftovers, which will now become second class ('old') goods, each unit with a potential sales price $p_2$. 

S. Eilom et al., *Exercises in Industrial Management*
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$Q_2 - y$ units which are leftovers from the second-class pile and which have to be scrapped (the scrap value is assumed to be nil).

Thus the problems that management has to face may be divided into two parts. First, assuming that we are now on the threshold of period 1, what issuing and pricing policies should be adopted? Secondly, how should similar situations be tackled in the future, assuming that we can plan several periods in advance?

**ISSUING POLICIES AT PERIOD 1**

Let us start with the first situation and assume that $Q_1$, $Q_2$, and $p_1$ cannot be altered ($Q_1$ and $Q_2$ are the results of previous decisions; $p_1$ is determined by market conditions and competition). Our study, therefore, mainly revolves round the questions of issuing sequences and the value that should be determined for $p_2$.

There are four alternative issuing policies for period 1 that need to be investigated:

1. We can issue the fresh goods first and supply any further demand from the pile of old goods (this is a LIFO policy, i.e. 'last in first out').
2. We can adopt a FIFO policy ('first in first out', i.e. the old pile is issued first).
3. We can use a mixed strategy, i.e. issue old and fresh goods in predetermined proportions.
4. We can leave the choice to the customer, whose decision is assumed to be dependent on the relative prices to be charged.

It could, of course, be argued that alternatives 1 and 2 are special cases of 3 (in other words if $x_1 = 0$ we have a FIFO policy, whereas $y = 0$ denotes a LIFO policy), but as FIFO and LIFO are depletion policies common in practice, it is convenient to name them specifically.

The choice of an issuing sequence and the expected demand for the commodity will naturally affect the position in period 2. Assume, for example, that the demand in period 1 is $d_1$ and that it is not affected by which class of goods is offered for sale. If $d_1 \geq Q_1 + Q_2$ the whole stock will be depleted in the first period and none will be left for the second, irrespective of which issuing policy is chosen. But if LIFO is used, then $d_1 \geq Q_1$ will already result in no stock being carried forward, since any leftovers of the old pile will be useless in period 2.