Letters to the Editor

ABC analysis in inventory control — The issue of stability

In a recent expository paper (*OR Insight* Vol. 2, No. 1, 1989), Shorrock sketched the role of ABC analysis in inventory control. He identified the basis of the method as the fact that a small number of products often account for a large proportion of total annual usage value. He described how items could be ranked and classified into A, B and C categories by their annual usage value, proposed simple reordering rules based on these categories and then outlined a "quick and dirty" approach for estimating the investment in stock.

Although many advantages of ABC analysis were identified, Shorrock overlooked Brown's (1977) important argument that a total reliance on mechanistic ordering rules is not particularly desirable in the case of the A items where, because of their relatively small number, direct intervention by management to make decisions which embody the latest market intelligence is possible. Furthermore, like many other authors, he failed to highlight the fact that the ABC technique relies on a presumed stability which may or may not be present in reality.

We first became aware of the problem of stability when developing procedures for controlling spare-part inventories for an airline (Dunsmuir and Snyder, 1989). In this project the ABC technique was applied in two successive years to yield results similar to those shown below.

Inventory transition matrix

		1987		
Category		A	B	C
1986	A	0.50	0.10	0.40
	B	0.02	0.75	0.23
	C	0.03	0.06	0.91

The table is reminiscent of a transition matrix from the theory of Markov chains. Each cell of the table contains a number which represents the proportion of items in a particular category in 1986 which then move to another category in 1987. Thus, for example, the number at the intersection of row C and column A indicates that 3% of the C items in 1986 became A items in the following year.

Under perfectly stable conditions, all items stay within the same categories. Each diagonal element of the matrix then equals unity, while all off-diagonal elements

equal zero. The table above deviates quite markedly from this ideal form. In particular, it indicates that 50% of the A items changed category between the two years, most in fact becoming C items. This reflects the fact that the majority of spare parts were slow-moving and that in many cases the elapsed time between successive usages extended beyond the period of one year. The annual usage value could therefore be zero in one year and a sizeable amount in another. In such circumstances, the value of ABC analysis, let alone any scientific approach to inventory management, is open to serious doubt. This example highlights the fact that a blind application of ABC analysis is fraught with dangers for the unwary, and that the presumed stability implicit in most expositions of this technique may be completely absent.

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