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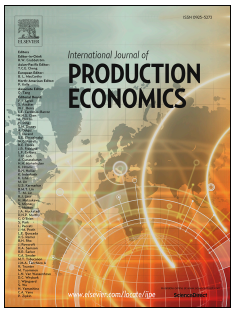

A new method to forecast intermittent demand in the presence of inventory obsolescence

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A new method to forecast intermittent demand in the presence of inventory obsolescence

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Abstract: Croston is the standard method used to forecast intermittent demand items. One of its modifications, referred to as the Syntetos and Boylan approximation (SBA), has been shown in the academic literature to provide very good forecasting and inventory performance. However, Croston and SBA update demand sizes and demand intervals only in periods with positive demand, so in periods with zero demand forecasts are not adjusted downwards in the case of inventory obsolescence. The Teunter-Syntetos-Babai (TSB) method tackles this issue by updating the demand probability instead of the demand interval, and doing so in every period. This method has been shown to provide good theoretical performance for items with linear and sudden obsolescence. However, the TSB method has been shown to be empirically outperformed by the SBA method in some cases with obsolescence. In this paper, we propose a new forecasting method that is a modification of SBA. In periods with positive demand the new method updates the demand sizes, the demand intervals, and the estimator, similar to SBA, but in any time period if the actual demand interval becomes higher than the most recent estimated demand interval (which is likely to happen when the risk of obsolescence increases), the update becomes in every period similar to the probability of occurrence in TSB. The performance of the new method is analysed numerically by means of an extensive simulation experiment considering demand series with linear and sudden obsolescence and empirically by using two datasets, one coming from the military sector and the other from automotive industry. The forecast accuracy and the inventory performance are considered in the empirical investigation. The results show the outperformance of the new forecasting method in many cases dealing with obsolescence.

Keywords: Intermittent demand, forecasting, inventory obsolescence, empirical performance.

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