البحث رقم (7)

عنوان البحث	**تحليل تضخيم التباين ومستوى الخدمة في سلسلة الامداد في حالة الطلب ذي الارتباط** **Analysis of variance amplification and service level in a supply chain with correlated demand**
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The bullwhip effect reflects the variance amplification of demand as they are moving upstream in a supply chain, and leading to the distortion of demand information that hinders supply chain performance sustainability. Extensive research has been undertaken to model, measure, and analyze the bullwhip effect while assuming stationary independent and identically distributed (i.i.d) demand, employing the classical order-up-to (OUT) policy and allowing return orders. On the contrary, correlated demand where a period's demand is related to previous periods' demands is evident in several real-life situations, such as demand patterns that exhibit trends or seasonality. This paper assumes correlated demand and aims to investigate the order variance ratio (OVR), net stock amplification ratio (NSA), and average fill rate/service level (AFR). Moreover, the impact of correlated demand on the supply chain performance under various operational parameters, such as lead-time, forecasting parameter, and ordering policy parameters, is analyzed. A simulation modeling approach is adopted to analyze the response of a single-echelon supply chain model that restricts return orders and faces a first order autoregressive demand process AR(1). A generalized order-up-to policy that allows order smoothing through the proper tuning of its smoothing parameters is applied. The characterization results confirm that the correlated demand affects the three performance measures and interacts with the operating conditions. The results also indicate that the generalized OUT inventory policy should be adopted with the correlated demand, as its smoothing parameters can be adapted to utilize the demand characteristics such that OVR and NSA can be reduced without affecting the service level (AFR), implying sustainable supply chain operations. Furthermore, the results of a factorial design have confirmed that the ordering policy parameters and their interactions have the largest impact on the three performance measures. Based on the above characterization, the paper provides management with means to sustain good performance of a supply chain whenever a correlated demand pattern is realized through selecting the control parameters that decrease the bullwhip effect.