Does Forecast-Accuracy Based Allocation Induce Customers to Share Truthful Order Forecasts?

Pelin Pekgün, Ph.D.
Moore School of Business, University of South Carolina

Abstract:

One of the key elements of a successful supply chain collaboration scheme is the sharing of forecast information between supply chain partners. In many industries, buyers (who may sell to end consumers or other buyers) often submit forecasts for future orders to their supplier to help with capacity planning. Since these forecasts (“soft orders”) represent the intent of purchasing and are often not legally binding, buyers tend to submit inflated order forecasts to secure capacity from their supplier. Capital-intensive industries, such as semiconductor and aerospace manufacturing, particularly suffer from this phenomenon. An important issue is how the supplier should allocate his capacity when the total order quantity from buyers exceeds the available capacity. Certain allocation rules can motivate a buyer to submit orders and/or forecasts higher than their optimal or realistic levels so as to compete with other buyers for scarce inventory.

In this research, we investigate buyers' strategic order forecasting behavior under different allocation policies of their supplier through a behavioral study. We developed an interactive game that simulates a supply chain in which one supplier sells a key component to two buyers, who in turn sell to consumers. In each period, buyers share forecasts of future orders with their supplier. The participants in the game play the role of a buyer, while the supplier is automated. We investigate the effects of two allocation policies: (1) uniform allocation in which the supplier equally distributes available inventory among buyers, and (2) forecast accuracy based allocation, where the supplier allocates (proportionally) more inventory to the buyer with the better order forecast accuracy in case of scarce supply. Our experimental findings suggest that rewarding forecast accuracy in allocating inventory can significantly improve the order forecast accuracy of the buyers by reducing forecast inflation and bias, and even the bullwhip effect can be reduced when the supplier communicates this policy to the buyers.