

Empirical Newsvendor Decisions under a Service Level Contract

Analyzing the newsvendor problem in laboratory experiments gives new insights into the behavioral aspects of decision makers. However, a valid question is whether the results of experimental studies can be transferred to real-world decisions. To analyze real-world newsvendor-type decisions, we investigate data from a company selling bakery items at several supermarkets. Bakery items are typical newsvendor products, since all leftovers are discarded at the end of the day.

In contrast to most of the recent behavioral newsvendor studies, our decision maker is not facing a single-product cost-minimization problem, but sells various products. In addition to that, he is facing an aggregated service level constraint, i.e., he has to achieve an α -service level over all products, measured as the fraction of products in-stock at the end of the day in each store. We derive the optimal inventory policy for a manufacturer who operates under this aggregated service level contract. The optimal policy differentiates the target service levels between products by taking the demand variability, under- and overage costs into account. We show that profits can be increased significantly if these factors are incorporated compared to the single-product newsvendor solution.

Furthermore, we compare the decision making of the manufacturer who operates under such a contract with the optimal policy. We identify the elements of the optimal policy that the manufacturer has implemented and those that he has ignored. Our analyses show that the manufacturer considers some elements of the optimal policy, but his order quantities are not profit maximizing.

We use recent insights from behavioral operations management to explain the behavior of the actual manufacturer and to develop a behavioral model to describe actual decision making under an aggregated service level contract. Our analysis reveals that his decisions are subject to several behavioral biases: demand chasing, anchoring and ex-post inventory error minimization.