

SEMINAR SERIES

**Department of Quantitative Analysis and Operations Management
University of Cincinnati**

A Central Warehouse with a Dual Role in the Supply Chain*

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Traditional multi-echelon inventory theory focuses on arborescent supply chains that use a central warehouse which replenishes remote warehouses. Using data from a U. S. supplier of home improvement products, we find that neither the assumptions from the academic literature nor the approximations from the practitioner literature necessarily work well in practice.

In a variation of the strictly arborescent supply chain, the central warehouse at our real company not only replenishes other warehouses but also meets demand from customers in the region near the central warehouse. We use Monte Carlo simulations to study the impact of 1) the use of a dual-role centralized warehouse, 2) common demand assumptions made in multi-echelon research, 3) single-echelon approximations for managing a multi-echelon supply chain, and 4) centralized versus decentralized control logic. We find that the common assumptions of theoretical models impede their usefulness and that heuristics that ignore the actual supply chain structure fail to account for additional opportunities to utilize safety stock more effectively.

Bio: Kyle D. Cattani is Associate Professor of Operations & Decision Technologies at the Kelley School of Business at Indiana University. His research and teaching interests are in supply chain management and logistics. Recent research considers inventory policies for a variation of the strictly arborescent supply chain where the central warehouse not only serves to replenish other warehouses, but also meets demand from customers in the region near the central warehouse. Kyle also is interested in quantifying the effects of strategies that minimize exposure to obsolescence for products at the end of the product life cycle. A particular strategy involves the simultaneous use of make-to-stock and make-to-order production. Kyle worked for Hewlett Packard for six years in various manufacturing positions including master scheduler, production planning manager and purchasing manager before returning to Stanford University where he earned a Ph.D. in Industrial Engineering and Engineering Management. Kyle previously was on the faculty of the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill.

*Joint work with Robert Jacobs and Jan Schoenfelder (Indiana University)

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