

# Revenue Management of a Make-to-Stock Queue

René A. Caldentey

*Department of Operations Management, Stern School of Business, New York University,  
40 W. 4th Street, Tisch Hall 7-09, New York, New York 10012  
rcaldent@stern.nyu.edu*

Faculty Mentor: Lawrence M. Wein

*Sloan School of Management, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139*

In this paper, we address the joint problem of order admission and inventory control for a single-product manufacturing system. We model the demand for the good as the combination of two exogenous and possibly correlated stochastic processes; one describes the arrival pattern of orders over time and the other describes the evolution of the market price. Electronic marketplaces (e.g., Keskinocak et al. 1999) are motivating examples. Here potential customers take the form of dynamically arriving e-orders, who post on the Internet a price they are willing to pay for a unit of product. On the manufacturing side, we use a single-server, make-to-stock queueing model. That is, production capacity is limited and stochastic

and the manufacturer carries finished goods inventory to service demand. The manufacturer acts as a price taker and decides whether to accept or reject each arriving job at the time of its arrival. In addition, he has to decide how to control production and inventory levels. In this setting, the problem becomes how to adequately balance the benefits and costs associated with providing the good to the end customers by controlling both the admission of orders (accept/reject policy) and the levels of stock (traditional busy/idle production policy). A detailed formulation and analysis of this stochastic control problem can be found in Caldentey and Wein (2001). In what follows, we briefly summarize the main results.