Contract Complexity and Performance under Asymmetric Demand Information: An Experimental Evaluation

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Exploring the tension between theory and practice regarding complexity and performance in contract design is especially relevant. The goal of this paper is to understand why simpler contracts may commonly be preferred in practice despite being theoretically suboptimal. We study a two-tier supply chain with a single supplier and a single buyer to characterize the impact of contract complexity and asymmetric information on performance and to compare theoretical predictions to actual behavior in human subject experiments. In the experiments, the computerized buyer faces a newsvendor setting and has better information on end-consumer demand than the human supplier. The supplier offers either a quantity discount contract (with two or three price blocks) or a price-only contract; contracts that are commonplace in practice, yet different in complexity. Results show that, contrary to theoretical predictions, quantity discounts do not necessarily increase the supplier’s profits. We also observe a more equitable distribution of profits between the supplier and the buyer than what theory predicts. These observations can be described with three decision biases (the probabilistic choice bias, the reinforcement bias, and the memory bias), and can be modeled using the experience-weighted attraction learning model. Our results demonstrate that simpler contracts, such as a price-only contract or a quantity discount contract with a low number of price blocks, are sufficient for a supplier designing contracts under asymmetric demand information.

Key words: behavioral operations management, all-unit quantity discount contracts, price-only contracts, complex contracts, contract performance, supply chain efficiency, asymmetric demand information, experience-weighted attraction learning model

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