

On The Value of Demand Information Dissemination

by

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Abstract:

The importance of information can never be overstated. In the industrial world, more and more firms have deployed information systems to collect market data. Those firms who have symmetric information availabilities can choose to share their signals with each other, which is called horizontal information sharing. For the supply chain, however, the firms often have asymmetric information availabilities. The downstream firms, due to their market proximity and IT investment, usually have exclusive access to market demand. To be proactive with market savvy, more and more of upstream firms have taken the initiatives to strengthen the connection with the downstream firms and acquire information from them. The main purpose of this study is to explore the incentives for horizontal information sharing and vertical information acquisition among firms facing uncertain demand.

We first investigate information flow in two-tier supply chains, where retailers order products from suppliers and sell in a market with uncertain demand. The retailers each have access to a demand signal. They can exchange signals (horizontal information sharing), while the suppliers can offer them payments to acquire signals (vertical information acquisition). We establish the impacts of channel structure, signal structure, and market competition on information dissemination, and the strategic interplay between horizontal information sharing and vertical information acquisition. We find that the retailer competition provides a necessary condition to sustain information flow of any form while supplier competition excludes vertical information acquisition. Furthermore, facing horizontal competition, the retailers can have an incentive to share signals if competition is not too intense; and this incentive is stronger when they order from independent suppliers than when they order from the same supplier. In the latter situation, once the retailers exchange signals, the supplier will acquire signals from them both. If the retailers forfeit this option, the supplier will have an incentive to acquire signals if the signals are sufficiently correlated.

We then study information flow in the particular system where a supplier sells to two retailers that serve a market with uncertain demand. We examine the incentives for the retailers to share signals, and for the supplier to solicit signals from the retailers, together with the procedure it should follow. On the basis of the outcomes thus obtained, we demonstrate that vertical information acquisition by the supplier and horizontal information sharing between the retailers are strategic complements. System-wide information transparency, under which the demand signals at the retailers are visible throughout the entire supply chain, is attainable through information flow. Moreover, we show that incentive-driven demand information dissemination can be egalitarian to benefit each and every individual party.

Furthermore, we consider unintentional information leakage in the above system, in which case the supplier learns a retailer's signal and utilizes it in wholesale pricing, the other retailer can infer the signal from the adjusted wholesale prices and use the signal in making order decision. We show that, with indirect signal divulgence, the retailers will forfeit horizontal information sharing, and information transparency is attainable through a combination of information acquisition by the supplier and unintentional information leakage to the retailers.

Bio:

HAO Zhongyuan received her Master Degree (2013) from Nanjing University and Bachelor Degree (2011) from Anhui University. She is currently a PhD candidate under the supervision of Dr Li JIANG.

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All are welcome!