Transshipment of Inventories Among Retailers: Myopic vs. Farsighted Stability

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The author considers a model of a decentralized distribution system consisting of \( n \) retailers selling an identical product. Retailers face a stochastic demand and must order their initial inventory before this demand is realized. After demand realization, retailers decide how much of their unsold inventory or unsatisfied demand they want to share with other retailers. This is followed by a transshipment of leftover inventories and distribution of the additional profit generated through inventory sharing.

The author addresses the following issue: Suppose that the retailers distribute the profit from inventory sharing according to an allocation rule that induces retailers to share their residuals in a way that maximizes the additional profit, such as the Shapley value, but may not belong to the core. Is it likely that, in this framework, all retailers will jointly share their residuals and not form subcoalitions? Previous research has looked at this problem from a myopic viewpoint and concluded that the grand coalition is not stable. Unlike the prior work, the author looks at stability in a farsighted sense. That is, retailers do not consider only their immediate payoffs but are also concerned with reactions of other retailers to their actions. In a symmetric setting, with identical additional unit revenues from transshipments generated by all retailers, farsighted retailers always maximize their allocations by not defecting from the grand coalition. The author also provides conditions when the same is true for nonidentical additional unit revenues.

**Key words**: inventory sharing; cooperation and competition; farsighted stability; coalitions

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