

Research and Management Insights

Distributional and Peer-induced Fairness in Supply Chain Contract Design

Teck-Hua Ho, Xuanming Su, Yaozhong Wu

When making business transactions, supply chain members care about not only their individual profit but also fairness in profit comparisons of one another. Specifically, in a supply chain with one supplier and two retailers, a retailer dislikes an unfavorable distribution of the total pie between himself or herself and the supplier. The retailer also avoids being behind of the other peer retailer in terms of economic performance. Thus, the retailers exhibit preferences for both distributional and peer-induced fairness, which significantly influences their decisions in the transaction with the supplier. Teck-Hua Ho, Xuanming Su, and Yaozhong Wu show, theoretically and empirically, that the supplier incurs economic loss when the retailers are motivated by distributional fairness concerns. However, the supplier also benefits from a retailer's peer-induced fairness concerns because it weakens the negative impact that the other retailer's distributional fairness has on the supplier's profit. This research suggests that a profit-seeking supplier should strategically incorporate the retailer's fairness preferences in making contract offers.

Does Higher Transparency Lead to More Search in Online Auctions?

Ernan Haruvy, Peter T. L. Popkowski Leszczyc, Yu Ma

Ernan Haruvy, Peter T. L. Popkowski Leszczyc, and Yu Ma provide managerial guidelines on auction transparency regarding comparability and item specification. Greater comparability is expected to reduce price competition and therefore reduce auction revenue, while greater transparency regarding the item description may reduce uncertainty and increase willingness to pay and auction revenue. In two controlled field studies, the authors examine these tradeoffs. They find that higher transparency in terms of comparability increases ending price, but this is somewhat offset by the effect of higher transparency on price sensitivity. In contrast, higher transparency in level of item description detail

reduces bidders' willingness to pay as well as ending price. Higher transparency also reduces search time and search incidence. The authors are able to separate out effects that are due to search to arrive at specific recommendations for different design variables. Design variables such as the number of concurrent auctions and auction overlap affect price sensitivity irrespective of search. That is, when there are more choices, bidders are less likely to bid in the lowest price auction. However, the effect of information transparency is contingent on search, meaning that attention must be paid to the way by which bidders process information and translate that information to choice.

Reputation and Mechanism Choice in Procurement Auctions: An Experiment

Jeannette Brosig-Koch, Timo Heinrich

Every year companies and government agencies buy billions worth of goods and services using procurement auctions. By now, several internet marketplaces for procurement auctions exist and most major vendors integrate support of procurement auctions in their enterprise resource planning systems. If the characteristics of supplied goods or services can vary across bidders in a procurement auction, picking the bidder who offers the lowest price will not necessarily maximize the buyer's profit from the trade, because often contracts cannot be based on the outcome of the transaction. In such a setting reputation could provide bidders with an incentive to exert high effort or supply high quality.

In controlled laboratory experiment Brosig-Koch and Heinrich study the role of reputation in procurement using two common mechanisms: price-based and buyer-determined auctions. While buyers are bound to buy from the lowest bidder in price-based auctions, they can choose between bidders in buyer-determined auctions. Only in the latter buyers can consider the reputation of bidders. The authors find that bidders supply higher quality in buyer-determined auctions leading to higher market efficiencies in these auctions. Accordingly, buyers prefer the buyer-determined auction over the price-based auction, while only half of the bidders do so.

Coordination in Games with Strategic Complementarities: An Experiment on Fixed vs. Random Matching

Kyle Hyndman, Santiago Kraiselburd, Noel Watson

Kyle Hyndman, Santiago Kraiselburd, and Noel Watson experimentally study the advantages and disadvantages of long-term relationships in a coordination game where the effort of both parties jointly determines the success of the partnership. The results show that long-term relationships allow firms to better align their actions, but that this does not necessarily lead to higher average earnings. Indeed, average earnings across subjects are substantially more variable in long-term relationships, and one of the main drivers appears to be a “first-impressions” bias in which initial misalignment of choices poisons the relationship and leads to lower subsequent earnings. This suggests that lines of communication to overcome early mistakes or strategies to allow for an early dissolution of unsuccessful partnerships may be important in ensuring success. The results also show that communication is helpful under both long- and short-term relationships, with communication playing a slightly more important role under long-term relationships. Finally, the authors show that lying about one’s information actually leads to significantly lower profits. Thus, honestly may be the best policy with respect to communication.

Willingness to Pay for Shifting Inventory Risk - The Role of Contractual Form

Mirko Kremer, Luk N. Van Wassenhove

Most firms’ exposure to supply-demand mismatch risk is directly affected by contractual agreements with their supply chain partners. A manufacturer may contract with its upstream supplier for shorter supply lead-time, allowing the postponement of the supply decision until better information about downstream demand is available. Or, the manufacturer may contract with its downstream buyer for a longer order lead-time, allowing the manufacturer to place orders with the upstream supplier under improved information about downstream demand. Mirko Kremer, Luk Van Wassenhove study decision makers’ willingness to pay for the elimination of mismatch risk, and whether contract structure matters – the risk-assuming party could be compensated on a per-unit basis, or with a fixed fee. The results suggest that decision makers tend to overpay for the option to eliminate mismatch risk. This willingness-to-overpay is largest when the cost of eliminating mismatch risk is framed as a per-unit markup (paid to the supplier in exchange for the flexibility to delay the order decision) or a per-unit discount

(granted to the retailer in exchange for advanced demand information).

Supply Chain Contract Design: Impact of Bounded Rationality and Individual Heterogeneity

Diana Yan Wu, Kay-Yut Chen

Diana Yan Wu and Kay-Yut Chen find that multiple behavioral traits, such as the tendencies to anchor on salient quantities, to reinforce/repeat past actions and to make inconsistent decisions, are relevant to how decision makers respond to different supply chain contracts. Hence, when formulating contracts terms for supply chain partners, the contract designer should pay attention to various behavioral factors. Furthermore, these tendencies are found to vary considerably across individuals, and can significantly impact the contract profit performance. Thus, it would be useful for companies to profile the behavior of their specific business partners and design contracts accordingly. For example, the quantity discount, by adjusting its threshold (breakpoint) setting, can be used to effectively influence the behavior of retailers with strong anchoring tendency. Finally, this research suggests the need of analytical tools in contract design. It demonstrates, methodically, the possibility to measure behavior from historical information and use it for contract calibration and optimization.

Complexity as a Contract Design Factor: A Human-to-Human Experimental Study

Basak Kalkanç, Kay-Yut Chen, Feryal Erhun

Despite being theoretically suboptimal, such simpler contracts as price-only contracts and quantity discount contracts with limited number of price blocks are commonly preferred in practice. Thus, exploring the tension between theory and practice regarding complexity and performance in contract design is especially relevant. Kalkanç, Chen, and Erhun demonstrate that, in human subject experiments, simpler contracts perform effectively, that is, they achieve similar supplier and total supply chain profits compared to more complex contracts. In addition, comparisons between human-to-computer and human-to-human experiments further our understanding of when automating some players in an experiment makes a difference and when it does not. The results show that suppliers have fairness concerns even when they interact with computerized buyers. These concerns tend to be even stronger when suppliers interact with human buyers, particularly when the complexity of the contract is low. Human suppliers are more prone to random decision errors (i.e., bounded rationality) when interacting with

human buyers. Based on human subject experiments, there is a nontrivial trade-off between complexity and inefficiency of all-unit quantity discount contracts: the notion that complex contracts can optimize the supplier's profit is flawed and requires deeper consideration. It is crucial to consider contract complexity as a design factor.

Wholesale Pricing Under Mild and Privately Known Concerns for Fairness

Elena Katok, Tava Olsen, Valery Pavlov

Elena Katok, Tava Olsen, and Valery Pavlov analyze the wholesale price contract in a simple supply chain setting in which the parties that negotiate the contract care not only about profits, but also about how these profits are allocated—they care about fairness. Their model uses a realistic assumption that the two parties do not know one another's fairness concerns—fairness preferences are private information. They test this model in the laboratory and find that it organizes the data we observe well.

Comparison as Incentive: Newsvendor Decisions in a Social Context

Buket Avcı, Zeina Loutfi, Jürgen Mihm, Elena Belavina, Steffen Keck

Purchasers do not make purchasing decisions in an organizational void. Rather they are part of a group and their performance is often directly or indirectly evaluated in comparison to the performance of others in the group. Thus, social comparison between peers may provide strong implicit incentives for individuals. Social comparison arises naturally in all social settings and may thus be unintended; however, many companies deliberately use it to motivate employees and thus induce effort. Buket Avcı, Zeina Loutfi, Jürgen Mihm, Elena Belavina, and Steffen Keck show that social comparison, besides inducing effort, may

provide incentives to distort decision making under uncertainty. Hence, in a purchasing context, social comparison may influence order quantities. The authors show that there are typical patterns in which purchasers can be expected to deviate from a newsvendor optimal order quantity depending on the nature of social comparison that purchasers are subjected to.

Distributed Decisions in Networks: Laboratory Study of Routing Splittable Flow

Amnon Rapoport, Eyran J. Gisches, Vincent Mak

It is intuitive to assume that a central authority will always improve a network's performance by augmenting the network thereby increasing the number of available routes. The Braess Paradox is a well-known example that shatters this belief. Studying this in the controlled environment of the laboratory with financially motivated participants, Amnon Rapoport, Eyran J. Gisches, and Vincent Mak analyze route choice behavior in congestible networks with a rich architecture where asymmetric players could split their multiple flow units across the paths of the network so coordination is centralized within but not between cohorts (players). They observe that route choice behavior approaches the equilibrium prediction – both on the aggregate level and the individual level – and that the Braess Paradox was clearly manifested with an increase in total system cost when the network was expanded. The results suggest that while psychological factors such as altruism, reciprocity, punishment, fairness, trust, and other social norms might be useful to explain observed behavior in repeated two-person games, when groups are large they may diminished or entirely disappear. However, when policy implications are considered, it is usually the aggregate, rather than individual, behavior that matters.