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**Competition and cooperation in decentralized push and pull assembly systems.** (English)

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Summary: We study a decentralized assembly system consisting of a single assembler who buys complementary components from independent suppliers under two contracting schemes: push and pull. In both schemes, the component suppliers are allowed to freely form coalitions (or alliances) among themselves to better coordinate their pricing or production decisions. We show that the sole driver of the inefficiency in a push system, which is due to horizontal decentralization of suppliers, is the number of alliances that were formed. Specifically, it is shown that in a push system, the assembler's profit, the total profit of all suppliers and the consumers' surplus are all decreasing in the number of coalitions, and are thus maximized when the grand coalition is formed. We further carry out a stability analysis of coalition structures to verify to what extent suppliers can reduce or eliminate the inefficiency due to their decentralization by forming alliances. We show that in a push system with more than two suppliers and a power demand distribution, myopic suppliers would act independently, resulting with a least efficient channel, which makes all channel members, as well as the end consumers, worse off. On the other hand, we prove that farsighted suppliers would form the grand coalition and thus be able to completely eliminate the inefficiency stemming from their decentralization. Finally, it is shown that, in contrast to a push system, in a pull system the suppliers can easily coordinate their production quantities to eliminate the inefficiency due to their decentralization.

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