

# On the Role of a Market Maker in Networked Cournot Competition

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In networked Cournot competition, there is a market maker that centrally manages transport between geographically distributed markets or participating firms. This paper studies the role of the centralized intermediary seeking to maximize some metric of social benefit subject to network flow constraints. Clearly, well-designed strategies of the market maker will prominently increase the efficiency of the marketplace, while constraints inherent to the transport network may give rise to hidden monopolies and thus impair the entire efficiency to a large extent. Motivated by this, the authors first introduce a general, parameterized model of a market maker in networked Cournot competition and apply this model to wholesale electricity markets. In this model, the market maker trades with multiple participating firms that locally compete in a Cournot competition and attempts to maximize a payoff function that is parameterized by the tradeoff among the benefit to the consumer, the producer and the market maker itself. Further, the authors characterize the equilibrium outcomes over a parameterized family of market maker designs and guarantee the existence and uniqueness of Nash equilibria. With the characterization, the authors then develop an approach for devising an approximately optimal design of the market maker payoff function, or equivalently the parameters of the function, and illustrate the efficacy of the proposed approach to the California electricity market.