Optimal Commissions and Subscriptions in Networked Markets
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Abstract: We consider a platform that charges commission rates and subscription fees to sellers and buyers for facilitating transactions but does not directly control the transaction prices, which are determined by the traders. Buyers and sellers are divided into types, and we represent the compatibility between different types using a bipartite network. Traders are heterogeneous in terms of their valuations, and different types have possibly different value distributions. Buyers may have additional value for trading with some seller types. The platform chooses commissions-subscriptions to maximize its revenues. Two salient features of most online platforms are that they do not dictate the transaction prices, and use commissions/subscriptions for extracting revenues. We shed light on how these commissions/subscriptions should be set in networked markets.

Using tools from convex optimization and combinatorics, we obtain tractable methods for computing the optimal commissions/subscriptions and provide insights on revenues and welfare. We provide a tractable convex optimization formulation to calculate the revenue-maximizing commissions/subscriptions, and establish that, typically, different types should be charged different commissions/subscriptions depending on their network positions. We establish that the latter result holds even when the traders on each side have identical value distributions, and in this setting we provide lower and upper bounds on the platform’s revenues in terms of the supply-demand imbalance across the network. Motivated by simpler schemes used in practice, we show that the revenue loss can be unbounded when all traders on the same side are charged the same commissions/subscriptions, and bound the revenue loss in terms of the supply-demand imbalance across the network. Charging only buyers or only sellers leads to at least half of the optimal revenues, when different types on the same side can be charged differently. Our results highlight the suboptimality of commonly used payment schemes, and showcase the importance of accounting for the compatibility between different user types. Under mild assumptions, we establish that a revenue-maximizing platform achieves at least 2/3 of the maximum achievable social welfare.

Bio: Kevin is a Ph.D. Candidate in Operations Management at the University of Chicago Booth School of Business. His research focuses on revenue management, platform economy, and optimization under uncertainty. Before Chicago Booth, Kevin studied Applied Mathematics and Industrial Engineering as a Yellow Jacket at Georgia Tech.