

# Bargaining with Intermediaries\*

Thành Nguyen<sup>†</sup>

September 2011

## Abstract

We analyze two non-cooperative network bargaining models, where trade opportunities arise according to a stationary stochastic process, and a randomly selected agent makes a take-it-or-leave-it offer. The first model, called coalitional bargaining, assumes an agent can bargain directly with everyone involved in trade. On the contrary, in the second model agents cannot bargain “globally”. Instead, at every time period only pairs of neighboring agents can bargain, and the final outcome results from a sequence of such “local” transactions.

We show that a stationary equilibrium exists in the coalitional bargaining model. Furthermore, its payoff is the unique solution of a convex program. Applied to several network games, the convex program explicitly predicts how the network topology influences an agent’s bargaining power. Among the applications, we contrast our prediction with the Shapley-Shubik solution of a buyer-seller network and the Core of a general TU game. On the other hand, in the second model, a stationary equilibrium need not exist. However, when it exists, its payoff is also the unique solution of a (different) convex program. Here, we identify a chain effect, caused by a sequence of local bargaining, which distorts payoffs toward the end of the chain, and we characterize a condition when a stationary equilibrium fails to exist. This nonexistence of stationary equilibria can be interpreted as the emergence of an unstable market, so we examine how long-term relationship between buyers and sellers, or biased bargaining rules can make the market more stable.

**Keywords:** Non-cooperative Bargaining, Network Games.

---

\*The author thanks Rakesh Vohra for many fruitful discussions and his tremendous help. I also would like to thank Randall Berry, Michael Honig and Asher Wolinsky for helpful conversations and comments.

<sup>†</sup>Postdoctoral Fellow at Managerial Economics & Decision Sciences, Kellogg School of Management and Department of Electrical Engineering and Computer Science, Northwestern University. Email: t-nguyen@kellogg.northwestern.edu.