Supply function equilibria in networks with transport constraints

P. Holmberg and A.B. Philpott

HP (2012)

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Summary

- Purpose of the article is to provide and solve a framework of spot market competition in a network.
- HP2012 allow for uncertain (and potentially elastic) demand at each node of the network.
- Strategic firms which are located throughout the nodes of the network are allowed to submit supply functions.
- Unlike previous contributions on supply function competition on networks (Wilson 2008) they do not only provide necessary FOCs but also show existence of SFE in several cases.

=> That is a very impressive agenda, contributing substantially to the solution of rather hard problems.

Relation of HP 2012 to previous literature

Previous contributions have provided:

- **Full characterization of all SFE for single nodes:** Klemperer and Meyer 1989, Anderson and Philpott 2002

- **Necessary conditions for SFE for Network:** Wilson 2008

⇒ **Holmberg and Philpott 2012 propose a framework which (at least in principle!) allows to also show existence of SFE in networks - based on the Methods developed in Anderson and Philpott 2002!**

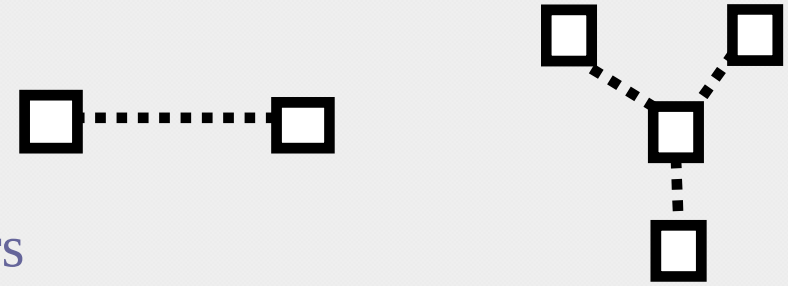
⇒ **Holmberg and Philpott 2012 provide both positive (existence of SFE) and negative (failure of existence of SFE) results in their analysis**

Details and their devil…

The neccessary optimality conditions for SFE are formulated for a very general setting (also for meshed network).

However the explicit derivation of existence of SFE is made only for rather specific settings:

-> Networkstructure



-> Symmetric players

-> Uniform distribution of demand uncertainty

-> Existence of one SFE, no statement w.r.t. uniqueness and so on…

-> For specific ranges of transmission capacities

Discussion

- In my view the paper proposes a very (!) important first step in providing a tractable framework which also allows to derive existence of SFE in networks (unlike Wilson 2008).
- Whereas the necessary optimality conditions are provided for frightingly general settings, the explicit derivation of existence of SFE obtains only for relatively simple examples:

  => Current results are not yet immediately operational for quantitative/computational applications

Question 1: In your view, how large are the obstacles to extend your existence results to slightly more general settings?
- e.g. (truncated) normal uncertainty, asymmetries, more gen. network

Question 2: In your view, what is feasible within your framework to at least approach issues of uniqueness?

My major takeaways

-> Holmberg and Philpott 2012 provide an impressive technical framework which in principle seems to allow deriving existence of SFE on networks.

-> To make SFE on networks (more) operational, however, further research on this topic will definitely be necessary. Holmberg and Philpott 2012 will certainly be/become a central reference (together with Wilson 2008) along that path.

Question 3: Apart from those rather technical takeaways, are there already now some immediate (policy-) takeaways?

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