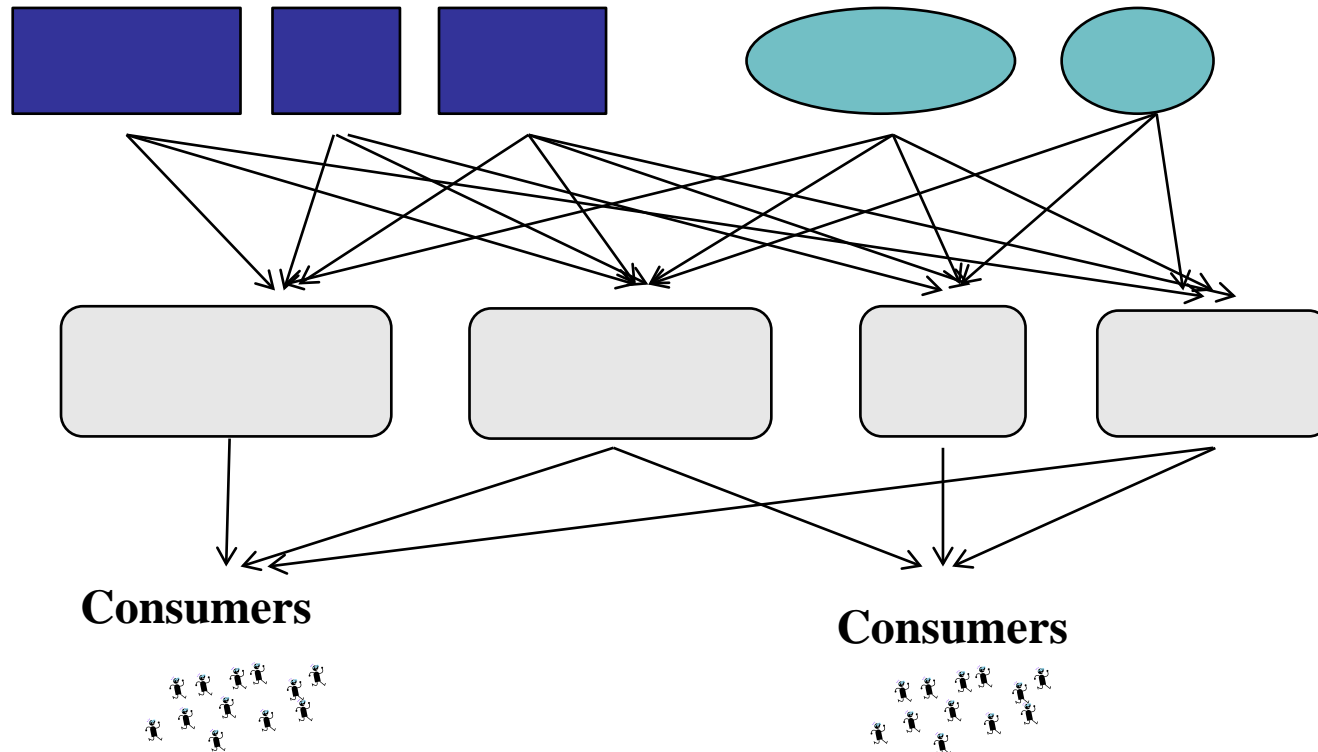# Discussion of *Contracting, Exclusivity, and the Formation of Supply Networks with Downstream Competition*

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FTC Conference, 2017
Discussion by Ali Yurukoglu, Stanford GSB

Big Picture: Bilateral Oligopoly

Consumers

Consumers

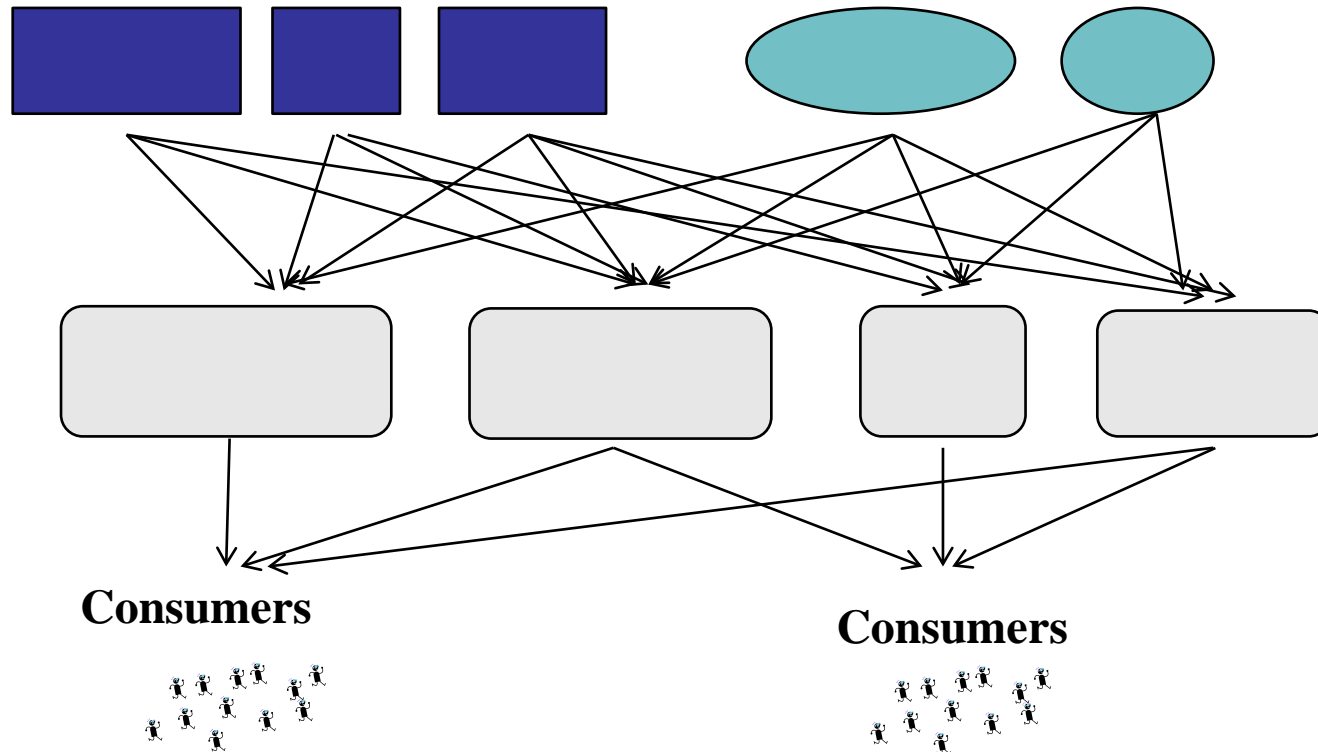*Main ingredients*: Buyers and sellers with market power, inter-connected payoffs/externalities, contracting

Examples

- Mobile handsets and tablets

- iPhone
	Apple Store, Best Buy, Amazon, Verizon retail, AT&T retail, Target, Wal-Mart, etc…

- Samsung Galaxy
- Google Pixel
- Amazon Fire
- Sony xPeria

- Mixed availability at different retailers.

- Incomplete network of supply relationships (some brands aren't in some retailers).

- Would be nice to understand how we ended up here and be able to predict what would happen after a merger (eg Amazon buys Sony).

More Examples

- Some video programming (sports, specialty channels) and cable/satellite providers.

- Hospitals and doctors on managed care plans.

- Grocery stores and food products.

- Department stores and clothing brands.

- Soft drinks and restaurant chains.

- In many cases of bilateral oligopoly, we see some interesting cases of incomplete supply networks.

Big Picture: Bilateral Oligopoly

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Main ingredients: Buyers and sellers with market power, inter-connected payoffs/externalities, contracting

Big Picture: Bilateral Oligopoly
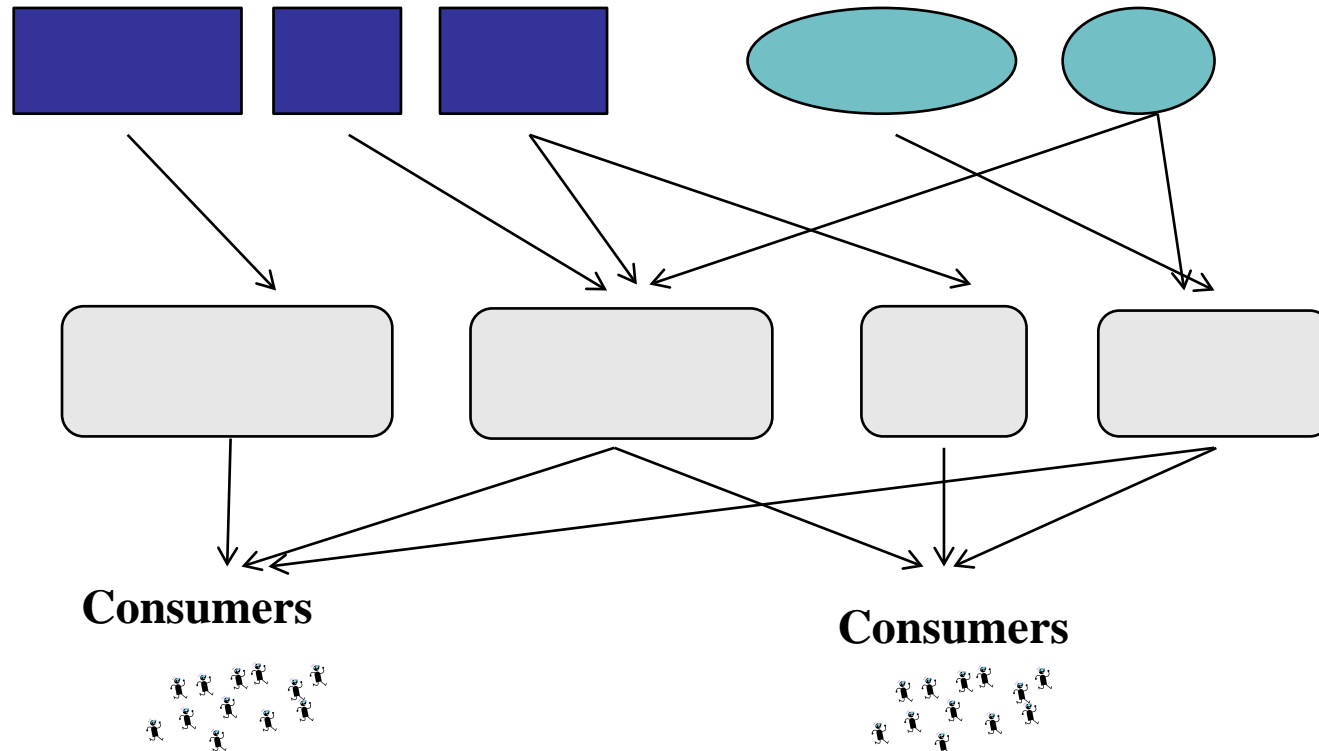
Consumers

Consumers

Main ingredients: Buyers and sellers with market power, inter-connected payoffs/externalities, contracting

This paper

- Theoretical analysis which combines ideas from literature on **contracting in vertical relationships** with ideas from literature on **coalition formation**.

- Specifically,

- 1. the principle that secret contracts and flexible contract spaces lead to equilibrium wholesale costs equal to the marginal cost of production.
  - **My comment: how to deal with the fact that we see linear prices above wholesale cost in reality?**
- 2. coalition proof Nash equilibrium (CPNE)
  - **My comment: Point out some trade-offs relative to other notions in the literature.**

- Roughly, one can solve for payoffs under any configuration of supply relationships, and then ask which configurations are CPNE
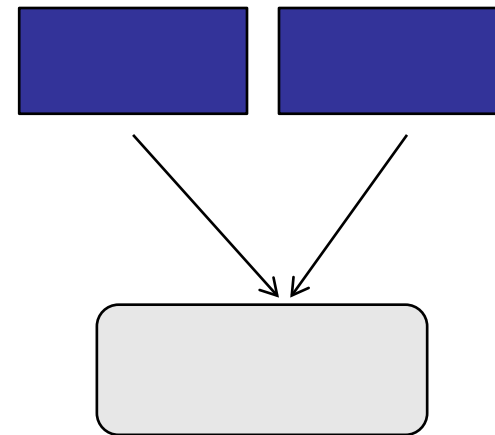
Horn and Wolinsky Supply Networks

- Analysis using Horn and Wolinsky equilibrium notion (also known as Nash-in-Nash)

- Recall that HW equilibrium checks for U-D pairwise deviations.

- Misperception that this equilibrium notion does not say anything about equilibrium supply networks.

- It does.

- Some supply networks can not be part of a HW equilibrium.

Horn and Wolinsky Supply Networks

- Consider 2 identical upstream manufacturers and downstream monopoly. Only HW equilibrium involves both firms serving the downstream monopoly at cost.

- Were only one firm serving the downstream monopoly, either U1-D or U2-D would have a deviation.
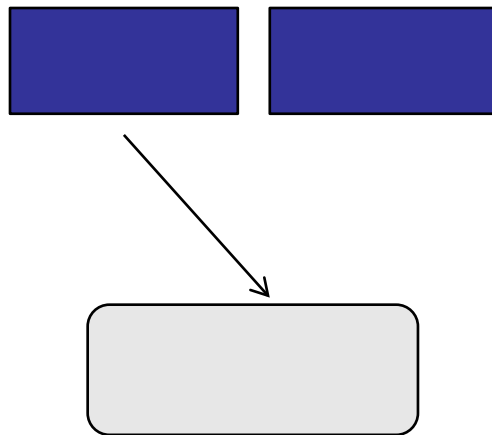
Not a HW equilibrium supply network.   **Yes, a HW equilibrium supply network.**

Horn and Wolinsky Supply Networks

- That said, the potential weakness in the HW model is that it only requires single pair deviations to be unprofitable.

- This rules out:

- **Perhaps unrealistically**: deviations involving the same firm in two negotiations

- **Perhaps less unrealistically**: multi-firm deviations

- This criticism applies of course to both determination of contractual terms and supply networks.

CPNE Supply Networks

- If we think about trying to predict two types of outcomes: (1) supply networks and (2) contractual terms, then looking at CPNE is really about working on (1).

- The key difference with HW is that allows for certain types of multilateral deviations.

- By allowing for, we mean that the equilibrium notion requires that certain types of multilateral deviations are not profitable.

Coalition Proof Nash Equilibrium (CPNE)

- Make sure doesn't allow for horizontal coordination

- Any deviation that requires two firms in the same segment jointly deviating could be problematic.

- Like Nash-in-Nash, CPNE its own impurities.
  - Why do deviations by a sub-coalition only have to be immune to further deviations within the sub-coalition?
  - Can we get to CPNE in this setting with offers and counteroffers?

- Potentially difficult to compute (paper restricts to 2x2 analysis mostly).
  - Would be interested to know how feasible for computer simulations.
  - Estimation could be based off of necessary conditions, so potentially do-able.

Demand vs Supply vs Contracting Model

- Come across several papers recently which take standard supply-demand models in IO (eg BLP demand, Nash pricing equilibrium) and…

- Alter details of contracting model to try and generate incomplete supply networks.

- I would like to see whether one can generate incomplete supply networks via supply or demand conditions:
  - Non-linear cost functions
  - Costly capacity for retailer
  - Non-linear pricing by downstream firm
  - One stop shopping by consumers with multi-product demand
  - … probably more

General Contracting Spaces

- As mentioned before, one ingredient that makes analyzing coalition formation more feasible (but still difficult) here is that the equilibrium fees given a set of supply relationships end up with cost based pricing.

General Contracting Spaces

- Nothing really legally that would prevent firms from using flexible contract spaces.

- With two part tariffs and secret contracts and certain intuitive belief systems, the Hart and Tirole opportunism problem arises.

- If a supplier is ever in a contract where the wholesale linear cost is higher than the marginal cost of production, then a mutually agreeable deviation can be found by lowering the wholesale linear costs and raising the fixed fee.

- In equilibrium, all wholesale linear prices must be equal to the marginal cost of production.

General Contracting Spaces

- Theory is fairly clear here.

- However, in practice/data, **we see linear pricing all the time** (cable, music streaming, certain medical procedures, fuel for trucks, etc).

- One has to choose between allowing for flexible contract spaces (theoretically satisfying) and assuming linear fee contracting (closer to what we see in many industries).

- Seems like the models are missing something that leads to more linear contracting.

- For those assuming linear fees, like myself, would be nice to know how they ended up there to feel more comfortable about holding that fixed in equilibrium.

Conclusion

- Very interesting paper wrestling with important issues in antitrust and IO.

- Combines insights from contracting in vertical relations literature with coalition formation theory.

- Can predict a decent array of supply relationships.

- Show us what CPNE can do that Nash-in-Nash can not, and trade off against downsides (eg computational costs).

- Important area of research for theory.