Competition and Bargaining
The optimal size of buyer groups

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ESEM conference August 29, 2024

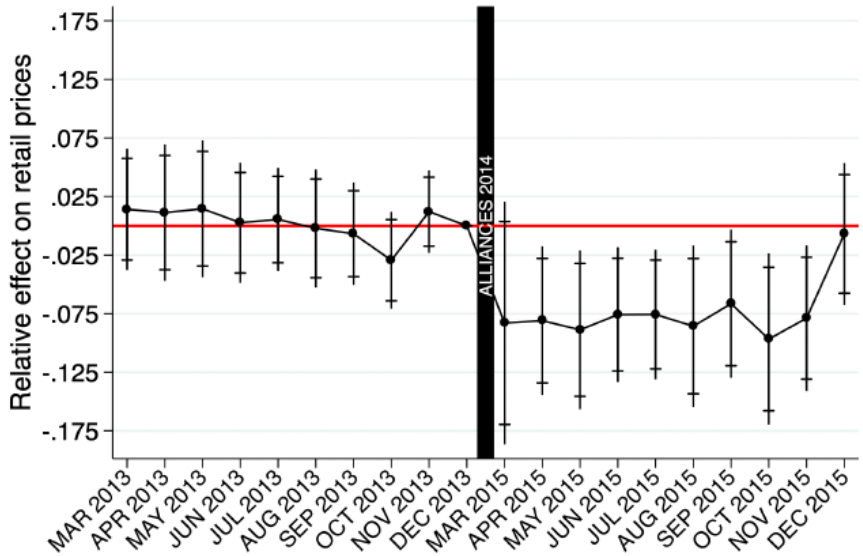
Motivation

- In many markets organizations source together from suppliers and subsequently compete in product markets $\Rightarrow$ *buyer groups*
- Supported but regulated (EU: 15 % & US: 35 % of the market share) by competition authorities
- IBIS World database: more than 700 buyer groups in the US
- Examples
  - Supermarkets: e.g., in France: Carrefour and Cora; nationwide brands
  - Airlines: CA, LH, SAS, and Australian Air joined to purchasing aircraft
  - Labor markets: coalition of employers vis-a-vis unions
  - Global supply chains: firms build a supply chain together
  - Innovation: coalition of firms vis-a-vis innovators

French bottled water industry

- Highly concentrated on the supplier side of bottled water (national brands): Nestlé, Danone, and Groupe Alma: market share 80%
- Molina (2021): Buyer group between Cora and Carrefour in 2014 $\Rightarrow$ lower retail prices

Figure 1 – Evolution of the difference in the log of retail prices between national-brand goods and store-brand goods sold by retailers who have formed a buying group



Unions

- In many countries like Germany, unions can be interpreted as the (monopolistic) supplier of labor
- Firms individually (no buyer group), groups of firms (partial buyer group) or the whole industry (full buyer group) bargain with the unions for the costs of labor
- Firms compete on downstream markets

Literature

- Theory:
  - Countervailing power (Galbraith (1952), von Ungern-Sternberg (1996), Dobson and Waterson (1997) and Chen (2003))
  - Bargaining power of a buyer group (Chipty and Snyder (1999), Inderst and Wey (2003) & (2007))
  - Welfare effect of bargaining on linear or non linear tariffs (Marvel and Yang(2008), Symeonidis (2008))
  - Buyer Groups and collusion (Dana (2012), Normann et al.(2015))

Literature

- Empirical Papers buyer groups:
  - Chipty (1995) Cable Television Industry in the US
  - Clarke et al.(2002) European food retailing
  - Sorensen (2003) Insurer-Hospital Bargaining
  - Molina (2019) Bottled-Water Industry

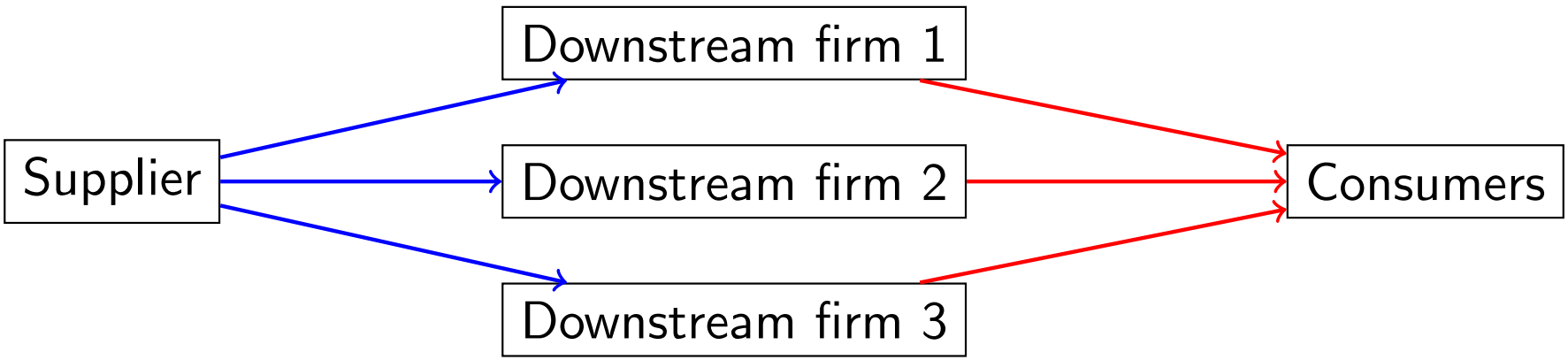
Research Questions

- We aim to understand the complete interaction of bargaining with suppliers and competing on product markets
- Main research questions
  - What is the expected size of the buyer group?
  - Is this solution welfare optimal?
  - What is the welfare optimal size of the group? Is this inline with the actual restrictions?

General Mechanism

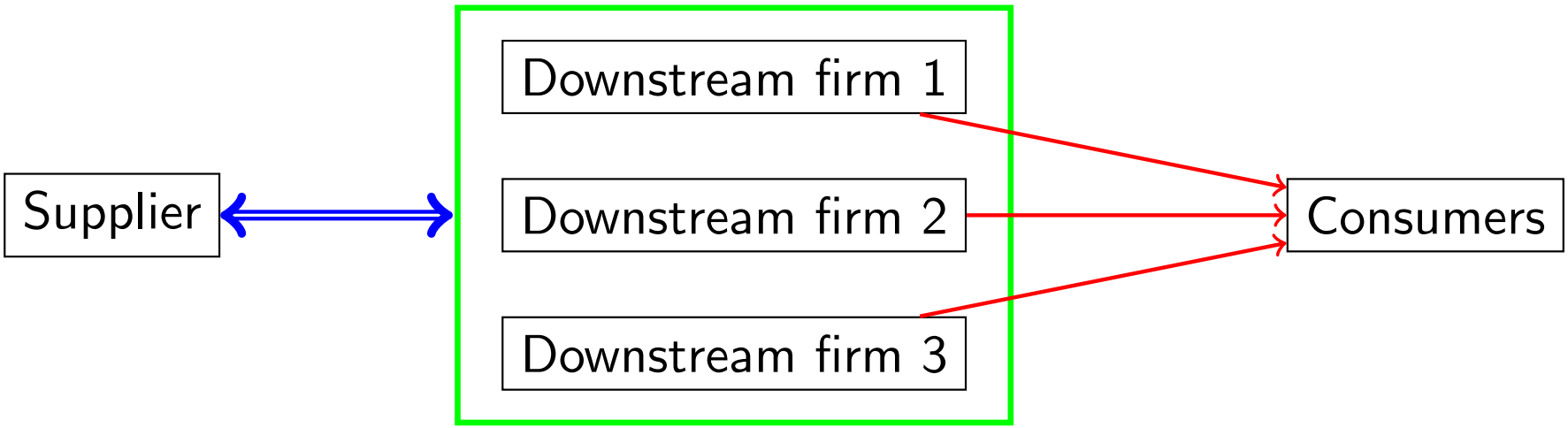
- Main mechanism of our model: larger buyer group leads to higher bargaining power and therefore, lower sourcing prices
- But at the same time: lower sourcing prices for a larger set of companies leads to fiercer product market competition
- Three possible solutions: Firms prefer to operate on a stand-alone base (nb), firms build a full buyer group (fb) or firms form a partial buyer group of size $N_b < N$ (pb)
- We are interested for which kind of setting which solution is expected and what the welfare effect of this is

General Set-up: No buyer group (nb)



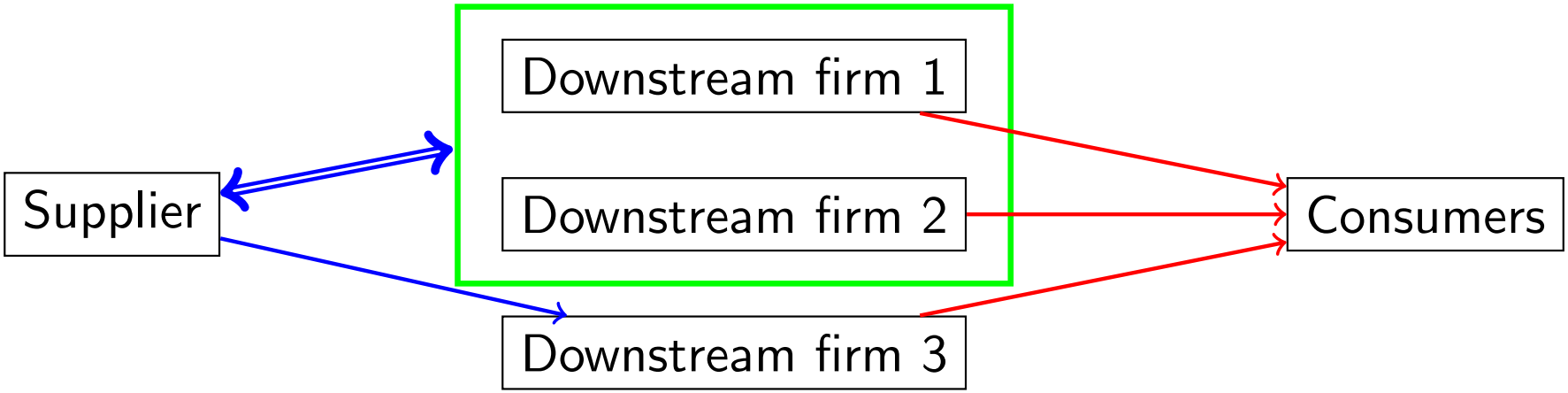
Without a buyer group the supplier makes a take it or leave it offer to the downstream firms and then they compete on the downstream market.

Full buyer group (fb)



If downstream firms form a full buyer group. The group and the supplier bargain about the input price. Then they compete on the downstream market with the same sourcing price. Since bargaining reduces the sourcing price firms always prefer a full buyer group instead no buyer group.

Partial buyer group (pb)



If downstream firms form a partial buyer group. The group and the supplier bargaining about the input price. Stand-alone based firms still receive a take it or leave it offer. Then they compete on the downstream markets with different sourcing prices.

Model Set-Up

- Players: One supplier (S) and 3 downstream firms
- Pricing competition in the downstream market with different degree of market competition
- Demand of firm i: $p_i = 1 - q_i - \sum_{j \neq i}^{2} \gamma q_j$
- Timing
  - Stage 1: Buyer group is formed among $N_b = \{0, 2, 3\}$ firms; $(3 - N_b) = N_o$ firms remain outside the group and act on a stand-alone basis
  - Stage 2: Interaction with the supplier
    - ★ Stage 2.1.: Supplier offers a take-it-or-leave-it offer to outside firms
    - ★ Stage 2.2: Nash-Bargaining between supplier and buyer group
  - Stage 3: Competition in downstream market

Stage 3: Product Market Competition

- Two types of settings: 1) Symmetric (fb and nb) 2) Asymmetric (pb)
- In the symmetric cases the equilibrium price are given by:

$$p_i^e = \frac{(1-\gamma)+(1+\gamma)c_i^e}{2} \quad \text{with} \quad e = \{nb, fb\}$$

- In the pb case the prices are given by:

$$p_b = \frac{1-\gamma+\gamma p_o+(1+\gamma)c_b}{2+\gamma} \qquad p_o = \frac{1-\gamma+2\gamma p_b+(1+\gamma)c_o}{2(1+\gamma)}$$

- Different prices since firms are facing different sourcing prices

Stage 2.2: Nash Bargaining

- Nash-bargaining between the supplier and the group amounts to maximize the product of the respective profits minus threat points
- Full buyer group:

$$max_{c_b}(3q_b(p_b - c_b) - 0)\Big(3q_b c_b - 0\Big)$$

- Partial buyer group:

$$max_{c_b}(2q_b(p_b - c_b) - 0)\Big(2q_b c_b + q_o c_o - c_o\frac{1 - c_o}{2}\Big)$$

Stage 2.1: Take it or leave it offer

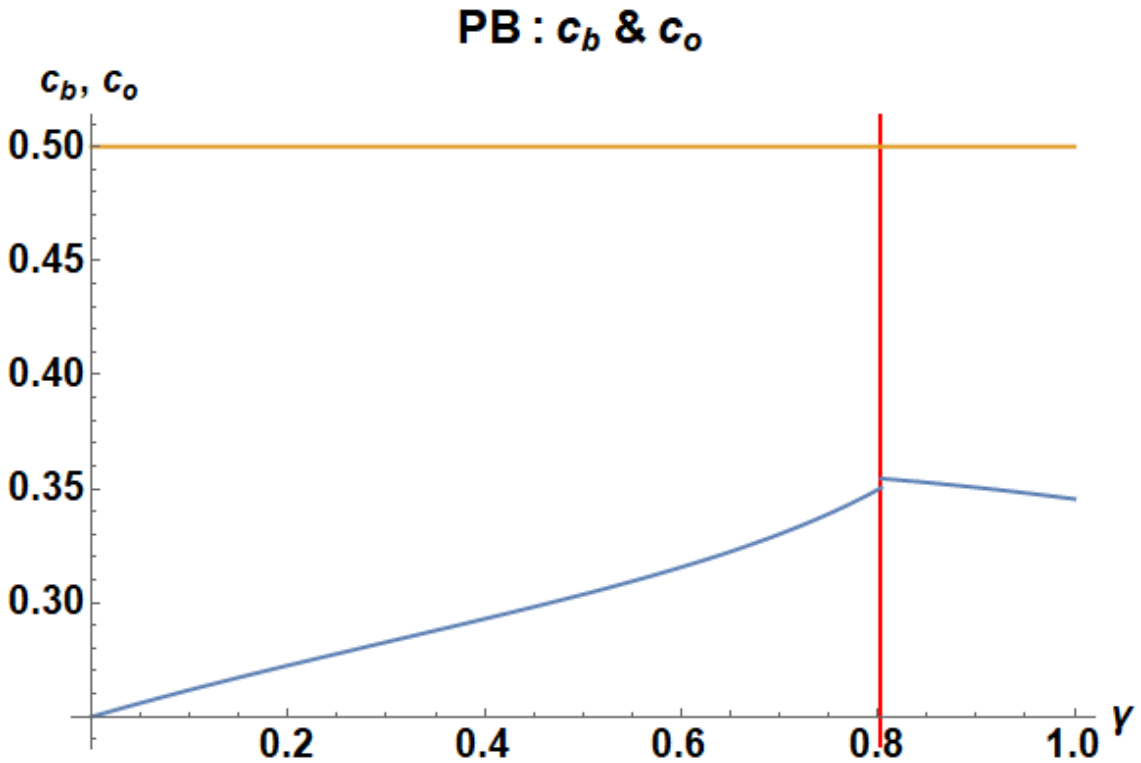
- The take-it-or-leave-it offer emerges from

$$max_{c_o}(N_b c_b(c_o) q_B + N_o c_o q_o)$$

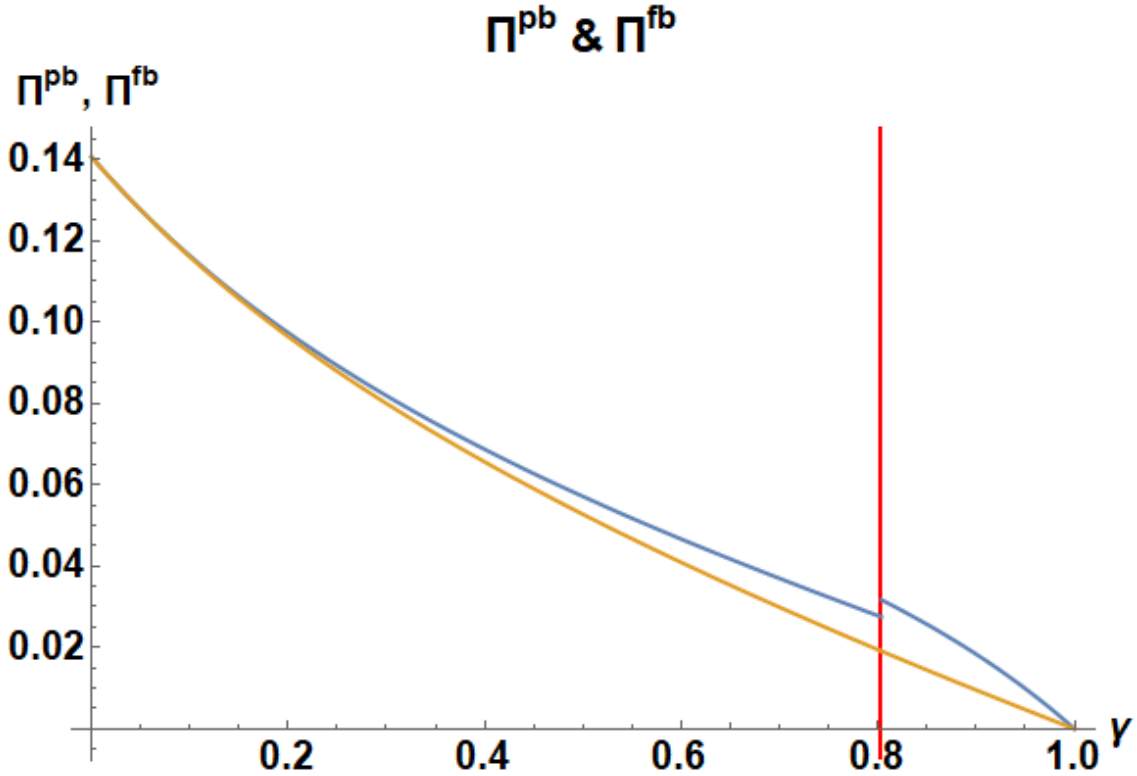
- The optimal sourcing price of the supplier for firms outside the group is always $c_o = \frac{1}{2}$
- Maximizes profits in the abstinence of a group at all or maximizes the profits earned by outside firms plus maximizes the threat point

Resulting sourcing prices:

- With a full buyer group the sourcing price is given by: $c_b^{fb} = \frac{1}{4}$
- In the partial buyer group sourcing prices are:

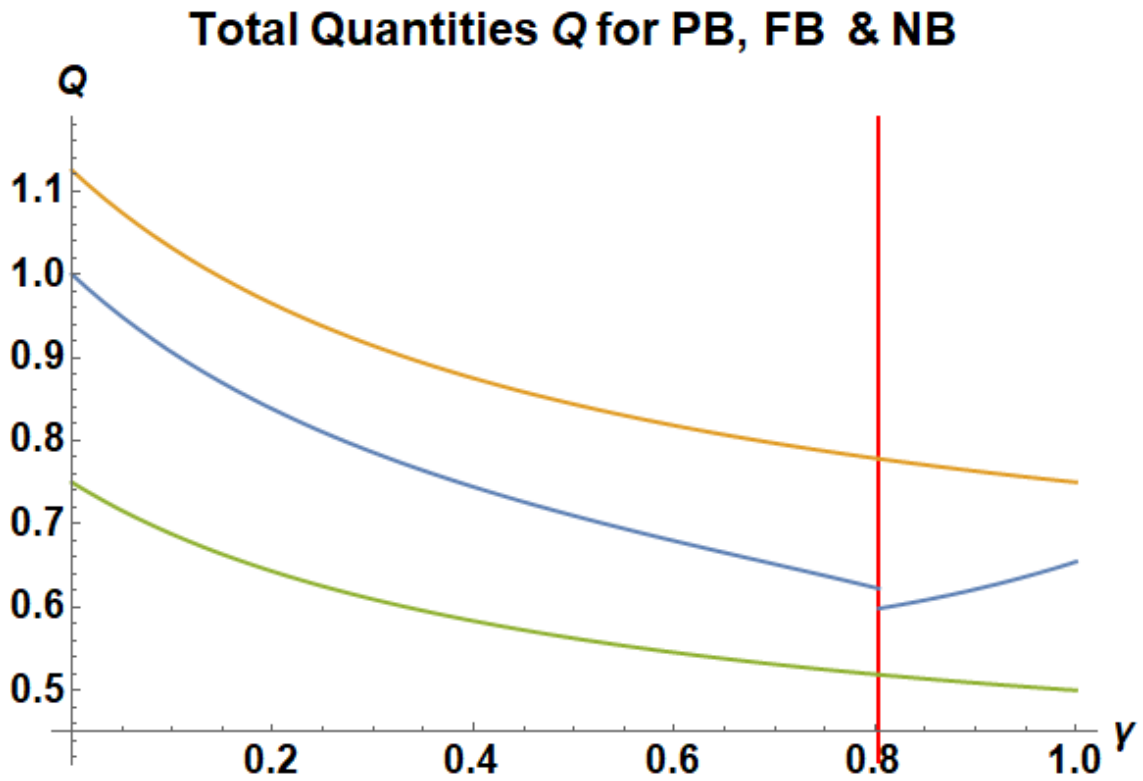


Stage 1: Optimal size of a buyer group



- Firms prefer the formation of a partial buyer group. In the two extreme cases $\gamma = 0, 1$ the firms are indifferent between a full and a partial buyer group.

Welfare



Welfare is measured by total quantities shipped to the consumers.

$FB > PB > NB$

Further Extensions

- N firms
- Cournot competition
- Possible transfer between firms
- Bargaining power increases directly in group size

Results

- If market competition is strong enough firms prefer to exclude other firms from the group $\Rightarrow$ formation of a partial buyer group
- From a welfare perspective a full buyer group is optimal
- Regulation of the size of buyer groups is not needed instead policy makers should focus on preventing group members to collude on downstream markets

Thank you for your attention!

Feedback:

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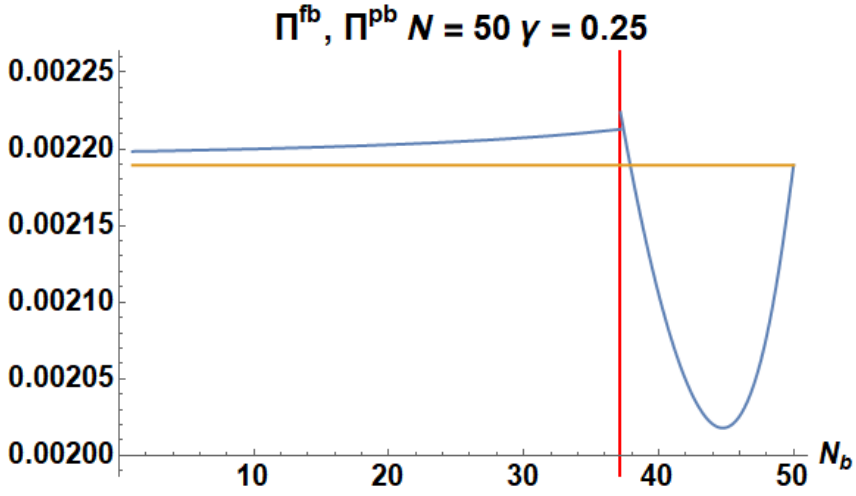
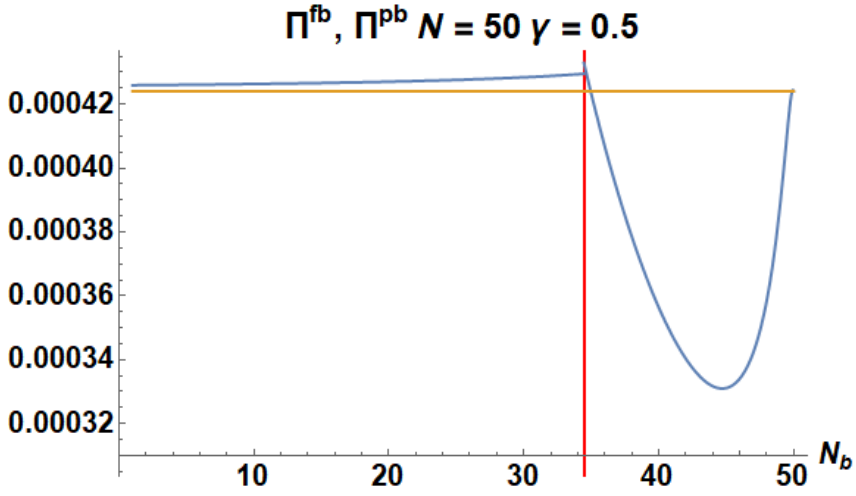
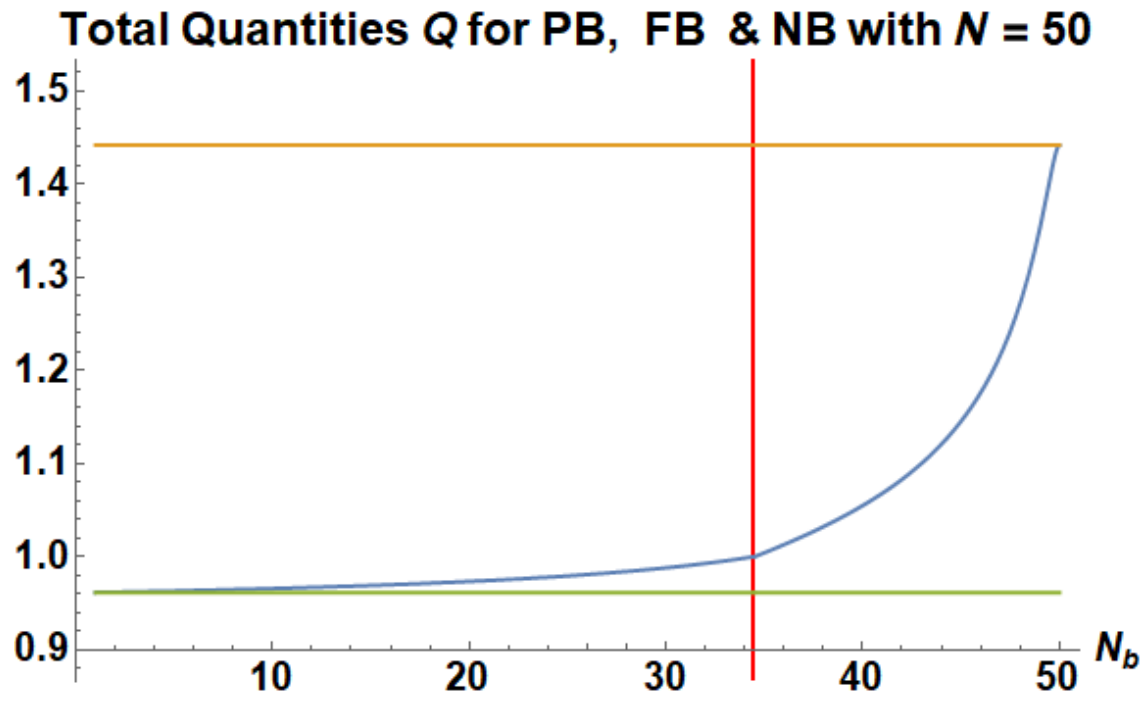
N Firms





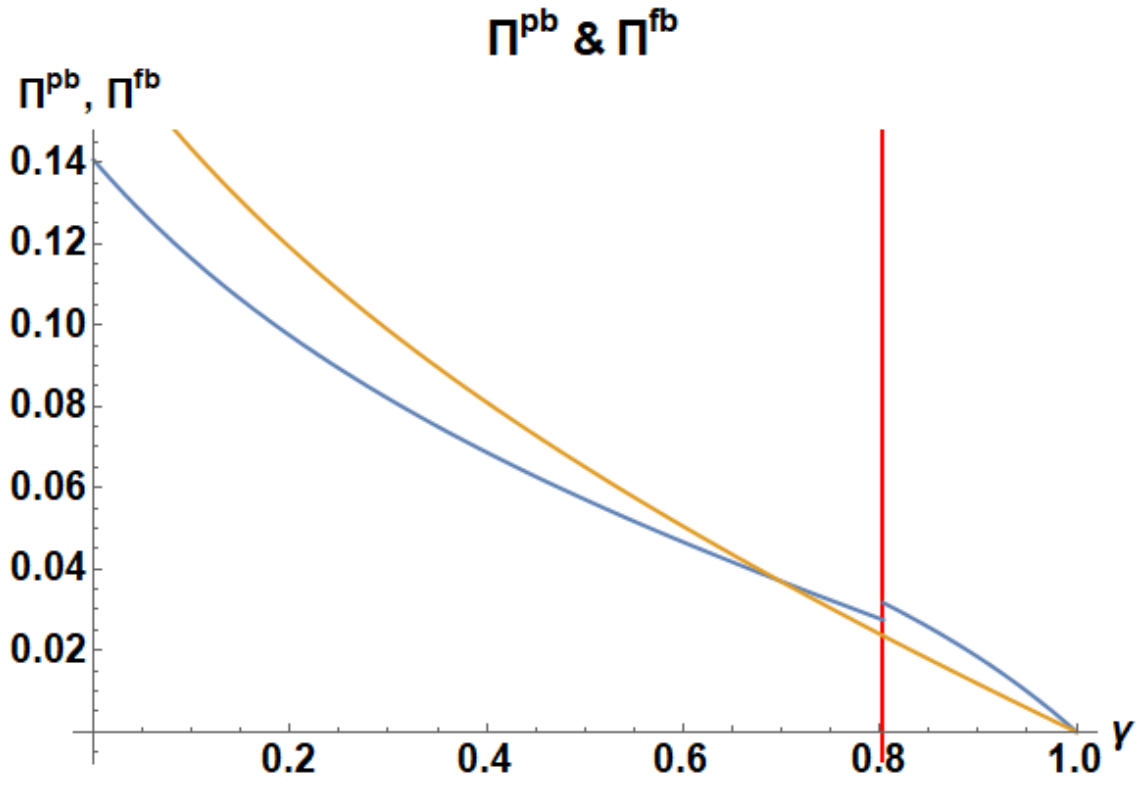
A partial buyer group is also expected with N firms. Optimal size is exactly the point in which the firms outside the group are pushed out of the market. If the competition is stronger, the optimal group size is relatively smaller.

N Firms - Welfare



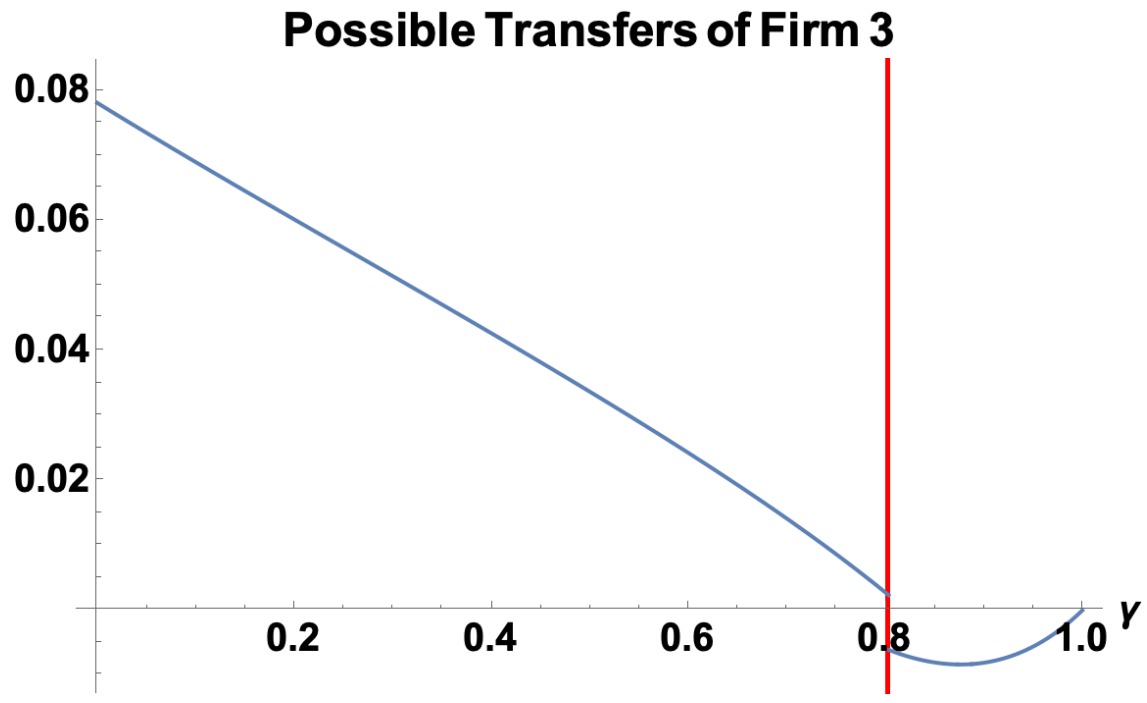
$FB > PB > NB$

Bargaining Power



If there is also a directly effect on bargaining power through the group size, still for strong enough competition a partial buyer group is expected.

Possible Transfers



Even if we allow for transfers between firms, we expect a partial buyer group for strong enough competition.

Building the coalition

- The decision-mechanism can be displayed as follows
- A firm i has the first initiative. The initiator may shift the initiative to another player, or he may make a proposal.
- A proposal consists of a coalition and a responder who must be a player of the coalition. If the responder rejects, then he becomes the new initiator. If the responder accepts there are two possibilities:
  1. The coalition forms and the game ends if the responder was the last player in the coalition needed to accept the proposal.
  2. Otherwise the responder must select the next responder to the existing proposal
  3. An infinite play of the game results in zero payoffs to all players.
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