5C. Bertrand Duopoly

Feenstra, Chapter 7.
Prices are the strategic variables.

\[ p = \text{the price of the imported good} \]
\[ q = \text{the price of the domestic good.} \]

- Homogeneous goods \( \Rightarrow \) marginal cost pricing, and identical prices.
- Assume differentiated goods
- Assume ad valorem tariff: \( p = p^* (1 + t) \).

\[ p^* = \frac{p}{1+t} \]

Foreign Firm

\[ \pi^*(p, q) = \frac{px(p, q, I)}{1+t} - C^*(x), \quad (1) \]

FOC

\[ \frac{x}{1+t} + \frac{px_p}{1+t} - C'x_p = 0, \]

Or
\[ x + px_p - (1+t)C'x_p = 0, \]  

(2) 

\[ p - p\eta^* + (1+t)C^*\eta^* = 0, \]  

\[ \Rightarrow \]  

(3) 

**Effect of a tariff**

The LHS of (2) increases with t.

\[ \pi^*_p = -\frac{x + px_p}{(1+t)^2} > 0. \]

Note that \( x + px_p < 0 \).

(Tariff shifts FF’s reaction curve to the right)
Domestic firm’s profit

\[ q y(p, q, I) - C(y). \]  \hspace{1cm} (4)

FOC:

\[ q \left(1 - \frac{1}{\eta}\right) - C'(y) = 0. \]  \hspace{1cm} (5)

SOC:

\[ \pi_{qq} < 0, \quad \pi^*_{pp} < 0, \quad \pi_{qq} \pi^*_{pp} - \pi_{qp} \pi^*_{pq} > 0, \]

Bertrand Equilibrium

Figure
Remarks

- It is not appropriate to say that Cournot model is better than Bertrand or vice versa.

- The model is too simplistic.

- In some industries, Cournot model is a better description of reality than the Bertrand model, and in other industries the latter may be.
● Price setting is appropriate for certain industries, where price change is costly. Automobile industry. Prices are set annually.

● Agriculture: (Target) outputs are fixed in the fall. Outputs are realized with some degree of uncertainty. After harvest, only price competition prevails among firms.

Quality Issues
In high income countries, quality is an important variable. When new products are invented, firms initially compete in quality. As products become more standardized, products are produced in LDCs through outsourcing or FDI.

(Electronic dictionary is an example. Automobiles may be another.) High income countries gradually leave the manufacturing industries, and enter services (financial and medical products).

● UK hardly exports any manufactured products.

● Virtually no homogeneous oligopolies. Most oligopolies produce differentiated products.
Quality Competition

● Oligopolies engage in quality competition.

● Automobile industry ⇒ compete in fuel efficiency and reliability. Toyota won.

● Japanese cars: price was a strategic decision variable at first, but over time quality became the winning strategic decision variables.

● In high income countries, quality is a decision variable, but as quality increases market demand also declines.

● Lag effects: GM and Ford cars are winning many international contests, but the majority of American consumers who bought Japanese cars are not switching to American cars.

● China needs to improve the quality of its exports.

● Example: Japanese automobiles since 1970s.

● Modeling: Use two differentiated products with different quality parameters, and two demand functions.
Emerging Trade Patterns

- **North (High Income Countries):** Develop new products through R&D.

- **South (Low Income Countries):** Imitate the products developed by the North.