Lecture 11: Trade Policy I

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Trade Policy Literature

Key questions:

- Why are countries protectionist? Can protectionism ever be "optimal"? Can we explain how trade policies vary across countries, industries, and time?
- How should trade agreements be designed? Can we explain the main institutional features of actual trade agreements (e.g. WTO, NAFTA, EU)? (not covered in this class)

Why is International Trade Not Free?

- **Optimal Tariff Argument:** Even when free trade is Pareto optimal, a large enough country will have a unilateral incentive to use trade taxes to tilt the terms of trade in its favor.
- **Second-Best Argument:** In the presence of domestic distortions (non-economic objectives, learning-by-doing, price or wage rigidity, commitment problems), and when direct correction of these distortions is not possible, trade taxes might improve welfare.
- **Political Economy:** Trade taxes are a way to redistribute income across different groups in society. They are used when more effcient means are not available or prove to be too costly.

Why is International Trade Not Free?

To analyse trade policies, one needs to take a stand on:

- **Economic environment:** What is the market structure? Are there distortions, e.g. unemployment or pollution?
- **Political environment:** What is the objective function that governments aim to maximize, e.g. social welfare, welfare of the median voter, political support? What are the trade policy instruments, e.g. import tariffs, quotas, product standards? Are trade policy instruments the only instruments available?
- **Constraints on the set of feasible contracts**: Do trade agreements need to be self-enforcing? How costly is it "to complete" contracts?

Today's lecture

- We will restrict ourselves to environments such that:
 - All markets are perfectly competitive.
 - There are no distortions.
 - Governments only care about welfare.
- Only motive for trade protection is **price manipulation**.
- How should trade tariffs vary across countries and industries?

A General Framework

• Consider a general framework in which a social planner maximizes the utility of the representative consumer subject to a feasibility constraint and an import "affordability" constraint:

$$\begin{aligned} \max_{\{X,m\}} & u(X+m) \\ \text{s.t. } & F(X,V) \leq 0 \\ & m^T \pi(m) \leq 0, \end{aligned}$$

• where X denotes the production vector, V is the endowment vector, m is the net import vector (so C = X + m), and $\pi(m)$ is the vector of world prices.

A General Framework

- The key feature of the problem is that if a country is large enough, world prices will depend on the net import vector of that particular country.
- The first-order conditions of this program can be written as

$$u_i = \lambda \cdot F_i$$
, for all *i*; (1)

$$u_i = \mu(\pi_i + \sum_{j=1}^{l} m_j \frac{\partial \pi_j}{\partial m_i}), \text{ for all } i;$$
(2)

where λ and μ are the Lagrange multipliers.

A General Framework

- Which type of policies can achieve these allocations in a decentralized way?
- From consumer and producer behavior in a competitive economy we have:

$$u_i = \omega p_{ci};$$

 $F_i = \varepsilon p_i$

where p_c and p denote consumer and producer prices, respectively.

- Using (1) and the fact that only relative prices matter, this implies that optimal policies will not create a wedge between consumer prices and producer prices ($p_c = p$).
 - Consumption taxes or production subsidies are not optimal.
- By choice of units, we can next write (2) as:

$$p_i = \pi_i + \sum_{j=1}^n m_j \frac{\partial \pi_j}{\partial m_i},$$
(3)

which shows that optimal policies create a wedge between domestic prices and international prices.

No Cross-Price Effects

• In the absence of cross-price effects, condition (3) becomes

$$p_i = \pi_i + m_i \frac{\partial \pi_j}{\partial m_i}.$$

- If the country is large enough, then $\frac{\partial \pi_i}{\partial m_i} > 0$. In such a case, $p_i > \pi_i$ when $m_i > 0$ and $p_i < \pi_i$ when $m_i < 0$.
- In other words, the country wants to tax imports $(p_i > \pi_i)$ or tax exports $(p_i < \pi_i)$.
- Intuition in a competitive economy, the effect of a marginal unit of exports or imports neglects its effects on prices, and therefore on export revenue or import cost.
 - A government can internalize this pecuniary externality by introducing trade taxes.
- Optimal add-valorem tariff is

$$\frac{p_j}{\pi_i} - 1 = \frac{m_i}{\pi_i} \frac{\partial \pi_i}{\partial m_i},\tag{4}$$

which corresponds to the inverse of the foreign export supply elasticity. $V_{\text{train Zi}}$ (UiO) 9/20 $Y_{\text{train Zi}}$ (UiO) 9/20

Surplus Analysis

• Preferences are quasi-linear:

$$u(c) = c_0 + \sum_{i=1}^n u_i(c_i),$$

where c_0 denotes consumption of the outside numeraire good.

 Provided that income is large enough, consumer satisfies the following optimality condition (assume u_i(.) is increasing and strictly concave):

$$u'_i = p_i$$

• From this we obtain the demand functions:

$$c_i = D_i(p_i) \text{ for } i=1,2,...,n,$$

 $c_0 = I - \sum_{i=1}^n p_i D_i(p_i).$

Optimal Trade Policy

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Surplus Analysis

• Consumer surplus is

$$S_i(p_i) = u_i(D_i(p_i)) - p_i D_i(p_i),$$

which has the property

$$S'_i = -D_i$$

- On the supply side, the numeraire good is produced one-to-one with labor, which pins down the wage rate to w = 1.
- Non-numeraire goods are produced combining labor and sector-specific capital according to a constant returns to scale technology.
- This generate a rent function $\Pi(p_i)$ for the capital specific to sector i = 1, 2, ...n. Furthermore, in a perfectly competitive environment,

$$\Pi'_i(p_i) = X_i(p_i),$$

where $X_i(p_i)$ is the supply of good *i*.

• A useful property of quasi-linear preferences is that the indirect utility function is:

$$v(p, I) = I + \sum_{i=1}^{n} S_i(p_i).$$
(5)

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Consumer Surplus



Producer Surplus



Welfare Effect of Tariff: Small Country

$$v(p, I) = wL + \sum_{i=1}^{n} \prod_{i} (p_{i}) + \sum_{i=1}^{n} S_{i} (p_{i}) + \sum_{i=1}^{n} (p_{i} - \pi_{i}) m_{i} (p_{i}).$$



Optimal Trade Policy

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Optimal Tariff



- Next consider non-economic objectives. Divide X into X¹, X², where we have non-economic objectives with respect to X¹, but not X², e.g., X¹ ≥ X
 ¹.
- Assume constant international prices π . Then the planner solves:

$$\begin{aligned} \max_{X,m} & u(X+m) \\ s.t. \ F(X) \leq 0, \ m^T \pi \leq 0, \ X^1 \geq \bar{X}^1 \end{aligned}$$

• The FOCs are:

$$X^{1}: \nabla_{1} u = \lambda \nabla_{1} F - \delta,$$

$$X^{2}: \nabla_{2} u = \lambda \nabla_{2} F,$$

$$m: \nabla u = \mu \pi$$

- Normalize π so that $\mu=1.$ Then the consumer's first order conditions imply

$$p_c = \pi. \tag{6}$$

• The producers's first order conditions imply

$$p^2 = \pi^2,$$

$$p^1 = \pi^1 + s^1$$

- Optimal policy: subsidize producers facing non-economic objectives, where $s^1 = \delta$.
- Conclusion: it is not optimal to use protection to secure minimum output levels.

Comparing a tariff with an output subsidy which achieve the same output level:



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