International Trade:
Theory and Policy

Lecture 12

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Topic 8. Normative analysis of tariff and non-tariff instruments of international trade policy

Lecture 11

1. Traditional and modern arguments for protectionism and for free trade in international trade policy.

2. Instruments of international trade policy.

3. Analysis of import tariffs for 'small' open economy without 'distortions': partial and general economic equilibrium.
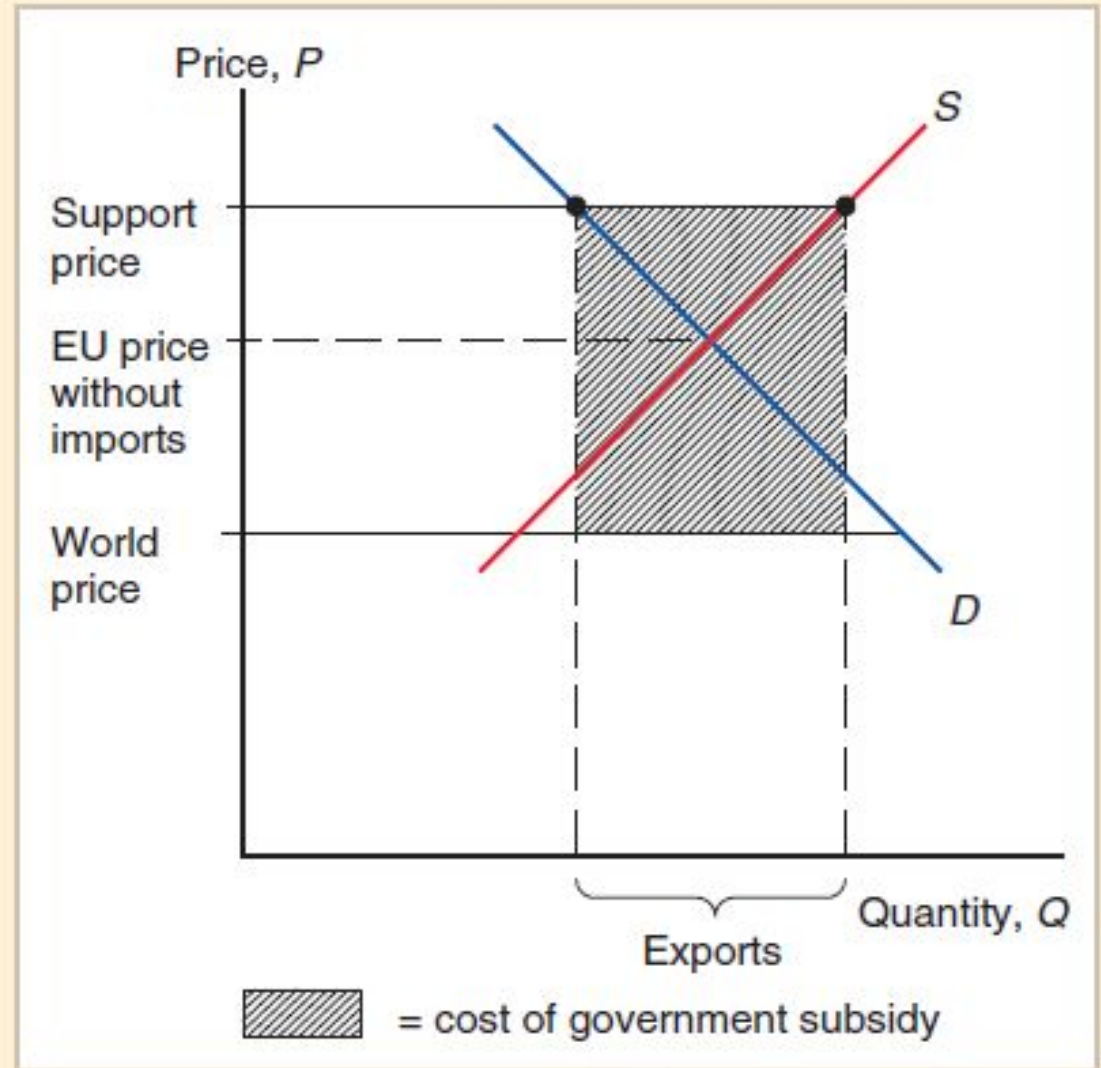
Lecture 12

1. <u>Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium.</u>

2. <u>Equivalence of import tariff and export tax.</u>

3. <u>Import tariff as a sub-optimal instrument of international trade policy</u>.

The instruments of trade policy: example
European Union's common agricultural policy (CAP)

Figure 9-12

Europe's Common Agricultural Policy

Agricultural prices are fixed not only above world market levels but also above the price that would clear the European market. An export subsidy is used to dispose of the resulting surplus.
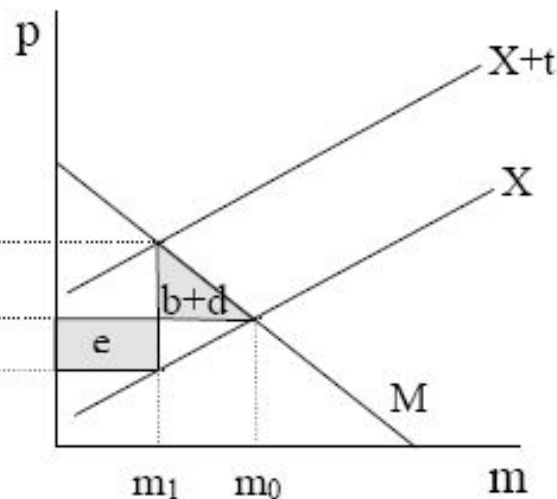
Source: Krugman, Obstfeld, Melits (2011), Ch. 9, pp. 204-205.

(1) Analysis of import tariffs for 'large' open economy without 'distortions' *: partial and general economic equilibrium

Graphical illustration: the impact of import tariff in partial equilibrium framework
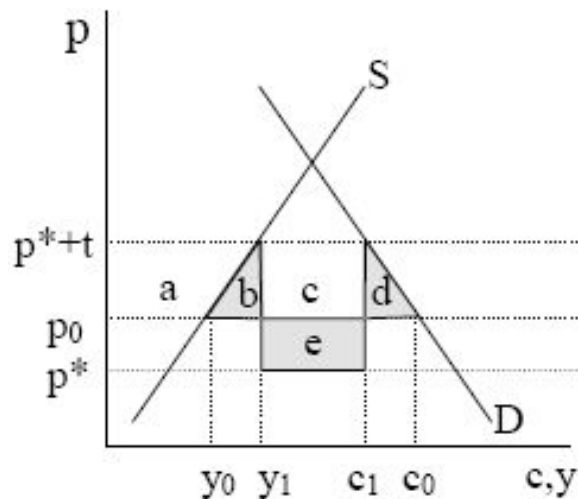
(a) Domestic market

(b) Import market

(b) Import market:

$M = D - S$

There is <u>foreign supply curve X</u>, which we assume is upward sloping.

Source: Feenstra (2004) Ch. 7

* What is large economy without distortions?

(1) Analysis of import tariffs for 'large' open economy without 'distortions' *: partial and general economic equilibrium

Positive analysis: conclusions

- Price of the good in the country increases;
- Price of the good in the world decreases;
- Import volume decreases.

Normative analysis: conclusions

- Decrease in consumer surplus (i.e. consumer losses);
- Increase in producer surplus (i.e. producer gains);
- Income from tariff, received by the government;
- Total gain of the economy is possible - 'dead weight loss *(«мёртвый груз»)* from tariff can be compensated by government income from tariff.

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Compare

Small economy

- ☐ Negative excess demand from foreigners (supply by foreigners) is perfectly elastic.
- ☐ Optimal tariff is equal to zero.

Large economy

- ☐ Elasticity of negative excess demand from foreigners is finite and positive *.
- ☐ <u>Optimum tariff</u> allows to maximize welfare **.

* When demand is more elastic than supply, who will bear a greater proportion of the tax burden - producers or consumers?

** How does it work?

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Optimum tariff

For a large economy, there is an optimum tariff t_o at which *the marginal gain* from improved terms of trade equals *the marginal efficiency loss* from production and consumption distortions.

Source: Krugman (2008), p. 218

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium
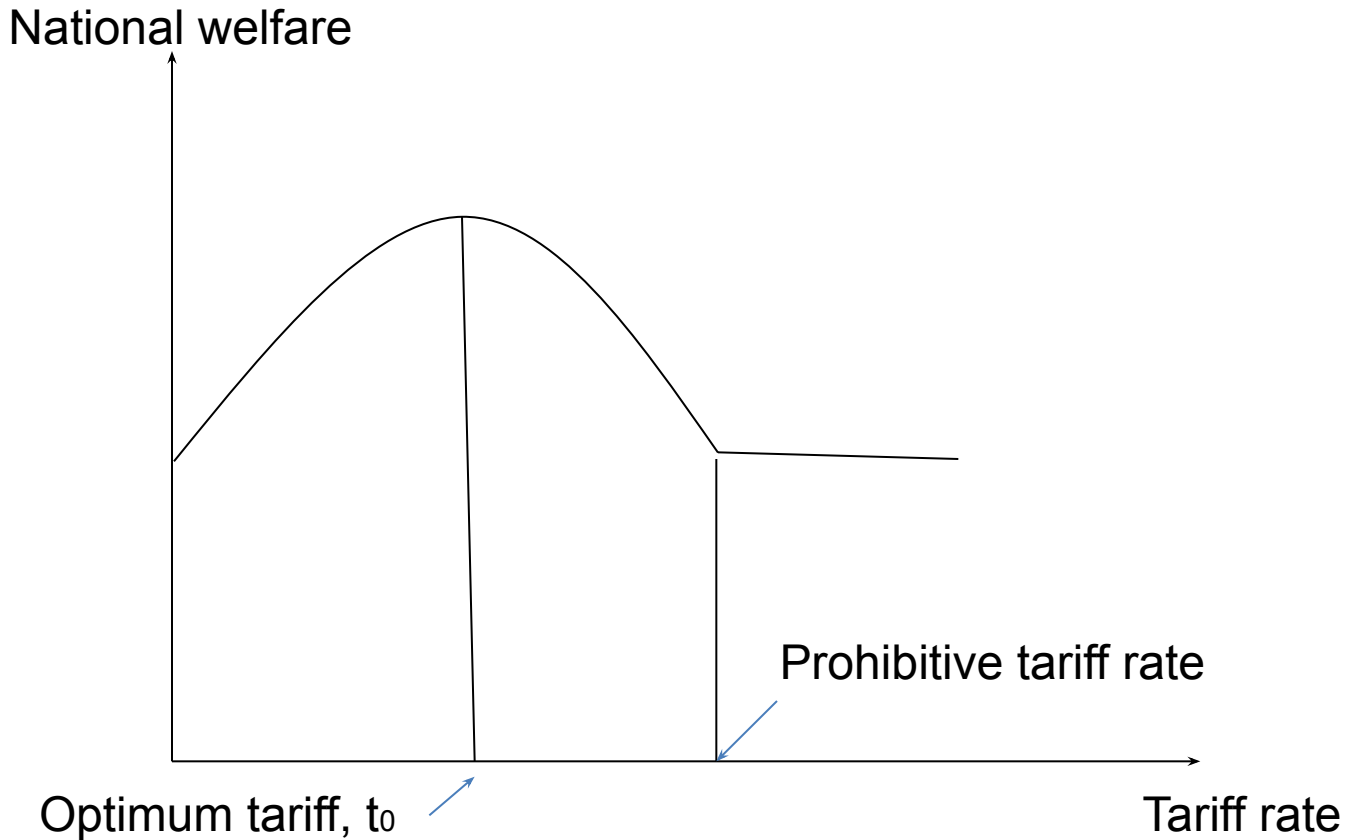
Graphical illustration: optimum import tariff

National welfare

Prohibitive tariff rate

Optimum tariff, t_0

Tariff rate

Figure 1: Optimum import tariff
Source: Krugman (2008), p. 218

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Formulation of the general equilibrium model for large open economy

Exogenous parameters of the model

- Production technology (at least 2 goods) – production functions
  - $X = f_x (K_x, L_x)$.
  - $Y = f_y (K_y, L_y)$.
- Resource endowment in the economy (at least 2 resources) – capital (K) and labor (L)
  - $K = K_x + K_y$.
  - $L = L_x + L_y$.
- Preferences of representative household – utility function
  - $U = U (X, Y)$.
- Market structure on the final goods markets – perfect competition.
- Market structure on the resource markets – perfect competition.

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Formulation of the general equilibrium model for large open economy

(2)   Endogenous parameters of the model

- Equilibrium production of final goods: X_p^*, Y_p^*.
- Equilibrium consumption of final goods: X_c^*, Y_c^*.
    - If $(X_c^* - X_p^*) > 0$ or $(Y_c^* - Y_p^*) > 0$ – the good is imported.
    - If $(X_c^* - X_p^*) < 0$ or $(Y_c^* - Y_p^*) < 0$ – the good is exported.
    - World price ratio for final goods: P_x^* / P_y^*.

(3)   Equilibrium conditions

- Producer optimization: $MRT^* = P_x^* / P_y^*$.
- Consumer optimization: $MRS^* = P_x^* / P_y^*$.
- Trade balance
    - $(P_x^* / P_y^*)(X_c^* - X_p^*) + (Y_c^* - Y_p^*) = 0$.

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

(4) **Graphical illustration of general equilibrium in large open economy**
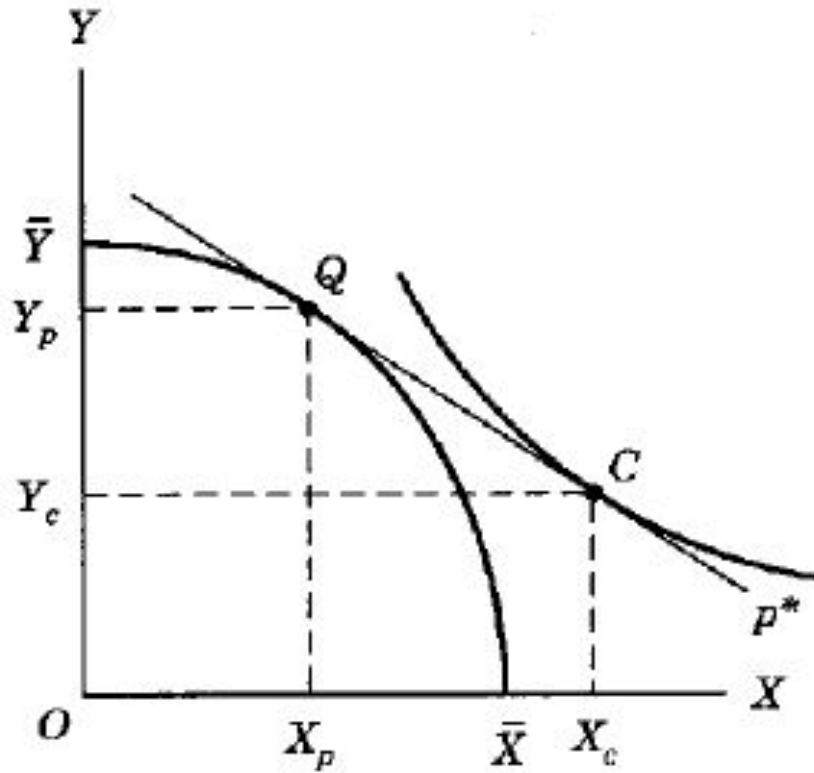

Figure 2: Open-economy general equilibrium
Source: Markusen et al. (1995), Ch. 4, p.55.

Explain the difference between 'large' and 'small' open economy.
Does this graph describe small open economy as well?

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Objective: to estimate the consequences of **import tariff** for the national welfare compared to the case of **free trade**.

Let $(Y_c^* - Y_p^*) < 0$ and $(X_c^* - X_p^*) > 0$, i.e. good Y is exported and good X is imported.
Ad valorem import tariff t is levied.

- Price in the national economy will change

$$p_x = p_x^*(1+t), \ p_y = p_y^* \Rightarrow \left(\frac{p_x}{p_y}\right) = \left(\frac{p_x}{p_y}\right)^* (1+t) \quad or \quad p = p^*(1+t)$$

- National consumers and producers 'see' the price distorted by the tariff.

- Large economy affects the world price: $\quad p_t^* < p^*$
- Trade is balanced based on the world price.

Equilibrium conditions: $\quad MRS_{xy} = MRT_{xy} = (p)^*(1+t) > (p)^*$
Interrelation between the national production and consumption volumes

$$(p_x)_t^*(x_c - x_p) + p_y^*(y_c - y_p) = 0 \quad or \quad p^* = \left(\frac{p_x}{p_y}\right)_t^* = \frac{(y_c - y_p)}{(x_c - x_p)}$$

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

How will consumption and welfare change?

Graphical illustration of the effects from import tariff: diagram with production possibility curves and indifference curves
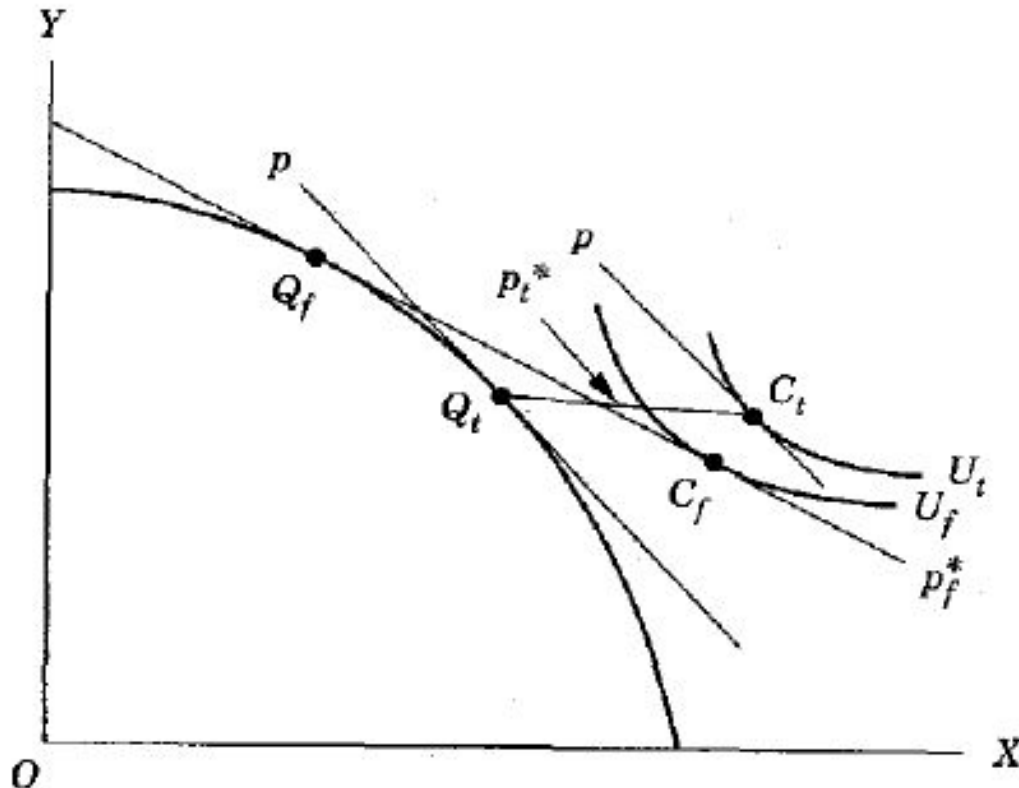
Figure 3: Welfare improvement from tariff
Source: Markusen et al. (1995), Ch. 15, p.255.

Compare this situation to the situation for 'small' economy.
Can introduction of import tariff lead to welfare losses for large economy? If yes, in which case?

(1) Analysis of import tariffs for 'large' open economy without 'distortions': partial and general economic equilibrium

Consequences of import tariff

- Resources move from sector Y (exporting sector) to sector X protected by the tariff, i.e. equilibrium shifts towards the autarky equilibrium.

- Consumption of imported good decreases relative to the exported good.

- Import decreases.

- Social welfare may increase compared to free trade situation.

(2) Equivalence of import tariff and export tax

Import tariff is equivalent to export tax if rates are the same:

$$\left(\frac{p_x}{p_y}\right)^t = \left(\frac{p_x}{p_y}\right)^* (1+t) \qquad \text{- import tariff}$$

$$\left(\frac{p_x}{p_y}\right)^{exp.t} = \left(\frac{p_x}{p_y}\right)^* \frac{1}{(1-t)} \qquad \text{- export tax}$$

Resources are reallocated to import - competing sector in both cases.

The only difference is absolute price level: under export tax it is lower than under tariff.

However, it is relative prices that matter when choosing production and consumption. Therefore the effects from import tariff and export tax will be the same (Lerner's theorem on symmetry).

(2) Equivalence of import tariff and export tax

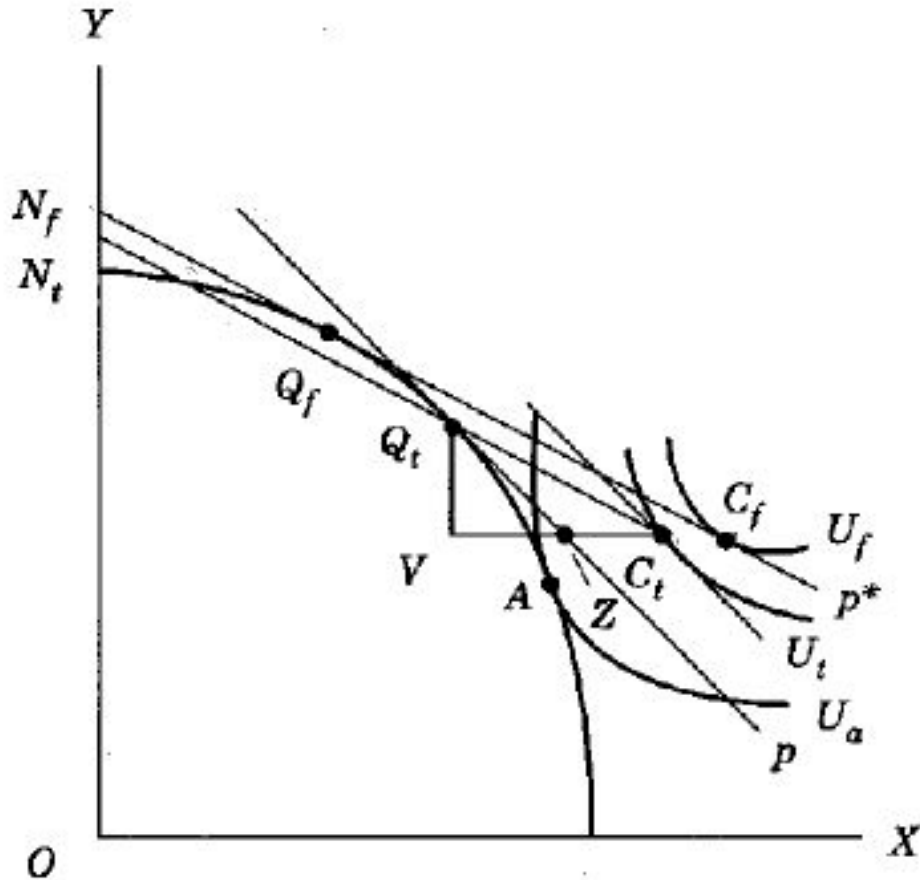**Graphical illustration in terms of general equilibrium**

Figure 4: Effects of an import tariff
Source: Markusen et al. (1995), Chapter 15, p. 247.

Build the graph illustrating export tax. Compare the graphs illustrating export tax and import tariff. What are specific features for large open economy?

(3) Import tariff as a sub-optimal instrument of international trade policy
Import tariff and production subsidy

Possible **objective** of government:

support of employment in import-competing sector / a certain level of output in this sector.

- **Production subsidy, *s*** – direct instrument;
- **Import tariff , *t*** – indirect instrument.

Bhagwati, Srinivasan, Vandendorpe et al. found that the best instrument for attaining a certain objective is the one **directly** affecting the targeted variable.

Price ratios in national economy under **import tariff** and under **production subsidy**:

$$\left(\frac{p_x}{p_y}\right)^t = \left(\frac{p_x}{p_y}\right)^* (1+t) \quad \text{and} \quad \left(\frac{p_x}{p_y}\right)^s = \left(\frac{p_x}{p_y}\right)^* (1+s)$$

The effect for producers is the same; the effect for consumers is different *.

* Why is it so? What is the difference?

(3) Import tariff as a sub-optimal instrument of international trade policy
Import tariff and production subsidy

Graphical illustration in terms of general equilibrium in <u>small</u> open economy: comparison of the effects from tariff and from subsidy
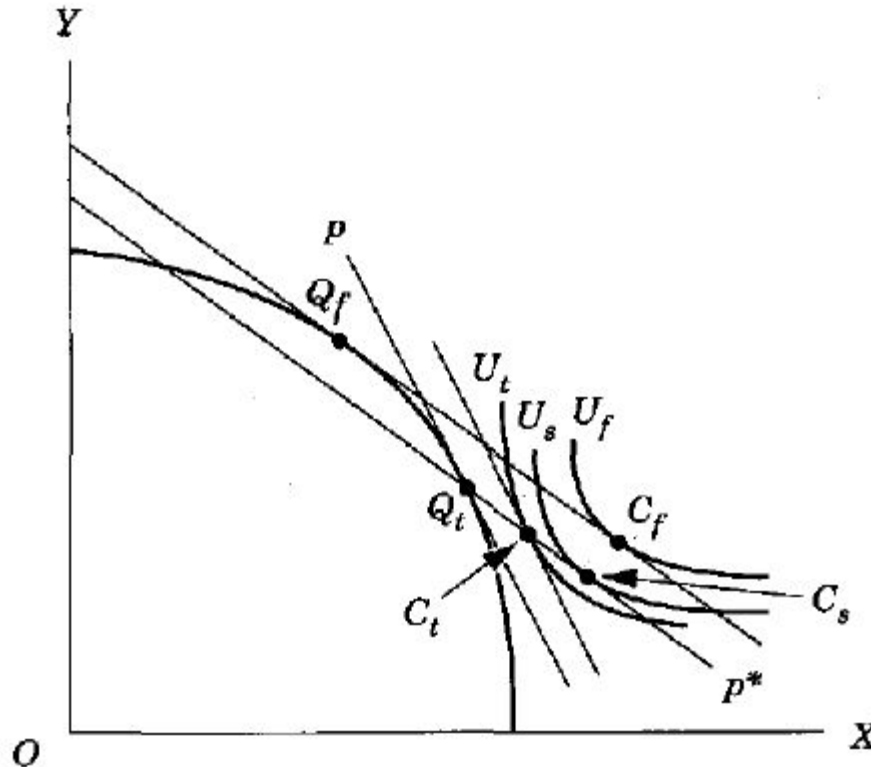

Figure 5: Consumption taxes and production subsidies
Source: Markusen et al. (1995), Chapter 15, p. 252.

Compare import tariff, production subsidy and consumption tax.

(3) Import tariff as a sub-optimal instrument of international trade policy
Analysis of the effects from production subsidy

Objective: to estimate the consequences of **production subsidy** for the national welfare compared to the case of **free trade**.

Let $(Y_c^* - Y_p^*) < 0$ and $(X_c^* - X_p^*) > 0$, i.e. good Y is exported and good X is imported.

Ad valorem subsidy is introduced.

- National producers 'see' the prices distorted by the subsidy:

$$p_x^s = p_x^*(1+s), \ p_y = p_y^* \Rightarrow \left(\frac{p_x}{p_y}\right)^s = \left(\frac{p_x}{p_y}\right)^* (1+s) \quad or \quad p^s = p^*(1+s)$$

- National consumers 'see' the world price.
- Small economy does not affect the world price.
- Trade is balanced based on the world price.

Equilibrium conditions: $MRS_{xy} = p^* \qquad MRT_{xy} = (p)^*(1+s) > (p)^*$

Interrelation between national production and consumption volumes:

$$p_x^*(x_c - x_p) + p_y^*(y_c - y_p) = 0 \quad or \quad p^* = \left(\frac{p_x}{p_y}\right)^* = \frac{(y_c - y_p)}{(x_c - x_p)}$$

(3) Import tariff as a sub-optimal instrument of international trade policy

Import tariff as a measure aimed at decreasing the existing distortions

Example. Small economy. Good Y is exported.

Export or overall production in the sector is subsidized.

Let **production** be subsidized:

$$\left(\frac{p_x}{p_y}\right)^s = \left(\frac{p_x}{p_y}\right)^* \frac{1}{(1+s)} < \left(\frac{p_x}{p_y}\right)^*$$

There are losses from the subsidy.

☐ First best: to eliminate the subsidy.

☐ Second best: to introduce an import tariff:

$$\left(\frac{p_x}{p_y}\right)^{s,t} = \left(\frac{p_x}{p_y}\right)^s \frac{(1+t)}{1} = \left(\frac{p_x}{p_y}\right)^s \frac{(1+t)}{(1+s)} < \left(\frac{p_x}{p_y}\right)^* \qquad if \quad s > t$$

(3) Import tariff as a sub-optimal instrument of international trade policy

How will consumption and welfare change?

Graphical illustration of consequences of import tariff when there is production subsidy: diagram with production possibility curves and indifference curves
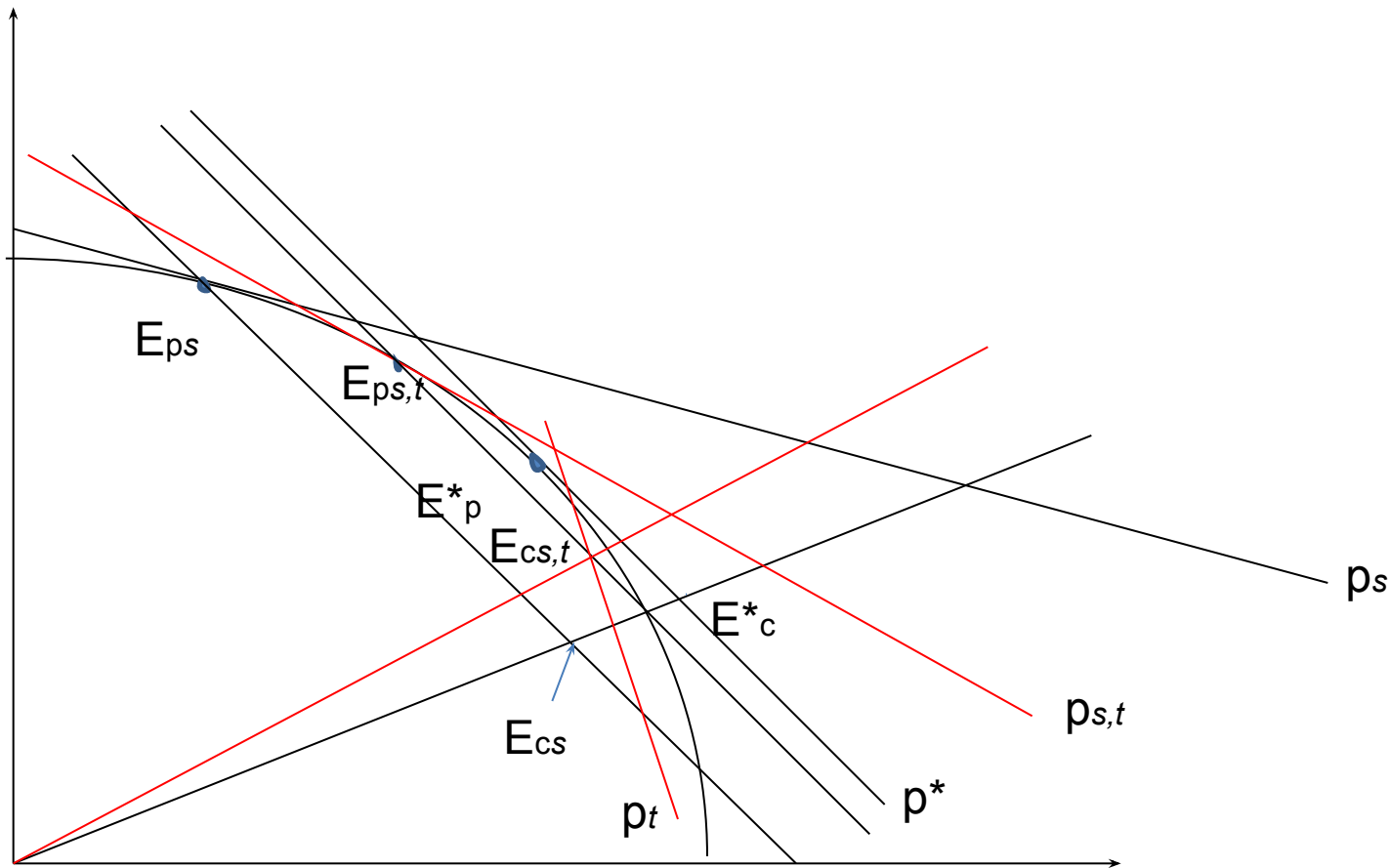
Draw indifference curves. Using these curves, compare welfare (a) under free trade; (b) under production subsidy; (c) under production subsidy and import tax. What are possible conclusions for trade policy?.

(3) Import tariff as a sub-optimal instrument of international trade policy

Consequences of import tariff (for X) when there is production subsidy (for Y):

- Resources move from sector Y (exporting sector) back to sector X (now protected by the tariff), i.e. equilibrium shifts back towards the free trade equilibrium.

- Consumption of imported good decreases relative to consumption of exported good.

- Import decreases.

- Social welfare increases compared to the situation with only subsidy.

(3) Import tariff as a sub-optimal instrument of international trade policy

Reasoning behind protectionism

Initially an industry should be protected so that afterwards it would develop independently.

The problem with this reasoning

In case all markets function properly, social costs and private costs of capital are the same. Therefore, if investment into a certain industry is not profitable from the view point of private investor, it is also not profitable from the point of view of society.

Possible exceptions

1) Positive production externality of the industry for other industries.

2) Coordination problem.

3) Imperfect capital market.

However, even in this case **production subsidies** are better (than tariffs).

Source: Lectures by Natalia Volchkova (New Economic School, Moscow, 2009).

(3) Import tariff as a sub-optimal instrument of international trade policy.
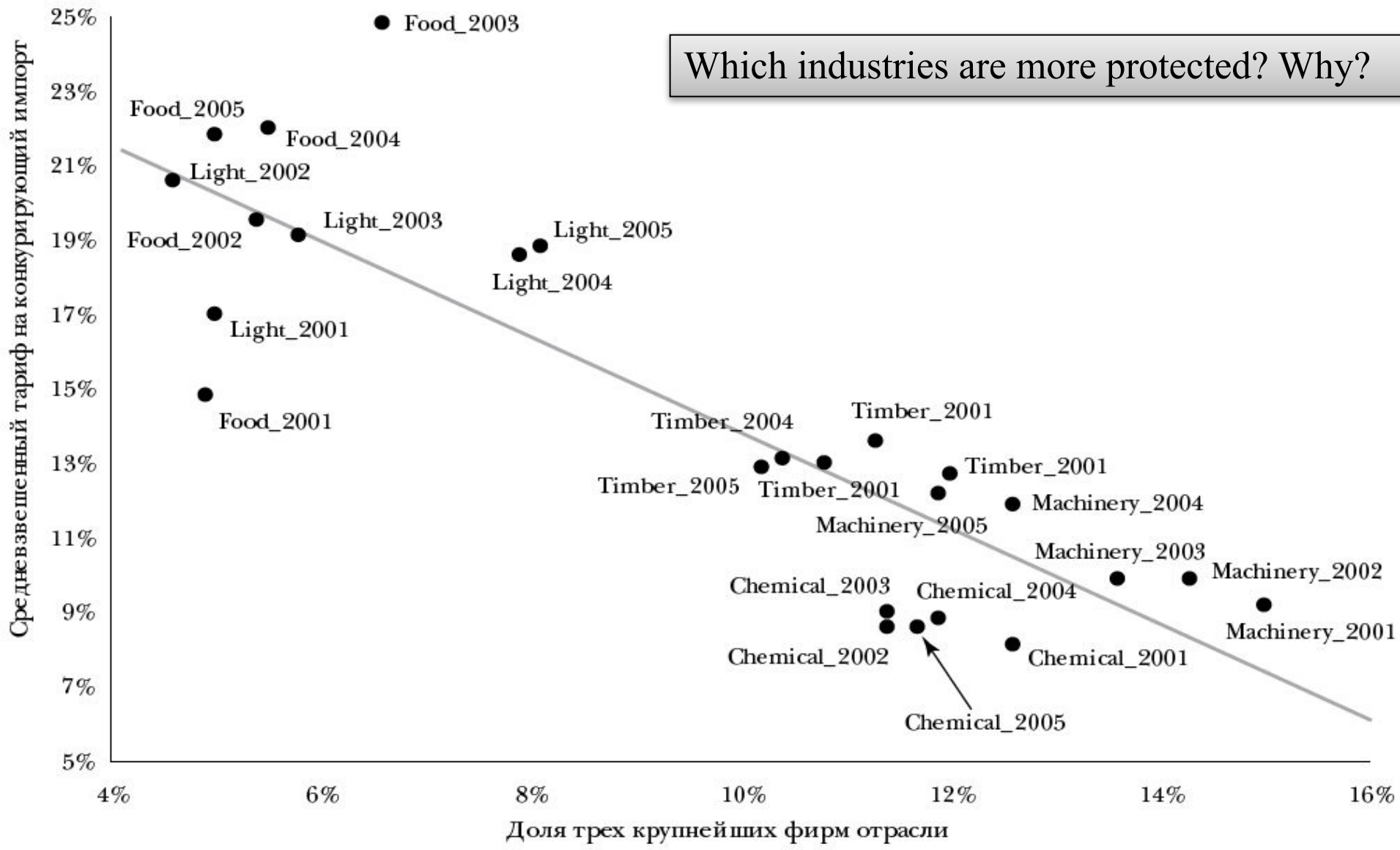
Which industries are more protected? Why?

Homework

(1) Exercise sessions 7 and 8

(2) Think about topics for reports during exercise sessions; work on presentation of the paper.

Office hours: Friday 13:50 – 14:30, room 216.

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Next lecture

Production factor mobility