Lecture 8a:

Tariffs in a small economy

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C181 – International Trade
Spring 2018
1- Introduction

These coming lectures (Feenstra and Taylor ch. 8):

1. How large are tariffs?

2. Is it beneficial to set a positive tariff on imports?

3. Two cases:
   • Small economies taking prices as given
   • Large economies

4. Global strategy to reduce tariffs worldwide?
What is a tariff?

- **Definition:** tariff = tax on imports

- Can be a tax in dollars (e.g. \( P = 6 + 2 \text{tax} \))
  ...or “ad valorem” (\% tax on value of imports)

- **Note:** There are other trade barriers (such as quotas) but effect usually similar to a tariff:

  → useful to start with a discussion of the effect of tariffs
1- Introduction

How large are tariff?

- Tariffs were very high historically
Average US tariffs
Average US tariffs
Tariffs and other trade barriers

Per-Capita Income as a Function of Trade Barriers

Per-Capita Income, 1999 US dollars at PPP

Import fees: tariffs, license fees, bank fees, time required for red tape
1- Introduction

How large are tariff?

• Tariffs were very high historically

• Low on average in rich countries but there are exceptions if we look more closely across industries

... Especially food items
1- Introduction

How large are tariff?

- Tariffs were very high historically

- Low on average in rich countries but there are exceptions if we look more closely across industries… Especially food items

- Tariffs are now often imposed on a temporary basis (e.g. recently to protect US steel and tire industries)
2- Tariffs in a small economy

Setup

• Perfect competition

• Partial equilibrium: looking at a specific industry, no effect on wages

• General setup to account for effects on two sides:
  - Consumer surplus
  - Producer surplus

• Small open economy: *constant international price*
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Objective

- Offers simple tools to evaluate/quantify effects of tariffs
- The same tools are being used by the ITC in DC: (ITC: International Trade Commission)
- ITC’s mission is to inform US policy makers on quantitative impacts of tariffs across industry
- Notes: tariffs often set up at the “HS 6” level
  = same level of disaggregation as in Problem Set 5
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Gains from tariffs?

• What we have seen so far:

• *In most the trade models:*  
  → Both countries gain from trade compared to autarky

• Same conclusion here?  
  - Not obvious: tariffs generate revenues.  
  - Gains to be redistributed from/to consumers/ producers?
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Review: consumer surplus

• For a small change in price:

\[ \Delta \text{(consumer surplus)} \approx Q \times \Delta \text{(price)} \]

• More generally:

Consumer surplus

= Area between the demand curve and price

(blue area above!)
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Review: producer surplus

- For a small change in price:

\[ \Delta(\text{producer surplus}) \approx Q \times \Delta(\text{price}) \]

- More generally:

Producer surplus

\[ = \text{Area between the supply curve and price} \]

(blue area above!)
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(a) Consumer Surplus

(b) Producer Surplus

Surplus for firm producing quantity $S_0$
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Numerical example: AUTARKY

Consumer surplus at $P=9$?

a) $9$

b) $10$

c) $12.5$

d) $22.5$

e) $45$

f) $50$

g) $1,000,000$
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Numerical example: AUTARKY

Consumer surplus = \( \frac{1}{2} \times (\$14 - \$9) \times 5 = \$12.5 \)
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Numerical example: AUTARKY

Producer surplus at $P = 9$?

- a) $9$
- b) $10$
- c) $12.5$
- d) $22.5$
- e) $45$
- f) $50$
- g) $1,000,000$
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Numerical example: AUTARKY

Producer surplus = \( \frac{1}{2} \times (9 - 4) \times 5 = $12.5 \) (coincidence!)
Numerical example: IMPORT case

Consumer surplus at $P=6$?

- a) $2$
- b) $8$
- c) $16$
- d) $32$
- e) $64$
- f) $128$
- g) $256$

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2- Tariffs in a small economy

Numerical example: IMPORT case

Consumer surplus = \( \frac{1}{2} \times (14 - 6) \times 8 = 32 \)
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Numerical example: IMPORT case

Producer surplus at P=$6?

- a) $2
- b) $8
- c) $16
- d) $32
- e) $64
- f) $128
- g) $256
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Numerical example: IMPORT case

Producer surplus = \( \frac{1}{2} \times (6 - 4) \times 2 = 2 \)
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Numerical example: IMPORT case

Gains from trade at $P=$6?

a) - $9  (loss)
b) - $5  (loss)
c) $0
d) $5
e) $9
f) $45
g) $100,000,000

Diagram:
- Price axis labels: $14, 9, 8, P^w = 6
- Quantity axis labels: 2, 4, 5, 6, 8
- Supply curve (S) starts at (6, 6) and ends at (8, 4)
- Demand curve (D) starts at (8, 8) and ends at (4, 14)
- Intersection point at (6, 6)
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Numerical example: IMPORT case

Gains from trade

= increase in consumer surplus – decrease in producer surplus

= ($32 - $12.5) - ($12.5 - $2)

= $9
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Gains from going from Autarky to trade:

(a) No Trade

(b) Free Trade

Imports = $M_1$
Gains from going from Autarky to trade:

Gains from trade
= increase in consumer surplus – decrease in producer surplus
= \((b + d) - (b)\)
= d
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Effect of tariffs?

Account for:

• change in consumer surplus
• change in producer surplus
• Tariff revenues
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Clicker question

Suppose that a small open economy sets up a tariff. This leads to:

a) An increase in consumer surplus which offsets the decrease in producer surplus

b) An increase in consumer surplus which is offset by the decrease in producer surplus

c) An increase in producer surplus which offsets the decrease in producer surplus

d) An increase in producer surplus which is offset by the decrease in consumer surplus

e) No change
Suppose that a small open economy sets up a tariff. This leads to:

d) An increase in producer surplus which is offset by the decrease in consumer surplus
Effect of tariffs?
First step: effect of the tariff on prices and imports:
→ Increase in price: $P^W$ to $P^W + t$
→ Decrease in imports: $M_1$ to $M_2$
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Effect of tariffs?
Second step: effect of the tariff on: consumer and producer surplus + tariff revenues:

(a) Home Market
(b) Import Market
Effect of tariffs?
Decrease in consumer surplus = ?

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(a) Home Market

(b) Import Market

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P^w + t$</td>
<td>$S_1$ $S_2$ $D_2$ $D_1$</td>
</tr>
<tr>
<td>$P^w$</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X^* + t$</td>
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<thead>
<tr>
<th>Imports</th>
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<tbody>
<tr>
<td>$M_2$ $M_1$</td>
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<table>
<thead>
<tr>
<th>Imports</th>
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<tbody>
<tr>
<td>$M$</td>
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Decrease in consumer surplus = ?

Effect of tariffs?
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Effect of tariffs?
Decrease in consumer surplus = (a+b+c+d)
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Effect of tariffs?
Increase in **producer surplus** = ?
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Effect of tariffs?
Increase in **producer surplus** = $a$
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Effect of tariffs?
Additional \textbf{tariff revenues} = ?

(a) Home Market

(b) Import Market
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Effect of tariffs?
Additional tariff revenues = c
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Effect of tariffs?

Account for:

- change in consumer surplus: \(- (a+b+c+d)\)
- change in producer surplus: \(+ a\)
- Tariff revenues: \(+ c\)

\[
\text{TOTAL: “deadweight loss”} \quad - (b+d)
\]
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Effect of tariffs?
NET effect = - (b+d)
\[
= \frac{1}{2} [(S_2 - S_1) + (D_1 - D_2)] \cdot t
\]
\[
= \frac{1}{2} (M_1 - M_2) \cdot t
\]

(a) Home Market

(b) Import Market

Deadweight loss due to the tariff b + d
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Effect of tariffs?
NET effect = - (b+d)
= \frac{1}{2} (M_1-M_2) \times t
= \text{consumer surplus using import curve!}
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Numerical example:
Compared to free trade ($P^w = $6), with tariff $t = $2:
Net welfare loss from tariff? (new price: $8)

- a) $2
- b) $4
- c) $8
- d) $16
- e) $32
- f) $64
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Numerical example:
Compared to free trade \((P^W=6)\), with tariff \(t = 2\):
Net welfare loss from tariff \(= \frac{1}{2} \times 2 \times 4 = 4\) loss
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Effect of tariffs?

Conclusion for a small open economy:

• Tariffs → net welfare loss

Next lectures:

• Tariffs in a large economy
• Why small economies would still have tariffs?
• How to constraint large economies to reduce tariffs?