Econ 340

Lecture 5

Tariffs
Outline: Tariffs

• What Are They?
• Who Uses Them?
• Effects of Tariffs
  – Small Country Case
    • Effects on quantities and prices
    • Effects on economic welfare
  – Large Country Case
    • Effect on world price
    • Effect on welfare
  – Size of These Effects
• Addenda on Tariffs
What Are Tariffs?

• Tariffs are Taxes on imports
• Two main types
  – Ad valorem: % of value
  – Specific: $ per unit
• How are they implemented?
  – At the border, by customs officers
  – They determine
    • What good it is
    • What price to use for ad valorem tariffs
  – Customs officers have power that may be abused (e.g., bribery)
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Who Uses Tariffs?

• Virtually all countries
• How big are tariffs?
  – In US, today, average only 2-3% (before Trump)
  – In developing countries, often around 20%
  – Both used to be much higher
  – Some particular tariffs are still much higher
  – And President Trump has put tariffs of
    • 25% on steel
    • 10% on aluminum
    • 10% so far on $50 billion of Chinese exports
Who Uses Tariffs?

• Sample US tariffs
  – Cars: 2.5%
  – Trucks: 25%
  – Men’s cotton shirts 19.7%
  – Women’s blouses 26.9%

• Tariffs facing exports of developing countries:
  – Nepal 13.2%
  – Bangladesh 13.6%

"Chicken tax" Raised in 1963 in retaliation against Europe’s tariffs on chickens

That’s why minivans are “trucks”

See Schavey
Who Uses Tariffs?

• Aside: Schavey, “The Catch-22 of U.S. Trade”
  – US tariffs are much larger against developing countries than against developed countries
  – Who gains and loses?
    • Some US workers gain, but they have social policies to protect them (unemployment insurance, etc.)
    • Developing-country workers lose, and their governments are too poor to help
  – WTO Agreement on Textiles and Clothing (1995) promised to eliminate quotas on these products by 2005, but not tariffs. (It did.)
  – Why “Catch-22”?
    • Countries can only develop by exporting
    • But if they do, we raise tariffs!
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Effects of Tariffs

• Easy to see from supply and demand
• Consider a good whose price would be above the world price without trade
• We will look at two cases:
  – Small country: Too small for its behavior to matter for the world price
  – Large country: Large enough (in market for this good) that its behavior may change world price
Effects of Tariffs: Small Country

Autarky price = $P_a$

Free trade price = world price = $P_W$

Lecture 5: Tariffs
Effects of Tariffs: Small Country

Effect on Price

Tariff

\[ P_w + t \]

\[ P_w \]

\[ P_a \]

\[ Q_S^0 \]

\[ Q_D^0 \]
Effects of Tariffs: Small Country

Tariff

Effects on Quantities

Lecture 5: Tariffs
Effects of Tariffs: Small Country

• Why the price increase?
  – On imports
    • Tariff is simply added to the price paid to foreign exporters
  – On domestically produced goods
    • Buyers don’t pay the tariff
    • But if price stayed below $P_w + t$, demand for the domestically produced good would be greater than supply
    • This shortage would drive up price
Effects of Tariffs: Small Country

• Thus: what happens due to a tariff:
  – Domestic price rises
    (by full amount of tariff)
  – Domestic output rises
    (Employment also rises in this industry)
  – Domestic demand falls
  – Imports (=D−S) fall
  – Suppliers gain
  – Demanders lose
  – Gov’t gets tariff revenue
  – World sells less to us
    (but it doesn’t lose, because we’re too small for it to notice)
Effects of Tariffs: Small Country

• How much do we gain and lose?
• Use changes in “consumer surplus” and “producer surplus” from Econ 101
Reminder: Change in Consumer Surplus

When price changes, Consumers
  – Gain from price decrease
  – Lose from price increase
    • By amount equal to area to the left of the demand curve

while...

Gain from price decrease, or loss from price increase
Reminder: Change in Producer Surplus

Producers

– Gain from price increase

– Lose from price decrease

• By amount equal to area to the left of the supply curve

Gain from price increase, or loss from price decrease
Effects of Tariffs: Small Country

• Apply these to the effects we found for a tariff

• Also note that the government (and thus the taxpayer) of the country gets benefit of tariff revenue
Effects of Tariffs: Small Country

The image shows a graph illustrating the effects of tariffs on welfare. The graph includes the following elements:

- **Tariff**: The tariff is indicated as $P_{W} + t$.
- **Welfare Changes**: The graph shows that suppliers gain an additional $+a$.

The graph illustrates the shift in demand and supply due to the imposition of a tariff, leading to changes in prices and quantities. The areas labeled 'a', 'b', 'c', and 'd' represent different impacts on welfare.

- **$P_{a}$**: The new price suppliers receive.
- **$Q_{S}^{0}$ and $Q_{S}^{1}$**:听话方的供给数量。
- **$Q_{D}^{0}$ and $Q_{D}^{1}$**: 采购方的需求数量。

This diagram is used to explain the economic effects of tariffs on small countries, focusing on changes in welfare and market equilibrium.
Effects of Tariffs: Small Country

Demanders lose $-(a+b+c+d)$

Lecture 5: Tariffs
Effects of Tariffs: Small Country

Tariff $P_{W} + t$

Government gains $+c$

Effects on Welfare

Lecture 5: Tariffs
Effects of Tariffs: Small Country

Effects on Welfare
Net for country $-(b+d)$

Country loses from tariff

Lecture 5: Tariffs
Effects of Tariffs: Small Country

Summary:

- Suppliers gain: $+a$
- Demanders lose: $-(a+b+c+d)$
- Government gains: $+c$
- Net effect on country: $Loss = -(b+d)$

“Dead Weight Loss” =
Effects of Tariffs: Small Country

- Dead Weight Loss
- Why?
- Because demanders and suppliers both are misled by the tariff to behave as if the good’s value were $P_W + t$, when in fact the country can buy or sell it for $P_W$. 

![Diagram showing the effects of tariffs on supply and demand, with a graph illustrating the deadweight loss.](image-url)
Clicker Question

Suppose the world price of a good is initially $10 and it then rises to $20. In which of the following cases will the domestic price of the good rise the most?

- a) It has a $2 specific tariff
- b) It has a 20% ad valorem tariff
- c) It has a $4 specific tariff
- d) It has a 30% ad valorem tariff

Price rises from
- $12 to $22, by $10
- $12 to $24, by $12
- $14 to $24, by $10
- $13 to $26, by $13

✓ d) It has a 30% ad valorem tariff
Clicker Question

Which of the following would cause the dead-weight loss due to a tariff to be zero?

a) Domestic supply curve is vertical
b) Domestic demand curve is vertical
✓ c) Both domestic supply and demand are vertical
d) Nothing: dead-weight loss due to a tariff can never be zero
Clicker Question

In the graph, initial price is $P_W$ and quantities are $S_0$ and $D_0$. A tariff $t$ is then applied to imports. For which demand curve is the dead-weight loss the largest?

a) $D^A$

b) $D^B$

✓ c) $D^C$
Clicker Question

For which demand curve is the loss to consumers the largest?

✓ a) \(D^A\)

b) \(D^B\)

c) \(D^C\)
How is this possible? If the country loses more with $D^A$ (dead-weight loss) but consumers lose less, who loses more?

- a) Suppliers
- b) Government
- c) Foreigners
- d) Other industries

Fills in the blanks with options: Gains less, actually
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Effects of Tariffs: Large Country

- If the country is not small, but large, then
  - when it reduces its imports of the good from the world market
  - the world price will fall. $P_W$

- Why?
  - Because, with less import demand by large country, world demand shifts left.
Effects of Tariffs: Large Country

- Results due to tariff and fall in world price:
  - Domestic price rises, but by less than the tariff
  - Thus, compared to the same tariff in a small country
    - Output (and employment) rises by less
      - Thus the benefit to suppliers is smaller
    - Demand falls by less
      - Thus the harm to demanders is smaller
    - Imports fall by less
    - Tariff revenue is larger (since imports fall less)
Effects of Tariffs: Large Country

\[ P \]

\[ Q \]

Tariff

\[ P_{W0} + t \]

\[ P_{W1} + t \]

\[ P_W^0 \]

\[ P_W^1 \]

\[ Q_S^0 \]

\[ Q_S^1 \]

\[ Q_D^1 \]

\[ Q_D^0 \]
Effects of Tariffs: Large Country

Suppliers gain \(+a'\)

Effects of tariff on Welfare
Effects of Tariffs: Large Country

Effects of tariff on Welfare
Demanders lose 
\(-(a'+b'+c'+d')\)
Effects of Tariffs: Large Country

\[ P^0_W + t \]

\[ P^1_W + t \]

\[ P^0_W \]

\[ P^1_W \]

Effects of tariff on Welfare

Government gains \(+ (c'+e')\)
Effects of Tariffs: Large Country

Effects of tariff on Welfare
Net for country
\[ +e' - (b' + d') \]

Country gains from tariff if \[ e' > (b' + d') \]

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Effects of Tariffs: Large Country

Summary:

• Suppliers gain \( +a' \)
• Demanders lose \( -(a' + b' + c' + d') \)
• Government gains \( +(c' + e') \)
• Net effect on country
  
  \[
  \text{Gain or Loss} = +e' - (b' + d')
  \]
Effects of Tariffs: Large Country

• This possibility of gain from a tariff goes under several names:
  – The “terms of trade” effect of a tariff
  – The “monopoly” effect of a tariff
  – The “optimal tariff”
Effects of Tariffs: Large Country

- The “Terms of Trade” Effect
  - Definition: 
    \[ TOT = \frac{P_{\text{exports}}}{P_{\text{imports}}} \]
    A country’s “Terms of Trade” is defined as the price of its exports relative to its imports.

- If \( TOT \) rises, the “terms of trade improves”
  - because the country gets more imports in return for its exports.

- A tariff by a large country drives down the world price of its imports
  - and thus improves its terms of trade.
Effects of Tariffs: Large Country

• The “monopoly” effect
  – From Econ 101, a monopoly firm increases its profit by
    • Selling less to the market, and hence
    • Raising the price that it gets
  – A large country can increase its welfare by
    • Buying less from the market (via a tariff), and hence
      • Lowering the price that it pays
  – Note: Large country could also gain by restricting exports, as OPEC has done with oil (Not in recent years, but it is trying again)
Effects of Tariffs: Large Country

• The “optimal tariff”
  – If a large country uses a tariff that is too large, it must lose.
  – Thus there is some level of tariff that is optimal

Example of a too large tariff:
Effects of Tariffs: Large Country

• The “optimal tariff”
Clicker Question

Who loses within a large country when it uses an optimal tariff?

a) Domestic suppliers
b) Domestic demanders ✓
c) The government
d) Nobody: only foreigners lose
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The Size of These Effects

• See Feenstra
  – Uses analysis like this one to measure effects of protection
  – Sectors with high US protection in 1985:
    • Automobiles
    • Dairy
    • Steel
    • Sugar
    • Textiles and Apparel
      (All these had quotas and other NTBs as well as tariffs.)
The Size of These Effects

• See Feenstra
  – For 1985, U.S. average tariffs caused dead-weight loss (DWL) for U.S. of
    \[ \text{DWL} = \$1.2-3.4 \text{ billion per year} \]
  – Sounds like a lot! But U.S. 1985 GDP was $4,181 b. So
    \[ \text{DWL} = 0.03\% \text{ of GDP} \]
    TINY!
The Size of These Effects

- Why is the loss from tariffs so small?
  - Most U.S. tariffs are small
  - But note, this is only the DWL
  - The transfer from consumers, to producers and to government, is much larger
The Size of These Effects

• Why so small?
  – DWL grows with the square of the tariff
  – Example:
    • Doubling the tariff
    • Multiplies DWL by 4
  – So DWL due to small tariff is smaller than the tariff itself might suggest
The US tariff on cars is 2.5%. The US tariff on light trucks is 25%. Suppose that the world prices of cars and trucks are the same and that US demand at those prices is the same. Then if the dead-weight loss due to the car tariff would be $75 per car, what would be the dead-weight loss due to the truck tariff per truck?

- a) $75
- b) $175
- c) $750
- d) $1,375
- e) $7500

The tariff is 10 times as large, so the dead weight loss is $10^2 = 100$ times as large.
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Addenda on Tariffs

• Three more things:
  1. The model we are using makes several assumptions:
     • Perfect competition:
       – All buyers and sellers are too small, individually, to affect price (even if the country is large). Answers could be different otherwise
     • Partial equilibrium
       – Market is small part of large economy, so that effects on other markets can be ignored
     • Homogeneous products
       – The imported good is a perfect substitute for domestically produced good
Addenda on Tariffs

• Three more things:

2. The large-country tariff
   • Harms the other country (or rest of world)
   • Lowers world welfare. Thus the rest-of-world loses more than the tariff-levying country gains.
   • The other country may retaliate with its own tariff. Then both lose.
Addenda on Tariffs

• Three more things:

  3. Effective Protection

  • Just as a tariff on an industry’s output helps it by raising its price, a tariff on its input hurts the industry

  • The Effective Rate of Protection takes account of tariffs on both inputs and outputs to gauge the level of protection in an industry:

    \[ ERP = \frac{t_o - at_i}{1 - a} \]

    where

    \( t_o = \text{ad valorem tariff on output} \)

    \( t_i = \text{ad valorem tariff on input} \)

    \( a = \text{value of input as share of value of output} \)
Clicker Question

Suppose that to make a $100 bicycle requires $50 of imported steel. If the tariff on bicycles is 10% and the tariff on steel is 20%, what is the effective rate of protection on bicycles?

a) 20%
b) 10%
✓ c) 0%  \( ERP = (t_o - at_i) / (1 - a) = (0.1 - 0.5 \times 0.2) / (1 - 0.5) = 0 \)
d) –10%
e) –20%
Next Time

• Nontariff Barriers
  – Quotas, etc.
  – Subsidies