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
    • Up to 25% so far on well over $250 billion of Chinese exports, with more coming on most of the rest
Who Uses Tariffs?

• Sample US tariffs
  – Cars: 2.5%
  – Trucks: 25%
  – Men’s cotton shirts: 19.7%
  – Women’s blouses: 26.9%
  – Blankets: 8.5%
  – Pullover apparel: 14.9%

• 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

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See Schavey

Sorry. Men write the tariffs

See Swanson & the “Snuggie”
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 = $P_w$

$Q^0_S$, $Q^0_D$
Effects of Tariffs: Small Country

Effect on Price

Tariff

P

S

P_a

Q_S^0

P_W+t

P_W

Q_D^0

Q

D

Lecture 5: Tariffs
Effects of Tariffs: Small Country
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

Effects on Welfare
Suppliers gain $+a$

Tariff $P_w + t$

P

P_a

P_w

Q

Q_S^0 Q_S^1 Q_D^1 Q_D^0

Diagram with shaded areas a, b, c, d representing changes in welfare.
Effects of Tariffs: Small Country

Effects on Welfare
Demanders lose $-(a+b+c+d)$
Effects of Tariffs: Small Country

Tariff: \( P_{w+t} \)

\( P_a \)

Government gains: \( +c \)

Effects on Welfare

\( Q_s^0 \), \( Q_s^1 \), \( Q_d^1 \), \( Q_d^0 \)

Lecture 5: Tariffs
Effects of Tariffs: Small Country

Effects on Welfare
Net for country
\[-(b+d)\]

Country loses from tariff

Diagram showing the effects of a tariff on a small country. The diagram illustrates the shift in supply and demand, and the calculation of welfare effects as \[-(b+d)\].
Effects of Tariffs: Small Country

Summary:

- Suppliers gain  
  \[ +a \]
- Demanders lose  
  \[ -(a+b+c+d) \]
- Government gains  
  \[ +c \]
- Net effect on country  
  \[ \text{Loss} = -(b+d) \]

"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 market equilibrium with a shift in demand and supply curves, explaining dead weight loss.]
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
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) $D^C$
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
   Gains less, actually
d) Other industries
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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

![Graph showing the effects of tariffs on supply and demand]

- $P^0_W + t$ (new price with tariff)
- $P^{1+}_W$ (price at quantity $Q^1_D$)
- $P^0_W$ (price at quantity $Q^0_D$)
- $P^1_W$ (price at quantity $Q^1_S$)
- $Q^0_S$, $Q^1_S$, $Q^1_D$, $Q^0_D$ (quantities before and after tariff)

Lecture 5: Tariffs
Effects of Tariffs: Large Country

The diagram illustrates the effects of tariffs on welfare. The supply and demand curves are shown with the following notations:

- \( P_W^0 \) is the original price for suppliers.
- \( P_W^1 \) is the price after the tariff is applied.
- \( P_W^0 + t \) is the price with the tariff.
- \( Q_S^0 \) is the original quantity supplied.
- \( Q_S^1 \) is the quantity supplied after the tariff.
- \( Q_D^0 \) is the original quantity demanded.
- \( Q_D^1 \) is the quantity demanded after the tariff.

The effects of the tariff on welfare are:

- Suppliers gain an additional amount \( +a' \).

The diagram highlights the change in welfare due to the tariff, with areas representing the gains and losses.
Effects of Tariffs: Large Country

P

\[ P_W^0 + t \]

\[ P_W^1 + t \]

\[ Q_S^0 \]

\[ Q_S^1 \]

\[ Q_D^1 \]

\[ Q_D^0 \]

Demanders lose \(- (a'+b'+c'+d')\)

Effects of tariff on Welfare

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Effects of Tariffs: Large Country

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 $e'>(b'+d')$
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 keeps trying)
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”
Is the US Large

• One would think so
• But evidence from Trump’s tariffs in 2018 (see Foy) found
  – US prices rose by full amount of tariffs
  – No fall in prices for foreign exporters
• Apparently,
  – Even though US appears to be large
  – Our share of the world market is not that big
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
    \[ DWL = 1.2 - 3.4 \text{ billion per year} \]
  – Sounds like a lot! But U.S. 1985 GDP was $4,181 b. So
    \[ DWL = 0.03\% \text{ of GDP} \]

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

\[ P \]

\[ Q \]
Clicker Question

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.

✓ e) $7500
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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

    \[ t_o = ad \ valorem \ tariff \ on \ output \]
    \[ t_i = ad \ valorem \ tariff \ on \ input \]
    \[ a = value \ of \ input \ as \ share \ of \ value \ of \ output \]
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% \[ ERP = \frac{t_o - at_i}{1 - a} = \frac{0.1 - 0.5 \times 0.2}{1 - 0.5} = 0 \]

d) –10%

e) –20%
Next Time

• Nontariff Barriers
  – Quotas, etc.
  – Subsidies