Factor Mobility

1-4 Dubai and Sri Lanka produce energy using labor and land and share the same technology. Initially, labor is scarce relative to land in Dubai compared to Sri Lanka. Consider the effects of allowing labor to move freely between the two countries.

1. Who benefits in Dubai?
   a) workers
   b) landowners
   c) workers and landowners
   d) neither workers nor landowners
   e) cannot tell from the information given

2. Who is hurt in Dubai?
   a) workers
   b) landowners
   c) workers and landowners
   d) neither workers nor landowners
   e) cannot tell from the information given

3. Who benefits in Sri Lanka?
   a) all workers, regardless of whether they leave or stay
   b) only workers who stay
   c) only workers who leave
   d) landowners
   e) landowners and workers who stay

4. Who is hurt in Sri Lanka?
   a) all workers, regardless of whether they leave or stay
   b) only workers who stay
   c) only workers who leave
   d) landowners
   e) landowners and workers who stay
FOREIGN DIRECT INVESTMENT

5-8 A U.S. firm is deciding how to serve the market in Mexico.

5. If the firm lacks ownership advantage, what mode will it choose?
   a) exports
   b) foreign direct investment
   c) licensing
   d) joint ventures
   e) stay out of Mexican market

6. If there is no location advantage, what mode will the firm choose?
   a) exports
   b) foreign direct investment
   c) licensing
   d) outsourcing
   e) stay out of Mexican market

7. If there is no internalization advantage, what mode will the firm choose?
   a) exports
   b) foreign direct investment
   c) licensing
   d) exports and foreign direct investment
   e) stay out of Mexican market

8. If there are ownership, location, and internalization advantages, what mode will the firm choose?
   a) exports
   b) foreign direct investment
   c) licensing
   d) exports and licensing
   e) stay out of Mexican market
TRADE POLICIES

9-12 Brazil, a large country, removes a binding quota on imports of industrial goods from the United States.

9. The price of industrial goods in the United States
   a) rises
   b) remains the same
   c) falls
   d) remains the same or falls
   e) cannot tell from the information given

10. The price of industrial goods in Brazil
    a) rises
    b) remains the same
    c) falls
    d) remains the same or rises
    e) cannot tell from the information given

11. The quantity demanded of industrial goods in the United States
    a) rises
    b) remains the same
    c) falls
    d) remains the same or rises
    e) cannot tell from the information given

12. The quantity supplied of industrial goods in the United States
    a) rises
    b) remains the same
    c) falls
    d) remains the same or falls
    e) cannot tell from the information given
13-16 The United States, a large country, removes a specific subsidy on cotton exports.

13. The price of cotton in the United States
   a) falls by more than the amount of the subsidy
   b) falls by exactly the amount of the subsidy
   c) falls by less than the amount of the subsidy
   d) remains the same
   e) rises

14. The price of cotton in the ROW
   a) rises by more than the amount of the subsidy
   b) rises by exactly the amount of the subsidy
   c) rises by less than the amount of the subsidy
   d) remains the same
   e) falls

15. The volume of cotton exported by the United States
   a) rises
   b) remains the same
   c) falls
   d) remains the same or rises
   e) cannot tell from the information given

16. Who in the United States gains?
   a) consumers
   b) producers
   c) government revenue
   d) a) and c)
   e) b) and c)
TRADE POLICY PROBLEMS

In the United States (US), inverse demand for clothing is \( P = 28 - 2Q_D \), while inverse supply of clothing is \( P = 10 + 2Q_S \). In the rest of the world (ROW), inverse demand for clothing is \( P^* = 22 - 2Q_D^* \), while inverse supply of clothing is \( P^* = 2Q_S^* \).

1. Derive the US autarky price and quantity.

Derive the US import demand (including slope-intercept form).

Derive the ROW autarky price and quantity.

Derive the ROW export supply (including slope-intercept form).
2. Derive the free trade price and US imports under free trade.

Derive US quantity demanded and quantity supplied under free trade.

3. Derive the US tariff-ridden import demand for a specific tariff $t = 4$ (including slope-intercept form).

Derive the ROW price, the US price, and US imports with the tariff.

Derive US quantity demanded and quantity supplied with the tariff.

How large of a tariff would the United States need to impose to prohibit all imports?
4. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff (starting with the general equations and being sure to indicate the areas corresponding to each on the US graph).

5. Define and derive the US consumption distortion and production distortion.

Define and derive the US efficiency loss and terms of trade gain.

6. Derive the change in welfare in the United States due to the tariff. Confirm that the net welfare calculation yields the same answer.

Is the United States better or worse off with the tariff and why?
DRAW WORLD MARKET GRAPH HERE: US IMPORT DEMAND, ROW EXPORT SUPPLY, US TARIFF-RIDDEN IMPORT DEMAND

DRAW US MARKET GRAPH HERE: US DEMAND, US SUPPLY
Indicate free trade price, US quantity demanded and quantity supplied under free trade, US tariff-ridden price, US quantity demanded and quantity supplied with the tariff, and ROW tariff-ridden price. Label areas corresponding to change in consumer surplus, change in producer surplus, change in government revenue, production distortion, consumption distortion, efficiency loss, and terms of trade gain.

On my honor as an Aggie, I have neither given nor received unauthorized aid on this exam.

Signature __________________________
1b Landowners in Dubai benefit.
2a Workers in Dubai are hurt.
3a All workers, regardless of whether they leave or stay benefit in Sri Lanka.
4d Landowners in Sri Lanka are hurt.
5e Without ownership advantage, the firm will stay out of the Mexican market.
6a Without location advantage, the firm will choose exports.
7c Without internalization advantage, the firm will choose licensing.
8b With ownership, location, and internalization advantage, the firm will choose foreign direct investment.
9a The price of industrial goods in the United States rises.
10c The price of industrial goods in Brazil falls.
11c The quantity demanded of industrial goods in the United States falls due the higher price.
12a The quantity supplied of industrial goods in the United States rises due the higher price.
13c The price of cotton in the United States falls by less the amount of the subsidy.
14c The price of cotton in the ROW rises by less the amount of the subsidy.
15c The volume of cotton exported by the United States falls.
16d Consumers and government revenue gain in the United States.
PROBLEMS

1. Derive US autarky price and quantity.
\[28 - 2Q^A = 10 + 2Q^A, \quad 4Q^A = 18, \quad Q^A = 9/2 = 4.5\]
\[P^A = 28 - 2Q^A = 28 - 9 = 19\]

Derive the US import demand (including slope-intercept form).
\[P = 28 - 2Q_D, \quad Q_D = 14 - \frac{1}{2}P\]
\[P = 10 + 2Q_S, \quad Q_S = -5 + \frac{1}{2}P\]
\[M = Q_D - Q_S = 14 - \frac{1}{2}P - \left(-5 + \frac{1}{2}P\right)\]
\[M = 19 - P, \quad P = 19 - Q_M\]

Derive the ROW autarky price and quantity.
\[22 - 2Q^{A*} = 2Q^{A*}, \quad 4Q^{A*} = 22, \quad Q^{A*} = 11/2 = 5.5\]
\[P^{A*} = 22 - 2Q^{A*} = 22 - 11 = 11\]

Derive the ROW export supply (including slope-intercept form).
\[P^* = 2Q_S^*, \quad Q_S^* = \frac{1}{2}P^*\]
\[P^* = 22 - 2Q_D^*, \quad Q_D^* = 11 - \frac{1}{2}P^*\]
\[X^* = Q_S^* - Q_D^* = \frac{1}{2}P^* - \left(11 - \frac{1}{2}P^*\right)\]
\[X^* = -11 + P^*, \quad P^* = 11 + Q_X^*\]
2. Derive the free trade price and US imports under free trade.

\[ M = X^*, \ 19 - P = -11 + P^*, \ 30 = 2P, \ P = P^* = 15 \]
\[ M = 19 - P = 19 - 15 = 4 \]

Derive US quantity demanded and quantity supplied under free trade.

\[ P = 28 - 2Q_D, \ 15 = 28 - 2Q_D, \ D^1 = Q_D = \frac{13}{2} = 6.5 \]
\[ P = 10 + 2Q_S, \ 15 = 10 + 2Q_S, \ S^1 = Q_S = \frac{5}{2} = 2.5 \]

3. Derive the US tariff-ridden import demand for a specific tariff \( t = 4 \) (including slope-intercept form).

\[ M_T = 19 - P_T = 19 - (P_T^* + 4) \]
\[ M_T = 15 - P_T^*, \ P_T^* = 15 - Q_{M_T} \]

Derive the ROW price, the US price, and US imports with the tariff.

\[ M_T = X^*, \ 15 - P_T^* = -11 + P_T^*, \ 26 = 2P_T^*, \ P_T^* = 13 \]
\[ P_T = P_T^* + t = 13 + 4 = 17 \]
\[ M_T = 15 - P_T^* = 15 - 13 = 2 \]

Derive US quantity demanded and quantity supplied with the tariff.

\[ P_T = 28 - 2Q_D^T, \ 17 = 28 - 2Q_D^T, \ D^2 = Q_D^T = \frac{11}{2} = 5.5 \]
\[ P_T = 10 + 2Q_S^T, \ 17 = 10 + 2Q_S^T, \ S^2 = Q_S^T = \frac{7}{2} = 3.5 \]

How large of a tariff would the United States need to impose to prohibit all imports?

\[ t' = P^A - P^{A*} = 19 - 11 = 8 \]
4. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff.

\[
\Delta CS = -abcd = -(P_T - P) \left( \frac{D^1 + D^2}{2} \right) = -(17 - 15) \left( \frac{6.5 + 5.5}{2} \right) = -12
\]

\[
\Delta PS = a = (P_T - P) \left( \frac{S^1 + S^2}{2} \right) = (17 - 15) \left( \frac{2.5 + 3.5}{2} \right) = 6
\]

\[
\Delta GR = ce = TM_T = 4(2) = 8
\]

5. Define and derive the US consumption distortion and production distortion.

*Consumption distortion is loss due to too little consumption (some units not consumed where value above free trade price).*

\[
d = \Delta P \left( \frac{\Delta D}{2} \right) = (17 - 15) \left( \frac{6.5 - 5.5}{2} \right) = 1
\]

*Production distortion is loss due to too much production (some units produced at cost above free trade price).*

\[
b = \Delta P \left( \frac{\Delta S}{2} \right) = (17 - 15) \left( \frac{3.5 - 2.5}{2} \right) = 1
\]

Define and derive the US efficiency loss and terms of trade gain.

*Efficiency loss is size of total distortion, consumption plus production.*

\[
b + d = 1 + 1 = 2
\]

*Terms of trade gain is degree that buy imports cheaper.*

\[
e = (P - P^T)M_T = (15 - 13)(2) = 4
\]

6. Derive the change in welfare in the United States due to the tariff. Confirm that the net welfare calculation yields the same answer.

\[
\Delta W = \Delta CS + \Delta PS + \Delta GR = -12 + 6 + 8 = 2
\]

\[
e-(b+d) = 4 - 2 = 2
\]

Is the United States is better or worse off due to the tariff and why?

Better. The terms of trade gain outweighs the efficiency loss for large country starting from free trade.
<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
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<tbody>
<tr>
<td></td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>b</td>
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<td></td>
<td>d</td>
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<tr>
<td></td>
<td>e</td>
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![Graph showing the intersection of demand and supply curves.](image-url)