Final Exam, Spring 2005

TRADE POLICIES

1-4 Palau, a small country, *imposes* a binding quota on imports of buffs.

1. The price of buffs in Palau
   a) rises
   b) remains the same
   c) falls
   d) b) or c)
   e) cannot tell from the information given

2. The price of buffs in the ROW
   a) rises
   b) remains the same
   c) falls by the same amount that the price in Palau rises
   d) falls by the same amount that the price in Palau falls
   e) cannot tell from the information given

3. Welfare in Palau
   a) rises
   b) remains the same
   c) falls
   d) a) or b)
   e) cannot tell from the information given

4. Welfare in the ROW
   a) rises
   b) remains the same
   c) falls if welfare in Palau rises
   d) falls if welfare in Palau falls
   e) cannot tell from the information given

5-8. Vanuatu, a small country, *imposes* a specific subsidy on exports of torches.

5. The price of torches in Vanuatu
   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

6. The price of torches 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

7. Welfare in Vanuatu
   a) rises
   b) remains the same
   c) falls
   d) a) or b)
   e) cannot tell from the information given

8. Welfare in the ROW
   a) rises
   b) remains the same
   c) falls if welfare in Vanuatu rises
   d) falls if welfare in Vanuatu falls
   e) cannot tell from the information given

FACTOR MOBILITY

9-12. The United States and Mexico produce swimming pools using labor and land. Initially, labor is scarce relative to land in the United States compared to Mexico. Suppose the countries share the same technology. Consider the effects of allowing labor to move freely between the two countries.

9. Welfare in the United States will
   a) rise
   b) fall
   c) remain unchanged
   d) a) or c)
   e) b) or c)

10. World welfare will
   a) rise
   b) fall
   c) remain unchanged
   d) a) or c)
   e) b) or c)

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

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

FOREIGN DIRECT INVESTMENT

13-16 Microsoft is deciding how to serve the software market in China.

13. The risk that employees, once trained, might leave to work for rival firms suggests that which type of advantage might be lacking?
    a) ownership
    b) location
    c) internalization
    d) a) and c)
    e) b) and c)

14. If that advantage is indeed lacking, what option cannot be ruled out?
    a) exports
    b) foreign direct investment
    c) licensing
    d) a) and c)
    e) b) and c)

15. The risk that a Chinese licensee might try to sell software outside of China (in violation of the terms of the license) suggests what type of advantage might be present?
    a) ownership
    b) location
    c) internalization
    d) a) and c)
    e) b) and c)

16. If that advantage is indeed present, what option is ruled out?
    a) exports
    b) foreign direct investment
    c) licensing
    d) a) and c)
    e) b) and c)

TRADE POLICY PROBLEMS

In the United States (US), inverse demand for clothing is $P = 71 - 2Q_D$, while inverse supply of clothing is $P = 31 + 2Q_S$. In the rest of the world (ROW), inverse demand for clothing is $P^* = 47 - 2Q_D^*$, while inverse supply of clothing is $P^* = 7 + 2Q_S^*$.

1. Derive the US autarky price and quantity. Derive the US import demand (including slope-intercept form).

2. Derive the ROW autarky price and quantity. Derive the ROW export supply (including slope-intercept form).

3. Derive the free trade price and US imports under free trade. Derive US quantity demanded and quantity supplied under free trade.

4. Derive the US tariff-ridden import demand for a tariff T = 12 (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?

5. 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).

6. Define and derive the US consumption distortion and production distortion. Define and derive the US efficiency loss and terms of trade gain. 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
Indicate US and ROW autarky prices, free trade price, US imports under free trade, US tariff-ridden price, ROW tariff-ridden price, and US tariff-ridden imports.

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.

Final Exam Solutions, Spring 2005

1a The price of buffs in Palau rises.
2b The price of buffs in the ROW remains the same since Palau is a small country.
3c Welfare in Palau falls due to consumption and production distortions.
4b Welfare in the ROW remains the same.

5b The price of torches in Vanuatu rises by exactly the amount of the subsidy.
6d The price of torches in the ROW remains the same.
7c Welfare in Vanuatu falls.
8b Welfare in the ROW remains the same.

9a Welfare in the United States will rise.
10a World welfare will rise.
11a Workers in the United States are hurt.
12b Landowners in Mexico are hurt.

13b Location advantage might be lacking.
14a Without location advantage, exports cannot be ruled out.
15c Internalization advantage might be present.
16c With internalization advantage present, licensing is ruled out.

PROBLEMS

1 Derive US autarky price and quantity.

$$71 - 2Q^A = 31 + 2Q^A,\ 4Q^A = 40,\ Q^A = 10$$

$$P^A = 71 - 2Q^A = 71 - 20 = 51$$

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

$$P = 71 - 2Q_D,\ Q_D = \frac{71}{2} - \frac{1}{2}P$$

$$P = 31 + 2Q_S,\ Q_S = -\frac{31}{2} + \frac{1}{2}P$$

$$M = D - S = Q_D - Q_S = \frac{71}{2} - \frac{1}{2}P - \left(-\frac{31}{2} + \frac{1}{2}P\right)$$

$$M = 51 - P,\ P = 51 - Q_M$$

2. Derive the ROW autarky price and quantity.

$$47 - 2Q^{A*} = 7 + 2Q^{A*},\ 4Q^{A*} = 40,\ Q^{A*} = 10$$

$$P^{A*} = 47 - 2Q^{A*} = 47 - 20 = 27$$

Derive the ROW export supply (including slope-intercept form).

$$P^* = 7 + 2Q_S^*,\ Q_S^* = -\frac{7}{2} + \frac{1}{2}P^*$$

$$P^* = 47 - 2Q_D^*,\ Q_D^* = \frac{47}{2} - \frac{1}{2}P^*$$

$$X^* = S^* - D^* = Q_S^* - Q_D^* = -\frac{7}{2} + \frac{1}{2}P^* - \left(\frac{47}{2} - \frac{1}{2}P^*\right)$$

$$X^* = -27 + P^*,\ P^* = 27 + Q_X^*$$

3. Derive the free trade price and US imports under free trade.

$$M = X^*,\ 51 - P = -27 + P^*,\ 78 = 2P,\ P = P^* = 39$$

$$M = 51 - P = 51 - 39 = 12$$

Derive US quantity demanded and quantity supplied under free trade.

$$P = 71 - 2Q_D,\ 39 = 71 - 2Q_D,\ D \equiv Q_D = \frac{32}{2} = 16$$

$$P = 31 + 2Q_S,\ 39 = 31 + 2Q_S,\ S \equiv Q_S = \frac{8}{2} = 4$$

4. Derive the US tariff-ridden import demand for a tariff T = 12 (including slope-intercept form).

$$M_T = 51 - P_T = 51 - (P_T^* + 12),\ M_T = 39 - P_T^*,\ P_T^* = 39 - Q_{M_T}$$

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

$$M_T = X^*,\ 39 - P_T^* = -27 + P_T^*,\ 66 = 2P_T^*,\ P_T^* = 33$$

$$P_T = P_T^* + T = 33 + 12 = 45$$

$$M_T = 39 - P_T^* = 39 - 33 = 6$$

Derive US quantity demanded and quantity supplied with the tariff.

$$P^T = 71 - 2Q_D^T,\ 45 = 71 - 2Q_D^T,\ D^T \equiv Q_D^T = \frac{26}{2} = 13$$

$$P^T = 31 + 2Q_S^T,\ 45 = 31 + 2Q_S^T,\ S^T \equiv Q_S^T = \frac{14}{2} = 7$$

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

$$T' = P^A - P^{A*} = 51 - 27 = 24$$

5. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff.

$$\Delta CS = -abcd = -(P_T - P)\left(\frac{D + D_T}{2}\right) = -(45 - 39)\left(\frac{16 + 13}{2}\right) = -87$$

$$\Delta PS = a = (P_T - P)\left(\frac{S + S_T}{2}\right) = (45 - 39)\left(\frac{4 + 7}{2}\right) = 33$$

$$\Delta GR = ce = TM_T = 12(6) = 72$$

6. 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).

$$d = \Delta P\left(\frac{\Delta D}{2}\right) = (45 - 39)\left(\frac{16 - 13}{2}\right) = 9$$

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

$$b = \Delta P\left(\frac{\Delta S}{2}\right) = (45 - 39)\left(\frac{7 - 4}{2}\right) = 9$$

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

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

$b + d = 9 + 9 = 18$

Terms of trade gain is degree that buy imports cheaper.

$e = (P - P^{T*})M_T = (39 - 33)(6) = 36$

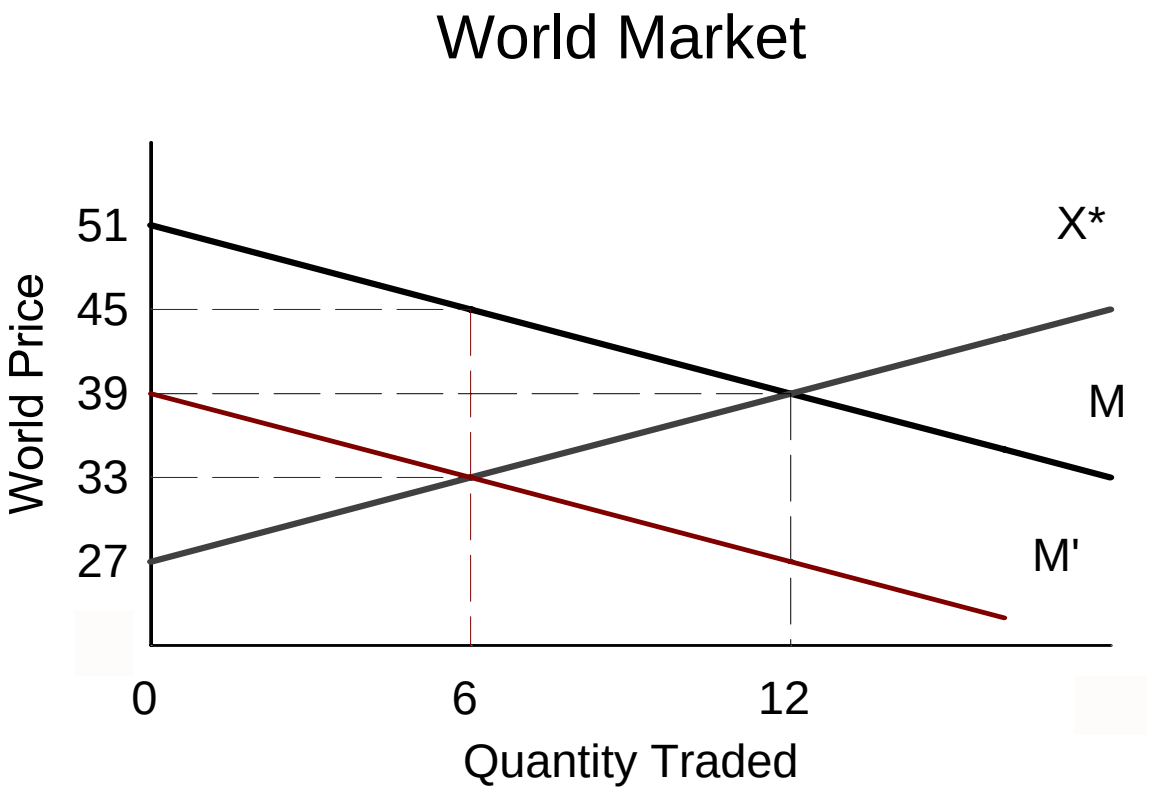
Derive the change in welfare in the United States due to the tariff. Confirm that the net welfare calculation yields the same answer.

$\Delta W = \Delta CS + \Delta PS + \Delta GR = -87 + 33 + 72 = 18$

e-(b+d) = 36 - 18 = 18

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.


World Market
World Price
51
45
39
33
27
X*
M
M'
0
6
12
Quantity Traded

U.S. Market