PROBLEM SET 2

1. Use partial equilibrium analysis and make the small country assumption. Show the welfare impact of a tariff of 50% using the producer/consumer surplus concepts. What is the net welfare loss/gain from imposing the tariff? (Fill in any needed information.)

What would the net welfare loss/gain be if a quota was used instead? What would the "Cost" of an equivalent subsidy be?

Loss-Consumer Surplus
\[ = (.50)(6000) + \frac{1}{2}(.50)(2000) \]
\[ = $3500 \]

D.W. Losses
\[ = \frac{1}{2}(.50)(1500) + \frac{1}{2}(650 \times 2000) \]
\[ = $875 \]

Gain-Producer Surplus
\[ = (.50)(2000) + \frac{1}{2}(.50)(1500) \]
\[ = $1375 \]

Cost of an Equivalent Subsidy
\[ = (.50)(3500) \]
\[ = $1750 \]

Gain-Government Revenue
\[ = (.50)(2500) \]
\[ = $1250 \]

Cost of a Quota
\[ = \text{the D.W. Loss + any loss of Quota} \]
\[ = $875 + (0 \times 1250) \]

Calculate the effective rate of protection in the following cases:

(a) \( t_j \) = tariff on the final good = .20
\( t_i \) = tariff on input #1 = .10
\( t_2 \) = tariff on input #2 = .15
\( t_3 \) = tariff on input #3 = .05
\( a_{ij} \) = input/output coefficient for input #1 = .10
\( a_{2j} \) = input/output coefficient for input #2 = .05
\( a_{3j} \) = input/output coefficient for input #3 = .20

2. (a) (Use Alternative Formula for ERP - p. 234)

\[ ERP = \frac{t_j - \sum a_{ij}t_i}{1 - \sum a_{iy}} \]
\[ = \frac{.20 - [(.1)(.1) + (.15)(.05) + (.05)(.20)]}{1 - (.10 + .05 + .20)} \]
(b) Price of the final good = $10.00

Value of input #1 used in production = $2.00
Value of input #2 used in production = $3.00
Therefore Value Added

\[ \text{Value Added} = 10 - (3 + 2) = \$5 \]

Tariff on the final good = .30
Tariff on input #1 = .10
Tariff on input #2 = .20

\[
\text{ERP} = \frac{\Delta \text{VA Tariff regime}}{\text{VA}_{\text{PT}}} = \frac{(10) - (2) - (3) - (120) - 5}{5} = \frac{7.20 - 5}{5} = .44 \text{ or } 44\%
\]

3. COUNTRY I (IMPORTER) COUNTRY II (EXPORTER)

International Equilibrium is at \( P_{\text{int}} \) where desired exports = desired imports.

—With a tariff, price in the importing country rises to \( P' \) and prices in the exporting country falls to \( P'' \), resulting in new lower levels of imports and exports.

—Total government revenue = c + d.

—The net effect on the importing country is the transfer from the exporting country through lower prices, c, minus the 2 dead weight losses in the importing country, a + b.
The net effect on the exporting country is the transfer loss, c, as well as the 2 dead weight losses e and f.

In the case of a quota, the effects are the same as the tariff if all the quota rent stay in the importing country. If the quota rent all goes to the exporting country:

- the effect on the exporting country = \( d - (e + f) \)
- the effect on the importing country = \(-d - (a + b)\)

4. (a) Calculate the net benefits of protection in the following large country example.

**Importing Country A**

Old Imports = 250
New Imports = 200

Because the two S curves diverge, this is an ad valorem tariff \( j \)

\[ t_j = \frac{13 - 8}{8} = \frac{5}{8} = 62.5\% \]

Gain - Government Revenue
\[ = (\$5)(200) = \$1000 \]

NET EFFECT on A
\[ = $400 - $75 = \$325 (+) \]

Total Dead Wt. Loss-Country A = “\( a \)”
\[ = \frac{1}{2} (3)(50) \]
\[ = \$75 \]

Transfer into A from the exporting country through lower price
\[ = (\$2)(200) \]
\[ = \$400 \]

Exporting Country D.W. Loss = \( \frac{1}{2} (2)(50) \)
\[ = \$50 = "b" \]

(b) How would an import quota of 200 affect this market? How would the welfare effects differ from the tariff?
—The Market effects are the same as the above tariff of 62.5%. However, there is the question of what happened to the “quota rent.” If it is all captured by the home country (through a auctioning of quota rights or, by retailers) the effects are the same as a tariff.

If the exporting country captures all the quota Rent, then:

Country A EFFECT = \( \frac{(-)}{D.W. Loss} + \frac{(-)}{transfer} = -\$75 + \left[-(3)(200)\right] = (-) \$675 \)

Exporting Country EFFECT = \( \frac{(-)}{D.W. Loss} + \frac{(+)}{Transfer} = (-) \$50 + (3)(200) \)

\[ = (+) \$550 \]

—The World Efficiency Loss = \( \$125 = D.W. Loss A + D.W. Loss in B \)

5.(a) In the case below, compare the effect of an export tax of $2 with that of an export subsidy of $2. How do the welfare effects compare in the two cases? The international price is $10.

Initial Exports at \( P = \$10 \)

\[ \begin{array}{l}
(1) \text{ Export tax of } \$2 \\
\text{New domestic price } = \$8 \\
\text{New Exports } = 70 \\
\text{Loss-Producer Surplus } = (2)(200) + \frac{1}{2}(2)(20) \\
\quad = \$420 \\
\text{Gain-Consumer Surplus } = 2(100) + \frac{1}{2}(2)(30) \\
\quad = \$230 \\
\text{Gov’t Revenue } = (2)(70) = \$140 \\
\text{D.W. Losses } = \$50 \\
\end{array} \]

\[ \begin{array}{l}
(2) \text{ Export subsidy of } \$2 \\
\text{New domestic price } = \$12 \\
\text{New exports } = 165 \\
\text{Gain-Producer Surplus } = (2)(220) + \frac{1}{2}(2)(25) \\
\quad = \$465 \\
\text{Loss-Consumer Surplus } = (2)(80) + \frac{1}{2}(2)(20) \\
\quad = \$180 \\
\text{Subsidy Cost } = (165)(2) = \$330 \\
\text{D.W. Losses } = (-)\$45 \\
\end{array} \]
5. (b) 

(1) Export tax of $2.

(2) $2 Export Subsidy

6. Calculate the net costs/benefits of economic integration between country A and country B in the following single market example; Assume that a tariff of 40% is applied by country A.
Trade Creation Effect

D.W. Gains - A = \( \frac{1}{2} \times 0.4 \times 300 \) + \( \frac{1}{2} \times 0.4 \times 400 \)
= 60 + 80
= $140

Trade diversion effect

Net loss in Gov't Revenue
= (2)500
= $1000

Net Effect
= + 140 - 1000
= (-) $860
7. Suppose that Batania has the following recorded transactions with the rest of the world during the year 1989 (expressed in millions of Bat dollars). Set up the Balance of Payments and calculate the Balance on Current Account, the Balance of Trade and the official Reserve Transactions Balance.

<table>
<thead>
<tr>
<th>Description</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merchandise exports</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Merchandise imports</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Tourist expenditure by Batanians in foreign countries</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Foreign tourist expenditures in Batania</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Transportation expenditures paid abroad</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Interest and dividends paid to foreigners</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Interest and dividends received from foreigners</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Government grants received (a unilateral transfer)</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Direct long term investment in foreign countries</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Direct long term investment in Batania by foreigners</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Short term (ST) U.S. bonds purchased by Bat residents</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Increase in (ST) private bank deposits abroad</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Increase in foreigners’ bank deposits in Batania (ST)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Sales or foreign currency (private)</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Change in Batania’s official public holding or foreign currencies</td>
<td>+3</td>
<td></td>
</tr>
<tr>
<td>Errors and omissions</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

**Balance of Payments**

**I. Current Account**

A. Merchandise Trade

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>800</td>
</tr>
<tr>
<td>Imports</td>
<td>500</td>
</tr>
</tbody>
</table>

Balance on Merchandise Trade: 300

B. Services

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
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</thead>
<tbody>
<tr>
<td>Exports</td>
<td>40</td>
</tr>
<tr>
<td>Imports</td>
<td>240</td>
</tr>
</tbody>
</table>

Balance of Trade in Goods and Services: 100

C. Unilateral Transfers

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Balance on Current Account: 200

**II. Capital Account**

A. Long term capital

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>60</td>
</tr>
</tbody>
</table>

B. Short term capital

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(800)</td>
<td>(500)</td>
</tr>
<tr>
<td>(40)</td>
<td>(240)</td>
</tr>
<tr>
<td>(100)</td>
<td>(150)</td>
</tr>
<tr>
<td>(60)</td>
<td></td>
</tr>
<tr>
<td>(50)</td>
<td>(50)</td>
</tr>
<tr>
<td>(8)</td>
<td>(75)</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
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</table>

Short Term Capital Account

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>8</td>
</tr>
</tbody>
</table>

C. Errors and Omissions

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Official Reverse Transfers Balance: -3

Total BOP: 2076

-- An errors and omissions entry of + $4 would happen if the sum of debits exceeded the sum of credits when eventually was totaled.