

Problem set 3

Objective: This problem set is designed to illustrate the economic implications of an import tariff both in terms of the partial equilibrium effects and some expected general equilibrium effects. In addition, the student is expected to apply various concepts introduced in class.

Problem: Suppose the internal agricultural markets of a net importing and a net exporting country are described by the following systems of equations. Model the changes in equilibrium and analyze the economic effects of a policy change from free trade to restricted trade in the agricultural good.

Importer's agricultural market	Exporter's agricultural market
$D_A: Q_A = 4125 - 12.5 P_A$	$ES_A: Q_A = -3000 + 100 P_A$
$S_A: Q_A = -375 + 37.5 P_A$	$S_A: Q_A = 1000 + 75 P_A$

- 3.1. Use a partial equilibrium framework (i.e., 3-panel diagram) to represent the three agricultural goods markets: the internal markets of the importer and exporter, and the world market.

	Pre-trade market situations		
	Price	Production	Consumption
Importer			
Exporter			

- 3.2. Step 1. Solve for the world price, $[P_A]_w$, quantity traded, $[Q_A]_T$, and the value of trade, $[V_A]_T$. Step 2. Then determine the initial quantities supplied, $[Q_A]_0$, and demanded, $[C_A]_0$, in the exporting country using the world market information.

Free trade price, production, consumption and trade quantities and value						
	Price $[P_A]_w$	Production $[Q_A]_0$	Consumption $[C_A]_0$	Trade		Excess supply and demand curves
				$[Q_A]_T$	$[V_A]_T$	
Importer						$[ED_A] =$
Exporter						$[ES_A] =$
Trade under trade policy intervention in agricultural market: ad valorem tariff of 75%						
	$[P_A]_D$	$[P_A]_w$	$[Q_A]_1$	$[C_A]_1$	$[Q_A]_{T'}$	$[V_A]_{T'}$
Importer						$[ED_A]_1 =$
Exporter						$[ES_A] =$

- 3.3. Now, suppose the government in the importing country applies an ad valorem tariff of 75 percent. Ignore the possibility for retaliation. Step 3. Solve for the new excess demand function with the tariff. Step 4. Determine the new equilibrium quantities supplied, $[Q_A]_1$, and demanded, $[C_A]_1$, in the importing and exporting countries by solving for the domestic price, $[P_A]_D$, the new world price, $[P_A]_{w'}$, and quantity and value traded, $[Q_A]_{T'}$ and $[V_A]_{T'}$.

- 3.4. For the exporting country, analyze the welfare effects of the export subsidy relative to the free trade equilibrium solution. Identify the areas in your partial equilibrium model that represent the welfare changes in consumer surplus, ΔCS , producer surplus, ΔPS , change in government revenue or budgetary expenditures, ΔG , and the net social welfare, ΔNSW . Compare the welfare estimates to a measurement of the consumer and producer subsidy equivalents, CSE and PSE, respectively. Explain the difference if the value of the measurements. What would be the change in NSW in the world? Explain.

Welfare analysis				Subsidy equivalent measurements		
	Importer	Exporter	Change in NSW in the world		Importer	Exporter
ΔCS				CSE		
ΔPS				PSE		
ΔG						
ΔNSW						

- 3.5 Application of concepts related to tariffs.
- 3.5.1 What is the specific tariff equivalent to the ad valorem tariff of 75%? That is, what rate of a specific tariff would result in the same economic and welfare effects? What is the quota equivalent of an ad valorem tariff of 75%?
- 3.5.2 Is this the maximum revenue-generating tariff? That is, is there a different rate of tariff that can generate the government more revenue than the 75% rate?
- 3.5.3 Is this an example of optimal tariff policy? That is, was the importing country's government able to improve overall social welfare? Was this an example of strategic import policy on the part of the government? Explain.
- 3.6. Use the partial equilibrium results to conclude directional changes in production, consumption and trade in the importing country's economy in a general equilibrium setting. Assume a two-sector economy, agriculture and manufacturing under the assumptions presented and discussed in class. Note: you only have solved a partial equilibrium problem in the agricultural sector. Deduce the trade effects on the international manufacturing market given the information you have about changes in relative price of the agricultural good (i.e., P_A relative to P_M) on the domestic market and the international market. To do this, use the offer curve analysis to show (1) the initial equilibrium of quantity trade, $[Q_A]_T$ for $[Q_M]_T$, (2) the initial terms of trade, TOT , (3) the new equilibrium quantity traded, $[Q_A]_{T'}$ for $[Q_M]_{T'}$, and (4) the new terms of trade, TOT_1 .

Optional: a more advanced general equilibrium solution would be the use of the H-O-S framework. Relying on the use of the H-O-S model, show the general equilibrium result of the tariff on trade on production, consumption, trade and welfare in the importing country. Do the same for the exporting country.