Exercise set 4. Assignment 2

Problem: The economies of North and South have both an agricultural and a manufacturing sector. Solve the partial equilibrium economic effects of trade liberalization in both sectors. The results of the partial equilibrium analysis are to be put into a general equilibrium context by using the H-O-S framework. Maintain the standard H-O-S assumptions discussed in class.

The internal agricultural markets in North and South are expressed exactly as in assignment 1.

North's Agricultural Market	South's Agricultural Market
D_A: $Q_A = 900 - 10\ P_A$	D_A: $Q_A = 1000 - 5\ P_A$
S_A: $Q_A = -150 + 15/2\ P_A$	S_A: $Q_A = 650 + 25/2\ P_A$

Suppose that the internal markets for manufactured products in North and South, respectively, are expressed mathematically as:

North's Manufacturing Market	South's Manufacturing Market
D_M: $Q_M = 1000 - 5\ P_M$	D_M: $Q_M = 1233.33 - 40/3\ P_M$
S_M: $Q_M = 650 + 25/2\ P_M$	S_M: $Q_M = -50 + 10\ P_M$

Suppose the endpoints of the production possibilities curves are observable: for PPC^N the points are (0A,1250M) and (375A,0M); and for PPC^S they are (0A,650M) and (1275A,0M).

2.1. The partial equilibrium analysis for the agricultural good was done in assignment 1. Repeat the steps taken to solve for the pre-trade equilibrium in the manufacturing sector: the quantity of manufactured goods produced (Q_M) and consumed (C_M) in North and South.

Pre-trade equilibrium in the agricultural and manufacturing sectors

North's agricultural market					South's agricultural market				
$[P_A]^*$	$[Q_A]^*$	$[C_A]^*$	$[Q_A]_T$	$[V_A]_T$	$[P_A]^*$	$[Q_A]^*$	$[C_A]^*$	$[Q_T]$	V_T
			0	0				0	0

North's manufacturing market					South's manufacturing market				
$[P_M]^*$	$[Q_M]^*$	$[C_M]^*$	$[Q_M]_T$	$[V_M]_T$	$[P_M]^*$	$[Q_M]^*$	$[C_M]^*$	$[Q_T]$	V_T
			0	0				0	0

2.2. Complete the partial equilibrium analysis by deriving the excess supply (ES) and demand curves (ED) for the world manufacturing market.

Excess demand and supply functions

World agricultural market	
$ED_A =$	$ES_A =$
World manufacturing market	
$ED_M =$	$ES_M =$

2.3. Determine the world price, $[P_M]_W$, quantity traded, $[Q_M]_T$, the value of trade, $[V_M]_T$, and the new domestic market situations in the manufacturing sectors in each country, i.e., $[Q_M]_1$ and $[C_M]_1$.

Free-trade equilibrium in the agricultural and manufacturing sectors

North's agricultural sector					South's agricultural sector				
$[P_A]_W$	$[Q_A]_1$	$[C_A]_1$	$[Q_A]_T$	$[V_A]_T$	$[P_A]_W$	$[Q_A]_1$	$[C_A]_1$	$[Q_A]_T$	$[V_A]_T$

North's manufacturing sector					South's manufacturing sector				
$[P_M]_W$	$[Q_M]_1$	$[C_M]_1$	$[Q_M]_T$	$[V_M]_T$	$[P_M]_W$	$[Q_M]_1$	$[C_M]_1$	$[Q_M]_T$	$[V_M]_T$

2.4. Construct the 3-panel diagram showing the market changes from pre-trade to free trade.

2.5. Using the price and the quantity traded information from parts 2.1 through 2.3, compute the pre-trade price ratios in both countries, $[P_A]_N / [P_M]_N$ and $[P_A]_S / [P_M]_S$, the free trade price, ratio, $[P_A]_W / [P_M]_W$, and compare the ratio of volume traded ratio, $[Q_M]_T / [Q_A]_T$.

General equilibrium analysis

Market:	Pre-trade prices				Trade prices		Quantity traded	
	North		South		World	TOT	Volumes	$[Q_M]_T / [Q_A]_T$ ratio
	Prices	P-ratio	Prices	P-ratio	prices	P-ratio		
Agriculture								
Manufacturing								

2.6. Use the H-O-S 2 x 2 x 2 modeling framework to construct the general equilibrium outcome that corresponds with the results of the partial equilibrium solutions. Separately graph the general equilibrium situations of North and South to show the economic and welfare effects of trade liberalization, i.e., moving from a pre-trade to a free trade situation. Identify the pre-trade prices, P_A / P_M, the TOT, the trade triangles, and plot the pre-trade and with-trade production and consumption points and the endpoints of the production possibilities curves. Be sure to include social welfare curves, SW, to show that the consumption points are welfare maximizing given preferences, income, and prices.

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