International Macroeconomics
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Problem Set 4 – The Real Exchange Rate and the TNT Model

Questions

4.1 Suppose that two countries, Brazil and Mexico, produce bananas. Brazil uses the real, Mexico uses the peso. In Mexico, bananas sell for 10 pesos per pound of bananas. The exchange rate is 0.5 reals per peso, $e_{reals-pesos} = 0.5$. The peso–dollar exchange rate is $e_{pesos-\$} = 10$.

(a) If LOOP holds, what is the price of bananas in Brazil? What is the price in the US?

(b) Suppose the price of bananas in Brazil is 5.5 reals per pound. At the same time, the price of bananas in the United States is $1.00 per pound. Based on this information, where does LOOP hold?

(c) How will banana traders respond to the previous situation? In which markets will traders buy bananas? Where will they sell them? What will happen to the prices of bananas in Mexico, Brazil, and the United States?

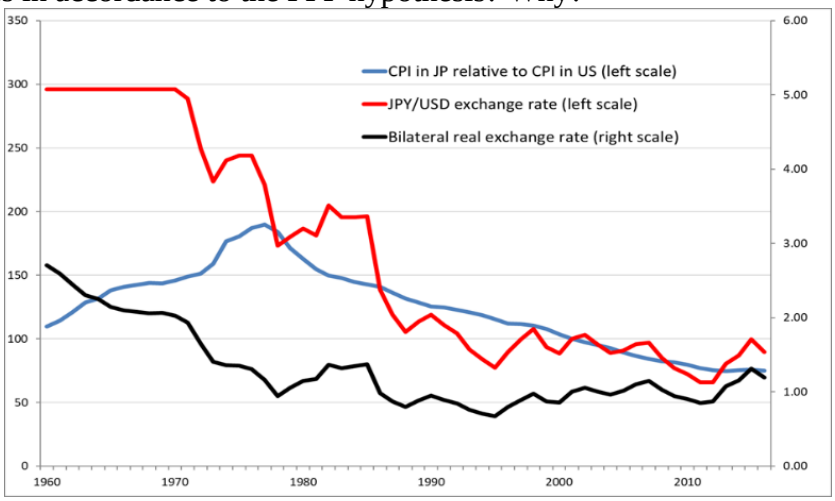
4.2 Consider a world with a single homogeneous good, which can either be produced domestically or abroad under conditions of perfect competition. Initially, the world price of this good is 100 USD and the price of the USD in terms of domestic currency (pesos) is 2.

(a) Suppose the price of the good in the domestic economy was initially 190 pesos. In the absence of trade costs, what do you think it would happen?

(b) In real life, would the adjustment described in a) would be instantaneous? Why?

(c) Suppose now that transport and other trade costs amounted to 20% of the price of the good. In this case, how would the non-arbitrage condition hold for exports and for imports? Find out the implied band for the real exchange rate.

4.3 The following graph describes the evolution of the nominal exchange rate, the relative CPI and the bilateral real exchange rate between the Unites Stares and Japan. Are these figures in accordance to the PPP hypothesis? Why?



4.4 Consider a small open economy producing a tradable good (*T*) and a non-tradable (*N*) good. The corresponding production functions are $Y_T = aL_T$ and $Y_N = bL_N$. Assume that the foreign prices of these goods are $P_T^* = P_N^* = 1$ and that the nominal exchange rate is $e = 1$. Finally, assume the weight of each good in the consumer price index is 50%. Define w as the nominal wage rate, P_T as the price of *T*, P_N as the price of *N* and *e* as the real exchange rate.

(a) Assuming that a = b = 1:
(a1) Find out the labor demand equations in the two sectors.
(a2) Find the equilibrium wage rate, the price level and the real exchange rate.

(b) Consider now that the productivity of the tradable good rises to $a = 4$.
(b1) Assuming that the nominal exchange rate was fixed, describe the implications of such a shift on P_T, P_N, w and on the equilibrium real exchange rate.
(b2) If instead the central bank' goal was to keep the inflation rate equal to zero, what should happen to prices and to the nominal exchange rate?

(c) What should happen to the real exchange rate if the productivity shock was instead on parameter b? Describe theoretically, assuming that e was fixed.

4.5 Consider a small open economy producing a tradable good (*T*) and a non-tradable (*N*) good. The corresponding production functions are $Y_T = aL_T$ and $Y_N = L_N$. Assume that the foreign prices of these goods are $P_T^* = P_N^* = 1$ and that the nominal exchange rate is $e = 100$. Finally, assume the weight of each good in the consumer price index is 50%. Define w as the nominal wage rate, P_T as the price of *T*, P_N as the price of *N* and *e* as the real exchange rate.

(a) Assuming that a=4:
(a1) Find out the labor demand equations in the two sectors.
(a2) Find the equilibrium wage rate, the price level and the real exchange rate.

(b) Suppose now that the nominal exchange rate depreciates to e=400 with a=4.
(b1) What would happen to the price level and to the real exchange rate?
(b2) Are the absolute and/or the relative PPP theories useful in this case? Why?

(c) Suppose instead that the productivity in the tradable sector falls to a=1.
(c1) Describe the implications of such a shift on P_T, P_N, and on the equilibrium real exchange rate, assuming that the nominal exchange rate was fixed.
(c2) Are the absolute and/or the relative PPP theories useful in this case? Why?
(c3) If non-tradable good prices were sticky, how could the central bank ease the adjustment process through the nominal exchange rate?

4.6 Consider two small open economies with two sectors, a tradable (T) and a non-tradable (N). The production functions are given as: $Y_T = 2L_T$ and $Y_N = 2L_N$ for the domestic economy, and, for the foreign economy, as $Y_T^* = 2L_T^*$ and $Y_N^* = 32L_N^*$. Further assume that in both economies each price weights 50% in the consumer price index (the CPI is $P = P_T^a P_N^{1-a}$) , that the prices abroad are fixed at $P^* = \frac{1}{4}$ and at $P_T^* = 1$, and that the price of foreign currency in terms of domestic currency is $e = 1$.

(a) Assuming that firms maximize profits find:
  (a1) the labour demand of each of the sectors in both countries.
  (a2) the domestic price of tradables.
  (a3) the nominal wage rate in both economies.
  (a4) the price of non-tradables in the domestic economy.
  (a5) the consumer price index in the domestic economy.
  (a6) the real exchange rate.

(b) Assume now that there was an exchange rate depreciation in the home economy to $e' = 2$. Find the impacts on the home economy, namely:
  (b1) the price of tradables.
  (b2) the nominal wage rate.
  (b3) the price of non-tradables.
  (b4) the consumer price level.
  (b5) the real exchange rate.
  (b6) are the absolute and/or the relative PPP theories useful in this case? Why?
  (b7) are the workers in the domestic economy better off after this shock?

(c) Departing from (a), compare the two economies in terms of:
  (c1) purchasing power of workers.
  (c2) nominal wages expressed in the same currency unit.
  (c3) Explain the difference in the results.