

**Homework 2**  
**Answer Key**

*Show all your work. Please type or use a pen. Assignments written in pencil will not be regraded. Graphs should be clearly labeled. The total for the homework is 5 points. Start early. Homework is due in class on Wednesday, February 3 (or if you cannot make it to class, drop it off in the main office, Buchanan Tower 997, by the end of the class). No late homeworks are excepted.*

**Problem 1 (2 points)**

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. Provide examples where asked. Where relevant, assume that foreign currency controls are in place.

1) If the dollar \_\_\_\_\_ from 5 Mexican pesos per dollar to 10 pesos per dollar, the peso \_\_\_\_\_ from 20 cents to 10 cents per peso

- A) appreciates; depreciates    B) depreciates; appreciates  
C) appreciates; appreciates    D) depreciates; depreciates

*ANSWER: A*

2) If the Japanese yen appreciates from one cent to two cents per yen, the dollar depreciates from \_\_\_\_\_ to \_\_\_\_\_ yen per dollar.

- A) 10; 5    B) 100; 50    C) 5; 10    D) 50; 100

*ANSWER: B*

3) According to the law of one price, if the price of Colombian coffee is 100 Colombian pesos per pound and the price of Brazilian coffee is 4 Brazilian reals per pound, then the exchange rate between the Colombian peso and the Brazilian reals is:

- A) 0.4 pesos per real.    B) 40 pesos per real.  
C) 25 pesos per real.    D) 100 pesos per real.

*ANSWER: C*

4) If a factor increases the demand for \_\_\_\_\_ goods relative to \_\_\_\_\_ goods, the domestic currency will appreciate. Provide one example.

- A) domestic; domestic    B) domestic; foreign

C) foreign; foreign      D) foreign; domestic

*ANSWER: B. Increase in CA population due to immigration.*

5) An increase in productivity in a country will cause its currency to \_\_\_\_\_ because it can produce goods at a \_\_\_\_\_ price. (HINT: Assume that productivity growth equals the growth in endowment and consumption for old and young.)

A) depreciate; higher      B) appreciate; higher  
C) depreciate; lower      D) appreciate; lower

*ANSWER: D.*

6) If the 2001 inflation rate in Canada is 4 percent, and the inflation rate in Mexico is 2 percent, then during 2001, the value of the Canadian dollar in terms of Mexican pesos will

A) fall by 5 percent.      B) rise by 2 percent.      C) fall by 2 percent.      D) rise by 5 percent.

*ANSWER: C*

### **Problem 2 (3 points)**

Consider a 2-country OLG economy used in class. Each country is a 2-period OLG economy with endowments:  $(y^{CA}, 0)$  and  $(y^{US}, 0)$  units of the same good (e.g., oranges). Initial old own home money:  $M^{CA}$  and  $M^{US}$  in CA and US respectively. Change in money supply finances government purchases. Assume free international trade in goods. Foreign currency controls are in place.

(a) Suppose in 2010 the price of an orange is 1.50 CA\$ in CA, and 1.20 US\$ in US. What is the exchange rate? Explain.

*ANSWER: By law of one price,  $e_t = p_t^{US} / p_t^{CA} = 1.20 / 1.50 = 0.80$  (US\$ per CA\$).*

(b) Suppose inflation in CA is 2% per year, and in US 2.5% per year. Will CA\$ appreciate or depreciate? How quickly? (HINT: don't forget that 2% net growth rate corresponds to the gross rate of growth of 1.02).

*ANSWER: From the law of one price we know that  $e_{t+1} / e_t = \pi_t^{US} / \pi_t^{CA} = 1.025 / 1.02 = 1.005$ . Hence CA\$ is appreciating 0.5% per year.*

(c) Suppose the exchange rate is flexible, and the money supply is growing 5% per year in US and 2% per year in CA. Population is constant in each country. Will CA\$ appreciate or depreciate? How quickly?

*ANSWER: From the law of one price and market clearing conditions for each country we know that  $e_{t+1}/e_t = \pi_t^{US}/\pi_t^{CA} = \mu_t^{US}/\mu_t^{CA} = 1.05/1.02 = 1.03$ . Hence CA\$ is appreciating 3% per year.*

(d) In addition to (c) assume now that population in CA is growing at 1% per year, whereas in US it is growing at 2% per year. Will CA\$ appreciate or depreciate? How quickly? Explain why the answer changed relative to (c).

*ANSWER: From the law of one price and market clearing conditions for each country we know that  $e_{t+1}/e_t = \pi_t^{US}/\pi_t^{CA} = \mu_t^{US}/\mu_t^{CA} * n_t^{CA}/n_t^{US} = 1.05/1.02 * 1.01/1.02 = 1.02$ . Hence CA\$ is appreciating 2% per year. The appreciation is slower than in (c) because slower population growth slows down the increase in demand for CA\$.*

(e) In addition to (d) assume now that productivity in CA is rising 1% per year, whereas in US it is 2% per year. Assume that productivity growth equals the growth in endowment and consumption for old and young. Will CA\$ appreciate or depreciate? How quickly? Explain why the answer changed relative to (d). (HINT: how productivity growth affects real money demand by the young?)

*ANSWER: Productivity growth equals the growth of real demand by each young person ( $y-c_1$ ), denote this growth by  $a$ . From the law of one price and market clearing conditions for each country we know that  $e_{t+1}/e_t = \pi_t^{US}/\pi_t^{CA} = \mu_t^{US}/\mu_t^{CA} * n_t^{CA}/n_t^{US} * a_t^{CA}/a_t^{US} = 1.05/1.02 * 1.01/1.02 * 1.01/1.02 = 1.01$ . Hence CA\$ is appreciating 1% per year. The appreciation is slower than in (d) because slower productivity growth slows down the increase in demand for CA\$.*

(f) In addition to (e) assume now that US government would like to fix its exchange rate relative to CA\$ at parity. What should it do to implement this fixed exchange rate? (HINT: US government now cannot freely choose its money growth rate).

*ANSWER: From the law of one price and market clearing conditions for each country under the fixed exchange rate we know that US government's money supply growth rate should be  $\mu_t^{US} = \mu_t^{CA} / n_t^{CA} * n_t^{US} / a_t^{CA} * a_t^{US} = 1.02/1.01 * 1.02/1.01 * 1.02 = 1.04$ . Hence US government should reduce the money supply growth down to 4%. Slower growth of money supply will increase its value relative to CA\$ and bring the exchange rate to parity.*