NANYANG TECHNOLOGICAL UNIVERSITY
SCHOOL OF SOCIAL SCIENCES
SEMESTER 1 AY23-24

HE1002 MACROECONOMICS I

PROBLEM SET 11 ANSWER GUIDE

Question 1
[Concept tested: Find nominal exchange rate between 2 currencies when given nominal exchange rates of these 2 currencies with a 3rd currency. Compute real exchange rate using the formula eP/P^f.]

Last Year
> 1 blue = US$0.80 → US$1 = 1/0.8 blue
> 1 red = US$0.20 → US$1 = 1/0.2 red
>
> 1/0.8 blue = 1/0.2 red
> 1 blue = 0.8/0.2 red = 4 red
>
> Thus, Blueland's nominal exchange rate with Redland last year is 4 red/blue.

This Year
> Do the same as above, and you will find that Blueland's nominal exchange rate with Redland this year is also 4 red/blue.

Since the nominal exchange rate did not change between last year and this year, the percentage change = 0.

The real exchange rate is $\dfrac{e \times P}{P^f}$, where e is the nominal exchange rate, P is the price level in Blueland (domestic price), and P^f is the price level in Redland (foreign price).

Using the formula for real exchange rate, last year's real exchange rate is (4 × 100)/100 = 4

This year's real exchange rate is (4 × 120)/115 = 4.174

The percentage change in Blueland's real exchange rate is
> (4.174 – 4)/4 × 100 = 4.348%.

As Blueland's real exchange rate with Redland increases, the relative price of its exports to Redland's increases. As a result, Blueland's exports to Redland will be hurt.

Question 2

[Concept tested: Using Purchasing power parity (PPP) theory to compute implied nominal exchange rate when given prices of commodity in different locations; and to compute price of commodity in one location when given nominal exchange rate.]

(a)   According to the PPP theory, price of gold, an internationally traded commodity, must be the same in all locations as long as transportation costs are relatively small.

Thus, equating the price of gold per ounce in the US and in Mexico,
$350 = 2,800 pesos
$1 = (2,800/350) pesos = 8 pesos.

The nominal exchange rate implied by the PPP theory is $1 = 8 pesos.

(b)   Similar to (a), equate the price of gold per ounce in the US and in Mexico,
$350 = 4,200 pesos
$1 = (4,200/350) pesos = 12 pesos.

The nominal exchange rate implied by the PPP theory is $1 = 12 pesos.

According to the PPP theory, countries with higher inflation rates tend to experience the most rapid depreciation of their currencies.

(c)   From (b), $1 = 12 pesos.
Since the price of crude oil is US$30 per barrel in the United States, then according to the law of one price, the price of crude oil is 360 pesos ($30 × 12 pesos/$) per barrel in Mexico.

(d)   Given the exchange rate between the United States and Canada is 1 C$ = 0.70 US$.
1 US$ = (1/0.7) C$
350 US$ = $350/0.7 C$ = 500 C$

An ounce of gold should cost 500 Canadian dollars in Canada.

Question 3
[Concept tested: How changes in demand and supply of dollars affect the value of dollar. Students need to know what are the factors that cause changes in demand and supply of dollars.]

(a)   When U.S. stocks are perceived to be riskier financial investments, American assets become less attractive and so the demand for dollars falls. The dollar depreciates.

(b)   When European computer firms switch from U.S.-produced software to software produced in India, Israel, and other nations, the demand for U.S. goods (software) falls, so the demand for dollars falls. The dollar depreciates.

(c)   When international investors become aware of new, high-return investment opportunities in East Asia, American assets become less attractive and so the demand for dollars falls. Note that financial investors might also be switching funds from existing American assets to East Asian assets and thus they will supply more dollars to the foreign exchange market (in exchange for East Asian currencies). This will further depreciate the U.S. dollar.

Question 4
[Concept tested: Why demand curve in the foreign exchange market is downward sloping.]

(a)   Given nominal exchange rate, e = 1 euro/$,
        iPod in France will cost:
                $240 x e = $240 x 1 euro/$ = 240 euros

(b)   Given nominal exchange rate, e = 0.8 euro/$,
        iPod in France will cost:
                $240 x e = $240 x 0.8 euro/$ = 192 euros

(c)   The depreciation of US$ (or appreciation of euro) leads to cheaper US goods/services/assets (when paid in euros) in France. Demand for US goods/services/assets increases, and quantity demanded of US dollars increases. This gives rise the downward sloping demand curve in the foreign exchange market: quantity of dollars demanded in the foreign exchange market rises as the euro–dollar exchange rate falls.

Question 5
[Concept tested: How monetary policy affects exchange rate and net exports.]

When the government follows an easy monetary policy, it results in a **falling real interest rate**. A decrease in real interest rate will cause assets in the country to be less attractive to foreign investors. This results in a decrease in demand for the currency and the currency depreciates. A weak currency boosts exports and reduces imports, giving rise to **higher net exports**.

Question 6

(a)   To find the fundamental value of the shekel, equate the demand and supply for shekels and solve. e = 0.25 dollars per shekel.

(b)   At the official exchange rate of 0.3 dollars per shekel, the shekel is overvalued.

At e = 0.3, quantity of shekels demanded is 30,000 - 8,000(0.3) = 27,600; quantity of shekels supplied is 25,000 + 12,000 (0.3) = 28,600.

Thus, quantity of shekels supplied to the foreign exchange market exceeds the quantity of shekels demanded by 1,000 (28,600 - 27,600) shekels. To maintain the existing fixed rate, the government must purchase 1,000 shekels per period, which is the nation's balance-of-payments deficit.

Since shekels are purchased at the official rate of 0.30 U.S. dollars per shekel, the balance-of-payments deficit in dollars is $300 (1,000 shekels × $0.3/shekel). Because a country with an overvalued exchange rate must use part of its international reserves to support the value of its own currency, over time its available reserves of foreign currencies will decline.

(c)   At the official exchange rate of 0.2 dollars per shekel, the shekel is undervalued.

At e = 0.2, quantity of shekels demanded is 30,000 - 8,000(0.2) = 28,400; quantity of shekels supplied is 25,000 + 12,000 (0.2) = 27,400.

Thus, the quantity of shekels demanded to the foreign exchange market exceeds the quantity of shekels supplied by 1,000 (28,400 - 27,400) shekels. To maintain the official value, the central bank must supply 1,000 shekels per period, which is the nation's balance-of-payments surplus.

Since shekels are sold at the official rate of 0.2 dollars per shekel, the balance-of-payments surplus in dollars is $200 (1,000 shekels × $0.2/shekel). The central bank's stock of international reserves will increase over time.

Question 7
[Concept tested: How massive selling of domestic currency due to expectation of possible devaluation leads to actual devaluation of currency.]

(a)   From Question 6
        Fundamental value of the shekel is 0.25 dollars per shekel.
        At the official exchange rate of 0.3 dollars per shekel, quantity of shekels demanded is 27,600; quantity of shekels supplied 28,600. The quantity of shekels supplied to the foreign exchange market exceeds the quantity of shekels demanded by 1,000 shekels. To maintain the existing fixed rate, the government must buy 1,000 shekels with $300 per period to keep the market balanced.

        The $300 represents a decline by half of the available reserves of $600, so the year end reserve will equal $300 ($600 – $300). In other words, the country can maintain its fixed value of 0.30 U.S for this year as long as the foreign financial investors do not convert their shekel checking accounts into dollars.

(b)   A devaluation of the shekel means that financial assets denominated in shekel will suddenly worth less in terms of other currencies, such as US dollars. Foreign financial investors are likely to sell off their assets denominated in shekel before devaluation happens. In this question, foreign investors are holding checking account balance of 5,000 shekels. The foreign investors would want to convert their shekels into dollars, while they are still worth a total of $1,500 ($0.3/shekels × 5,000 shekels).

(c)   If foreign financial investors withdraw all funds from their checking accounts and attempt to convert those shekels into dollars, there will be the need for an extra $1,500 in foreign reserve at the existing exchange rate of $0.3/shekel. With the country's international reserves being only $600, the country will not be able to maintain the fixed value of $0.3/shekel for this year if the foreign financial investors decide to convert their shekel checking accounts into dollars. The currency will need to be devalued.

(d)   Since the action taken by the foreign investors, which was prompted by the mere fear of devaluation, will become the cause of an actual devaluation—this forecast of devaluation can be considered a "self-fulfilling prophecy."