HE1002 Macroeconomics I

Problem Sheet 12 – Problems & Solutions

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Problem 12-1

Suppose total U.S. exports in the month of June were $123.1 billion and total imports from foreign countries were $192.2 billion. What was the balance of trade?

Solution:

$$\text{Balance of trade} = \text{Exports} - \text{Imports} = \$123.1 \text{ billion} - \$192.2 \text{ billion} = \textbf{-\$69.1 billion}$$

Problem 12-2

Suppose a country has total GDP (Y) = $10 trillion, consumption = $8 trillion, government spending = $2 trillion, investment = $3 trillion, and taxes = $1.6 trillion. What is the level of net exports or balance of trade? What is the level of public savings? What is the level of private savings? What is the level of net capital outflow?

Solution:
Net exports (Balance of trade):

$$Y = C + I + G + NX$$

$$NX = Y - C - I - G = 10 - 8 - 3 - 2 = \textbf{-\$3 trillion}$$

Public savings:

$$\text{Public savings} = T - G = 1.6 - 2 = \textbf{-\$0.4 trillion}$$

Private savings:

$$\text{Private savings} = Y - C - T = 10 - 8 - 1.6 = \textbf{\$0.4 trillion}$$

Net capital outflow:

$$\text{Net capital outflow} = NX = \textbf{-\$3 trillion}$$

Alternatively:

$$\text{NCO} = \text{Total savings} - I = (-0.4 + 0.4) - 3 = \textbf{-\$3 trillion}$$

Problem 12-3

Assume that U.S. investors purchased $50 billion in foreign assets, and foreigners purchased $100 billion in U.S. financial assets such as stocks and Treasury bills. In addition, U.S. businesses invested $150 billion in foreign factories and operations, while foreign companies invested $100 billion in U.S. factories and operations. What was the net capital outflow for the United States?

Solution:
Total U.S. foreign investment:

$$\$50 \text{ billion (portfolio)} + \$150 \text{ billion (direct)} = \$200 \text{ billion}$$

Total foreign investment in U.S.:

$$\$100 \text{ billion (portfolio)} + \$100 \text{ billion (direct)} = \$200 \text{ billion}$$

Net capital outflow:

$$\text{NCO} = \text{U.S. foreign investment} - \text{Foreign investment in U.S.} = \$200 - \$200 = \textbf{\$0}$$

Problem 12-4

Define each of the following as direct or portfolio foreign investment.

Definitions:

- **Direct investment:** Investment in a business or asset where the investor has significant control or influence.
- **Portfolio investment:** Investment in financial assets (stocks/bonds) without direct control.

(a) Nike (a U.S. company) builds new factories in Cambodia.

Direct investment

(b) A U.S. hedge fund purchases 30 percent of the shares of a Brazilian paper manufacturer.
Direct investment

(c) Mercedes-Benz (a German company) builds a new manufacturing plant in Alabama.
Direct investment

(d) Intel (a U.S. company) sets up a new call center in India.
Direct investment

(e) A British chocolate maker buys a smaller U.S. rival.
Direct investment

(f) Hilton Hotels (a U.S. company) builds a new resort in Hawaii.
Not foreign investment (Hawaii is part of the United States)

Problem 12-5

Tom is stuck with his friends on an island that uses coconuts for currency, but they recently discovered Wilson's Island nearby. Tom's Island agrees to make only one transaction with Wilson's Island: It sells a fishing boat to Wilson's for 15 coconuts. Assuming yearly consumption on Tom's Island equals 500 coconuts and domestic investments in huts and farm equipment equals 150 coconuts.

(a) What are net exports for Tom's Island?
Solution:

$$\text{Net exports} = \text{Exports} - \text{Imports} = 15 - 0 = \textbf{15 coconuts}$$

(b) What is the total national savings for Tom's Island?
Solution:

$$\text{National savings} = I + NX = 150 + 15 = \textbf{165 coconuts}$$

(c) Suppose Tom's Island imports a volleyball net from Wilson's Island for 5 coconuts. What is the total national savings now?
Solution:

$$NX = \text{Exports} - \text{Imports} = 15 - 5 = 10 \text{ coconuts}$$

$$\text{National savings} = I + NX = 150 + 10 = \textbf{160 coconuts}$$

(d) Now Tom purchases 1 coconut tree on Wilson Island at a cost of 10 coconuts. What is the net capital outflow?

Solution:

$$\text{Net capital outflow} = \textbf{10 coconuts}$$

(A coconut tree produces coconuts like a factory produces goods.)

Problem 12-6

Over the last five years, Portlandia's average income has risen and caused the supply curve of loanable funds to increase and shift right.

(a) Would the domestic interest rate have increased or decreased?

Solution:

Decreased. As the saving curve shifts to the right, interest rates decrease.

(b) Given the change in the interest rate, would General Motors (GM) be more or less likely to open a car manufacturing plant in the country?

Solution:

More likely. At the lower interest rate, firms are more likely to engage in investment spending due to lower borrowing costs.

(c) If Portlandia hits a recession and interest rates fall, which way must the demand curve for loanable funds have shifted?

Solution:

Left. Assuming the savings curve has remained constant, the demand curve must shift left to explain the fall in interest rates. During recessions, firms hold off on investment due to uncertainty and poor sales.

Problem 12-7

Describe what happens to the supply and/or demand curves for U.S. dollars under the following scenarios. In each scenario, does the U.S. exchange rate appreciate or depreciate, and what happens to the U.S. balance of trade?

(a) A drought in Russia destroys the wheat crop, resulting in increased purchases of wheat from the United States.

Solution:

Demand for dollars increases → Dollar appreciates

Russia's increased purchase of U.S. wheat increases demand for U.S. dollars. However, appreciation makes U.S. exports more expensive, which can decrease net exports. The net effect on the balance of trade depends on the relative sizes of these effects.

(b) Bollywood movies become extremely popular in the United States, increasing demand for foreign movies.

Solution:

Supply of dollars increases → Dollar depreciates

U.S. increased purchase of foreign movies increases supply of U.S. dollars. However, depreciation makes U.S. exports cheaper, which can increase net exports. The net effect depends on the relative sizes of these effects.

(c) The U.S. government forces all government offices to purchase American-made computer products, instead of importing them.

Solution:

Supply of dollars decreases → Dollar appreciates

Decreased imports reduce the supply of dollars in the foreign exchange market. However, appreciation makes U.S. exports more expensive, decreasing net exports. The net effect depends on the relative sizes.

Problem 12-8

Suppose there is major unrest in the labour market in the United States, making European investors nervous about investing in the United States.

(a) Draw the supply and demand curves for U.S. dollars, and show the appropriate shift(s) in supply and demand for U.S. dollars associated with the labour unrest.

Solution:

The demand curve for U.S. dollars shifts to the left as European investors reduce investment in the U.S.

(b) Did the value of the U.S. dollar depreciate or appreciate?

Solution:

Depreciate. The leftward shift of demand for U.S. dollars results in depreciation.

Problem 12-9

Suppose a pessimistic economic outlook has led to an increase in household saving, resulting in a rightward shift of the saving function. Explain how each of the following is affected under a floating exchange-rate regime.

(a) The interest rate.

Solution:

Decreases. The interest rate falls as the saving curve shifts right, increasing the supply of loanable funds.

(b) The exchange rate.

Solution:

Depreciates. Lower interest rates make domestic financial assets less attractive, leading to capital outflows. Supply of domestic currency increases and demand decreases, depreciating the exchange rate.

(c) The trade balance.

Solution:

Improves (increases). As the currency depreciates, net exports rise because domestic goods become relatively cheaper.

Problem 12-10

Suppose the new CEO for Apple Inc. decides to produce all the company's products in the United States instead of China.

(a) Which way will the supply for U.S. dollars shift?

Solution:

Left (decreases). Americans want to purchase domestic goods instead of imports, so they hold U.S. dollars, decreasing supply of U.S. dollars.

(b) Which way will the demand for U.S. dollars shift?

Solution:

Right (increases). Foreigners want to purchase American goods, so they demand more U.S. dollars.

(c) Does the value of the U.S. dollar depreciate or appreciate?

Solution:

Appreciates. Supply decreases (left shift) and demand increases (right shift). Both shifts cause appreciation.

Problem 12-11

Suppose that in the United States last season's hot holiday gift was the iPad (made in China), while this season's big gift is media content for the iPad (made in U.S.). Determine whether there will be an increase, decrease, or no change for each of the following variables compared to last year.

(a) Supply and demand for dollars.

Solution:

Supply decreases. Americans hold on to dollars to purchase domestic iPad content instead of foreign iPad hardware. Demand for dollars remains unchanged (no information about foreigners' relative interest).

(b) Exchange rate between the United States and China.

Solution:

Appreciates. Supply of dollars decreases, shifting the supply curve left.

(c) Net exports for the United States.

Solution:

Increases or decreases (indeterminate). Americans' decreased desire to purchase foreign goods shifts NX curve right, but dollar appreciation shifts quantity along NX curve left. Net effect depends on relative magnitudes.

(d) Net capital outflows for the United States.

Solution:

Increases or decreases (indeterminate). Since NX = NCO, the effect is the same as part (c).

Problem 12-12

In March 2009 the Canadian dollar was worth \$0.78 U.S. dollars. In April 2011 the Canadian dollar was worth \$1.06 U.S. dollars. What effect would this increase have on the trade balance between the United States and Canada? Why?

Solution:
Canadian dollar appreciated from \$0.78 to \$1.06.
Effects:

- U.S. goods and services become cheaper for Canadian buyers → Canadian imports from U.S. increase
- Canadian goods and services become more expensive for U.S. buyers → Canadian exports to U.S. decrease

- Canadian trade balance falls; U.S. trade balance rises

Problem 12-13

Hiro has $10,000 to invest in the foreign exchange market trading USD, EUR, and JPY. Determine the arbitrage profit/loss for each scenario.

Exchange rate	**USD**	**EUR**	**JPY**
USD	1.00000	0.78230	81.200
EUR	1.27830	1.00000	103.796
JPY	0.01232	0.00963	1.000

(a) USD → EUR → JPY → USD.

Solution:

$10,000 → 7,823 EUR → 811,996 JPY → $10,004

Arbitrage gain: $4 (less than $10 threshold, so no significant arbitrage opportunity)

(b) USD → JPY → EUR → USD.

Solution:

$10,000 → 812,000 JPY → 7,820 EUR → $9,996

Arbitrage loss: $4 (less than $10 threshold, so no significant arbitrage opportunity)

Problem 12-14

Some politicians argue for imposing trade restrictions to reduce the trade deficit. Assuming a floating exchange rate, answer the following:

(a) What is the impact in the foreign exchange market for dollars?

Solution:

Supply of dollars decreases. Trade barriers reduce imports, so U.S. consumers purchase fewer foreign goods and supply fewer dollars to exchange.

(b) What is the impact in the market for foreign currency?

Solution:

Demand for foreign currency decreases. U.S. consumers purchase fewer imported goods.

(c) What happens to the exchange rate of the dollar?

Solution:

Dollar appreciates. Supply of dollars decreases.

(d) What happens to net exports?

Solution:

Indeterminate. Trade barriers increase NX directly, but dollar appreciation makes U.S. exports more expensive and decreases NX. Net effect depends on relative magnitudes.

Problem 12-15

Suppose the U.S. economy slips into a recession. In response, the Federal Reserve cuts the federal funds rate. Consider floating exchange-rate regime:

(a) Domestic investment.

Solution:

Increases. Lower interest rates make borrowing cheaper, encouraging investment.

(b) Capital inflow.

Solution:

Decreases. Lower U.S. returns make U.S. investments less attractive to foreigners.

(c) Capital outflow.

Solution:

Increases. Lower U.S. returns encourage Americans to invest abroad seeking higher returns.

(d) Exchange rate.

Solution:

Falls (depreciates). Decreased capital inflow reduces demand for dollars; increased capital outflow increases supply.

(e) Net exports.

Solution:

Increases. Dollar depreciation makes U.S. exports cheaper and competitive.

(f) Aggregate demand.

Solution:

Increases. Both investment and net exports increase, raising aggregate demand.

Problem 12-16

Reevaluate Problem 12-15 assuming a fixed exchange-rate regime.

Solution:
All answers: No effect.

When the Fed cuts interest rates by selling bonds, capital outflows increase and inflows fall, putting downward pressure on the exchange rate. To maintain the fixed peg, the Fed must buy bonds to raise interest rates back to original levels, offsetting the initial rate cut. Thus, interest rates end up unchanged, and there is no change in any of the economic variables.

Problem 12-17

A country operating under a fixed exchange-rate regime falls into recession. Fiscal policy has failed to help.

(a) Can monetary policy be effective in this case? Why or why not?

Solution:

No, monetary policy cannot be effective. To lower interest rates (increase money supply), the central bank would cause capital outflows and decrease the value of the domestic currency. To maintain the fixed exchange rate, the central bank must sell foreign reserves to buy domestic currency, reducing the money supply and raising interest rates back to original levels.

(b) Should the country allow the exchange rate to float? Why or why not?

Solution:

Yes, allowing the exchange rate to float would be beneficial. Under a fixed regime, the central bank must prioritize maintaining the peg over using monetary policy for growth. With floating rates, monetary policy becomes effective for influencing economic activity and stimulating growth out of recession.

Problem 12-18

In Windsor, Ontario, a Big Mac costs C$4.17 (Canadian dollars), and in Detroit it costs $3.56 (U.S. dollars).

(a) Suppose the nominal U.S. exchange rate with Canada is US$0.70 per Canadian dollar. Does purchasing power parity hold?

Solution:

No, PPP does not hold.

Canadian Big Mac in U.S. dollars: $C\$4.17 \times 0.70 = \$2.92$

U.S. Big Mac: \$3.56

Since $\$2.92 \neq \$3.56$, PPP does not hold.

(b) What is the purchasing power parity exchange rate?

Solution:

For PPP to hold:

$$\text{Exchange rate} \times C\$4.17 = \$3.56$$

$$\text{Exchange rate} = \frac{3.56}{4.17} = \textbf{\$0.854 per Canadian dollar}$$

Problem 12-19

Suppose the current U.S.–UK exchange rate is 0.64 pound per dollar, and the aggregate price level is 175 for the United States and 138 for the UK. What is the real exchange rate? What does this mean?

Solution:

Real exchange rate:

$$\text{Real ER} = \frac{\text{Domestic price level}}{\text{Foreign price level}} \times \text{Nominal ER} = \frac{175}{138} \times 0.64 = \textbf{0.812}$$

Meaning: This real exchange rate means 0.812 times as much of goods and services can be purchased in the UK than in the U.S. for a given amount of money. In other words, goods in the U.S. are relatively more expensive than in the UK.

Problem 12-20

For each scenario, determine whether goods in one country will become more attractive given inflation rates and exchange rate changes:

(a) Inflation is 8% in UK and 4% in Germany; pound-euro exchange rate remains same.

Solution:

German goods become relatively cheaper. UK prices rising faster (8% vs. 4%) without currency appreciation means German goods are more attractive in the UK, and British goods less attractive in Germany.

(b) Inflation is 3% in U.S. and 7% in Japan; exchange rate increases from 70 to 80 yen/\$.

Solution:

Japanese goods become relatively cheaper. Despite higher inflation in Japan (7%), the yen depreciation (from 70 to 80 per dollar means yen weaker) more than offsets this, making Japanese goods cheaper in the U.S.

(c) Inflation is 10% in U.S. and 6% in Mexico; peso price rises from \$0.08 to \$0.15.

Solution:

U.S. goods become relatively cheaper. Despite higher inflation in U.S., the peso appreciation (from \$0.08 to \$0.15 means peso stronger) more than offsets higher U.S. inflation, making U.S. goods cheaper in Mexico.

Problem 12-21

Over several years, foreign investors poured billions into a country due to favorable growth prospects. They have now become concerned and are pulling out. Will this country better withstand the crisis with fixed or floating exchange rate?

Solution:
Floating exchange rate is preferable.
Fixed exchange rate problems:

- Capital outflows create downward pressure on currency value
- Central bank must defend the peg by selling foreign reserves
- Reserves can quickly deplete, leading to a currency crisis

Floating exchange rate advantages:

- Currency depreciates naturally, making exports cheaper and stimulating domestic production
- Central bank can use monetary policy (lower interest rates) to support growth and liquidity
- No risk of reserve depletion
- More flexibility to respond to crisis