HE1002 Macroeconomics – Solutions

Mock Final Exam, Academic Year 2025/2026, Semester 1

Quantitative Research Society @NTU

November 12, 2025

Question 1 (2 marks each)

Instruction: For each of the following questions, fill in the blank, state the formula used and show your working.

(a) Nominal GDP Calculation

A country produces only two goods: rice and tea. In 2024, it produced 1,000 units of rice at \$2 each and 500 units of tea at \$4 each. If 2023 is the base year and prices were \$1.50 for rice and \$3.50 for tea, the nominal GDP for 2024 was ______________.

Solution:

Formula:

$$\text{Nominal GDP} = \sum(\text{Quantity in current year} \times \text{Price in current year})$$

Calculation:

$$\begin{aligned}\text{Nominal GDP}_{2024} &= (Q_{\text{rice}} \times P_{\text{rice}}) + (Q_{\text{tea}} \times P_{\text{tea}}) \\ &= (1000 \times 2) + (500 \times 4) \\ &= 2000 + 2000 \\ &= 4000\end{aligned}$$

Answer: \$4,000

(b) Marginal Propensity to Consume (MPC)

If investment expenditure increases by \$100 and GDP increases by \$400 as a result, then the Marginal Propensity to Consume (MPC) is equal to ______________(2.d.p).

Solution:

Formula:

$$\text{Multiplier} = \frac{\Delta\text{GDP}}{\Delta\text{Investment}}$$

Relationship between Multiplier and MPC:

$$\text{Multiplier} = \frac{1}{1 - \text{MPC}}$$

Rearranging for MPC:

$$\text{MPC} = 1 - \frac{1}{\text{Multiplier}}$$

Calculation:

First, calculate the multiplier:

$$\begin{aligned}\text{Multiplier} &= \frac{\Delta\text{GDP}}{\Delta\text{Investment}}\\ &= \frac{400}{100}\\ &= 4\end{aligned}$$

Then, calculate the MPC:

$$\begin{aligned}\text{MPC} &= 1 - \frac{1}{\text{Multiplier}}\\ &= 1 - \frac{1}{4}\\ &= 0.75\end{aligned}$$

Answer: 0.75

(c) Reserve Ratio and Money Multiplier

Suppose people do not hold money as cash outside the bank, if the money multiplier is 2, then the reserve ratio is ______________(1.d.p).

Solution:

Formula:

$$\text{Money Multiplier} = \frac{1}{\text{Reserve Ratio}}$$

Rearranging for Reserve Ratio:

$$\text{Reserve Ratio} = \frac{1}{\text{Money Multiplier}}$$

Calculation:

$$\begin{aligned}\text{Reserve Ratio} &= \frac{1}{\text{Money Multiplier}}\\ &= \frac{1}{2}\\ &= 0.5\end{aligned}$$

Answer: 0.5 (or 50%)

(d) Real Exchange Rate

Suppose the current Singapore-Euro exchange rate is 0.68 euro per Singapore dollar (SGD), and the aggregate price level is 140 for Singapore and 112 for the Eurozone. If Singapore is the home country, the real exchange rate is ______________(2.d.p).

Solution:

Formula:

$$\text{Real Exchange Rate} = \text{Nominal Exchange Rate} \times \frac{P_{\text{foreign}}}{P_{\text{home}}}$$

Where:

$$\begin{aligned}\text{Nominal Exchange Rate} &= 0.68 \text{ EUR/SGD} \\ P_{\text{foreign}} &= 112 \text{ (Eurozone price level)} \\ P_{\text{home}} &= 140 \text{ (Singapore price level)}\end{aligned}$$

Calculation:

$$\begin{aligned}\text{Real Exchange Rate} &= 0.68 \times \frac{112}{140} \\ &= 0.68 \times 0.8 \\ &= 0.544\end{aligned}$$

Answer: 0.544

Question 2 (3 marks each)

(a) Why is Purchasing Power Parity (PPP) unlikely to hold for a product like the Big Mac across different countries?

Solution: The transaction costs would be too high. As a perishable fresh food item, it would be expensive to transport Big Macs from one country. Furthermore, there is little resale market for second-hand Big Macs.

(b) Describe ONE direct cost and ONE indirect cost of government debt. Briefly explain your answer.

Solution: The direct cost is the interest the government must pay. Interest payment reduces funding for other areas of government spending.

The indirect cost is the crowding out of private borrowing. Government borrowing leads to higher interest rates and increases the cost of borrowing for businesses, resulting in a fall in private investment.

(c) Classify each of the following situations as either frictional, structural, or cyclical unemployment?

Solution:

Situation	**Type of Unemployment**
Marcus lost his job due to company downsizing triggered by an economic downturn.	Cyclical unemployment
Mia is unemployed because she's waiting for the perfect job offer even though she has several options.	Frictional unemployment
Ethan is unemployed because his job as a machine operator was eliminated when companies in his industry relocated their operations to China in search of lower production costs.	Structural unemployment

Question 3 (5 marks each)

Instruction: For each of the following questions, clearly explain your reasoning.

(a) True or false: The GDP deflator uses a fixed basket of goods and services like the Consumer Price Index.

Solution: False. The GDP deflator is nominal GDP/real GDP. There is no fixed basket of goods and services. Instead, the GDP deflator allows the basket to change with current production.

(b) True or false: Population growth rate has no impact on long-run growth in real GDP per capita.

Solution: False. Using real GDP per capita growth rate = nominal GDP growth rate - inflation rate - population growth rate, a fall in population growth rate will increase real GDP per capita growth rate.

(c) True or false: In a situation where inflation is persistently below target and interest rates are at the effective lower bound, the Federal Reserve is likely to reduce the federal funds rate to further stimulate economic growth.

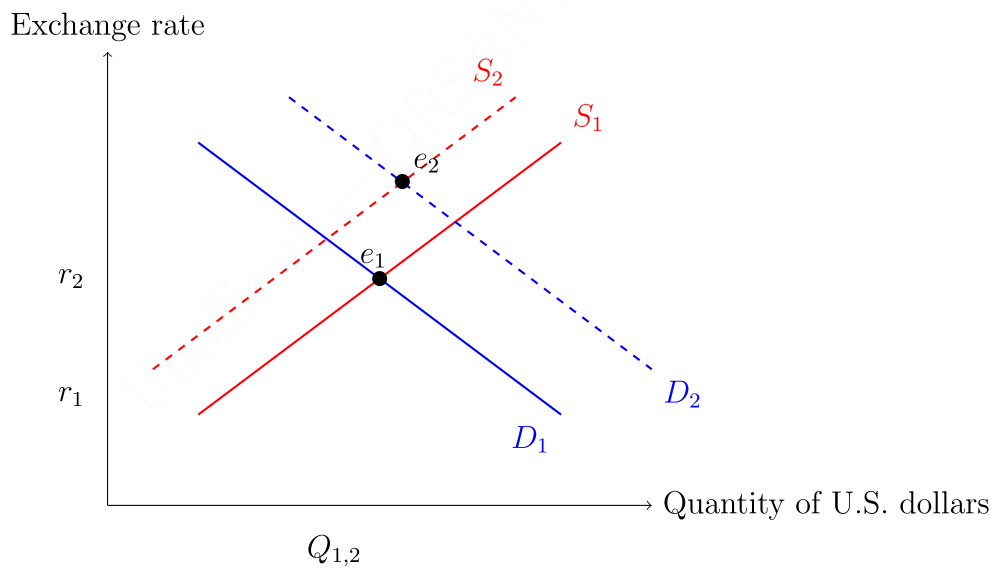
Solution: False. Effective lower bound means that the fed funds rate is near zero percent. Once the fed funds rate is at its lower bound, the Fed is unable to lower it further to stimulate the economy.

Question 4 (10 marks each)

Suppose the ongoing boom in artificial intelligence (AI) is increasing global and domestic investors' interest in U.S. financial markets. Using a well-labelled diagram of the foreign exchange market for U.S. dollars, illustrate and explain the effects of this AI boom on the value of the U.S. dollar and the balance of trade of the U.S.?

Solution:

Diagram: Foreign Exchange Market



Explanation: Due to the increased preference for U.S. financial assets, foreign investors want to buy more U.S. financial assets, demand for USS increases. Demand curve shifts from D_1 to D_2.

At the same time, US investors also prefer to invest in their own financial asset. This reduces supply of USS. Supply curve shifts from S_1 to S_2.

USS appreciates.

The appreciation of the USS causes imports to increase and exports to decrease. Trade balance falls.