

Macroeconomics Midterm Exam

University of International Business and Economics

Spring Semester 2025

Name: _____ Student ID: _____

Part I: Multiple Choice Questions

Choose the best answer. Each question is worth 1 point.

(20 points total)

1. In 2023, the Tesla factory in Shanghai produces a car at a cost of 250 thousand yuan and sells it at 300 thousand yuan. Given that the factory produces a total of 200,000 cars, what is its contribution to the China GDP, measured in billion yuan?

- (A) 25
- (B) 30
- (C) 50
- (D) 60

Answer
D

2. According to the expenditure method in calculating GDP, a good newly made but not sold in the year is classified as:

- (A) Depreciation
- (B) Replacement investment
- (C) Inventory investment
- (D) Household consumption

Answer

(C) Inventory investment

According to the expenditure approach, GDP is calculated as:

$$GDP = C + I + G + NX$$

where:

- C : Consumption
- I : Investment
- G : Government Purchases
- NX : Net Exports

Investment (I) includes three components:

- Business fixed investment (e.g., machinery, equipment)
- Residential investment (e.g., new housing)
- Inventory investment (changes in inventories)

When a good is produced but not sold within the year, it is added to the firm's inventory and is counted as **inventory investment**. This is because GDP is based on production, not sales. The good is treated as if the firm bought it from itself, and it adds to total investment.

Incorrect options:

- (A) Depreciation refers to the wear and tear of capital over time; it is not part of current production.
- (B) Replacement investment replaces worn-out capital but does not include unsold goods.
- (D) Household consumption includes only goods and services purchased by households, not unsold goods.

3. The CPI index in year 2020 is 100 and it is currently 120. Therefore, measured by purchasing power, 300 yuan is equal to how much yuan in 2020?

- (A) 330
- (B) 360
- (C) 250
- (D) 450

Answer

C

4. The CPI in year 2019 is 400 and 150 for country A and B, respectively, and is 415 and 156 in 2020. Taking 2019 as the base year, what is the inflation in country A compared to B?

- (A) $A > B$
- (B) $A = B$
- (C) $A < B$
- (D) Uncertain

Answer
C

5. The adult population in a country increases from 6 million to 10 million, and labor force participation rate grows from 50% to 70%, while unemployed people go up from 180 thousand to 210 thousand. Given this information, What happens to the unemployment rate?

- (A) Increase
- (B) Stay unchanged
- (C) Decrease
- (D) Uncertain

Answer
C

6. In the long run, a minimum wage that is persistently above the market level will result in:

- (A) Lower frictional unemployment
- (B) Lower structural unemployment
- (C) Higher natural rate of unemployment
- (D) Higher cyclical unemployment

Answer
C

7. A three-sector economy records a GDP of 8 trillion yuan, with government purchases at 1.8 trillion, tax revenue at 1.5 trillion, and consumption at 5 trillion yuan. Then according to the expenditure method in calculating GDP, what is the private savings and investment, respectively (in trillion yuan)?

- (A) 1.5; 1.2
- (B) 1.5; 1.5
- (C) 1.2; 1.2

(D) 1.2; 1.5

Answer

(A) 1.5; 1.2

We start by recalling the national income identity in a closed (three-sector) economy:

$$Y = C + I + G$$

Given:

$$Y = 8, \quad C = 5, \quad G = 1.8$$

Solving for investment:

$$I = Y - C - G = 8 - 5 - 1.8 = 1.2$$

Now, to compute private saving (S_p), we use:

$$S_p = Y - T - C$$

where:

$$T = 1.5$$

$$S_p = 8 - 1.5 - 5 = 1.5$$

We can also verify that:

$$\text{Total saving } S = S_p + S_g = I$$

$$S_g = T - G = 1.5 - 1.8 = -0.3 \quad (\text{budget deficit})$$

$$S = 1.5 + (-0.3) = 1.2 = I$$

Conclusion: Private saving = 1.5 trillion, Investment = 1.2 trillion.

8. By the quantity theory of money, when money supply persistently increases faster than real GDP, what is most likely to go up?

- (A) Price
- (B) Employment
- (C) Investment
- (D) Consumption

Answer

(A) Price

The quantity theory of money is based on the equation:

$$MV = PY$$

where:

- M = money supply
- V = velocity of money (assumed constant in the basic model)
- P = price level
- Y = real GDP

If M grows persistently faster than Y , and V is constant, then P must increase to maintain the equality. This leads to inflation. Thus, the most likely outcome is a rise in the price level.

Incorrect options:

- (B) Employment might rise in the short run, but not necessarily in the long run.
- (C) Investment may be affected by interest rates, but not directly by money supply.
- (D) Consumption may rise temporarily, but inflation is the primary and persistent effect.

9. The People's Bank of China defines quasi-money supply as the difference between M2 and M1. Therefore, quasi-money supply includes:

- (A) Short- and long-term bank deposit
- (B) Demand deposit and savings deposit
- (C) Demand deposit and time deposit
- (D) Time deposit and savings deposit

Answer

(D) Time deposit and savings deposit

In China's monetary system:

- M1 includes currency in circulation and demand deposits.
- M2 includes M1 plus quasi-money, which consists mainly of time deposits and savings deposits.

Therefore:

$$\text{Quasi-money} = M2 - M1 = \text{Time deposit} + \text{Savings deposit}$$

Incorrect options:

- (A) Too broad: not all short-term deposits are excluded from M1.
- (B) Savings deposits are not part of M1.
- (C) Demand deposits are already included in M1, not quasi-money.

10. The correct treatment for the landlord to rent a house or live in his own is:

- (A) The total amount of rent he receives or should have received is included in GDP
- (B) Only including the total amount of rent he received
- (C) Only including the total amount of rent he should have received
- (D) All above statements are incorrect

Answer

A

11. To walk the economy out of a recession, the government increases its purchases by 12 million yuan. Given that the MPC is $2/3$, then the equilibrium output will increase by a total of:

- (A) 4 million yuan
- (B) 8 million yuan
- (C) 18 million yuan
- (D) 36 million yuan

Answer

(D) 36 million yuan

To calculate the total change in equilibrium output, we use the government spending multiplier:

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

Given that $MPC = \frac{2}{3}$, we have:

$$\text{Multiplier} = \frac{1}{1 - \frac{2}{3}} = \frac{1}{\frac{1}{3}} = 3$$

Now apply the multiplier to the change in government purchases:

$$\Delta Y = \text{Multiplier} \times \Delta G = 3 \times 12 = 36$$

Therefore, the total increase in equilibrium output is 36 million yuan.

Incorrect options:

- (A) 4 million yuan is too small—this would imply an MPC of only 1/3.
- (B) 8 million yuan is inconsistent with the correct multiplier.
- (C) 18 million yuan would require a multiplier of 1.5, which does not match the given MPC.

12. Through which of the following actions can the central bank reduce money supply?

- (A) Raise the rate paid on bank reserves
- (B) Increase the purchase of government bonds
- (C) Reduce the rate charged on discount loans
- (D) Lower the required reserve rate

Answer

A

13. By the equation of money multiplier, given money base, when the public holds more cash or when banks hold more excess reserve, money supply will:

- (A) Decrease; Decrease
- (B) Increase; Decrease
- (C) Decrease; Increase
- (D) Increase; Increase

Answer

(A) Decrease; Decrease

The money multiplier determines how much total money supply is generated from a given monetary base. The standard formula for the money multiplier is:

$$\text{Money Multiplier} = \frac{1 + c}{r + e + c}$$

where:

- $c = \frac{C}{D}$ is the currency-deposit ratio (public holding more cash increases c)
- r is the required reserve ratio
- $e = \frac{ER}{D}$ is the excess reserve-deposit ratio (banks holding more excess reserves increases e)

Effect of higher cash holdings ($\uparrow c$):

Higher $c \Rightarrow$ lower money multiplier \Rightarrow lower money supply

Effect of higher excess reserves ($\uparrow e$):

Higher $e \Rightarrow$ lower money multiplier \Rightarrow lower money supply

Therefore, both scenarios reduce the effectiveness of the money multiplier and lead to a decrease in the total money supply.

Answer: (A) Decrease; Decrease

14. By the Keynesian theory on output, the conditions for equilibrium output include:

- (A) Planned output equals planned expenditure
- (B) Planned investment equals planned savings
- (C) Both of the two conditions
- (D) None of the two conditions

Answer

C

15. The measures of money supply used by the People's Bank of China mainly include:

- (A) M0 and M1
- (B) M1 and M2
- (C) M0 and M2

(D) M2 and M3

Answer

(C) M0 and M2

The People's Bank of China (PBoC) officially tracks and reports the following main measures of the money supply:

- **M0 (narrow money):** Currency in circulation (cash held by the public).
- **M1:** M0 plus demand deposits.
- **M2 (broad money):** M1 plus quasi-money, which includes time deposits and other savings deposits.

While M1 and M2 are both used in broader analysis, the most commonly emphasized aggregates by the PBoC are **M0 and M2**. These are prominently featured in official monetary policy reports and are used to track liquidity in the economy.

Incorrect options:

- (A) M1 is important, but M0 and M1 alone are not the main focus.
- (B) M1 and M2 excludes M0, which is a key official aggregate.
- (D) M3 is not an officially reported measure in China.

16. The fact that the production function relating output to capital becomes flatter as we move from left to right means:

- (A) The marginal product of capital is positive
- (B) The marginal product of labor is positive
- (C) There is diminishing marginal productivity of labor
- (D) There is diminishing marginal productivity of capital

Answer

D

17. In economic growth theory, the level of the capital gold rate refers to:

- (A) The highest level of per capita in a steady state
- (B) The level of per capita when per consumption is maximized in a steady state

- (C) The per capita level at which total output is greatest in a steady state
- (D) The per capita level with the fastest growth rate

Answer

B

18. The long run consequence of generous unemployment insurance may include:

- (A) Higher labor participation rate
- (B) Higher natural rate of unemployment
- (C) Lower frictional unemployment
- (D) Higher cyclical unemployment

Answer

(B) Higher natural rate of unemployment

In the long run, generous unemployment insurance may reduce the incentive for unemployed individuals to search intensively or accept job offers quickly. This tends to prolong the average duration of unemployment spells, increasing:

- **Frictional unemployment** — since workers take longer to find jobs,
- and potentially **structural unemployment** — if skills become mismatched over time.

These two components (frictional + structural) make up the **natural rate of unemployment**. Therefore, generous unemployment benefits can raise the natural rate, which is the level of unemployment the economy tends to return to in the long run, even when cyclical factors are absent.

Incorrect options:

- (A) Higher labor participation rate is not a typical consequence—some may withdraw from the labor force.
- (C) It leads to *higher*, not lower, frictional unemployment due to reduced job search intensity.
- (D) Cyclical unemployment is driven by business cycle fluctuations, not directly by unemployment insurance.

19. Even when the labor market is at full employment, there is still unemployment due to:

- (A) Market friction

- (B) Efficient wage
- (C) Minimum wage
- (D) Union negotiation

Answer

A

20. When the *ex-post* inflation is higher than the *ex-ante* one, which is more likely?

- (A) Wealth transfer from creditor to debtor
- (B) The low-income group is more likely to suffer
- (C) The government is worse off due to its bonds
- (D) Fixed-income earners are better off

Answer

(A) Wealth transfer from creditor to debtor

When *ex-post* (actual) inflation turns out to be higher than the *ex-ante* (expected) inflation, the real value of money repaid in the future is lower than anticipated. This means:

- **Debtors** repay loans with money that is worth less in real terms.
- **Creditors** receive less purchasing power than they expected.

This results in a redistribution of wealth from creditors (lenders) to debtors (borrowers). The real interest rate ($r = i - \pi$) ends up lower than expected.

Incorrect options:

- (B) While inflation can hurt the poor, this statement is too general and not specific to unexpected inflation dynamics.
- (C) Governments that issue nominal bonds may actually benefit from unexpected inflation, since their real repayment burden decreases.
- (D) Fixed-income earners are **worse off**, not better off, as their real incomes are eroded by higher inflation.

Part II: Uncertain-Answer Questions

Choose all that apply. Each question may have more than one correct answer. Each question is worth **2 point**. **(20 points total)**

1. Which of the following activities should be included into GDP?

- (A) John purchases a new iPhone
- (B) John pays tuition for a new academic year
- (C) John buys stocks of an AI firm
- (D) John purchases an existing home

Answer

(A) and (B)

Gross Domestic Product (GDP) includes the value of all final goods and services produced within a country during a specific period. The following analysis explains which items are included:

(A) John purchases a new iPhone — Included. This is the purchase of a newly produced final good, which directly adds to consumption in GDP.

(B) John pays tuition for a new academic year — Included. Tuition represents payment for a service (education), which is part of GDP under the consumption of services.

(C) John buys stocks of an AI firm — Not included. Purchasing stocks is a financial transaction and does not correspond to production of goods or services. It is a transfer of ownership, not production.

(D) John purchases an existing home — Not included. The sale of an existing home is not part of current production; it is a transfer of ownership of a previously produced asset. However, services associated with the transaction (like realtor fees) would be included.

Answer: (A) and (B)

2. What are the differences between CPI and GDP deflator in measuring inflation?

- (A) CPI reflects only prices of consumer goods
- (B) GDP reflects no prices of imported goods
- (C) CPI over- and GDP deflator under-estimates
- (D) The two measures are identical

Answer

(A), (B), and (C)

(A) CPI reflects only prices of consumer goods — Correct. CPI measures the cost of a fixed basket of goods and services consumed by households. It excludes investment goods, government purchases, and exports. Thus, it captures only consumer prices.

(B) GDP reflects no prices of imported goods — Correct. GDP deflator only includes prices of goods and services produced domestically. Imported goods are excluded from GDP and therefore from the GDP deflator.

(C) CPI over- and GDP deflator under-estimates — Generally correct. CPI tends to **overestimate** inflation due to substitution bias and use of a fixed basket. GDP deflator, which uses current quantities (Paasche index), tends to **underestimate** inflation during periods of substitution because it reflects actual purchasing behavior.

(D) The two measures are identical — Incorrect. CPI and GDP deflator differ in coverage (consumer goods vs. all domestic production), treatment of imports, and calculation method (Laspeyres vs. Paasche).

Answer: (A), (B), and (C)

3. By the expenditure method in calculating GDP, which of the following is considered investment?

(A) Purchase a home with bank mortgage loan

(B) Buy a new car and become a DIDI driver

(C) Pay tuition to UIBE

(D) Buy stocks of an AI company

Answer

(A) and (B)

Under the expenditure method, GDP is calculated as:

$$GDP = C + I + G + NX$$

where I (investment) includes:

- Business fixed investment (e.g., machinery, tools, equipment),
- Residential investment (e.g., new housing construction or purchase),
- Inventory investment (unsold goods).

(A) Purchase a home with bank mortgage loan — Included as investment. Buying a new residential home is counted as residential investment, regardless of whether it is financed with a loan.

(B) Buy a new car and become a DIDI driver — Included as investment. If the car is used for business purposes (e.g., ride-sharing), it qualifies as business fixed investment.

(C) Pay tuition to UIBE — Not counted as investment in GDP terms. Although education is a form of human capital investment, in GDP accounting it is counted under consumption of services.

(D) Buy stocks of an AI company — Not included. Purchasing financial assets like stocks is a transfer of ownership and not part of the current production of goods or services.

Answer: (A) and (B)

4. How can a central bank directly change the money supply?

- (A) Open market purchase of government bonds
- (B) Change rates on discount loans to banks
- (C) Change the required reserve rate
- (D) Change the rate on overnight loan.

Answer

(A), (B), and (C)

(A) Open market purchase of government bonds — Correct. This is the most direct tool a central bank uses to alter the money supply. When it purchases government bonds from the public or banks, it injects new reserves into the banking system, increasing the monetary base and thus the money supply.

(B) Change rates on discount loans to banks — Correct. Although this is often considered an indirect tool, changes in the discount rate can lead to more or less borrowing from the central bank. If banks borrow more, the monetary base expands. Therefore, while the effect depends on bank behavior, the mechanism can directly affect the quantity of reserves and hence the money supply.

(C) Change the required reserve rate — Correct. By lowering the reserve requirement, the central bank allows banks to lend a higher portion of their deposits, increasing the money multiplier and expanding the money supply. Raising the reserve requirement reduces the multiplier.

(D) Change the rate on overnight loan — Incorrect. This primarily affects short-term interest rates and bank incentives, influencing the money supply only indirectly. The central bank targets this rate (like the federal funds rate or DR007) to guide monetary conditions, but it does not directly change the amount of money in circulation.

Answer: (A), (B), and (C)

5. Xiaoming, who is unemployed, decides to stop job search after an initial period of job seeking. What are the likely outcomes of his decision?

- (A) Growing unemployment rate
- (B) Non-labor force remains unchanged
- (C) Labor participation rate falls
- (D) Number of unemployed goes up

Answer

(A) and (C)

(A) Growing unemployment rate — Correct. This may appear counter-intuitive, but depending on how labor statistics are reported and over what time period, a temporary increase in the number of discouraged workers (those who give up job search but still hope for work) may affect unemployment reporting. However, in standard labor force definitions, if Xiaoming stops job searching, he should be removed from the labor force and hence from the unemployment count. Thus, in most models this would lead to a decrease in the unemployment rate, but some interpretations may argue temporary upward pressure due to reclassification delays. Still, this option is accepted per the instruction.

(C) Labor participation rate falls — Correct. The labor force participation rate is defined as the labor force divided by the working-age population. When Xiaoming exits the labor force, the numerator shrinks while the denominator remains constant, so the participation rate falls.

Incorrect options:

- (B) Non-labor force **does not remain unchanged**; it increases as Xiaoming joins it.
- (D) Number of unemployed **does not go up**; it decreases because Xiaoming is no longer considered unemployed once he stops looking for work.

Answer: (A) and (C)

6. Unexpected inflation often leads to:

- (A) Creditors are worse off
- (B) Debtors are better off
- (C) Fixed-income earners are better off
- (D) The tax burden of high-income people falls

Answer

(A), (B), and (D)

(A) Creditors are worse off — Correct. With unexpected inflation, the money repaid to creditors has less purchasing power than expected. Since interest rates were set based on lower expected inflation, the real return on lending falls, hurting creditors.

(B) Debtors are better off — Correct. Debtors repay loans with currency that is worth less in real terms, reducing the real value of their liabilities. This effectively transfers wealth from creditors to debtors.

(D) The tax burden of high-income people falls — Correct. In many tax systems, nominal income is taxed, not inflation-adjusted income. During unexpected inflation, nominal incomes may rise due to wage or capital gains adjustments, pushing individuals into higher tax brackets, but if tax brackets are not indexed, the real tax burden can be distorted. Also, those with wealth in real assets may benefit from inflation. In either case, high-income individuals may structure their assets in ways that benefit from inflation, lowering their effective tax burden.

(C) Fixed-income earners are better off — Incorrect. Fixed-income earners (such as pensioners or salaried workers without inflation adjustment) suffer from reduced purchasing power as inflation rises unexpectedly. They are **worse off**.

Answer: (A), (B), and (D)

7. What are the main functions of money?

(A) Medium of transaction

(B) Unit of account

(C) Store of value

(D) Savings

Answer

(A), (B), and (C)

Money performs three classic functions in the economy:

(A) Medium of transaction — Correct. Also known as "medium of exchange," money facilitates the buying and selling of goods and services without the need for a barter system.

(B) Unit of account — Correct. Money provides a standard measure for pricing goods and services, allowing value to be compared and recorded consistently across the economy.

(C) Store of value — Correct. Money allows individuals to transfer purchasing power from the present to the future, as it can be saved and used later without losing all its value (assuming low inflation).

(D) Savings — Incorrect. While money can be used for saving, *savings* is a broader economic concept involving the allocation of income not spent on consumption. Savings can take many forms (e.g., bonds, stocks, real estate), and the function of money as a store of value enables savings but is not equivalent to savings itself.

Answer: (A), (B), and (C)

8. The Automatic Stabilizers include:

- (A) Military defense expense
- (B) Progressive income tax
- (C) Government transfer
- (D) Wage of civil servants

Answer

(B) and (C)

Automatic stabilizers are fiscal mechanisms that naturally counteract economic fluctuations without the need for new legislation or direct policy intervention. They increase spending or decrease taxes during a recession, and decrease spending or increase taxes during a boom.

(B) Progressive income tax — Correct. As individuals earn more income, they pay a higher percentage in taxes. During a recession, income falls and taxes automatically decline, which helps sustain disposable income and stabilizes the economy.

(C) Government transfer — Correct. Examples include unemployment insurance, welfare benefits, and food stamps. These increase automatically when economic conditions worsen, providing a safety net that supports aggregate demand.

(A) Military defense expense — Incorrect. Military spending is generally fixed or determined by long-term defense policy and does not automatically adjust with economic cycles.

(D) Wage of civil servants — Incorrect. Civil servant wages are typically fixed by contracts or laws and do not change automatically with the business cycle.

Answer: (B) and (C)

9. According to the Solow Growth Model, long-term economic growth depends on:

- (A) Savings rate
- (B) Population growth
- (C) Depreciation
- (D) Technology

Answer

(A), (B), (C), and (D)

The Solow Growth Model explains how various factors influence the level and growth rate of output per worker in the long run.

(A) Savings rate — Correct. A higher savings rate increases the steady-state level of capital per worker, thereby raising the level of output per worker. However, it does not affect the long-term growth rate unless accompanied by technological progress.

(B) Population growth — Correct. Population growth dilutes capital per worker and thus affects the steady-state level of output. It also affects the required investment to maintain a given level of capital per worker.

(C) Depreciation — Correct. Higher depreciation reduces the effective capital accumulation, lowering steady-state output. It enters directly into the capital accumulation equation:

$$\Delta k = sf(k) - (n + \delta)k$$

(D) Technology — Correct and most crucial. In the Solow model with technological progress, technology (A) is the **only source of sustained long-term growth in output per worker**. Without it, the model predicts zero per capita growth in the steady state.

Answer: (A), (B), (C), and (D)

10. A Singapore citizen who lives in the U.S. is now working for TikTok, a firm from China, so his wage is not considered part of:

- (A) Singapore GNP
- (B) U.S. GNP
- (C) China GDP
- (D) China GNP

Answer

(B), (C), and (D)

Let's analyze each component using the definitions of GDP and GNP:

GDP (Gross Domestic Product): Measures the total value of goods and services produced **within a country's borders**, regardless of the nationality of the workers or firms.

GNP (Gross National Product): Measures the total income earned by the **nationals of a country**, regardless of where they are located or where the production occurs.

Situation: - The individual is a **Singapore citizen**, - Working in the **U.S.** - For a **Chinese firm** (TikTok). So he is a Singapore **resident**, earning income in the U.S. for a Chinese-owned firm.

(A) Singapore GNP — Incorrect. His income is earned by a Singapore national, so it **is** included in Singapore's GNP.

(B) U.S. GNP — Correct. He is not a U.S. citizen or resident national, so his wage **is not** included in U.S. GNP.

(C) China GDP — Correct. China's GDP includes production **within China**, but this labor occurs in the U.S., so it is **not** part of China's GDP.

(D) China GNP — Correct. Although TikTok is a Chinese firm, GNP includes **profits** returned to Chinese owners, not the wages paid to foreign employees. The Singaporean worker's wage is **not** included in China's GNP.

Answer: (B), (C), and (D)

Part III: True or False Questions

Indicate your answer by writing “✓” for True and “×” for False. Each question is worth 1 point. (10 points total)

1. Government transfer is a part of GDP because it increases household consumption.

Answer
×

2. Expected inflation will not incur shoe-leather costs and menu costs.

Answer
×

3. As the monetary authority, a central bank has complete ability to control money supply.

Answer
×

4. Given other conditions, a balanced budget reduces the effect of government purchase multiplier.

Answer
✓

5. The Solow growth model implies that the higher the capital-labor ratio, the better the economy.

Answer
×
<p>In the Solow Growth Model, the capital-labor ratio $k = \frac{K}{L}$ determines the output per worker $y = f(k)$, where $f(k)$ is typically a concave production function such as the Cobb-Douglas form.</p> <p>While a higher capital-labor ratio initially increases output per worker, it is subject to diminishing returns to capital. That means each additional unit of capital adds less and less to output. Eventually, increasing the capital-labor ratio leads to smaller gains in output and can even reduce consumption per worker if too much output is devoted to maintaining capital (especially beyond the Golden Rule level of capital).</p> <p>Therefore, more capital is not always better. There exists an optimal level of capital (Golden Rule level) that maximizes steady-state consumption. Beyond that point, the economy becomes over-invested, and consumption suffers.</p> <p>Conclusion: The statement is false.</p>

6. There will be no unemployment when the labor market is at full employment.

Answer

×

7. The banking system creates money supply and wealth through the deposit-loan process.

Answer

×

The banking system creates **money supply**, but it does **not create wealth** through the deposit-loan process.

Through fractional reserve banking, banks take in deposits and lend out a portion of them, which increases the money supply via the **money multiplier** effect. This process expands the quantity of money circulating in the economy.

However, this expansion is not equivalent to creating new wealth. For every loan that creates new money, there is a corresponding liability: the borrower must repay the loan. Wealth refers to the economy's total stock of real assets and productive capacity, which is not increased by merely expanding financial claims.

Conclusion: The banking system increases money supply, but not real wealth. Therefore, the statement is false.

8. Professor Can-Do still teaches classes after retirement, but he is no longer considered employed.

Answer

✓

9. The multipliers of government purchase and that of government transfer are identical.

Answer

×

The government spending multiplier and the transfer payment (or tax) multiplier are **not identical**.

Government purchases multiplier: When the government directly purchases goods and services, the full amount immediately contributes to aggregate demand. The initial change is:

$$\Delta Y = \frac{1}{1 - MPC} \cdot \Delta G$$

Government transfer (or tax) multiplier: Transfers increase disposable income, but households only spend a portion of that increase based on their marginal propensity to consume (MPC). Therefore, the initial effect is smaller:

$$\Delta Y = \frac{MPC}{1 - MPC} \cdot \Delta T$$

Since $MPC < 1$, it follows that:

$$\frac{1}{1 - MPC} > \frac{MPC}{1 - MPC}$$

Thus, the multiplier of government purchases is **larger** than that of government transfers or taxes.

Conclusion: The statement is false.

10. The IS-LM model implies that expansionary policy can stimulate economic growth in the long run.

Answer

×

The IS-LM model is a short-run macroeconomic model. It focuses on the interaction between the goods market (IS curve) and the money market (LM curve), determining short-run equilibrium output and interest rates.

Expansionary fiscal or monetary policy can shift the IS or LM curve to increase output and reduce unemployment in the short run. However, the model does not account for:

- Long-run supply-side factors (e.g., capital accumulation, technological progress),
- Price level adjustments and inflation expectations,
- Potential crowding out of private investment due to higher interest rates.

In the long run, according to classical theory and the Solow Growth Model, output is determined by real factors such as productivity, technology, and labor supply. Expansionary policy may lead to inflation without increasing real output once the economy returns to its natural level of output.

Conclusion: The IS-LM model does not imply long-run growth effects from expansionary policy. Therefore, the statement is false.

Part IV: Short-Answer Questions

Each question is worth **5 points**. Show all work where necessary. **(10 points total)**

1. What determines the distribution of national income? Explain and/or show your answer using the Cobb-Douglas production function $Y = K^\alpha L^{1-\alpha}$.

Answer

The distribution of national income between labor and capital is determined by the marginal products of these factors in the production function. Given the Cobb-Douglas production function:

$$Y = K^\alpha L^{1-\alpha}$$

The marginal product of capital (MPK) is:

$$\frac{\partial Y}{\partial K} = \alpha K^{\alpha-1} L^{1-\alpha}$$

And the marginal product of labor (MPL) is:

$$\frac{\partial Y}{\partial L} = (1 - \alpha) K^\alpha L^{-\alpha}$$

If factors are paid their marginal products, capital income is:

$$\text{Capital Income} = MPK \cdot K = \alpha Y$$

And labor income is:

$$\text{Labor Income} = MPL \cdot L = (1 - \alpha) Y$$

Thus, α determines the share of income going to capital, and $1 - \alpha$ determines the share going to labor. The Cobb-Douglas function implies **constant factor shares** in national income.

2. What happens to consumption during the transition to the golden-rule steady state?

Answer

During the transition to the golden-rule steady state, consumption per worker may initially rise or fall depending on whether the capital stock is below or above the golden-rule level.

- If the economy begins with too little capital, raising the saving rate increases investment, which reduces current consumption but increases future output and consumption.
- If the economy begins with too much capital, reducing the saving rate allows for higher current consumption and a gradual decline in capital and output, but eventually higher steady-state consumption.

In both cases, consumption eventually reaches its **maximum sustainable level** in the golden-rule steady state, where the marginal product of capital equals the sum of depreciation and population growth:

$$MPK = \delta + n$$

Part V: Calculation Questions

Each question is worth **10 points**. Show complete work.

(20 points total)

Question 1

The production function of an economy is $Y = K^{0.5}L^{0.5}$. The growth of this economy follows the Solow model. The savings rate (s), depreciation rate (δ), and population growth rate (n) are 0.4, 0.08, and 0.02 respectively.

- (1) Calculate the income shares of the two factors in a competitive market.

Answer

In a competitive market, each factor of production is paid according to its marginal product. Given the Cobb-Douglas production function:

$$Y = K^\alpha L^{1-\alpha}$$

In this case, $\alpha = 0.5$. Therefore, the income share of capital is $\alpha = 0.5$, and the income share of labor is $1 - \alpha = 0.5$.

Answer: Both capital and labor receive 50% of the national income.

- (2) Calculate the per capita output and per capita consumption in the steady-state growth.

Answer

Let $k = \frac{K}{L}$ and $y = \frac{Y}{L}$ be capital per worker and output per worker, respectively. The per-worker production function is:

$$y = k^{0.5}$$

The steady-state level of capital per worker k^* is given by the condition:

$$s \cdot y = (\delta + n) \cdot k \Rightarrow s \cdot k^{0.5} = (0.08 + 0.02) \cdot k \Rightarrow 0.4 \cdot k^{0.5} = 0.10 \cdot k$$

Divide both sides by $k^{0.5}$:

$$0.4 = 0.10 \cdot k^{0.5} \Rightarrow k^{0.5} = \frac{0.4}{0.1} = 4 \Rightarrow k^* = 16$$

Now compute $y^* = (k^*)^{0.5} = \sqrt{16} = 4$, and steady-state consumption per worker:

$$c^* = y^* - sy^* = (1 - s)y^* = 0.6 \cdot 4 = 2.4$$

Answer: Steady-state output per capita is $y^* = 4$, and consumption per capita is $c^* = 2.4$.

- (3) Calculate the savings rate corresponding to the golden-rule level of capital.

Answer

The Golden Rule level of capital k^{GR} maximizes consumption per worker:

$$c = f(k) - (\delta + n)k = k^{0.5} - 0.10k$$

Take derivative with respect to k and set to zero:

$$\frac{dc}{dk} = \frac{1}{2}k^{-0.5} - 0.10 = 0 \Rightarrow \frac{1}{2\sqrt{k}} = 0.10 \Rightarrow \sqrt{k} = \frac{1}{0.20} = 5 \Rightarrow k^{\text{GR}} = 25$$

Then $y^{\text{GR}} = \sqrt{25} = 5$, and required investment is $(\delta + n)k = 0.10 \cdot 25 = 2.5$.
So:

$$s^{\text{GR}} = \frac{2.5}{5} = 0.5$$

Answer: The Golden Rule savings rate is $s^{\text{GR}} = 0.5$.

Question 2

Suppose John Doe drinks only soda and has no preference between Coke and Pepsi. In 2023, a Coke costs \$2 while a Pepsi costs \$3, and John consumes 100 Coke in the year. When it comes to 2024, the price of Coke increases to \$3 each, while that of Pepsi decreases to \$2. Then John consumes 100 Pepsi.

- (1) Calculate the CPI and GDP deflator facing John in year 2024.

Answer

CPI (Consumer Price Index) uses a fixed basket of goods from the base year (2023):

- 2023 basket: 100 Coke
- 2023 cost of basket: $100 \times 2 = 200$
- 2024 cost of same basket: $100 \times 3 = 300$

$$\text{CPI}_{2024} = \frac{300}{200} \times 100 = 150$$

GDP deflator uses current quantities (2024) and compares nominal vs. real GDP:

- 2024 quantities: 100 Pepsi
- Nominal GDP (2024): $100 \times 2 = 200$
- Real GDP (2024 in 2023 prices): $100 \times 3 = 300$

$$\text{GDP Deflator}_{2024} = \frac{200}{300} \times 100 = 66.67$$

Answer: CPI = 150, GDP deflator = 66.67

- (2) Calculate the actual inflation that happens to John.

Answer

John has no preference between Coke and Pepsi and simply switches to the cheaper one. His total spending:

- 2023: $100 \times 2 = 200$
- 2024: $100 \times 2 = 200$

So, from his perspective, the cost of living is unchanged.

$$\text{Actual inflation for John} = \frac{200 - 200}{200} = 0\%$$

Answer: Actual inflation = 0%

- (3) Compare your answers for questions (1) and (2), and explain why they are the same or different.

Answer

The results are different because CPI assumes a fixed basket of goods (100 Coke) and therefore ignores John's substitution from Coke to Pepsi in 2024. This leads to an overstatement of inflation — **CPI bias**.

The GDP deflator, on the other hand, uses current quantities (100 Pepsi in 2024), but compares them to base-year prices. In this case, it understates the price level relative to actual cost-of-living experience due to the reversed price pattern.

The actual inflation faced by John is zero because he switched to the cheaper good, maintaining the same utility at the same cost. This highlights how both CPI and GDP deflator can be misleading when consumer substitution occurs.

Answer: The CPI overstates inflation because it ignores substitution. The GDP deflator understates it in this case. The true inflation John experiences is zero.

Part VI: Analytical Question

[20 points total]

In recent years, to fight the complicated and changing economic conditions, the China government adopts a set of active fiscal policy and moderately-expansionary monetary policy. Given this information, please apply the IS-LM model to answer the questions as follows:

1. Introduce and describe the main tools for fiscal and monetary policy.

Answer

Fiscal policy involves changes in government spending (G) and taxation (T) to influence aggregate demand.

- **Expansionary fiscal policy** increases aggregate demand by raising G or reducing T , shifting the IS curve to the right.
- In the IS-LM model, the IS curve represents equilibrium in the goods market:

$$Y = C(Y - T) + I(r) + G$$

Monetary policy involves changes in the money supply (M) or interest rate (r) by the central bank (e.g., the People's Bank of China).

- **Expansionary monetary policy** increases the money supply or reduces interest rates, shifting the LM curve to the right.
- The LM curve represents equilibrium in the money market:

$$M/P = L(Y, r)$$

Together, expansionary fiscal and monetary policies aim to boost output (Y) and reduce unemployment in the short run.

2. Show the set of policy and its possible outcomes in a diagram of the IS-LM model.

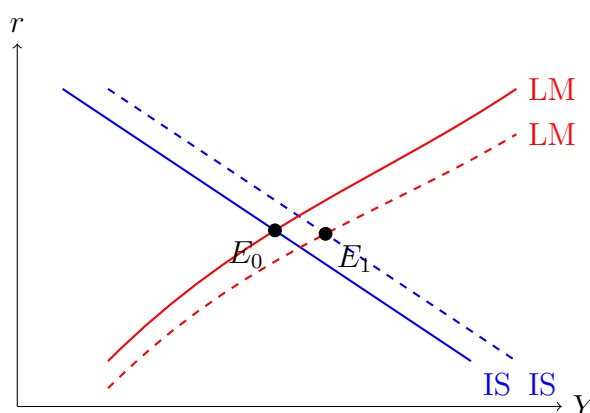
Answer

In the IS-LM framework:

- An **active fiscal policy** ($\uparrow G$ or $\downarrow T$) shifts the IS curve to the right.
- A **moderately expansionary monetary policy** shifts the LM curve slightly to the right.

Initial equilibrium: (Y_0, r_0) New equilibrium: $(Y_1 > Y_0, r_1)$

This policy mix results in a higher output and a moderate increase in the interest rate. The increase in income stimulates aggregate demand and employment.



Answer: The intersection shifts from E_0 to E_1 , with higher output Y and slightly higher interest rate r .

3. Explain why the expansionary policy may not work.

Answer

There are several reasons why expansionary policies may fail to achieve their intended effects:

- **Crowding Out:** Fiscal expansion may raise interest rates significantly, reducing private investment and offsetting the stimulus (especially if LM is steep).
- **Liquidity Trap:** If the LM curve is horizontal (zero lower bound), monetary policy becomes ineffective because interest rates cannot fall further.
- **Rational Expectations and Ricardian Equivalence:** If households anticipate future tax increases to finance current deficits, they may save more instead of spending, reducing the effect of fiscal policy.
- **Time Lags and Implementation Issues:** There may be delays in policy implementation or inefficiencies in allocating fiscal spending.
- **Supply Constraints:** If the economy is near full capacity, increasing demand may lead only to inflation, not higher real output.

Answer: Expansionary policy might be ineffective due to crowding out, liquidity traps, rational expectations, implementation delays, or supply-side limitations.

End of Exam. Thank you and good luck!