HE1002 Macroeconomics I

Final Practice Examination 5 – Problems

Academic Year 2025/2026, Semester 1

Quantitative Research Society @NTU

November 14, 2025

Examination Instructions

Time Allowed: 120 minutes (2 hours)

Total Marks: 100

Answer Requirements:
There is a total of 4 questions. Answer all the questions.

- **Question 1** consists of 15 calculation questions. 2 marks each, total 30 marks. Please state the formula used and show your working.
- **Question 2** consists of 10 short-answer questions. 3 marks each, total 30 marks. Each answer is expected to be around 4 to 5 lines (or 2 to 3 sentences) long.
- **Question 3** consists of 10 true or false questions. 3 marks each, total 30 marks. Please clearly explain your reasoning for both true and false statements. Each answer is expected to be around 4 to 5 lines (or 2 to 3 sentences) long.
- **Question 4** consists of 2 diagram-related questions. 5 marks each, total 10 marks.

Additional Instructions:

- There are NO MCQ questions.
- Bring a calculator.
- It is a closed-book examination.
- Write all answers in the answer booklet provided.
- Show all working for calculations.

Question 1: Calculations (30 marks)

Answer all 15 questions. Each question carries 2 marks. Show all formulas and working.

1.1 *[Adapted from Tutorial 1, Question 10 – modification: adapted – changes: numerical values changed for different year]*

Year 1: Nominal GDP = \$850 billion, Real GDP = \$800 billion.

Year 2: Nominal GDP = \$920 billion, Real GDP = \$840 billion.

Calculate:

(a) The GDP deflator in Year 2

(b) The percentage change in the GDP deflator from Year 1 to Year 2

1.2 *[Adapted from Tutorial 1, Question 6 – modification: adapted – changes: values scaled differently]*

An economy produces: 100 computers at \$1,500 each, 50 smartphones at \$800 each, 200 textbooks at \$120 each.

Calculate total GDP using the expenditure approach.

1.3 *[Adapted from Tutorial 2, Question 1 – modification: adapted – changes: base year shifted, different products]*

A market basket contains: 20 pizzas and 15 movie tickets.

2023 prices: Pizza = \$12, Movie ticket = \$15.

2024 prices: Pizza = \$13, Movie ticket = \$16.

Using 2023 as base year, calculate the CPI in 2024 and the inflation rate.

1.4 *[Adapted from Tutorial 3, Question 5 – modification: adapted – changes: all population values modified]*

Population data: Total population = 300,000, Under 16 = 80,000, Institutionalized = 5,000, Not in labor force = 85,000, Unemployed = 18,000.

Calculate:

(a) Working-age population

(b) Labor force

(c) Unemployment rate

1.5 *[Adapted from Tutorial 4, Question 7 – modification: adapted – changes: growth rates modified, time period extended]*

An economy's real GDP per capita was \$45,000 in 2015. It grew at 2.8% annually for 10 years.

Calculate real GDP per capita in 2025.

1.6 *[Adapted from Tutorial 5, Question 7 – modification: adapted – changes: consumption function parameters altered]*

An economy has: Autonomous consumption $C_0 = \$400$, MPC = 0.72, Disposable income $Y_d = \$3{,}000$.

Calculate total consumption.

1.7 *[Adapted from Tutorial 5, Question 10 – modification: adapted – changes: multiplier scenario with different MPC]*

MPC = 0.78. Government increases spending by \$250 million.

Calculate the total change in equilibrium GDP.

1.8 *[Adapted from Tutorial 6, Question 11 – modification: adapted – changes: all velocity and money supply values modified]*

Money supply = \$650 billion, Velocity = 4.5, Real GDP = \$2,700 billion.

Using $MV = PY$, calculate the price level.

1.9 *[Adapted from Tutorial 7, Question 13 – modification: adapted – changes: tax and MPC values changed]*

MPC = 0.75. Government cuts taxes by \$180 billion.

Calculate:

(a) The initial change in consumption
(b) The total change in equilibrium GDP

1.10 *[Adapted from Tutorial 8, Question 10 – modification: adapted – changes: interest rates and investment values modified]*

Investment demand: $I = 800 - 30r$ (billions, r in percentage).

If interest rate rises from 4% to 6%, calculate the change in investment.

1.11 *[Adapted from Tutorial 9, Question 10 – modification: adapted – changes: reserve requirements and deposits scaled]*

Bank receives \$8,000 deposit, reserve ratio = 0.15.

Calculate:

(a) Required reserves
(b) Excess reserves (assuming no prior reserves)
(c) Maximum loans bank can make

1.12 *[Adapted from Tutorial 10, Question 17 – modification: adapted – changes: Phillips curve parameters modified]*

Natural unemployment rate = 5.5%, Current unemployment = 7.0%, Sensitivity parameter $\beta = 0.6$.

Using Phillips curve $\pi = \pi^e - \beta(u - u_n)$ with expected inflation $\pi^e = 2.5\%$, calculate actual inflation.

1.13 *[Adapted from Tutorial 10, Question 14 – modification: adapted – changes: Okun's law parameters changed]*

Potential GDP = \$6,000 billion, Actual GDP = \$5,700 billion, Natural unemployment = 5%.

Using Okun's law (output gap = $-2\times$ cyclical unemployment), calculate actual unemployment rate.

1.14 *[Adapted from Tutorial 12, Question 5 – modification: adapted – changes: exchange rates and amounts modified]*

You have US$10,000. Exchange rate = 1.25 CAD per USD.

Calculate how many Canadian dollars you receive.

1.15 *[Adapted from Tutorial 12, Question 14 – modification: adapted – changes: interest rates and capital flows altered]*

U.S. interest rate = 4.5%, Canada interest rate = 3.2%.

According to interest rate parity, in which direction will capital flow and how will this affect the USD/CAD exchange rate?

Question 2: Short Answer (30 marks)

Answer all 10 questions. Each question carries 3 marks. Each answer should be 4-5 lines (2-3 sentences).

2.1 *[Adapted from Tutorial 1, Question 12 – modification: adapted – changes: focus changed to digital goods]*

Why is it difficult to accurately measure GDP in the digital economy, particularly for free services like social media and search engines?

2.2 *[Adapted from Tutorial 2, Question 12 – modification: adapted – changes: asks about substitution bias specifically]*

Explain substitution bias in CPI measurement. Why does it cause CPI to overstate inflation?

2.3 *[Adapted from Tutorial 3, Question 11 – modification: adapted – changes: question reframed to ask about policy trade-off]*

Why might policymakers face a trade-off between reducing structural unemployment and maintaining labor market flexibility?

2.4 *[Adapted from Tutorial 4, Question 7 – modification: adapted – changes: asks about catch-up growth mechanism]*

Explain the "catch-up effect" in economic growth. Why do poor countries often grow faster than rich countries?

2.5 *[Adapted from Tutorial 5, Question 5 – modification: adapted – changes: focuses on saving function instead]*

If autonomous consumption is \$500 and MPC is 0.75, derive the saving function $S = f(Y_d)$. Explain the relationship between MPC and MPS.

2.6 *[Adapted from Tutorial 6, Question 7 – modification: adapted – changes: asks about adjustment speed]*

Why do prices adjust faster in some markets (e.g., commodities) than others (e.g., wages)? How does this affect the slope of the short-run aggregate supply curve?

2.7 *[Adapted from Tutorial 7, Question 4 – modification: adapted – changes: asks about recognition and implementation lags]*

Distinguish between recognition lag and implementation lag in fiscal policy. Which is typically longer and why?

2.8 *[Adapted from Tutorial 8, Question 9 – modification: adapted – changes: focuses on risk-return trade-off]*

Explain why investors require higher returns on riskier assets. How does this principle determine the equilibrium interest rate in financial markets?

2.9 *[Adapted from Tutorial 9, Question 2 – modification: adapted – changes: asks about liquidity preference theory]*

According to Keynes's liquidity preference theory, what three motives do people have for holding money? Which motive is most sensitive to interest rates?

2.10 *[Adapted from Tutorial 12, Question 9 – modification: adapted – changes: asks about J-curve effect]*

What is the "J-curve effect" following currency depreciation? Why don't net exports improve immediately?

Question 3: True or False (30 marks)

Answer all 10 questions. Each question carries 3 marks. State whether each statement is TRUE or FALSE and explain your reasoning in 4-5 lines (2-3 sentences).

3.1 *[Adapted from Tutorial 1, Question 13 – modification: adapted – changes: T/F polarity reversed]*

Statement: If Country A has higher GDP than Country B, then Country A necessarily has higher GDP per capita than Country B.

3.2 *[Adapted from Tutorial 2, Question 14 – modification: adapted – changes: asks about core CPI instead]*

Statement: Core CPI, which excludes food and energy prices, is a better measure of underlying inflation trends than headline CPI.

3.3 *[Adapted from Tutorial 3, Question 12 – modification: adapted – changes: T/F polarity reversed]*

Statement: A college student actively searching for an internship during summer is counted as unemployed in official unemployment statistics.

3.4 *[Adapted from Tutorial 4, Question 13 – modification: adapted – changes: asks about property rights specifically]*

Statement: Strong property rights protection is essential for economic growth because they encourage investment and innovation.

3.5 *[Adapted from Tutorial 5, Question 7 – modification: adapted – changes: T/F polarity reversed]*

Statement: An increase in consumer confidence that raises autonomous consumption will shift the aggregate expenditure line downward.

3.6 *[Adapted from Tutorial 6, Question 11 – modification: adapted – changes: asks about menu costs]*

Statement: Menu costs—the costs of changing prices—help explain why prices are sticky in the short run, contributing to the positive slope of SRAS.

3.7 *[Adapted from Tutorial 7, Question 13 – modification: adapted – changes: asks about timing effects]*

Statement: Permanent tax cuts have larger short-run multiplier effects than temporary tax cuts because households adjust their permanent income expectations.

3.8 *[Adapted from Tutorial 8, Question 11 – modification: adapted – changes: focuses on budget deficit financing]*

Statement: When government increases borrowing to finance a budget deficit, interest rates always rise, reducing private investment through complete crowding out.

3.9 *[Adapted from Tutorial 9, Question 13 – modification: adapted – changes: asks about quantitative easing]*

Statement: Quantitative easing differs from conventional monetary policy because it targets long-term interest rates by purchasing long-term securities.

3.10 *[Adapted from Tutorial 10, Question 13 – modification: adapted – changes: asks about rational expectations]*

Statement: If workers have rational expectations and immediately adjust wage demands when they observe expansionary policy, the short-run Phillips curve becomes steeper.

Question 4: Diagrams (10 marks)

Answer both questions. Each question carries 5 marks.

4.1 *[Adapted from Tutorial 5, Question 17 – modification: adapted – changes: expenditure multiplier scenario with different shock]* **(5 marks)**

Consider the Keynesian Cross model (45-degree diagram).

(a) Draw the Keynesian Cross showing planned aggregate expenditure (PAE) and the 45-degree line representing the equilibrium condition $PAE = Y$.
(b) Mark the initial equilibrium output Y_0 where PAE intersects the 45-degree line.
(c) Suppose firms become pessimistic and reduce investment spending. Show the effect on the PAE line and identify the new equilibrium output Y_1.
(d) Explain the multiplier process: why does output fall by more than the initial decline in investment? Use the concept of induced consumption changes in your explanation.

4.2 *[Adapted from Tutorial 10, Question 23 – modification: adapted – changes: asks about sacrifice ratio calculation]* **(5 marks)**

Consider the Phillips curve framework.

(a) Draw both the short-run Phillips curve (SRPC) and long-run Phillips curve (LRPC) on the same diagram with inflation on the vertical axis and unemployment on the horizontal axis.
(b) Suppose the economy is initially at 6% inflation and natural unemployment rate of 5%. Mark this as point A.
(c) The central bank implements contractionary monetary policy to reduce inflation to 3%. Show the short-run adjustment path and mark the new point B where unemployment temporarily rises.
(d) Define the "sacrifice ratio" and explain why it measures the cost of disinflation. If unemployment rises to 7% during the disinflation, calculate the sacrifice ratio.

END OF EXAMINATION

Total: 100 marks
Time: 120 minutes

All questions adapted from HE1002 Tutorial Problem Sheets 1–12