Problem Set 1

ECON 304 – Intermediate Macroeconomics

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Department of Economics • Fall 2025

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| Assignment Information |
| **Due Date:** September 12, 2025  **Total Points:** 3.0  **Student Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **Instructions:** Show all work clearly. Partial credit may be awarded for correct methodology even if the final answer is incorrect. Groups of no more than three are permitted. |

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| Submission Instructions |
| 1. Show all mathematical work clearly 2. Include graphs where requested 3. Explain economic intuition behind your answers 4. Submit by **September 12, 2025** at the beginning of class. 5. Late submissions will be penalized 10% per day   **Office Hours:** Wednesday, 12:00-2:00 PM; Friday, 12:00-1:00 PM; or by appointment |

# Problem 1: Keynesian Multiplier

**Points: 0.5**

Given the equilibrium condition , where , and :

## Question 1.1

Derive the equilibrium output in terms of the parameters of the model – i.e., , , , , and . Include a graph to emphasize the equilibrium level of output.

## Question 1.2

Derive the partial derivative of the equilibrium output with respect to each of the parameters.

## Question 1.3

Discuss the behavior of . Be sure to address what must be true for the economic system to be stable.

## Question 1.4

Suppose the federal government cuts taxes by 30% (), by how much does the equilibrium output change?

# Problem 2: IS-LM

**Points: 1.0**

## Question 2.1

Derive the investment-saving (IS) relation. What does the IS relation represent? Explain.

## Question 2.2

Derive the liquidity-money (LM) relation. What does the LM relation represent? Explain.

## Question 2.3

Consider the financial market with money demand and money supply .

For the goods market, aggregate demand is where the government runs a balanced budget. Solve for the equilibrium output and nominal interest rate.

**Given parameters:** , , , , , , , .

# Problem 3: Response to the Great Recession

**Points: 1.5**

Use the equations from the previous question to illustrate changes to the economic system and your policy response.

## Question 3.1

In 2007-2008, falling house prices caused aggregate demand to fall and the financial system teetered on the verge of collapse. For simplicity, let’s assume this is represented by a decline in autonomous expenditure . Estimate the new equilibrium, graph the Keynesian Cross, and estimate the change in output through the Keynesian multiplier.

## Question 3.2

You are the chair of the Federal Reserve, what is your immediate response to the crisis? Illustrate your open market operations by making a change to one of the equations previously used. What is the new equilibrium and provide intuition for why it has shifted.

## Question 3.3

As chair of the Fed, are you satisfied with the results of your monetary operations? Are you concerned about the efficacy of future monetary policy?

## Question 3.4

How should the federal government respond to this crisis? Illustrate graphically and algebraically.

# Extra Credit

**Points: 0.3**

During the Great Recession the banking system nearly collapsed, what happened to the balance sheets of financial intermediaries and how did the Federal Reserve respond to prop up the system?

*This problem set covers fundamental macroeconomic models essential for understanding business cycles and policy responses. Focus on mastering the mathematical relationships and their economic interpretations.*