

Midterm Exam 1

You have 65 minutes to complete this 60 minute exam. Be sure to “box in” your answers. Show your work (so that partial credit can be granted if the final answer is incorrect).

1. [15 minutes] Use the AD-AS model, assuming the economy *begins above* Y_n , natural output, or potential GDP.

1.1 (5 minutes) Show what the IS-LM and AD-AS graphs look initially.

1.2 (5 minutes) Suppose the government cuts taxes. What happens over time? Use a graph to explain your answer. You can assume adaptive (price) expectations, and expected inflation is always zero.

1.3 (5 minutes) When output has stabilized at medium run equilibrium, will investment be more, less or the same as in your answer to 1.1? Use equations to explain your answer.

2. [30 minutes] Suppose the economy is described by the following equations, where P is fixed:

• Real Sector

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|-----|-----------------------------|---|
| (1) | $Y = Z$ | Output equals aggregate demand, an equilibrium condition |
| (2) | $Z = C + I + G$ | Definition of aggregate demand |
| (3) | $C = c_0 + c_1 Y_D - c_2 i$ | Consumption fn, c_1 is the marginal propensity to consume |
| (4) | $Y_D \equiv Y - T$ | Definition of disposable income |
| (5) | $T = t_0 + t_1 Y$ | Tax function; t_1 is marginal tax rate. |
| (7) | $I = b_0 + b_1 Y - b_2 i$ | Investment function |
| (8) | $G = GO_0$ | Government spending on goods and services, exogenous |

• Asset Sector

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|------|----------------------------------|-----------------------|
| (9) | $\frac{M^d}{P} = \frac{M^s}{P}$ | Equilibrium condition |
| (10) | $\frac{M^s}{P} = \frac{M_0}{P}$ | Real money supply |
| (11) | $\frac{M^d}{P} = \mu_0 + Y - hi$ | Real money demand |

The IS and LM equations are given by:

$$Y = \bar{\gamma}[\Lambda_0 - (c_2 + b_2)i] \quad \text{let} \quad \bar{\gamma} = \frac{1}{[1 - c_1(1 - t_1) - b_1]}$$

$$\boxed{i = \frac{\mu_0}{h} - \left(\frac{1}{h}\right)\left(\frac{M_0}{P_0}\right) + \left(\frac{1}{h}\right)Y}$$

2.1 (7 minutes) Assume G increases by ΔGO , and is completely bond financed. Calculate the government spending multiplier.

2.2 (6 minutes) Suppose that the central bank targets the interest rate so that interest rate does not change from its original value. What is the change in income resulting from the increase in government spending? Show using a graph and/or equations. Explain why this occurs.

2.3 (7 minutes) Suppose instead of (11), money demand behaves in such a way that it rises by j real dollars when real wealth, $(MB+B)/P$ rises by one real dollar, and the central bank targets the interest rate (as in 2.2). What is the impact on income resulting from the increase in government spending? Show using a graph.

2.4 (10 minutes) Returning to the model used in 2.1, now assume the central bank raises the target interest rate by 1%. Show graphically the effect. Using algebra, show the impact on investment and GDP.

3. [15 minutes] Term structure. Given:

Date	1 Mo	2 Mo	3 Mo	6 Mo	1 Yr	2 Yr	3 Yr	5 Yr	7 Yr	10 Yr	20 Yr	30 Yr
02/27/19	2.43	2.44	2.45	2.53	2.55	2.50	2.48	2.49	2.59	2.69	2.91	3.07
02/28/19	2.44	2.47	2.45	2.50	2.54	2.52	2.50	2.52	2.63	2.73	2.94	3.09
03/01/19	2.44	2.46	2.44	2.52	2.55	2.55	2.54	2.56	2.67	2.76	2.97	3.13

3.1 (5 minutes) Suppose the expectations hypothesis of the term structure holds exactly. What is the one year interest rate expected one year from 2/28? Show your work.

3.2 (5 minutes) Suppose it's known that there's a positive liquidity/risk premium of 0.2% associated with two year bonds, but a zero premium for one year bonds, in this equation:

$$i_{nt} = \frac{(i_{1t} + i_{1t+1}^e + \dots + i_{1t+n-1}^e)}{n} + rp_{nt}$$

What is the one year bond yield expected to hold one year from 2/28? Show your work.

3.3 (5 minutes) Is the expected one year interest rate one year from 2/28 higher or lower than the one year interest rate prevailing on 2/28? Explain specifically why this combination of current and expected one year rates might occur.