

Problem Set 1

Due *in lecture* on Monday, ~~September 23~~ **September 25**. Be sure to put your name on your problem set. Put “boxes” around your answers to the algebraic questions.

1. Suppose the economy is described by the following equations (so we are looking at a closed economy):

• 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) | $C = c_o + c_1 Y_D$ | Consumption fn, c_1 is the marginal propensity to consume |
| (4) | $Y_D \equiv Y - T + Tr$ | Definition of disposable income |
| (5) | $T = t_1 Y$ | Tax function; t_1 is marginal tax rate. |
| (6) | $Tr = TR_0$ | Transfer payments; TR_0 is lump sum transfers. |
| (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 |

1.1 Solve for the LM curve (i as a function of Y).

1.2 Solve for the IS curve (Y as a function of i).

1.3 What is the channel (or variable) by which factors in the monetary or asset sector affect the real goods sector in this model?

1.4 Solve for the equilibrium value of Y .

1.5 Graph the IS and LM curves on one diagram. Clearly indicate the intercepts and the slopes, and assume that the equilibrium interest rate is above zero. Label the equilibrium income and interest rate Y_0 and i_0 .

2.1 Assume G decreases by ΔGO , and is completely bond financed (no portfolio effects here). Calculate the government spending multiplier.

2.2 Suppose instead Tr decreases by ΔTR . Calculate the government transfers multiplier.

2.3 Redraw your answer to 1.5. Then in the same graph, show what happens to the equilibrium income and interest rate if government spending on goods and services is decreased by ΔGO ,

and assume again that the new interest rate is above zero. Include in your graph the level of income that would be achieved if somehow the interest rate stayed constant (label this point Y_A).

2.4 At the new equilibrium, do we know if investment is higher or lower than the level it started out with? Do we know if it is higher or lower than at Y_A ?

3.1 Redraw 1.5, *assuming initially $i_0 = 0$* . Show graphically what happens if government is decreased.

3.2 Determine quantitatively what happens to GDP and to the level of investment. Show your work.

4. In Professor Hamilton's presentation, what variable was the best, most up-to-date, indicator of whether we are at a given instant *currently* in a recession.

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