Economics 435                                                            Menzie D. Chinn
Spring 2014                                                               Social Sciences 7418
University of Wisconsin-Madison
**Problem Set 1**

Due **in lecture** on Monday, February 24. 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
(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

(9)    $\dfrac{M^d}{P} = \dfrac{M^s}{P}$       Equilibrium condition

(10)   $\dfrac{M^s}{P} = \dfrac{M_0}{P}$        Real money supply

(11)   $\dfrac{M^d}{P} = \mu_0 + Y - hi$        Real money demand

1.1 Solve for the IS curve ($Y$ as a function of $i$).
1.2 Solve for the LM curve ($i$ as a function of $Y$). What is the channel by which monetary influences affect the real goods sector in this model?
1.3 Solve for the equilibrium value of $Y$.
1.4 Graph the IS and LM curves on one diagram. Clearly indicate the intercepts and the slopes. Label the equilibrium income and interest rate $Y_0$ and $i_0$.

2.1 Assume $G$ decreases by $\Delta GO$, and is completely bond financed (no portfolio effects here). Calculate the government spending multiplier.
2.2 Suppose instead $Tr$ decreases by $\Delta TR$. Calculate the government transfers multiplier.
2.3 Redraw your answer to 1.4. 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 $\Delta GO$. 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 $Y_A$?

2.5 Suppose the Fed targets the interest rate at $i_0$ (call this $i_{target}$). Returning to 2.3, show graphically what happens if government spending on goods and services is decreased. What happens to the level of investment?

3. Consider the Aggregate Demand-Aggregate Supply framework. Suppose government spending is reduced when we are not in a liquidity trap (and do not end up in a liquidity trap), and the Fed does **NOT** target the interest rate. You can assume for simplicity expected inflation is always zero.

3.1 Show what happens in an IS-LM and AD-AS graph in the period the government spending reduction occurs.

3.2 Show what happens over time to output, the price level, and the interest rate.

3.3 Show what the IS-LM and AD-AS graphs look like if initially, the economy is not in a liquidity trap, but interest rates are very close to zero, and output is below potential GDP/full employment. Then show what happens if potential GDP shifts out *a lot* because entrepreneurs develop new products due to tax rate reductions and deregulation.

4.1. Look up on Bloomberg or elsewhere the yield on a one year T-bill. Calculate the price as if the bond were to mature one year from now (specify the date you looked up the data). Show your calculations.

4.2 Once again, look up the one year and two year yields. Assuming the expectations hypothesis of the term structure holds, what is the expected interest one year interest rate, one year from today. Show your calculations.

4.3 Draw the yield curve, for 3 months to 30 years.

4.4 Assuming the expectations hypothesis of the term structure holds (i.e., there is no liquidity premium), do you expect the US economy to go into recession in the next year? Why or why not?