Economics 21 **Spring 2016**

Problem Set 2

This problem set asks you to use IS-LM to explore the various ways in which the government can finance its expenditures. Problem Set is due Friday, **February 12**.

There are three **Options** that the government has to finance an increase in expenditure:

Option 1) Tax Financed Fiscal Expansion

Blanchard many times talks about expansionary fiscal policy in terms of the government budget; so, for example, raising the deficit or lowering the surplus is expansionary (p.94). A tax financed fiscal expansion does not change the deficit (why), so a literal interpretation of Blanchard might lead you to believe that it will not be expansionary. This is what we explore in this section. We will start with baby steps:

a) Use the Keynesian Cross reduced form equation to create a combined equation to determine what will happen to Y as a result of simultaneous increases in g_0 and t_0 (you are allowed to add the multipliers together). If $\Delta g_0 = \Delta t_0$, what does your combined equation say will happen to GDP (ie. stay the same, increase or decrease)? Why?

b) Given your answer in a), what would happen to total tax revenue as a result of this change if taxes are a positive function of income: $T = t_0 + t_1 Y$? Therefore, if we want the overall increase in taxes collected, ΔT, to equal Δg_0, what will have to be the relationship between Δg_0 and Δt_0 (ie. which will be bigger)?

c) To get more specific, we need an equation for a change in government spending that is balanced by an increase in tax revenue (including the change in Y):

$$(1)\ \Delta g_0 = \Delta T = \Delta t_0 + t_1 \cdot \Delta Y$$

Use the equation you found in a) along with the equation above to determine what will happen to GDP as result of a change in g_0 and t_0 that does not alter the deficit. This is called the Balanced Budget Multiplier. Algebraically, you are using equation (1) to eliminate either Δg_0 or Δt_0 from your answer in a). To insure that everyone gets the same answer, eliminate Δg_0. Assuming that the MPSpend + t_1 is less than 1, is this multiplier positive?

d) We know that the horizontal shift of the IS curve is what would be predicted by Yee Olde Keynesian Cross (est. 1936), so the answer you found in c) is how far the IS curve shifts horizontally. However, given that there is an upward sloping LM curve, will the shift in IS that you found in c) result in an increase in taxes equal to the increase in government spending? Why or why not?

e) Without calculating the actual IS-LM multiplier (though you get major Extra Credit if you do), how does an upward sloping LM curve change the amount of the tax increase, Δt_0, that is needed to help pay for the increase in g_0? Does the increase in t_0 have to be bigger or smaller than in c)? Why? Therefore, does the IS curve shift farther out or less far out than in c)?

Option 2) Bond Financed Fiscal Expansion: The U.S. Treasury sells bonds to the public and takes the money from the sale of the bonds to pay for its Δg_0. This is what is conventionally meant by "an increase in government spending" and involves no change in tax rates or the money supply.

a) Calculate the horizontal shift of the IS curve for this policy (this is a Dah).

b) Does the IS curve shift out more or less than in Option 1 Question c?

c) Using the reduced form equation for Y in the IS-LM model (found in your IS-LM handout), what is the IS-LM multiplier for this policy?

Option 3) Money Financed Fiscal Expansion: The U.S. Treasury prints $1 trillion dollars worth of platinum coins and pays for Δg_0 with them.

a) Using the reduced form equation for Y in the IS-LM model, calculate the effect on Y of an increase in g_0 and $(M/P)^s$ of equal magnitude.

b) Turns out that while the Treasury can print an unlimited number of platinum coins, it is not allowed to print normal money in any quantity. Consider the following:

i) The Treasury sells $1 trillion dollars of government bonds to the public, and
ii) Simultaneously, the Federal Reserve conducts an Open Market Purchase of $1 trillion.

How does, or does not, the policy in Option 3a) differ from the combined policies in Option 3b)?

Nuclear Option: Let's say Republicans in Congress refuse to raise the Debt Ceiling so the Treasury cannot sell any additional bonds to the public. What will be the effect of the following:

i) The Treasury prints a $1 trillion platinum coin and "sells" it to the Federal Reserve for $1 trillion in normal money, which the Treasury uses to pay for Δg_0, and
ii) Simultaneously, the Federal Reserve conducts an Open Market Sale of $1 trillion.

How does, or does not, the final outcome of the Nuclear Option differ from Option 2)?

Graphical Analysis (you definitely need to be able to do this on exams): Using IS-LM, draw graphs showing what each of the financing options looks like (be sure to include the increase in g_0). While you do not have exact numbers (since we have not specified any of the values of the parameters), the shifts of the IS and LM curves have a very specific relationship to one another which you should make clear on your graphs. Of the three non-nuclear financing options, which is the most expansionary? Why?

Crowding Out is the belief that an increase in g_0 will drive up interest rates as the government competes with the private sector for the pool of available funds, and this will cause I to decline. If the Investment function is $I = i_0 + i_1 \cdot Y - i_2 \cdot r$, is it the case that Investment necessarily declines as g_0 increases when that increase is financed by bonds? What determines whether it declines or not?