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Department of Economics

Econ 305   Prof. Kasa
Intermediate Macroeconomic Theory   Spring 2011

PROBLEM SET 3
(Solutions)

1. Suppose a country is hit by a major earthquake, which destroys a significant portion of its capital stock.

   (a) Use the market-clearing Real Business Cycle model developed in chapters 9-11, to illustrate the effects of this event on the economy's real output, employment, wage rate, investment, consumption, and price level.

   The earthquake has direct effects in both the labor and goods markets. In the labor market, the decline in K reduces the marginal product of labor, which shifts the L^D down and to the left. At the same time, the decline in K represents a decline in household wealth, since they are ultimately the owners of the capital stock. Lower wealth causes the L^S curve to shift out and to the right. Wages clearly fall, but the net effect on employment is ambiguous. It is more likely to rise when the wealth effect on labor supply is large, which of course depends on how big the earthquake is.

   In the goods market, the decline in K obviously reduces the supply of output, so Y^S shifts up and to the left. On the demand side, there are opposing effects. The decline in K increases the marginal product of capital (due to diminishing returns), which then promotes investment, in an effort to replace the lost capital. However, to the extent that a lower K makes people less wealthy, output demand will decline. On net, the leftward shift of Y^S is likely to dominate, so current output declines and the interest rate rises. A higher interest rate then causes a further shift out in the L^S curve in the labor market, due to intertemporal substitution.

   Finally, in the money market, the demand for money is likely to fall, since both Y falls and r rises. If the money supply remains constant, this would cause an increase in price level, and a temporarily higher inflation rate.

   The following graphs illustrate the effects. For more details, see pages 321-324 from chapter 9 in the text.
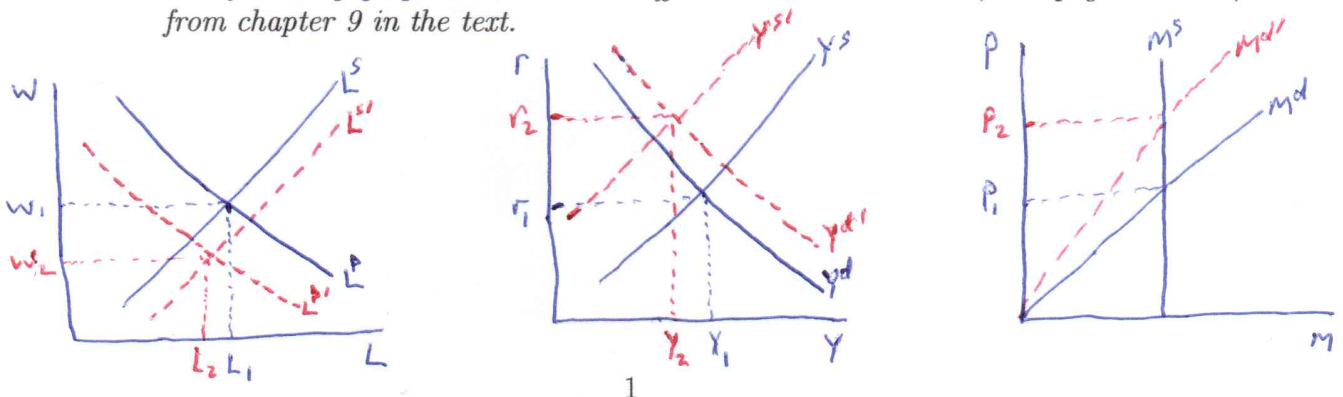
(b) According to this model how, if at all, should the government respond to this event?

Despite the lower output and potentially higher inflation rate, there is no reason for the government to respond for the sake of "stabilization". The economy has been hit with the bad shock, and the market is responding the best it can. This is a key difference between the market-clearing and Keynesian approaches. However, in the real world, even a classical economist would likely support increased government spending in response, simply because much of the lost capital is likely to be in the form of 'public goods', like roads and bridges.

2. Currently there is a lot of debate in the United States about the fiscal deficit. Suppose it becomes clear that government spending will be reduced in the future. Use the market-clearing Real Business Cycle model developed in chapters 9-11, to illustrate how the economy would response today to an anticipated reduction in future government spending. Be sure to explain how output, employment, wages, interest rates, and the price level respond.

Again, this has effects in both the labor and goods markets. In the labor market, lower G means lower future taxes, which makes people wealthier. As a result, the L^S curve shifts up. This reduces employment and increases wages. In the goods market, the decline in employment causes the Y^S curve to shift up and to the left. On the demand side, the increase in household wealth will produce an increse in consumption, which shifts out the Y^D curve (remember, the decline in G takes place in the future, so there is no offset there). Clearly, the model predicts that r will rise, which then causes the L^S to shift down towards its original position. On net, the wage rate and interest rate clearly rise, employment falls, and the effect on output is ambiguous. It is interesting that the announcement of deficit reduction plan could actually cause current output to decline! (Of course, from a market-clearing perspective this would not be a bad thing! Output declines because people are wealthier and are enjoying more leisure). The following graphs illustrate the effects, assuming the shift in Y^S dominates, so that output declines. With lower Y and higher r, money demand falls, and so the price level rises.
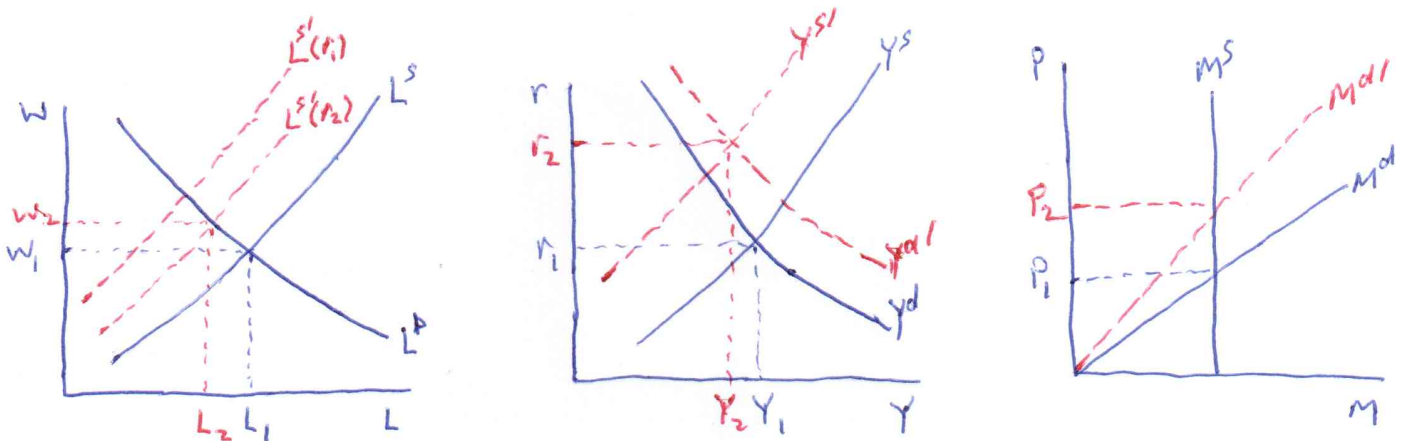
3. Use the Keynesian IS-LM model to predict the effects of each of the following shocks on output and the interest rate. In each case, explain what the Central Bank should do if it wants to keep income at its initial level.

   (a) A sudden loss of confidence in the financial system, which causes households to increase their demand for currency relative to bonds and other interest-bearing assets.

   An increase in money demand causes he LM curve to shift up and to the left. This causes higher interest rates (on riskier, less liquid forms of wealth) and lower output. Note, if the loss of confidence causes people to take their money out of the bank entirely, and hold more currency, it could also produce a decline in the money supply, since the money multiplier would decline. The multiplier would also decline if the banks themselves wanted to reduce leverage, and so increased their reserve/deposit ratios. This was the dominant effect in the recent financial crisis.

   Clearly, if the central bank wants to stabilize output it must increase the money supply, by purchasing government bonds.

   (b) A slowdown in China's economy, which reduces domestic exports.

   A decline in exports due to a foreign recession (or slowdown in China's case), will cause the domestic IS curve to down and to the left. This causes current output to decline. If the central bank wants to stabilize output, then it must clearly increase the money supply in response.

   (c) Passage of a deficit reduction package, which involves higher taxes and lower government spending.

   Note that from a Keynesian perspective, it doesn't really matter whether deficit reduction takes the form of higher taxes or lower spending. This is not the case in market-clearing models. Either way, in a Keynesian model, a fiscal 'contraction' causes the IS curve to shift down and to the left. This would cause output to decline. To prevent this the central bank would need to increase the money supply.

4. Suppose you are an economic analyst for the government, and your job is to keep the economy as stable as possible. Suppose incoming data suggest that output and employment are falling. Use the Keynesian IS-LM model to illustrate two possible reasons why the economy might be falling into a recession. How could you use market data to decide what is the source of the decline in output, and how would that affect your policy advice?

Output and employment could be declining because either the LM curve shifts left (due perhaps to increased money demand or decline in the money multiplier), or because the IS curve shifts left (lower investment due to less optimism about the future?). From a stabilization perspective, it would be desirable to use a policy that responds directly to the disturbance (ie., fiscal expansion in response to an IS shift, and monetary expansion in response to an LM shift). Doing so would keep the price level stable too. To figure out which is the source of the output decline you just need to look at what's happening to interest rates. If rates are rising, it must be due to a leftward shift in LM. If rates are falling, it must be due to a leftward shift in IS. (Of course, both could be shifting, and then the interest rate effect depends on which effect dominates, and keeping a stable price level would require a combination of monetary and fiscal policy.