Economics 442   Menzie D. Chinn
Spring 2020   Social Sciences 7418
University of Wisconsin-Madison
Problem Set 3

Due on Canvas by 5:30pm CST on Wednesday, November 11th. Be sure to put your name on your
problem set. Put "boxes" around your answers to the algebraic questions.

1. Answer true/false: Recessions are:
1.1 Officially determined by the National Bureau of Economic Research, for recessions in the United
States.
1.2 Always characterized by at least two quarters of negative GDP growth.
1.3 Usually follow an inversion of the 10 year-3 month Treasury spread.
1.4 Are becoming less frequent over the past 100 years.

2. Consider the IS-LM model in a period of Covid-19, specifically the two-good model described by
Blanchard. X is the affected sector, Z is the unaffected sector, and they both start out at full employment.
2.1 Show what happens graphically in Sector X if the pandemic hits. What is the level of output and
interest rates after the shock (call it X_1)?
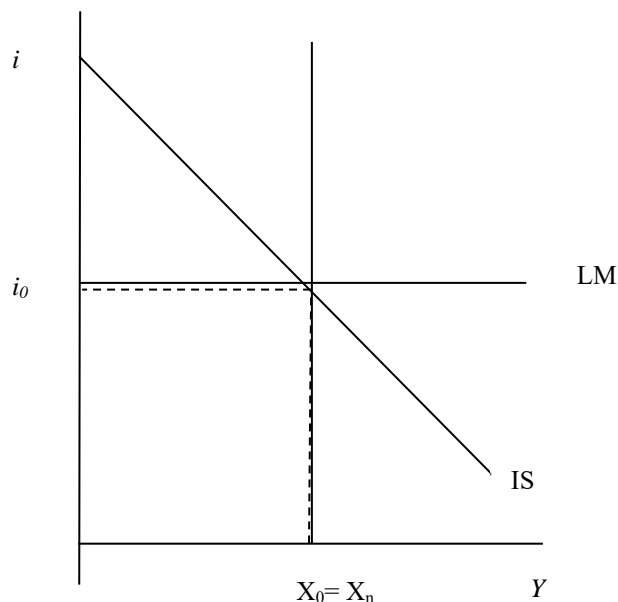
2.2 Suppose firms exit when output falls, and the new natural rate of output in the X sector changes to X_1.
Can fiscal or monetary policy prevent the decline in the natural rate of output in X? If so, show how.
2.3 The Paycheck Protection Program essentially provided grants to firms that closed down, but retained
(and paid) at least 90% of their pre-pandemic employees, and did *not* exit. Suppose exit of firms in Sector
X are prevented. What will equilibrium look like *after* the pandemic?
2.4 Compare the outcome from Problem 2.3 against that in 2.2.

3. Suppose the AD-AS diagram looks like the following:
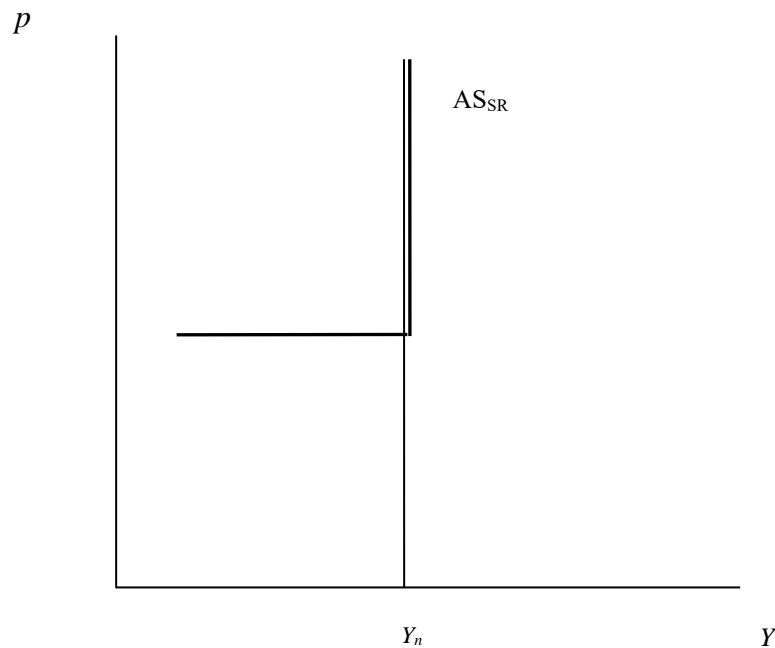
3.1 Suppose output is currently below Y_n (at Y_0) and interest rates are above 0. Using IS-LM and AD-AS diagrams, show what is the size of the multiplier for government spending, assuming the final level of income is below Y_n? You can let $\hat{\gamma}$ be the multiplier from the IS-LM handout, in your answer.

3.2 Suppose output is at Y_n. What is the size of the government spending multiplier for an increase in government spending?

3.3 Using the same assumptions as in 3.2, state the size of the increase in income arising from a $1 billion increase in the money supply.

3.4 Suppose output is currently below Y_n, but interest rates are already at zero. What is the size of the increase in income for a $1 billion real increase in money supply?

3.5 Re-answer 3.1, using the same assumptions, but assume the central bank will not let output rise. Show what does the IS-LM diagram look like.

4. Suppose the pure expectations hypothesis of the term structure applies.

4.1 Can credit easing (buying long term Treasury securities) affect the long term interest rate relative to the short term interest rate?

4.2. How can forward guidance affect the long term interest rate. Show using algebra.

5. The new monetary policy framework indicates that the Fed will pursue a maximum employment target, rather than a full employment target. (By Okun's Law, when $Y > Y_n$, $u < u_n$, and vice versa).

5.1 Show how the LM curve is moved when output rises above Y_n, and when it falls below Y_n, using the old framework (assuming the Taylor rule is used).

5.2 Show how the LM curve is moved when output rises above Y_n, and when it falls below Y_n, using the new framework.

5.3 What does the new monetary policy framework imply for fiscal multipliers? Will they be generally larger or smaller, or just different, from those seen in the old framework.