

ECON 3010 Intermediate Macroeconomic Theory

Solutions to Homework #9

Due: Thursday, December 6, 2018

Ten *LaunchPad* multiple-choice questions. You have unlimited attempts to complete the assignment and they are due at midnight on the date above.

The written questions below are due at the beginning of class and should be typed.

1. Chapter 14. Problems and Applications #5.

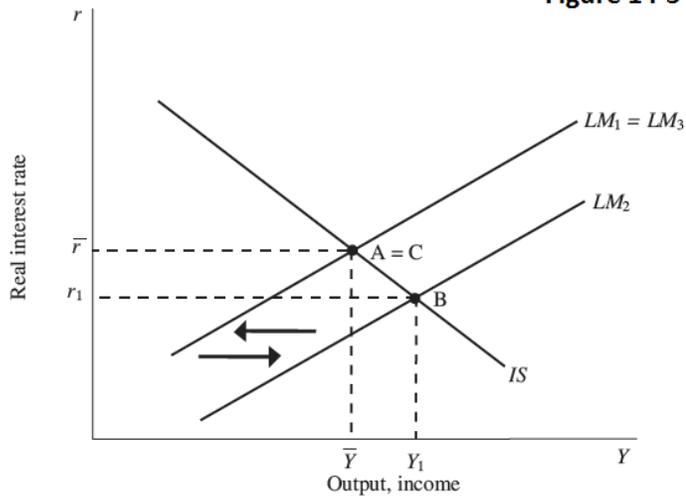
Solutions.

1. a. Beginning in long-run equilibrium, where output is at the natural level, if the Federal Reserve increases the money supply, this will cause the economy to go through an expansionary phase. Starting with the *IS-LM* model in Figure 14-3A, an increase in the money supply will shift the *LM* curve to the right, resulting in a lower interest rate and higher level of output at point B. In the long run, the price level will rise, real-money balances will decline, and the *LM* curve will shift back to its original position. There is no long-run change in the real interest rate or the level of output. Moving to the *AD-AS* model in Figure 14-3B, an increase in the money supply will shift the *AD* curve to the right, resulting in a higher level of output and a higher price level at point B. In the long run, expected inflation will rise, shifting the *SRAS* curve upward. The economy ends up at point C with output back at its natural level and the price level at a higher level. Moving to the Phillips curve graph in Figure 14-3C, the economy starts at point A, where unemployment is at the natural rate. The increase in the money supply pushes output above its natural level, and as a result, the unemployment rate falls below its natural level. This causes a movement along the short-run Phillips curve to point B, where inflation is higher and unemployment is lower. In the long run, expected inflation will rise, causing the Phillips curve to shift upward. The economy ends up at point C with higher inflation and no change in the unemployment rate. The economy moves through this expansionary cycle because the increase in the money supply does not immediately cause expected inflation to rise.
- b. Beginning in long-run equilibrium with output at its natural level, if the Federal Reserve increases the money supply and people immediately expect inflation to rise, then nothing changes except for the price level and the inflation rate. In the *IS-LM* model, the increase in the money supply will cause the price level to rise at the same rate as the money supply such that there is no change in real balances. The economy stays at point A, as illustrated in Figure 14-4A. Moving to the *AD-AS* model, the increase in the money supply shifts the *AD* curve to the right, but at the same time,

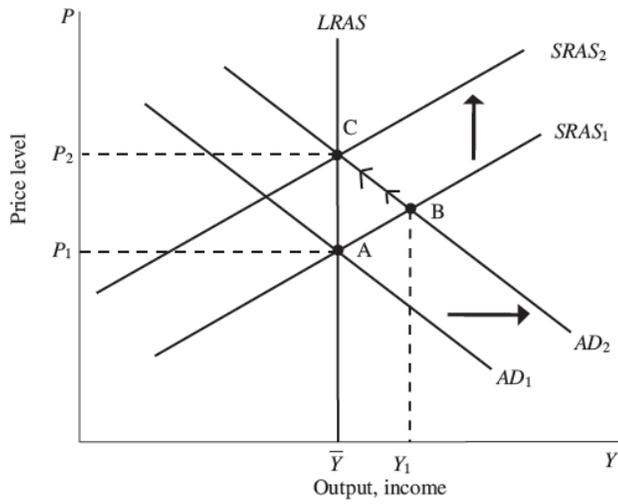
the increase in expected inflation shifts the *SRAS* curve up and to the left. The economy remains at the natural level of output and the price level is higher, as illustrated in Figure 14-4B. Moving to the Phillips curve, the immediate increase in expected inflation shifts the short-run Phillips curve upward, causing the inflation rate to rise with no change in the unemployment rate, as illustrated in Figure 14-4C. When the money supply increases and the public immediately expects higher inflation, the economy does not move through an expansionary cycle.

A. IS-LM Model

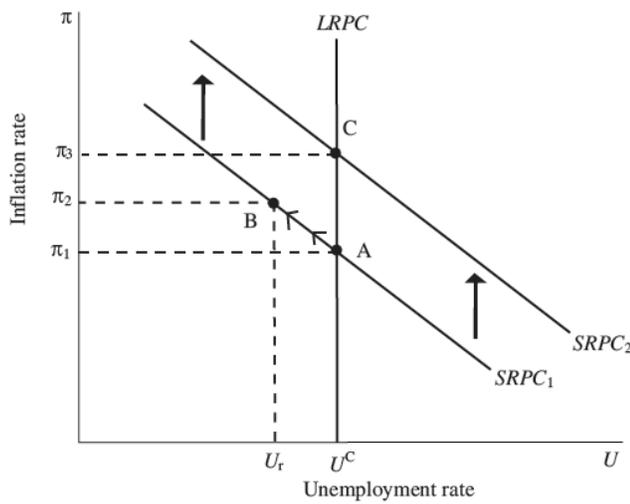
Figure 14-3



B. AD-AS Model

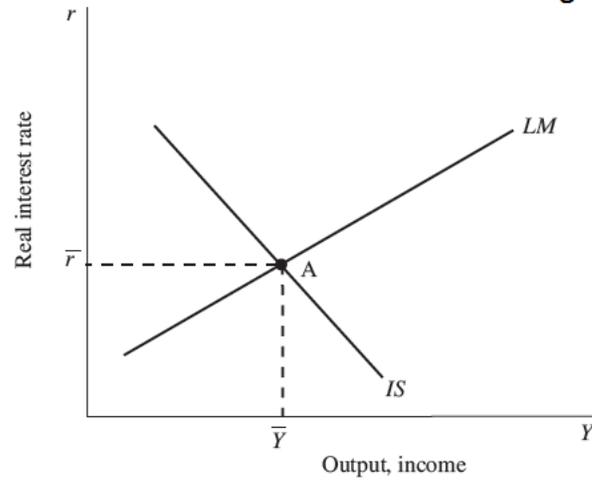


C. Phillips curve

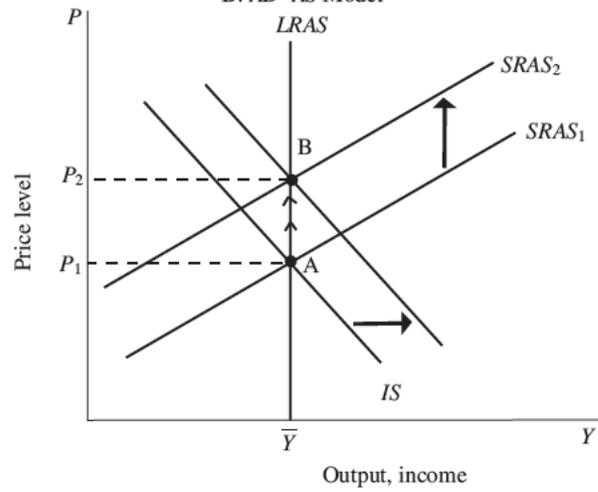


A. IS-LM Model

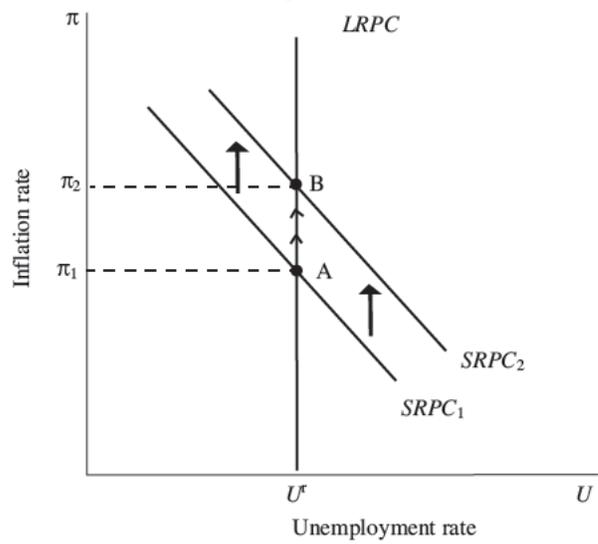
Figure 14-4



B. AD-AS Model

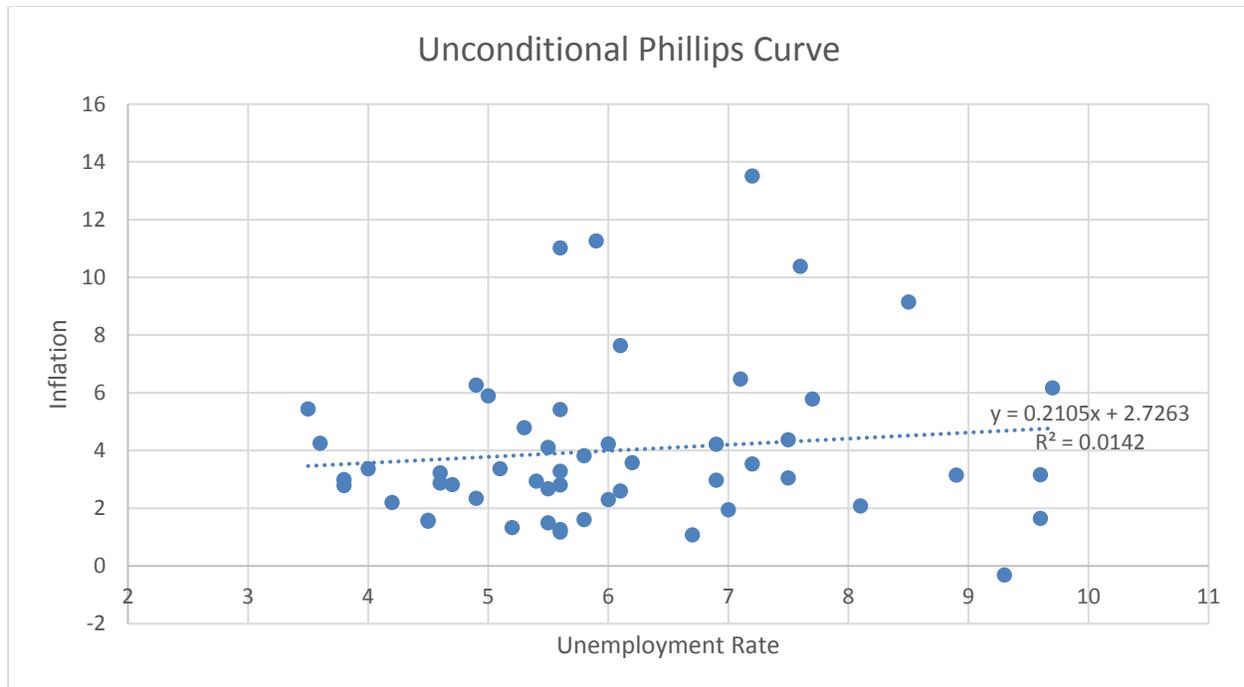


C. Phillips curve



- Use FRED (<http://research.stlouisfed.org/fred2/>) to collect annual data on unemployment and inflation in the United States. Use Excel to create a scatter plot of the data from 1960-2017. Draw the best fitting regression line to the data. What is the R^2 (goodness-of-fit) value and why is the fit so poor? (HINT: Excel will automatically add a linear trend with the best-fitting equation and R^2 value.)

Solutions.



The R^2 is 0.014, which is very low. This implies that the Phillips curve explains about 1.4% of the variation in inflation rates using the unemployment rate. The reason the explanatory power is so low is due to inflation expectations and various shocks. These two factors shift the Phillips curve and are not accounted for in the simple scatter plot above.

- The natural rate of unemployment is thought to be in the 4-5% range and the inflation target is 2%. Start in 1960 and use the Phillips curve data to describe each episode where the U.S. economy deviated significantly from full employment and the inflation target. Then describe the likely cause of each deviation, making sure to explain whether you think the episode was caused by an aggregate demand and/or an aggregate supply shock. Also, make sure to describe any fiscal or monetary response. In some cases, there may not be a single well-established explanation so it will be important to carefully defend your answer.

Solutions. There is no single right answer here. You could divide the data up into numerous episodes where the data deviated significantly from its natural level. I'm going to focus on three major macroeconomic "shocks", which in turn create three episodes. (1) The Vietnam War in the late 1960's and early 1970's increased the demand for goods and services and acted as a stimulus to the macroeconomy. This could be modeled as a positive AD shock, causing a decrease in the unemployment rate but an increase in inflation. (2) The Middle East oil shocks in the mid and late 1970's raised the price of oil and the prices of all the goods and services that require oil-based products as inputs to production. This can be modeled as an adverse SRAS shock, leading to higher unemployment and inflation. The policy response by the Fed was to lower the money supply and raise interest rates in order to reduce inflation. Simultaneously, the Reagan administration cut taxes in order to stimulate the economy and reduce unemployment. (3) The Financial Crisis of 2008 and the associated housing decline could be modeled as an adverse AD shock. This tended to increase the unemployment rate and decrease inflation. The fiscal response of the Obama administration was to implement a fiscal "stimulus" that would reduce unemployment. At the same time, the Fed was implementing expansionary monetary policy by keeping short-term interest rates near zero and experimenting with a program of "quantitative easing".