

6. What policy change did Paul Volcker implement, and how did it affect interest rates, output, and inflation over time?
7. Why do central banks often exercise monetary policy by targeting an interest rate rather than by setting particular levels of the money supply?


### EXERCISES

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1. **How the Fed affects investment:** The Federal Reserve exercises monetary policy by means of a very short-term, overnight nominal interest rate. Explain how changes in this overnight nominal rate influence longer-term real interest rates, and thus investment.
2. **Lowering the nominal interest rate:** Suppose the Fed announces today that it is lowering the fed funds rate by 50 “basis points” (that is, by half a percentage point). Using the IS-MP diagram, explain what happens to economic activity in the short run. What is the economics underlying the response in the economy?
3. **A consumption boom:** Using the IS-MP diagram, explain what happens to the economy if there is a temporary consumption boom that lasts for one period.
  - (a) Initially, suppose the central bank keeps the nominal interest rate unchanged.
  - (b) Suppose you are appointed to chair the Federal Reserve. What monetary policy action would you take in this case and why? Refer to the IS-MP diagram.
4. **No inflation stickiness:** Suppose the classical dichotomy holds in the short run as well as in the long run. That is, suppose inflation is not sticky but rather adjusts immediately to changes in the money supply.
  - (a) What effect would changes in the nominal interest rate (or the money supply) have on the economy?
  - (b) What effect would an aggregate demand shock have on the economy?
  - (c) What about an inflation shock?
5. **Your day as chair of the Fed (I):** Suppose you are appointed to chair the Federal Reserve. Your twin goals are to maintain low inflation and to stabilize economic activity—that is, to keep output at potential. Why are these appropriate goals for monetary policy? (*Hint:* What happens if the economy booms?)
6. **Your day as chair of the Fed (II):** With the goal of stabilizing output, explain how and why you would change the interest rate in response to the following shocks. Show the effects on the economy in the short run using the IS-MP diagram.
  - (a) Consumers become pessimistic about the state of the economy and future productivity growth.
  - (b) Improvements in information technology increase productivity and therefore increase the marginal product of capital.
  - (c) A booming economy in Europe this year leads to an unexpected increase in the demand by European consumers for U.S. goods.



- (d) Americans develop an infatuation with all things made in New Zealand and sharply increase their imports from that country.
- (e) A large earthquake destroys many houses and buildings on the West Coast, but fortunately results in little loss of life.
- (f) A housing bubble bursts, so that housing prices fall by 20% and new home sales drop sharply.
7. **The summary diagram:** The end of Section 12.4 contains a summary of the short-run model. Explain the economic reasoning that underlies each step in this summary.
8. **An oil price shock (hard):** Suppose the economy is hit by an unexpected oil price shock that permanently raises oil prices by \$50 per barrel. This is a temporary increase in  $\bar{o}$  in the model: the shock  $\bar{o}$  becomes positive for one period and then goes back to zero.
- (a) Using the full short-run model, explain what happens to the economy in the absence of any monetary policy action. Be sure to include graphs showing how output and inflation respond over time.
- (b) Suppose you are in charge of the central bank. What monetary policy action would you take and why? Using the short-run model, explain what would happen to the economy in this case. Compare your graphs of output and inflation with those from part (a).
9. **Immigration and inflation:** Suppose a large number of new immigrants enter the labor market. Assume this increase in the supply of labor provides a drag on wage increases: wages rise by less than the prevailing rate of inflation over the next year. Use the short-run model to explain how the economy responds to this change.
10. **The consumption boom revisited:** Go back to exercise 3 and explain what happens in the full short-run model (including the Phillips curve and allowing the economy to evolve over time). Do this for both parts (a) and (b), and be sure to provide graphs of output and inflation over time.
11. **Changing the slope of the Phillips curve:** Suppose the slope of the Phillips curve—the parameter  $\bar{v}$ —increases. How would the results differ from the Volcker disinflation example considered in the chapter? What kind of changes in the economy might influence the slope of the Phillips curve?
-  12. **The productivity slowdown and the Great Inflation:** Using the IS-MP diagram and the Phillips curve, explain how the productivity slowdown of the 1970s may have contributed to the Great Inflation. In particular, answer the following:
- (a) Suppose growth in actual output is slowing down, as shown in Figure 12.13. Policymakers believe this is occurring because of a negative shock to aggregate demand. Explain how such a shock would account for the slowdown using an IS-MP diagram.
- (b) With this belief, what monetary policy action would policymakers take to stabilize the economy? Show this in the IS-MP diagram, as perceived by policymakers.

- (c) In truth, there was a slowdown in potential output, as also shown in Figure 12.13. Show the effect of monetary policy on short-run output in the “true” IS-MP diagram.
- (d) Show the effect of this monetary policy in a graph of the Phillips curve. Explain what happens.
- (e) How will policymakers from parts (a) and (b) know they have made a mistake?
- 13. The new economy of the late 1990s:** Between 1995 and 2000, the U.S. economy experienced surprisingly rapid growth, termed the “new economy” by some observers. Was this a change in potential output or short-run output? Alan Greenspan, Fed chairman, argued it was a change in potential and did not raise interest rates to slow the economy. At the time, many economists thought this was a mistake. Look back at the data on inflation in Figure 12.9 to form your own opinion. Write a brief memo (one page or less) either defending or criticizing Greenspan’s position. Be sure to use the graphs of the short-run model to make your case.
- 14. E-commerce and monetary policy:** In the context of the money supply-and-demand diagram, explain the effects of financial innovations like e-commerce and the increased prevalence of credit card readers in stores. Are the effects possibly related to the fact that central banks in most countries express monetary policy in terms of a target for the nominal interest rate?



### WORKED EXERCISES

#### 4. No inflation stickiness:

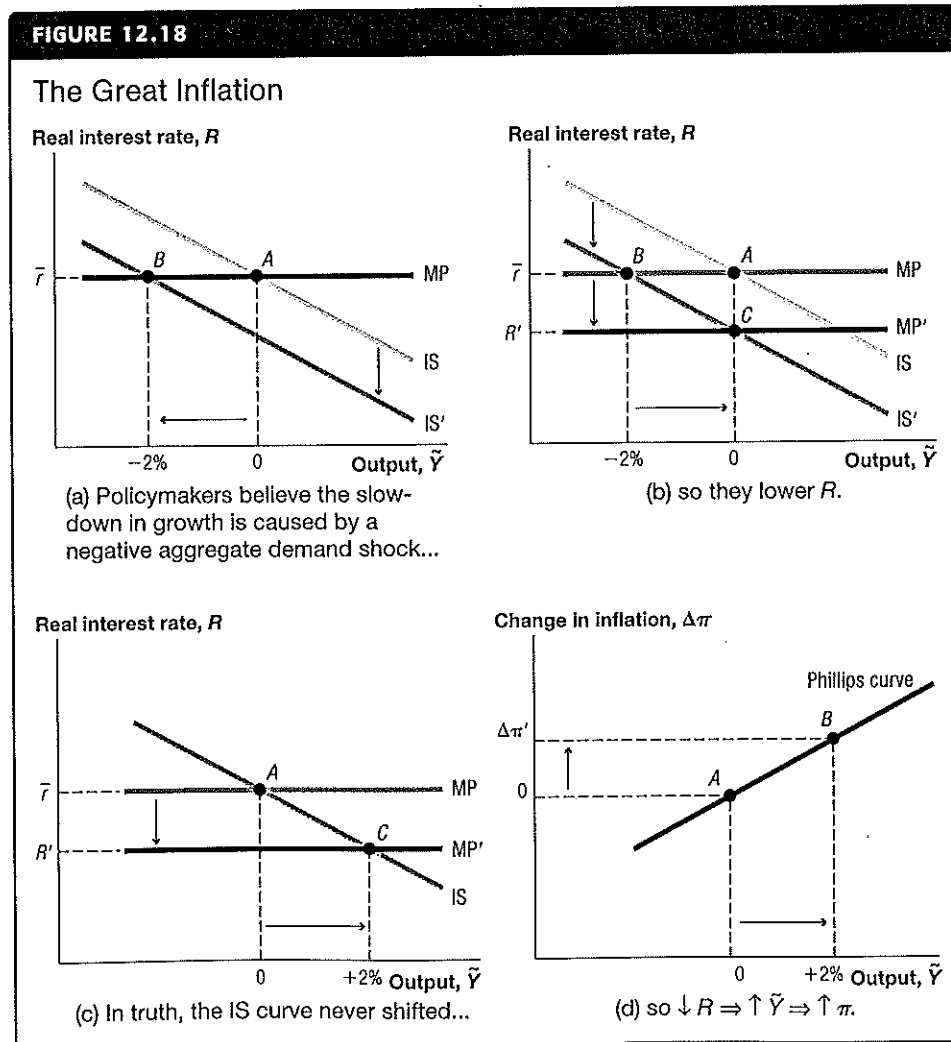
- (a) Recall that the classical dichotomy says that real variables in the economy are determined entirely by real forces and are not influenced by nominal changes. In this case, a change in monetary policy that changes the nominal interest rate will affect inflation immediately and leave the real interest rate—and therefore the rest of the real economy—unchanged. In the absence of sticky inflation, changes in monetary policy have only nominal effects, not real effects.
- (b) Recall that the IS curve is entirely a relationship between real variables in the economy and has nothing to do with the classical dichotomy. So in the IS-MP diagram, the IS curve would still shift in the presence of an aggregate demand shock.

What would differ is the ability of monetary policy to insulate the economy from such shocks. Since monetary policy could no longer affect the real interest rate, the MP curve would be stuck at the marginal product of capital  $\bar{r}$ . Aggregate demand shocks would then push the economy around, causing booms and recessions. For example, in response to the bursting of a housing bubble, the economy would respond as in panel (a) of Figure 12.5. Monetary policy could not implement the changes associated with panel (b).

(c) Similarly, inflation shocks like a change in oil prices could affect the inflation rate. If inflation were not sticky, the inflation rate would potentially move around even more. What would be different in this case is that monetary policy could respond to the rate of inflation with no fear of causing a recession. If the central bank didn't like the current rate of inflation, it could simply adjust monetary policy to deliver the desired rate.

**12. The productivity slowdown and the Great Inflation:**

- (a) Policymakers believe that the slowdown in growth is caused by a negative aggregate demand shock that reduces output below potential. This is straightforward to analyze in an IS-MP diagram, as shown in Figure 12.18(a).
- (b) Perceiving a negative shock to aggregate demand, policymakers react by lowering the real interest rate, in the belief that they are restoring output to potential (panel b).



- (c) In truth, of course, there has been no negative aggregate demand shock, so the IS curve has not shifted. The stimulation of the economy by the Fed moves the economy down the original IS curve, raising output above potential rather than restoring the economy to potential (panel c).
- (d) Since output is above potential, firms raise their prices by more than the original rate of inflation, leading the rate of inflation itself to increase. This is dictated by the Phillips curve (panel d). At this point, we have explained how misconstruing the productivity slowdown as a negative aggregate demand shock could have led to the Great Inflation: the Fed stimulates the economy in an effort to move it back to potential. In fact, this leads output to rise above potential, which raises inflation.
- (e) The key indicator that the central bank has made a mistake is that inflation rises. In the absence of any other shocks, this would be a strong indication that output is above potential. The experience of the 1970s, however, was not so clear because of the presence of oil shocks, which would also tend to increase inflation. Learning about the productivity slowdown and the mistakes in policy thus took longer than was ideal.