

5. An important stylized fact of economic fluctuations is that the inflation rate usually falls during a recession. This fact lies at the heart of our short-run model in the form of the Phillips curve. The Phillips curve captures the dynamic trade-off between output and inflation: a booming economy leads to a rising inflation rate and a slumping economy to a declining inflation rate.
6. The essence of the short-run model is that the economy is hit with shocks, which policymakers may be able to mitigate, and inflation evolves according to the Phillips curve. Policymakers use monetary and fiscal policy in an effort to stabilize output and keep inflation low and steady. This task is made difficult by the fact that potential output is not readily observed, and the economy is always being hit by new shocks whose effects are not immediately obvious.
7. Okun's law, which allows us to go back and forth between short-run output and the unemployment rate, says that a one percentage point decline in output below potential corresponds to a half percentage point increase in the unemployment rate.

### KEY CONCEPTS

annualized rate	Okun's law	the short run
economic shocks	the Phillips curve	short-run fluctuation
the Great Depression	recession	short-run output
long-run trend		

### REVIEW QUESTIONS

1. How do the long-run model and the short-run model fit together? What is the purpose of each model?
2. Why do we measure short-run output  $\tilde{Y}$  in percentage terms rather than in dollar terms?
3. Before the latest financial crisis and recession, when was the largest recession of the past 50 years, and what was the cumulative loss in output over the course of the slowdown?
4. What are some recent shocks that have hit the macroeconomy?
5. How can you "see" the Phillips curve operating in the graph of inflation in Figure 9.5?
6. Why is Okun's law a useful rule of thumb to keep in mind when analyzing our short-run model?

### EXERCISES

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1. Using the "Country Snapshots" data file, plot per capita GDP over time for two countries. Drawing upon Wikipedia and/or other data sources, write a paragraph for each country, discussing the general causes of the major fluctuations in per

capita GDP. What shocks appear to be most important in explaining fluctuations in economic activity for the countries you chose? Be sure to document your sources carefully.



**2. Overstimulating the economy:** Suppose the economy today is producing output at its potential level and the inflation rate is equal to its long-run level, with  $\bar{\pi} = 2\%$ . What happens if policymakers try to stimulate the economy to keep output above potential by 3% every year? How does your answer depend on the slope of the Phillips curve?

**3. The slope of the Phillips curve:** Draw a graph with a steep Phillips curve and a graph with a gently sloped Phillips curve.

- (a) Explain how the two economies respond differently to a boom and to a slump.
- (b) What are some factors that might influence the slope of the Phillips curve?
- (c) Do you think the slope of the Phillips curve has changed over time in the U.S. economy? Consider the United States in the 1970s versus today.

**4. An oil shock:** Consider an economy that begins with output at its potential level and a relatively high inflation rate of 6%, reflecting some recent oil price shocks. As the head of the Federal Reserve, your job is to pick a sequence of short-run output levels that will get the rate of inflation back down to 3% no later than 3 years from now. Your expert staff offers you the following menu of policy choices:

Option	-Short-run output-			-Inflation-		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
1	-6%	0	0	3%	3%	3%
2	-4%	-2%	0	4%	3%	3%
3	-2%	-2%	-2%	5%	4%	3%

- (a) According to these numbers, what is the slope of the Phillips curve?
- (b) If you as a policymaker cared primarily about output and not much about the inflation rate, which option would you recommend? Why?
- (c) If you cared primarily about inflation and not much about output, which option would you recommend? Why?
- (d) Explain the general trade-off that policymakers are faced with according to the Phillips curve.

**5. A productivity boom:** Suppose the economy exhibits a large, unexpected increase in productivity growth that lasts for a decade. Policymakers are (quite reasonably) slow to learn what has happened to potential output and incorrectly interpret the increase in output as a boom that leads actual output to exceed potential. Suppose they adjust macroeconomic policy so that the *mismeasured* level of short-run output is zero.

- (a) What happens to the true amount of short-run output  $\tilde{Y}$ ?
- (b) What happens to inflation over time?

(c) This problem outlines a concern economists have had in recent years after the large increase in productivity growth that started around 1995. Now consider the opposite problem: suppose productivity growth declines for a decade. What would be predicted to happen? Has this ever happened to the U.S. economy?

6. **Measuring  $\bar{Y}_t$  and  $\check{Y}_t$ :** A real-world problem faced by policymakers, forecasters, and businesses every day is how to judge the state of the economy. Consider the table below, showing hypothetical measures of real GDP in the coming years, starting at a level of \$18.0 trillion in 2018.

Year	Actual output $Y_t$	Potential output $\bar{Y}_t$	$Y_t - \bar{Y}_t$	Short-run output $\check{Y}_t$	Growth rate of actual output % $\Delta Y$
2018	18.00				
2019	18.60				
2020	19.00				
2021	18.90				
2022	19.00				
2023	20.00				
2024	20.90				

Now fill in the remaining columns of the table by answering the following questions.

- What is potential output in 2018? You could call this a trick question, since there's no way for you to know the answer! In a way, that's the main point: fundamentally, we have to take some other measurements and make some assumptions. Suppose your research assistant tells you that in 2018, business surveys, unemployment reports, and recent years' experience suggest that the economy is operating at potential output. So go ahead and write 18.0 for potential in this year.
- Assume potential output grows at a constant annual rate of 2.5%, and complete the remainder of the table.
- Comment on the state of the economy in each year. When does the economy enter a recession? When does the recession end?
- How is your answer in part (c) related to the growth rate of actual output in the last column of the table?

7. **Okun's law:** Suppose the economy has a natural rate of unemployment of 6%.

- Suppose short-run output over the next 4 years is +1%, 0%, -1%, and -2%. According to Okun's law, what unemployment rates would we expect to see in this economy?
- Consider another economy in which the unemployment rate over the next 3 years is 6%, 7%, and then 4%. According to Okun's law, what are the levels of short-run output  $\check{Y}$  in this economy?

**WORKED EXERCISE**

2. **Overstimulating the economy:** Figure 9.9 shows the Phillips curve in this case. Since output exceeds potential, inflation is increasing according to the Phillips curve:  $\Delta\pi > 0$ .

Suppose the slope of the Phillips curve is 1. In this case, the inflation rate rises by 3 percentage points each year. For example, if it starts at 2%, then it's 5% in year 1, 8% in year 2, and 11% in year 3. The cost of maintaining output above potential is that the inflation rate keeps increasing.

If the slope is even higher, then the rate of increase is also higher—inflation rises faster when the Phillips curve is more steeply sloped.

