ADDITIONAL CASE STUDY

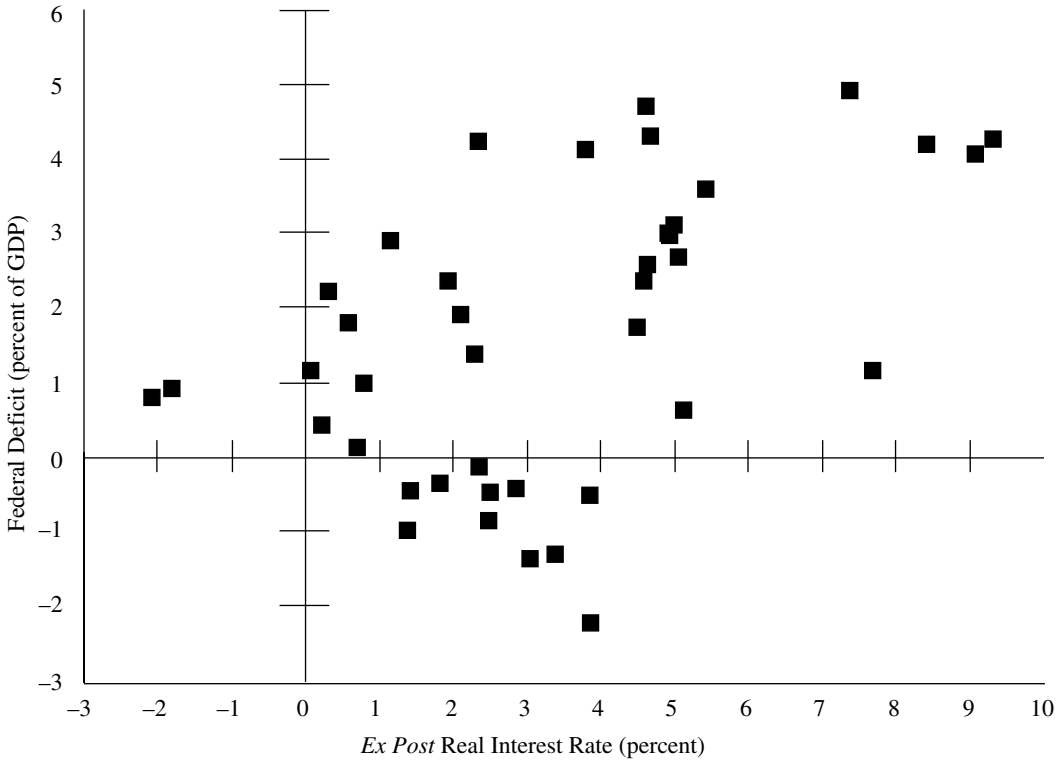
11-1 Do High Deficits Cause High Interest Rates?

The *IS–LM* model of Chapter 11 predicts that expansionary fiscal policy (that is, increases in government spending or decreases in taxes, both of which imply increases in the deficit) leads to high interest rates. Increases in the deficit increase the demand for goods and services and thus shift the *IS* curve to the right. The associated increase in income increases the demand for money, and so interest rates must rise to keep the money market in equilibrium. In the long run, the effect is even stronger: increases in the price level cause the *LM* curve to shift back to the left, resulting in still higher interest rates. This result can equivalently be seen in the classical model of Chapter 3; that model shows how increases in the deficit decrease national saving and so increase interest rates.

Increases in interest rates in turn imply reduced investment—crowding out—in both the short run and the long run. Economists worry, therefore, that high deficits imply low levels of investment, leading ultimately to a lower capital stock and so lower living standards. It is, therefore, important to see if this prediction that high deficits lead to high interest rates is supported by the data.[1]

Like many empirical questions in economics, this one is difficult to answer unequivocally. Figure 1 shows a scatterplot of the real government deficit and the *ex post* real interest rate between 1960 and 2000. While there is some evidence of a positive association, it is not strong.

Figure 1 The Federal Deficit and Real Interest Rates, 1960–2000



Note: Real interest rate is the 10-year constant maturity yield on Treasury bonds minus the percent change in the GDP price index over the subsequent year. Federal deficit is expressed as a percent of GDP.
Source of Figures 1–4: U.S. Department of Commerce, Bureau of Economic Analysis, Federal Reserve Board, and U.S. Department of Labor, Bureau of Labor Statistics.

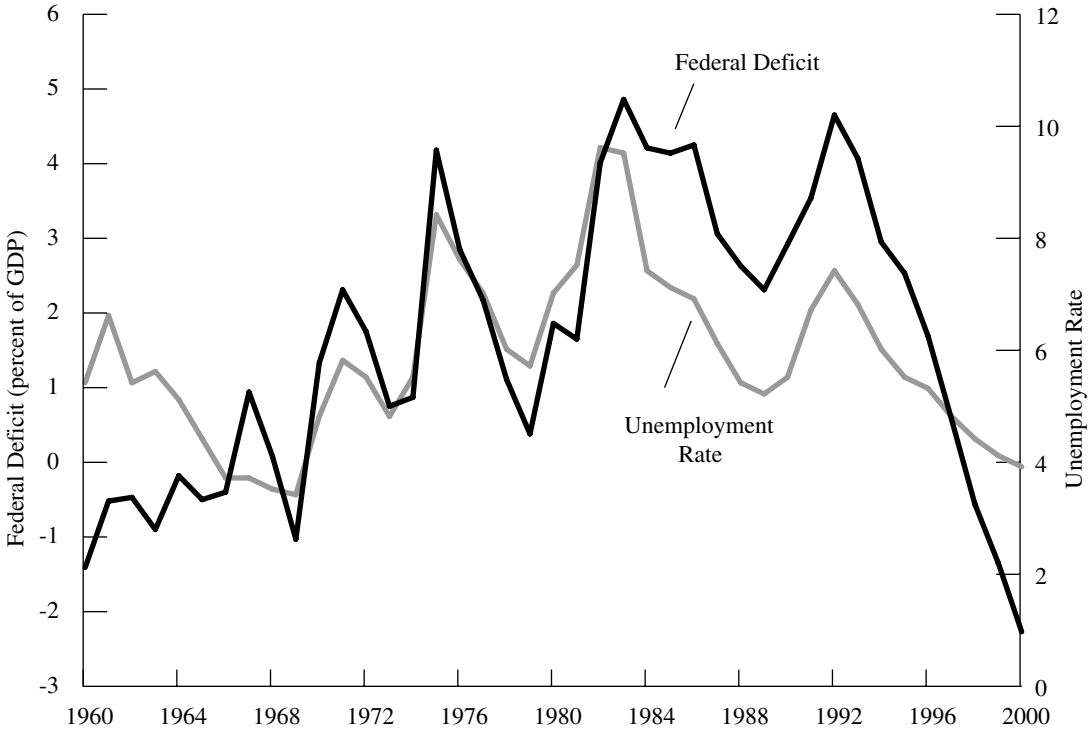
[1]Some economists think that deficits are less harmful because changes in private saving may offset changes in public saving. This idea, known as *Ricardian equivalence*, is discussed in Chapter 15 of the textbook.

To see why the data might be unclear on whether or not high deficits cause high interest rates, consider what happens if there is some shock to the *IS* curve unrelated to changes in fiscal policy—for example, increased autonomous investment as a result of animal spirits. Interest rates increase and GDP increases. But the increased GDP itself has consequences. As the economy expands, people return to work and unemployment falls. Hence unemployment insurance falls. More generally, people come off welfare rolls and transfers such as Medicaid and others fall. Further, increased GDP means that the government takes in more in tax revenues. The presence of these *automatic stabilizers* results in a decrease in the deficit. (Automatic stabilizers are discussed in more detail in Chapter 14 of the textbook.) In the data, we would observe interest rates rising and the deficit falling, although there was no direct causal link between the two. Figure 2 illustrates this relationship between the unemployment rate and the federal deficit.

Exactly the opposite would occur given an *LM* shock (the result, for example, of a change in money demand or money supply). If the *LM* curve shifts out, we observe interest rates falling and the deficit falling, but again with no causal link. The data are thus likely to be substantially contaminated by these sorts of effects, since shocks other than changes in the deficit are likely to swamp the effects of exogenous changes in the deficit. Overall, economists have not yet managed categorically to establish either the presence or the absence of a link between deficits and interest rates.[2]

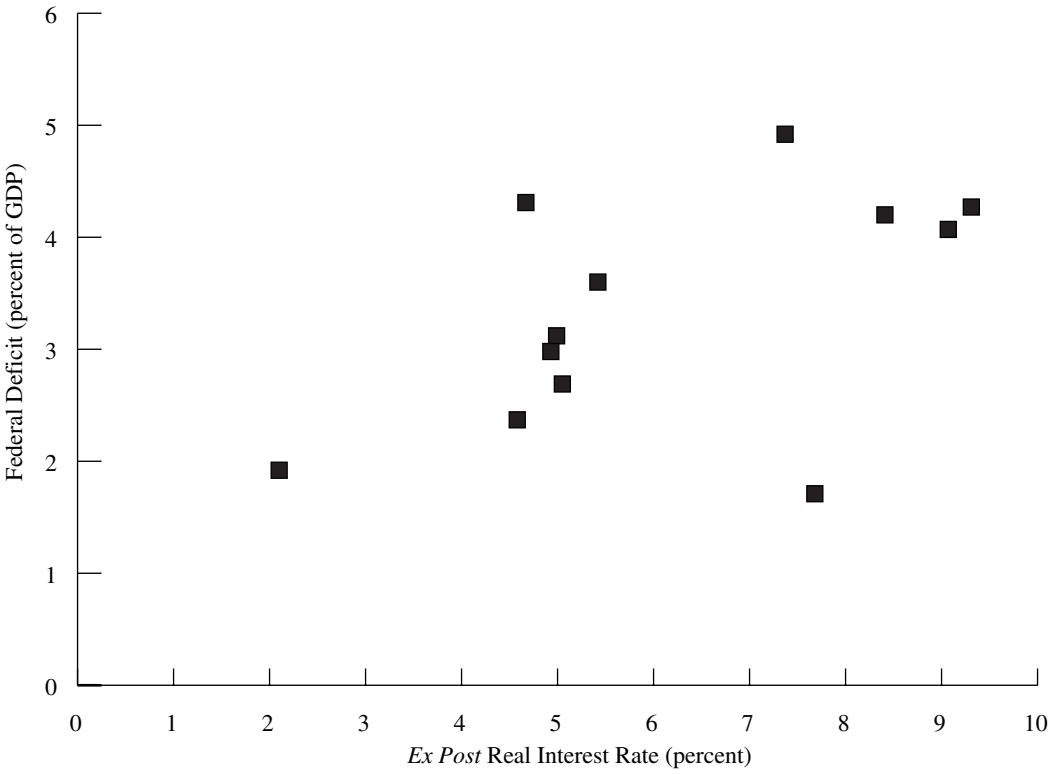
Recent experience is instructive, however. In the early 1980s, the federal government deficit rose rapidly and remained high throughout the 1980s and into the early 1990s (see Figure 2). We might be more likely to see the consequences of these changes than at other times. As Figure 3 shows, in the 1980s and early 1990s there was a positive relationship between government deficits and real interest rates. This casual evidence seems to support the idea that the deficit may have been a cause of high interest rates. In the 1990s, the

Figure 2 The Federal Deficit and the Unemployment Rate



[2]See, for example, P. Evans, "Interest Rates and Expected Future Budget Deficits in the United States," *Journal of Political Economy* 95, no. 1 (February 1987): 34–58, for evidence that there is no relationship; and P. Miller and W. Robards, "How Little We Know About Deficit Policy Effects," *Federal Reserve Bank of Minneapolis Quarterly Review* (Winter 1992) for an assessment of the evidence.

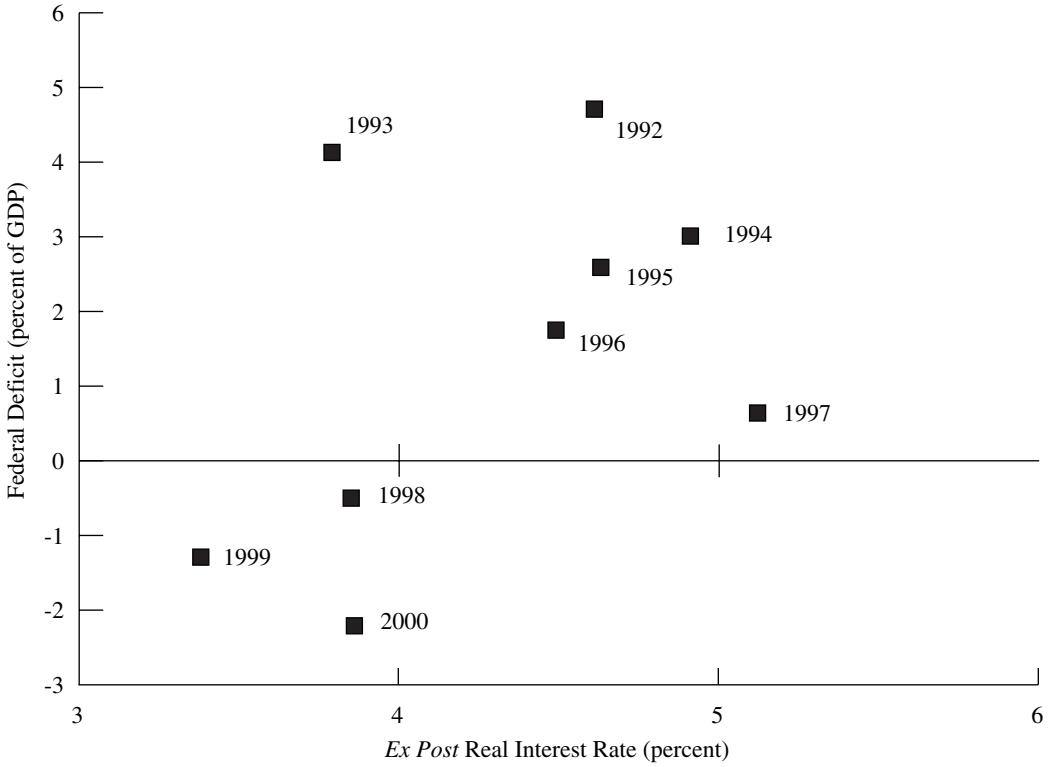
Figure 3 The Federal Deficit and Real Interest Rates, 1980–1991



deficit declined and the budget moved into surplus in 1998–2000 (see Figure 2). As shown in Figure 4, as the deficit fell, real interest rates did not exhibit a clear-cut response.

Although interest rates rose at first as the deficit declined, they fell sharply during the last three years of the decade. Thus, disentangling the effect of deficits on real interest rates remains a difficult task.

Figure 4 The Federal Deficit and Real Interest Rates, 1992–2000



CASE STUDY EXTENSION p. 309

11-2 The Fair Model

The textbook discusses the DRI model of the economy. The macroeconomist Ray Fair is author of another large-scale macroeconometric model.[1] The basic structure of Fair's model resembles an *IS–LM* model with careful attention paid to microfoundations. But whereas a simple *IS–LM* model is based on three behavioral equations (consumption, investment, and money demand functions) and two equilibrium conditions (goods market and money market), Fair's basic model of the U.S. economy has 30 behavioral equations and about 100 identities (equilibrium conditions and definitional relationships).

Fair's model is more complicated partly because he considers more disaggregated data (and so has three different consumption functions, for example), partly because he considers labor-market variables and asset-market variables that are not included in a simple *IS–LM* model, and partly because he considers price adjustment.

Models such as Fair's were initially developed in the 1950s, and at one time the refinement of these models was a major focus of empirical work in macroeconomics. In the 1970s, however, many macroeconomists became dissatisfied with these models and focused their attention on smaller and simpler economic models. In large part, this change in emphasis is attributable to upheavals in macroeconomic theory in the 1970s, in particular to the development of theories of *rational expectations* and the *Lucas critique*.[2]

Models with rational expectations suppose that people form expectations in ways that are consistent with the model. Large-scale macroeconometric models generally make the simpler assumption that people have adaptive expectations and so base their guesses about the future on events in the recent past. A rational-expectations model is not, in principle, incompatible with large models of the economy but is computationally very difficult, even with powerful computers.[3] The Lucas critique is a more fundamental criticism. Lucas pointed out that these models might not be good for evaluating different economic policies because agents will change their behavior in response to changed policies. Thus, according to Lucas, it does not make sense to suppose that a behavioral equation estimated under one set of policies will be unchanged when policies are changed.

Fair, not surprisingly, is a strong advocate of the usefulness of large-scale models of the economy, arguing that "a few equations are not sufficient to approximate well the structure of the economy."[4] And, while recognizing the Lucas critique, Fair argues that large models should be judged by results: "If the Lucas point is a serious quantitative problem for the model, this should be revealed in poor performances."[5]

---

[1] See R. C. Fair, *Specification, Estimation, and Analysis of Macroeconometric Models* (Cambridge, Mass.: Harvard University Press, 1984). See also, http://fairmodel.econ.yale.edu, where several versions of the Fair Model are available for online use.

[2] See Chapters 13 and 14 of the textbook.

[3] Ray Fair has pioneered some of the work on this topic; it is discussed in Fair, "*Specification, Estimation, and Analysis of Macroeconometric Models*."

[4] Ibid., 1.

[5] Ibid., chap. 12.

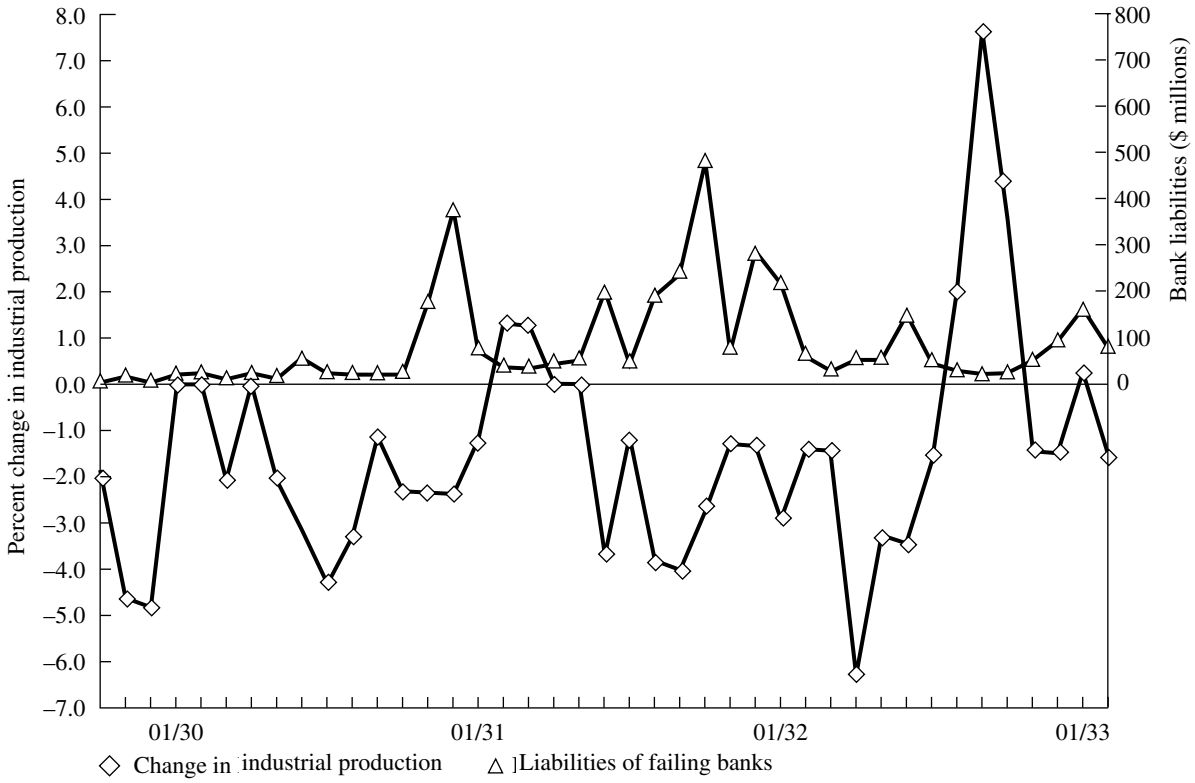
ADDITIONAL CASE STUDY

11-3 Credit Rationing and the Great Depression

The economist Ben Bernanke has made a strong case that failures in credit markets were an important aspect of the Great Depression.[1] As noted in Chapter 11 of the textbook, this is an element of the *spending hypothesis*. Bernanke first documents the connection between the decline in output in the Depression and the elements of financial crisis. Figure 1 shows the change in industrial production and the liabilities of failing banks in the early 1930s. The steep declines in industrial production at the end of 1930 and the latter part of 1931, in particular, coincide with periods of high bank failures.

Figure 1

Industrial Production and Bank Failures



Source: Based on data from B. Bernanke, "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review* 73 (June 1983): 262.

Roughly speaking, the link between financial panics and economic activity, as set out by Bernanke, is as follows. First, he argues that bank failures raised the cost of credit intermediation and led to a contraction of bank credit. Part of the reason for this was that increasing default rates made banks less willing to extend loans. *Credit rationing* occurred, whereby banks extended loans to very safe borrowers only; those who could have borrowed in more normal times were unable to obtain loans. (Banks did not respond to the higher risk of default by raising interest rates, since this might simply have the effect of making default more likely.) The second part of Bernanke's argument is straightforward. Decreased availability of credit reduced borrowing by consumers and firms and led to a reduction in aggregate demand.

[1] B. Bernanke, "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review* 73 (June 1983): 257–76.

ADDITIONAL CASE STUDY

11-4 More on Japan and the Liquidity Trap

After growing spectacularly over most of the post-World War II era, Japan's economy came to a near standstill during the 1990s. As the stagnation continued through the end of the decade, some observers argued that Japan had fallen into a *liquidity trap*—a situation where nominal interest rates are close to zero, so monetary policy is ineffective in lowering them further. But, as the textbook discusses on pages 301–303, a monetary expansion that resulted in price inflation would push real interest rates below zero and could stimulate spending.

The following article from the *Journal of Commerce* discusses Japan's predicament and proposes that the Bank of Japan aim to raise the rate of price inflation.

Time for Japan to Inflate

Over the past few weeks, Japan's central bank has moved to ease monetary policy by lowering overnight bank-lending rates to zero. This shift by the Bank of Japan is a welcome sign that, at long last, both fiscal and monetary policy levers in the Asian nation are set on expansion. With a serious bank-restructuring plan now in place and significant fiscal stimulus in the pipeline, a monetary expansion is the third leg of a balanced approach for returning Japan to economic health. But the Bank of Japan must be prepared to stay the course and loosen policy further in coming months.

The shift toward easier monetary policy has contributed to a recent drop in long-term interest rates, which had risen late last year in anticipation of increased government borrowing to finance huge fiscal stimulus and bank restructuring programs. Rising rates had threatened to curtail an already restrained level of spending on investment and consumer goods—spending that needs boosting if Japan is to emerge from its decade of stagnation.

This turnaround in long-term rates alone, however, will not prove sufficient to spur spending. Rates are already quite low and have been for some time: The recent peak for the 10-year government bond rate was just below 2.5% and this rate has not exceeded 3% since mid-1996. And with domestic prices continuing to fall, inflation-adjusted interest rates remain above nominal rates, acting as a drag on private-sector spending. The Bank of Japan should halt this deflationary spiral by loosening monetary policy enough to induce price inflation and thereby push real interest rates below zero.

Japan has witnessed a period of sustained deflation not seen among major industrial countries since the 1930s. Domestic prices have declined by more than 10% since 1991, and the pace has recently accelerated: The latest data from the Bank of Japan shows domestic wholesale prices fell nearly 2.5% during the past year. The Japanese stock market remains far below its value of a decade ago and real estate prices continue to sag. Although low prices raise purchasing power and might be expected to spur spending, anticipation of even lower prices in the future has caused consumers and businesses to postpone spending. And deflation in asset prices has led to deteriorating balance sheets among banks and businesses, restraining lending and investments.

With a package of fiscal stimulus and bank restructuring in place, monetary policymakers in Japan may be tempted to wait before easing further, arguing that effects from these other policies should be allowed to run their course before committing to additional monetary stimulus. But the time to expand upon the recent shift toward looser policy is now for several reasons.

First, the yen has strengthened considerably against the dollar and the euro since last summer, providing a cushion for the inevitable weakening of the currency as monetary policy is loosened. The yen is now roughly 20% above its dollar value of last August. This cushion helps limit import-price inflation since a decline now in the yen merely offsets its earlier rise.

Second, the gain in the yen since last summer also provides important breathing room for China to hold off devaluing the renimbi. China would be far more likely to devalue its currency to regain competitiveness against Japanese exporters if the yen had remained at its August low and additional decline was now expected.

Third, the burgeoning U.S. trade deficit and recent dumping disputes over steel and other products are likely to gain increased attention during next year's presidential election, making a weakening yen easier for the Clinton administration to accept this year than in the politically charged atmosphere of next year.

Finally, the Japanese government has announced plans to issue 31 trillion yen in new bonds during the fiscal year starting April 1, which is certain to put upward pressure on interest rates in order to attract buyers for these bonds.

By printing money to purchase government bonds, the Bank of Japan could support this influx of new government debt and help ensure that the boost to

demand from spending programs financed by the debt is not offset by higher interest rates. Although Japanese law prevents the bank from directly purchasing debt issued by the government, open-market operations in which the bank purchases bonds in the secondary market would accomplish the same purpose.

By choosing to further ease monetary policy, the Bank of Japan will be taking advantage of an economic and political environment that provides a prime opportunity for Japan to finally emerge from its "lost decade." As Europe lurches toward recession and emerging economies continue to bear the fallout of financial market turmoil, restoring Japan as an engine of world growth is crucial. The Bank of Japan has taken important first steps to achieve this. Now it must follow through and complete the job of returning Japan to economic health.

Source: Robert G. Murphy, "Time for Japan to Inflate," *The Journal of Commerce,* March 16, 1999.

11-5 Proportional Income Taxes and the *IS* Curve

The textbook makes the simplifying assumption that the level of (net) tax revenue, T, is independent of the level of GDP. In reality, we expect that T is likely to increase as Y increases. There are two reasons for this. First, *income taxes* are important in the United States. Income taxes imply that the government collects more tax revenue when income is higher. Second, transfer payments go down as income increases—when the economy is booming, more people are employed, so unemployment insurance and other welfare payments fall. These are examples of *automatic stabilizers*, which are discussed further in Chapter 14 of the textbook.[1] Here we show how such features affect the algebra of the *IS* curve.

We assume that tax revenues are proportional to income. (This is still a simplification, because the income tax code actually implies that marginal tax rates increase with income. State income taxes, however, sometimes take this form.) If the tax rate is equal to t, then we have

$$T = tY.$$

The remainder of our analysis is as before:

$$C = a + b(Y - T)$$
$$I = c - dr.$$

Substituting into the goods-market equilibrium condition ($Y = C + I + G$), we get

$$\begin{aligned} Y &= a + b(Y - T) + c - dr + G \\ &= a + b(Y - tY) + c - dr + G \\ &= a + b(1 - t)Y + c - dr + G \\ \Rightarrow \quad Y(1 - b(1 - t)) &= (a + c + G) - dr \\ \Rightarrow \quad Y &= \left(\frac{1}{1 - b(1 - t)}\right)((a + c + G) - dr). \end{aligned}$$

Our earlier equation for the *IS* curve was

$$Y = \left(\frac{1}{1 - b}\right)((a + c + G - bT) - dr).$$

Comparing the two, we see that the new *IS* curve no longer contains a bT term. This is because the level of tax revenue, T, is no longer an exogenous variable in the model. More important, we see that the multiplier term, which was previously $1/(1 - b)$, is now $1/(1 - b(1 - t))$. Proportional income taxes reduce the value of the multiplier. This can be understood in terms of the circular flow of income. Suppose, as considered in the text, government purchases are increased. This increases GDP and so increases income. But now some of that extra income disappears in the form of taxes, so the increase in *disposable income* is less. As a result, consumption increases less than was the case with lump-sum taxes.

A smaller multiplier means that fiscal policy has less of an effect upon the economy, but also means that the economy is more stable in the face of shocks. The assumption of proportional income taxes means that the *IS* curve is steeper: a given change in the interest rate requires a smaller change in GDP to maintain goods-market equilibrium. Shifts in the *LM* curve thus lead to smaller output changes. Proportional income taxes also mean that a given spending change results in a smaller *shift* in the *IS* curve and, thus, a smaller change in output.

[1] See also the discussion of the Great Depression in Chapter 11 of the textbook and Supplement 11-1,"Do High Deficits Cause High Interest Rates?"

LECTURE SUPPLEMENT

11-6 Additional Readings

The Spring 1993 edition of the *Journal of Economic Perspectives* contains a symposium on the Great Depression, with articles by Christina Romer, Robert Margo, Charles Calomaris, and Peter Temin. Economists have, of course, written a great deal on the Depression; a good place to start is Peter Temin's book, *Lessons From the Great Depression* (Cambridge, Mass.: MIT Press, 1989).

For some interpretations of the most recent recession, see G. Perry and C. Schultze, "Was This Recession Different? Are They All Different?" *Brookings Papers on Economic Activity* 1 (1993): 145–211, and also the session on "What Caused the Last Recession" in the *American Economics Association Papers and Proceedings* (May 1993), which contains short papers by Olivier Blanchard, Robert Hall, and Gary Hansen and Edward Prescott.